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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/676,284	02/25/2025	12236728	044228.111208	7645

30734 7590 02/05/2025

BakerHostetler
Washington Square, Suite 1100
1050 Connecticut Ave. N.W.
Washington, DC 20036-5304

ISSUE NOTIFICATION

The projected patent number and issue date are specified above. The patent will issue electronically. The electronically issued patent is the official patent grant pursuant to 35 U.S.C. § 153. The patent may be accessed on or after the issue date through Patent Center at https://patentcenter.uspto.gov/. The patent will be available in both the public and the private sides of Patent Center. Further assistance in electronically accessing the patent, or about Patent Center, is available by calling the Patent Electronic Business Center at 1-888-217-9197.

The USPTO is implementing electronic patent issuance with a transition period, during which period the USPTO will mail a ceremonial paper copy of the electronic patent grant to the correspondence address of record. Additional copies of the patent (i.e., certified and presentation copies) may be ordered for a fee from the USPTO's Certified Copy Center at https://certifiedcopycenter.uspto.gov/index.html. The Certified Copy Center may be reached at (800)972-6382.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Center (https://patentcenter.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

INVENTOR(s) (Please see PATENT CENTER site https://patentcenter.uspto.gov for additional inventors):

Andrew William Wright, Virginia Water, UNITED KINGDOM;

APPLICANT(s) (Please see PATENT CENTER site https://patentcenter.uspto.gov for additional applicants):

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/676,284	05/28/2024	Andrew William Wright	044228.111208	7645

30734 7590 01/17/2025

BakerHostetler
Washington Square, Suite 1100
1050 Connecticut Ave. N.W.
Washington, DC 20036-5304

EXAMINER	
PAIGE, TYLER D	

ART UNIT	PAPER NUMBER
3664	

NOTIFICATION DATE	DELIVERY MODE
01/17/2025	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

edervis@bakerlaw.com
eofficemonitor@bakerlaw.com
patents@bakerlaw.com

Corrected ***Notice of Allowability***	**Application No.** 18/676,284	**Applicant(s)** Wright, Andrew William	
	Examiner TYLER D PAIGE	**Art Unit** 3664	**AIA (FITF) Status** No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 01/09/2025.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☐ The allowed claim(s) is/are _____ . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☑ Other Amended claims.

/TYLER D PAIGE/
Examiner, Art Unit 3664

Response to Rule 312 Communication	Application No.	Applicant(s)	
	18/676,284	Wright, Andrew William	
	Examiner	Art Unit	AIA (FITF) Status
	TYLER D PAIGE	3664	No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

1. ☑ The amendment filed on 09 January 2025 under 37 CFR 1.312 has been considered, and has been:
   a) ☑ entered.
   b) ☐ entered as directed to matters of form not affecting the scope of the invention.
   c) ☐ disapproved because the amendment was filed after the payment of the issue fee.
      Any amendment filed after the date the issue fee is paid must be accompanied by a petition under 37 CFR 1.313(c)(1) and the required fee to withdraw the application from issue.
   d) ☐ disapproved. See explanation below.
   e) ☐ entered in part. See explanation below.
   f) ☐ not entered because the supplemental or corrected Application Data sheet (ADS)
      ☐ was not accompanied by a petition to accept an unintentionally delayed claim under 37 CFR 1.55 or 27 CFR 1.78;
      ☐ did not identify the information being changed in accordance with 37 CFR 1.76(c)(2);
      ☐ was not properly signed in accordance with 37 CFR 1.76(e) (or 37 CFR 1.33(b) for applications filed prior to September 16, 2012).

/TYLER D PAIGE/ Examiner, Art Unit 3664	

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/676,284	05/28/2024	Andrew William Wright	044228.111208	7645

30734 7590 01/14/2025

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EXAMINER	
PAIGE, TYLER D	

ART UNIT	PAPER NUMBER
3664	

NOTIFICATION DATE	DELIVERY MODE
01/14/2025	ELECTRONIC

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eofficemonitor@bakerlaw.com
patents@bakerlaw.com

Corrected ***Notice of Allowability***	**Application No.** 18/676,284	**Applicant(s)** Wright, Andrew William	
	Examiner TYLER D PAIGE	**Art Unit** 3664	**AIA (FITF) Status** No

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1. ☐ This communication is responsive to _____.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☐ The allowed claim(s) is/are _____ . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
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THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

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4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☑ Other Index of Claims, Issue Information Sheet.

/TYLER D PAIGE/
Examiner, Art Unit 3664

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/676,284	Wright, Andrew William
	Examiner	Art Unit
	TYLER D PAIGE	3664

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS										
☐ Claims renumbered in the same order as presented by applicant				☐ CPA		☐ T.D.		☐ R.1.47		
CLAIM		DATE								
Final	Original	07/26/2024	11/07/2024							
1	24	✓	=							
-	25	✓	-							
-	26	✓	-							
-	27	✓	-							
-	28	✓	-							
2	29	✓	=							
3	30	✓	=							
7	31	✓	=							
-	32	✓	-							
8	33	✓	=							
9	34	✓	=							
10	35	✓	=							
11	36	✓	=							
4	37	✓	=							
13	38	✓	=							
-	39	✓	-							
14	40	✓	=							
-	41	✓	-							
15	42	✓	=							
16	43	✓	=							
17	44	✓	=							
-	45	✓	-							
18	46	✓	=							
19	47	✓	=							
20	48	✓	=							
21	49	✓	=							
22	50	✓	=							
23	51	✓	=							
24	52	✓	=							
25	53	✓	=							
26	54		=							
27	55		=							
28	56		=							
5	57		=							
6	58		=							
12	59		=							

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/676,284	Wright, Andrew William
	Examiner	**Art Unit**
	TYLER D PAIGE	3664

CPC						
Symbol					**Type**	**Version**
G07C	/	5	/	02	F	2013-01-01
G07C	/	5	/	0858	I	2013-01-01
G07C	/	5	/	0866	I	2013-01-01
H04M	/	1	/	72406	I	2021-01-01
H04M	/	1	/	72454	I	2021-01-01
H04M	/	1	/	724098	I	2022-02-01
G07C	/	5	/	008	I	2013-01-01
G06F	/	17	/	00	I	2013-01-01
G09B	/	19	/	14	I	2013-01-01
G06Q	/	40	/	08	I	2013-01-01
H04M	/	1	/	6075	I	2013-01-01
H04M	/	1	/	6041	I	2013-01-01
G09B	/	5	/	02	I	2013-01-01
H04M	/	1	/	72412	A	2021-01-01
H04M	/	2201	/	36	A	2013-01-01
H04M	/	2250	/	12	A	2013-01-01
H04M	/	2250	/	74	A	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	28	
/TYLER D PAIGE/ Examiner, Art Unit 3664	08 January 2025	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	24	1

U.S. Patent and Trademark Office — Part of Paper No.: 20250108

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/676,284	Wright, Andrew William
	Examiner	**Art Unit**
	TYLER D PAIGE	3664

INTERNATIONAL CLASSIFICATION				
CLAIMED				
G07C	/	5	/	02
G06F	/	17	/	00
G06Q	/	40	/	08
G07C	/	5	/	00
G07C	/	5	/	08
H04M	/	1	/	60

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**
701	33.4

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 28	
/TYLER D PAIGE/ Examiner, Art Unit 3664 (Primary Examiner)	08 January 2025 (Date)	O.G. Print Claim(s) 24	O.G. Print Figure 1

U.S. Patent and Trademark Office — Part of Paper No.: 20250108

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/676,284	Wright, Andrew William
	Examiner	**Art Unit**
	TYLER D PAIGE	3664

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	24	8	33	15	42	23	51								
-	25	9	34	16	43	24	52								
-	26	10	35	17	44	25	53								
-	27	11	36	-	45	26	54								
-	28	4	37	18	46	27	55								
2	29	13	38	19	47	28	56								
3	30	-	39	20	48	5	57								
7	31	14	40	21	49	6	58								
-	32	-	41	22	50	12	59								

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 28	
/TYLER D PAIGE/ Examiner, Art Unit 3664 (Primary Examiner)	08 January 2025 (Date)	O.G. Print Claim(s) 24	O.G. Print Figure 1

U.S. Patent and Trademark Office Part of Paper No.: 20250108

UNITED STATES
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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/676,284	**01/09/2025 08:34:10 PM Z ET**	**044228.111208**

Title of Invention

Method and System for Logging Vehicle Behaviour

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7645	FILED BY	Mara Rodriguez
PATENT CENTER #	68675635	AUTHORIZED BY	Mark Krietzman
CUSTOMER #	30734	FILING DATE	05/28/2024
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Andrew William Wright

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
DA / 502036	**E202519K34475700**	**Mara Rodriguez**

PRE-AUTHORIZED ACCOUNT	PRE-AUTHORIZED CATEGORY
502036	**37 CFR 1.16 (National application filing, search, and examination fees); 37 CFR 1.17 (Patent application and reexamination processing fees); 37 CFR 1.19 (Document supply fees); 37 CFR 1.20 (Post Issuance fees); 37 CFR 1.21 (Miscellaneous fees and charges)**

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
2501	UTILITY ISSUE FEE	480.00	1	480.00
			TOTAL AMOUNT:	**$480.00**

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement

Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/676,284	**01/09/2025 10:28:01 PM Z ET**	**044228.111208**

Title of Invention

Method and System for Logging Vehicle Behaviour

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7645	FILED BY	Mara Rodriguez
PATENT CENTER #	68676284	FILING DATE	05/28/2024
CUSTOMER #	30734	FIRST NAMED INVENTOR	Andrew William Wright
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Mark Krietzman

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
044228_111208_Response_After_Allowance_2025-01-09_fnl.pdf	12	Amendment after Notice of Allowance (Rule 312)	108 KB
2025-01-09_Electronic_Payment_Receipt_044228_111208_Issue_Fee_Paid.pdf	2	Miscellaneous Incoming Letter	47 KB

Warning: The PDF file has been signed with a digital signature and the legal effect of the document will be based on the contents of the file not the digital signature.

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)

044228_111208_Response_After_Allowance_2025-01-09_fnl.pdf	0D6982E2CD5073E67EE3DC03279E26397141B827611F75D2E84986227CD880D80026FA1C9FEE105220E62C36BA6F548635F1200C5984FBC69304B80FD1BAC9DD
2025-01-09_Electronic_Payment_Receipt_044228_111208_Issue_Fee_Paid.pdf	616325CE1A3AD3C94B25FAD22A20C050648C86A0735827E2734AFEBA30A783EAEAEC0E55F93CE24BE7B497B634DC245187A4490432B9560CFB5721C9A5EB7FCD

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Andrew William Wright

Confirmation No.: 7645

Application No.: 18/676,284

Group Art Unit: 3666

Filing Date: May 28, 2024

Examiner: TYLER D PAIGE

For: Method and System for Logging Vehicle Behaviour

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

AMENDMENT AFTER ALLOWANCE UNDER 37 CFR § 1.312

Dear Commissioner:

This paper is an amendment of the above-referenced application being filed after a Notice of Allowance has been mailed, but prior to the payment of the issue fee. This amendment is being filed to correct several minor errors in the claims.

Applicant respectfully submits that these amendments present no new matter and will not require an additional search or more than a cursory review.

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1-23. (Canceled)

24. (Previously Presented) A data-logging system configured to monitor how safely a vehicle is being driven by a driver throughout a driving period and to log, during the driving period, driving information representing movement of the vehicle whilst the vehicle is being driven by the driver, the data-logging system comprising:

a remote data-logging server;

a mobile telecommunications device including a user interface, a processor, a memory, and a sensor set comprising at least an accelerometer and a positioning module; and

an application comprising computer-executable instructions downloaded onto the memory, wherein the computer-executable instructions, when executed by the processor, cause the mobile telecommunications device to:

process, using the processor, raw sensor data representing at least acceleration of the vehicle and position of the vehicle from the sensor set to generate derived driving information representing how safely the vehicle is being driven by the driver throughout the driving period, wherein the driving period is defined by a duration of a vehicle journey, and the derived driving information includes a driving score, and wherein the processing of the raw sensor data, by the processor, includes determining a driving incident occurring within the driving period by comparing the raw sensor data against at least one predetermined threshold value and detecting the driving incident when the raw sensor data exceeds the at least one predetermined threshold, the driving incident including at least one of harsh braking, harsh acceleration, harsh swerving or a vehicle accident;

generate the derived driving information without data from vehicle sensors throughout the driving period in which the mobile telecommunications device is within the vehicle and the vehicle is being driven by the driver; and

transmit at least some of the derived driving information including the driving incident to the remote data-logging server,

wherein the remote data-logging server is configured to log the at least some of the derived driving information received from the mobile telecommunications device and comprises:

a database for storing a plurality of accounts, at least one of the plurality of accounts having a unique identifier, and the database being configured to store the selection of the derived driving information transmitted from the mobile telecommunications device to the at least one account, the derived driving information being associated by the unique identifier to the vehicle and the driver; and

a communications interface configured to communicate with the mobile telecommunications device and receive therefrom:

the unique identifier for association of the mobile telecommunications device with the at least one of the plurality of accounts; and

the at least some of the derived driving information transmitted from the mobile telecommunications device to be logged to the at least one of the plurality of accounts.

25. (Canceled)

26. (Canceled)

27. (Canceled)

28. (Canceled)

29. (Previously Presented) The data-logging system of Claim 24 , wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to:

store the raw sensor data relating to the driving incident; and

transmit the stored raw sensor data to the remote data-logging server.

30. (Previously Presented) The data-logging system of Claim 29, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications

device to store the raw sensor data generated before, during, and after the driving incident that is continuously collected, associated with the driving incident.

31. (Previously Presented) The data-logging system of Claim 58, wherein the driving incident, determined by the processor, is defined by a marked variation in a change of the raw sensor data over at least a portion of the plurality of portions of time during the driving period indicative of a difference in a state of motion of the vehicle occurring over the at least a portion of the plurality of portions.

32. (Canceled)

33. (Previously Presented) The data-logging system of Claim 31, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to select, prior to transmitting the derived driving information, the raw sensor data relating to the driving incident.

34. (Previously Presented) The data-logging system of Claim 33, wherein, to select the raw sensor data relating to the driving incident, execution of the computer-executable instructions by the processor further cause the mobile telecommunications device to select the raw sensor data generated before, during, and after the driving incident.

35. (Previously Presented) The data-logging system of Claim 34, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to transmit the selected raw sensor data to the remote data-logging server.

36. (Previously Presented) The data-logging system of Claim 31, wherein the at least a portion of the plurality of portions comprises a five-minute time period.

37. (Previously Presented) The data-logging system of Claim 24, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications

device to register a start of the driving period in response to an initialization input generated automatically in response to the raw sensor data having predetermined values.

38. (Currently Amended) A data-logging system configured to monitor how safely a vehicle is being driven by a driver throughout a driving period and to log driving information representing movement of the vehicle whilst the vehicle is being driven by the driver during the driving period, the data-logging system comprising:

a remote data-logging server;

a mobile telecommunications device including a user interface, a processor, a memory, and a sensor set comprising at least an accelerometer and a positioning module; and

an application comprising computer-executable instructions downloaded onto the memory, wherein the computer-executable instructions, when executed by the processor, cause the mobile telecommunications device to:

process, using the processor, raw sensor data from the sensor set representing at least acceleration of the vehicle and position of the vehicle, to generate derived driving information representing how safely the vehicle is being driven by the driver throughout the driving period, wherein the driving period is defined by a duration of a vehicle journey comprising a plurality of portions of time, and wherein processing of the raw sensor data, by the processor, includes determining a driving incident occurring within the driving period by comparing the raw sensor data against at least one predetermined threshold value and detecting the driving incident when the raw sensor data exceeds the at least one predetermined threshold, the driving incident including at least one of harsh breaking, harsh acceleration, harsh swerving or a vehicle accident;

generate the derived driving information without data from vehicle sensors ~~during~~ throughout the driving period in which the mobile telecommunications device is within the vehicle and the vehicle is being driven by the driver; and

transmit at least some of the derived driving information including the driving incident to the remote data-logging server;

wherein the remote data-logging server is configured to log at least some of the derived driving information, including the driving incident, received from the mobile telecommunications device and comprises:

a database for storing a plurality of accounts, at least one of the plurality of accounts having a unique identifier, and the database being configured to store the selection of the derived driving information, associated by the unique identifier to the vehicle and the driver, to the at least one account; and

a communications interface configured to communicate with the mobile telecommunications device, and receive therefrom:

the unique identifier for association of the mobile telecommunications device with the at least one of the plurality of accounts; and

the derived driving information transmitted from the mobile telecommunications device to be logged to the at least one of the plurality of accounts, and

wherein the remote data-logging server is further configured to process the derived driving information logged to the at least one of the plurality of accounts to determine a risk profile for at least one of the vehicle and driver.

39. (Canceled)

40. (Previously Presented) The data-logging system of Claim 38, wherein the at least one driving incident is defined by an occurrence of the sensor data exceeding a predetermined value during the driving period.

41. (Canceled)

42. (Previously Presented) The data-logging system of Claim 40, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to:

store the raw sensor data relating to the at least one driving incident; and

transmit the stored raw sensor data to the remote data-logging server.

43. (Previously Presented) The data-logging system of Claim 42, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications

device to store the raw sensor data generated before, during, and after the at least one driving incident.

44. (Previously Presented) The data-logging system of Claim 38, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to determine the at least one driving incident as a marked variation in a change of the raw sensor data over at least a portion of the plurality of portions of time during the driving period indicative of a difference in a state of motion of the vehicle occurring over the at least a portion of the plurality of portions.

45. (Canceled)

46. (Previously Presented) The data-logging system of Claim 44, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to select, prior to transmitting the selection of the derived driving information, the raw sensor data relating to the at least one driving incident.

47. (Previously Presented) The data-logging system of Claim 46, wherein to select the raw sensor data relating to the at least one driving incident, execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to select the raw sensor data generated before, during, and after the at least one driving incident.

48. (Previously Presented) The data-logging system of Claim 47, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to transmit the selected raw sensor data to the remote data-logging server.

49. (Previously Presented) The data-logging system of Claim 38, wherein the sensor set further comprises an image sensor.

50. (Previously Presented) The data-logging system of Claim 38, wherein the driving information further comprises one or more of velocity, direction of travel, an indication of exceeding a velocity limit, or data representing jerky steering.

51. (Previously Presented) The data-logging system of Claim 38, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to register the start of the driving period in response to an initialization input generated automatically in response to the raw sensor data having predetermined values.

52. (Currently Amended) A data-logging system configured to monitor how safely a vehicle is being driven by a driver throughout a driving period and to log driving information representing movement of the vehicle whilst the vehicle is being driven by the driver during the driving period, the data-logging system comprising:

a remote data-logging server;

a mobile telecommunications device including a user interface, a processor, a memory, and a sensor set comprising at least an accelerometer and a positioning module;

an application comprising computer-executable instructions downloaded onto the memory, wherein the computer-executable instructions, when executed by the processor, cause the mobile telecommunications device to:

process, using the processor, raw sensor data from the sensor set representing at least acceleration of the vehicle and position of the vehicle, to generate derived driving information representing how safely the vehicle is being driven by the driver ~~during~~ throughout the driving period, wherein the driving period is defined by a duration of a vehicle journey comprising a plurality of portions of time, and wherein the driving information includes at least one driving incident, the at least one driving incident being determined by the processor establishing ~~by~~ an occurrence of the raw sensor data exceeding a predetermined value during the driving period, the driving incident including at least one of harsh braking, harsh acceleration, harsh swerving, or a vehicle accident;

generate the derived driving information without data from vehicle sensors ~~during~~ throughout the driving period in which the mobile telecommunications device is within the vehicle and the vehicle is being driven by the driver;

store the raw sensor data relating to the at least one driving incident; and

transmit at least some of the derived driving information, including the at least one driving incident, and the stored raw sensor data corresponding to the at least one driving incident;

wherein the remote data-logging server is configured to log the derived driving information and the raw sensor data received from the mobile telecommunications device and comprises:

a database for storing a plurality of accounts, at least one of the plurality of accounts having a unique identifier and the database being configured to store the at least some ~~selection of the~~ derived driving information associated by the unique identifier to the vehicle and the driver, and the raw sensor data, to the at least one of the plurality of accounts;

a communications interface configured to communicate with the mobile telecommunications device, and receive therefrom:

the unique identifier for association of the mobile telecommunications device with the at least one of the plurality of accounts; and

the at least some ~~selection of the~~ derived driving information and the raw sensor data to be logged to the at least one of the plurality of accounts,

wherein the remote data-logging server is further configured to process the derived driving information and the raw sensor data logged to the at least one of the plurality of accounts to determine a risk profile for at least one of the vehicle and driver.

53. (Previously Presented) A mobile telecommunications device configured to log driving information associated with how safely a vehicle is being driven, the mobile telecommunications device comprising:

a sensor set comprising at least an accelerometer and a positioning module;

a processor;

a memory; and

an application comprising computer-executable instructions downloaded onto the memory, wherein the computer-executable instructions, when executed by the processor, cause the mobile telecommunications device to:

determine, based on the raw sensor data from the sensor set, a start of a driving period at which the mobile telecommunications device is within the vehicle and the vehicle is in use, wherein the driving period is defined by a duration from a start to an end of a vehicle journey and the duration is comprised of a plurality of portions of time;

process, using the processor, the raw sensor data from the sensor set representing at least acceleration of the vehicle and position of the vehicle throughout the driving period to derive driving information associated with how safely the vehicle is driven by the driver, the driving information representing movement of the vehicle whilst the vehicle is being driven by the driver throughout the driving period, wherein the processing of the raw sensor data, by the processor, includes determining a driving incident occurring within the driving period by comparing the raw sensor data against at least one predetermined threshold value, and detecting the driving incident when the raw sensor data exceeds the at least one predetermined threshold, the driving incident including at least one of harsh braking, harsh acceleration, harsh swerving or a vehicle accident;

wherein the driving information is derived without data from vehicle sensors throughout the driving period and wherein the selection is determined by identifying a portion of the plurality of portions of time;

transmit at least some of the derived driving information including the driving incident to a remote data-logging server; and

wherein the mobile telecommunications device is controlled by a downloaded application to register the start of the driving period in response to an initialization input generated automatically in response to the sensor data having a predetermined start value.

54. (Previously Presented) The mobile telecommunications device of Claim 53, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to detect the end of the driving period in response to an ending input generated automatically in response to the raw sensor data having a predetermined end value.

55. (Previously Presented) The mobile telecommunications device of Claim 53,wherein the driving period comprises a plurality of portions of time throughout the driving period, and the

execution of the computer executable instructions by the processor further causes the processor to select a portion of time related to the driving incident from the plurality of portions of time for transmission to the remote logging server and to reduce the amount of data transmitted by transmitting raw sensor data relating to the selected portion of time to the remote data logging server.

56. (Previously Presented) The mobile telecommunications device of Claim 53, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to determine the at least one driving incident as a marked variation in a change of the raw sensor data over at least a portion of the plurality of portions of time during the driving period indicative of a difference in a state of motion of the vehicle occurring over the at least a portion of the plurality of portions.

57. (Previously Presented) The data logging system of Claim 24,wherein the remote data-logging server is further configured to process the derived driving information logged to the at least one of the plurality of accounts over a plurality of driving periods, including the driving period, to generate an aggregated driving score used to determine a risk profile for at least one of the vehicle and the driver.

58. (Previously Presented) The data logging system of Claim 24, wherein the driving period comprises a plurality of portions of time throughout the driving period, and the execution of the computer executable instructions by the processor further causes the processor to select a portion of time related to the driving incident from the plurality of portions of time for transmission to the remote logging server and to reduce the amount of data transmitted by transmitting raw sensor data relating to the selected portion of time to the remote data logging server.

59. (Currently Amended) The data logging system of Claim ~~26~~58, wherein the remote-logging server is configured to store the raw data relating to the selected portion of time related to the driving incident to the at least one account.

REMARKS

Claims 38, 52, and 59 have been amended to clarify the claimed amendment.

No new matter was added by these amendments.

CONCLUSION

Applicant respectfully submits that the present application is in condition for allowance. Reconsideration of the application and an early Notice of Allowance are respectfully requested. In the event that the Examiner cannot allow the application for any reason, the Examiner is encouraged to contact Applicant's representative (714) 966-8827.

Date: January 9, 2025

/Mark H. Krietzman/
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/676,284	**01/09/2025 08:34:10 PM Z ET**	**044228.111208**

Title of Invention

Method and System for Logging Vehicle Behaviour

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7645	FILED BY	Mara Rodriguez
PATENT CENTER #	68675635	FILING DATE	05/28/2024
CUSTOMER #	30734	FIRST NAMED INVENTOR	Andrew William Wright
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Mark Krietzman

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
Issue_Fee_Transmittal_044228_111208.pdf	1	Issue Fee Payment (PTO-85B)	258 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
Issue_Fee_Transmittal_044228_111208.pdf	5CFAAFFD79493240BEF281BC00F5014E0E1E3B5530467C9635B60C2EA6C5E8E4AD78EC8CB494FB6566BDABE56F1A018DC256EDDA9E6F5E145B9CFD0EB3D85E8A

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via the USPTO patent electronic filing system.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

38714 7598 11/14/2024

BakerHostetler
Washington Square, Suite 1100
1050 Connecticut Ave. N.W.
Washington, DC 20036-5304

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via the USPTO patent electronic filing system or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/676,284	05/28/2024	Andrew William Wright	044228.111208	7645

TITLE OF INVENTION: Method and System for Logging Vehicle Behaviour

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$480	$0.00	$0.00	$480	02/14/2025

EXAMINER	ART UNIT	CLASS SUBCLASS
PAIGE, TYLER D	3664	701-033400

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 BAKER HOSTETLER LLP
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: AUTO TELEMATICS LTD.

(B) RESIDENCE: (CITY and STATE OR COUNTRY): YORKSHIRE, UNITED KINGDOM

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required)

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

☒ Electronic Payment via the USPTO patent electronic filing system ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 50-2036

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29
NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

☐ Applicant asserting small entity status. See 37 CFR 1.27
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

☐ Applicant changing to regular undiscounted fee status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Mark H. Krietzman/ Date 01/09/2025

Typed or printed name Mark H. Krietzman Registration No. 41,128

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/676,284	**01/09/2025 08:34:10 PM Z ET**	**044228.111208**

Title of Invention

Method and System for Logging Vehicle Behaviour

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7645	FILED BY	Mara Rodriguez
PATENT CENTER #	68675635	AUTHORIZED BY	Mark Krietzman
CUSTOMER #	30734	FILING DATE	05/28/2024
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Andrew William Wright

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
DA / 502036	**E202519K34475700**	**Mara Rodriguez**

PRE-AUTHORIZED ACCOUNT	PRE-AUTHORIZED CATEGORY
502036	**37 CFR 1.16 (National application filing, search, and examination fees); 37 CFR 1.17 (Patent application and reexamination processing fees); 37 CFR 1.19 (Document supply fees); 37 CFR 1.20 (Post Issuance fees); 37 CFR 1.21 (Miscellaneous fees and charges)**

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
2501	UTILITY ISSUE FEE	480.00	1	480.00
			TOTAL AMOUNT:	**$480.00**

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement

Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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United States Patent and Trademark Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/676,284	05/28/2024	Andrew William Wright	044228.111208	7645

30734 7590 11/27/2024

BakerHostetler
Washington Square, Suite 1100
1050 Connecticut Ave. N.W.
Washington, DC 20036-5304

EXAMINER	
PAIGE, TYLER D	

ART UNIT	PAPER NUMBER
3664	

NOTIFICATION DATE	DELIVERY MODE
11/27/2024	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

edervis@bakerlaw.com
eofficemonitor@bakerlaw.com
patents@bakerlaw.com

Corrected ***Notice of Allowability***	**Application No.** 18/676,284	**Applicant(s)** Wright, Andrew William	
	Examiner TYLER D PAIGE	**Art Unit** 3664	**AIA (FITF) Status** No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☐ This communication is responsive to _____.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☐ The allowed claim(s) is/are _____ . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☑ Other Index of claims, issue classification.

/TYLER D PAIGE/
Examiner, Art Unit 3664

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/676,284	Wright, Andrew William
	Examiner	**Art Unit**
	TYLER D PAIGE	3664

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS										
☐ Claims renumbered in the same order as presented by applicant				☐ CPA		☐ T.D.		☐ R.1.47		
CLAIM		**DATE**								
Final	Original	07/26/2024	11/07/2024							
1	24	✓	=							
-	25	✓	-							
-	26	✓	-							
-	27	✓	-							
-	28	✓	-							
2	29	✓	=							
3	30	✓	=							
25	31	✓	=							
-	32	✓	-							
26	33	✓	=							
27	34	✓	=							
28	35	✓	=							
29	36	✓	=							
4	37	✓	=							
8	38	✓	=							
-	39	✓	-							
9	40	✓	=							
-	41	✓	-							
10	42	✓	=							
11	43	✓	=							
12	44	✓	=							
-	45	✓	-							
13	46	✓	=							
14	47	✓	=							
15	48	✓	=							
16	49	✓	=							
17	50	✓	=							
18	51	✓	=							
19	52	✓	=							
20	53	✓	=							
21	54		=							
22	55		=							
23	56		=							
5	57		=							
6	58		=							
7	59		=							

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/676,284	Wright, Andrew William
	Examiner	**Art Unit**
	TYLER D PAIGE	3664

CPC						
Symbol					**Type**	**Version**
G07C	/	5	/	02	F	2013-01-01
G07C	/	5	/	0858	I	2013-01-01
G07C	/	5	/	0866	I	2013-01-01
H04M	/	1	/	72406	I	2021-01-01
H04M	/	1	/	72454	I	2021-01-01
H04M	/	1	/	724098	I	2022-02-01
G07C	/	5	/	008	I	2013-01-01
G06F	/	17	/	00	I	2013-01-01
G09B	/	19	/	14	I	2013-01-01
G06Q	/	40	/	08	I	2013-01-01
H04M	/	1	/	6075	I	2013-01-01
H04M	/	1	/	6041	I	2013-01-01
G09B	/	5	/	02	I	2013-01-01
H04M	/	1	/	72412	A	2021-01-01
H04M	/	2201	/	36	A	2013-01-01
H04M	/	2250	/	12	A	2013-01-01
H04M	/	2250	/	74	A	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 29	
/TYLER D PAIGE/ Examiner, Art Unit 3664 (Primary Examiner)	22 November 2024 (Date)	O.G. Print Claim(s) 24	O.G. Print Figure 1

U.S. Patent and Trademark Office — Part of Paper No.: 20241122

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/676,284	Wright, Andrew William
	Examiner	**Art Unit**
	TYLER D PAIGE	3664

INTERNATIONAL CLASSIFICATION				
CLAIMED				
G07C	/	5	/	02
G06F	/	17	/	00
G06Q	/	40	/	08
G07C	/	5	/	00
G07C	/	5	/	08
H04M	/	1	/	60

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**
701	33.4

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 29	
/TYLER D PAIGE/ Examiner, Art Unit 3664 (Primary Examiner)	22 November 2024 (Date)	O.G. Print Claim(s) 24	O.G. Print Figure 1

U.S. Patent and Trademark Office — Part of Paper No.: 20241122

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/676,284	Wright, Andrew William
	Examiner	**Art Unit**
	TYLER D PAIGE	3664

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	24	26	33	10	42	18	51								
-	25	27	34	11	43	19	52								
-	26	28	35	12	44	20	53								
-	27	29	36	-	45	21	54								
-	28	4	37	13	46	22	55								
2	29	8	38	14	47	23	56								
3	30	-	39	15	48	5	57								
25	31	9	40	16	49	6	58								
-	32	-	41	17	50	7	59								

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 29	
/TYLER D PAIGE/ Examiner, Art Unit 3664 (Primary Examiner)	22 November 2024 (Date)	O.G. Print Claim(s) 24	O.G. Print Figure 1

U.S. Patent and Trademark Office — Part of Paper No.: 20241122

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

30734 7590 11/14/2024

BakerHostetler
Washington Square, Suite 1100
1050 Connecticut Ave. N.W.
Washington, DC 20036-5304

EXAMINER	
PAIGE, TYLER D	
ART UNIT	PAPER NUMBER
3664	

DATE MAILED: 11/14/2024

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/676,284	05/28/2024	Andrew William Wright	044228.111208	7645

TITLE OF INVENTION: Method and System for Logging Vehicle Behaviour

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$480	$0.00	$0.00	$480	02/14/2025

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via the USPTO patent electronic filing system.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

30734 7590 11/14/2024
BakerHostetler
Washington Square, Suite 1100
1050 Connecticut Ave. N.W.
Washington, DC 20036-5304

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via the USPTO patent electronic filing system or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/676,284	05/28/2024	Andrew William Wright	044228.111208	7645

TITLE OF INVENTION: Method and System for Logging Vehicle Behaviour

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$480	$0.00	$0.00	$480	02/14/2025

EXAMINER	ART UNIT	CLASS-SUBCLASS
PAIGE, TYLER D	3664	701-033400

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1_____
2_____
3_____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑Issue Fee ❑Publication Fee (if required)

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via the USPTO patent electronic filing system ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29
NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

❑ Applicant asserting small entity status. See 37 CFR 1.27
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

❑ Applicant changing to regular undiscounted fee status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/676,284	05/28/2024	Andrew William Wright	044228.111208	7645

30734 7590 11/14/2024

BakerHostetler
Washington Square, Suite 1100
1050 Connecticut Ave. N.W.
Washington, DC 20036-5304

EXAMINER	
PAIGE, TYLER D	

ART UNIT	PAPER NUMBER
3664	

DATE MAILED: 11/14/2024

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. The United States Patent and Trademark Office (USPTO) collects the information in this record under authority of 35 U.S.C. 2. The USPTO's system of records is used to manage all applicant and owner information including name, citizenship, residence, post office address, and other information with respect to inventors and their legal representatives pertaining to the applicant's/ owner's activities in connection with the invention for which a patent is sought or has been granted. The applicable Privacy Act System of Records Notice for the information collected in this form is COMMERCE/PAT-TM-7 Patent Application Files, available in the Federal Register at 78 FR 19243 (March 29, 2013).
https://www.govinfo.gov/content/pkg/FR-2013-03-29/pdf/2013-07341.pdf

Routine uses of the information in this record may include disclosure to:

1) law enforcement, in the event that the system of records indicates a violation or potential violation of law;
2) a federal, state, local, or international agency, in response to its request;
3) a contractor of the USPTO having need for the information in order to perform a contract;
4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record;
5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record;
6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations;
7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals;
8) another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c));
9) the Office of Personnel Management (OPM) for personnel research purposes; and
10) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

Notice of Allowability	**Application No.** 18/676,284	**Applicant(s)** Wright, Andrew William	
	Examiner TYLER D PAIGE	**Art Unit** 3664	**AIA (FITF) Status** No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 10/31/2024.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are See Continuation Sheet . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☑ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/TYLER D PAIGE/
Examiner, Art Unit 3664

Continuation of 3. The allowed claim(s) is/are: 24,29-31,33-38,40,42-44 and 46-59

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application is being examined under the pre-AIA first to invent provisions.

Examiner's Amendment/ Reason's for Allowance

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

2. In claim 59, line 1, after the word "claim" the number "26" is deleted and the number "24" has been added.

Allowable Subject Matter

3. Claims 24, 29 – 31, 33 – 38, 40, 42 – 44, and 46 – 59 are allowed. Claims 1 – 23, 25 – 28, 32, 39, 41, and 45 are canceled.

4. The following is an Examiner's Statement for reasons for allowance. None of the references of record either alone or in combination teaches or suggest the following limitations as claimed in claim 24, A data-logging system configured to monitor how safely a vehicle is being driven by a driver throughout a driving period and to log, during the driving period, driving information representing behavior movement of the vehicle whilst the vehicle is being driven by the driver the data-logging system comprising: a remote data-logging server; a mobile telecommunications device including a user interface, a processor, a memory, and a sensor set

comprising at least an accelerometer and a positioning module; and an application comprising computer-executable instructions downloaded onto the memory, wherein the computer-executable instructions, when executed by the processor, cause the mobile telecommunications device to: process, using the processor, raw sensor data representing at least acceleration of the vehicle and position of the vehicle from the sensor set to generate derived driving information representing how safely the vehicle is being driven by the driver throughout the driving period, wherein the driving period is defined by a duration of a vehicle journey; and wherein the derived driving information includes a driving score, and wherein the processing of the raw sensor data, by the processor, includes determining a driving incident occurring within the driving period by comparing the raw sensor data against at least one predetermined threshold value and detecting the driving incident when the raw sensor data exceeds the at least one predetermined threshold, the driving incident including at least one of harsh braking, harsh acceleration, harsh swerving or a vehicle accident:; generate the derived driving information without data from vehicle sensors throughout the driving period in which the mobile telecommunications device is within the vehicle and the vehicle is being driven by the driver; and transmit at least some of the derived driving information including the driving incident to the remote data-logging; wherein the remote data-logging server is configured to log the at least some of the derived driving information received from the mobile telecommunications device and comprises: a database for storing a plurality of accounts, at least one of the plurality of accounts having a unique identifier, and the database being configured to store the selection of the derived driving information transmitted from the mobile telecommunications device to the at least one account, the derived driving information being associated by the unique identifier to the vehicle and the driver; and a communications interface configured to communicate with the mobile telecommunications

device and receive therefrom: the unique identifier for association of the mobile telecommunications device with the at least one of the plurality of accounts; and the derived driving information being associated by the unique identifier to the vehicle and the driver; and a communications interface configured to communicate with the mobile telecommunications device and receive therefrom: the unique identifier for association of the mobile telecommunications device with the at least one of the plurality of accounts; and the selection of the at least some of the derived driving information transmitted from the mobile telecommunications device to be logged to the at least one of the plurality of accounts. This limitation, in combination with the other elements of the claim, is not shown or suggested in the prior art of record.

5. None of the references of record either alone or in combination teaches or suggest the following limitations as claimed in claim 38, A data-logging system configured to monitor how safely a vehicle is being driven by a driver throughout a driving period and to log driving information representing movement behavior of the vehicle whilst the vehicle is being driven by the driver during the driving period, the data-logging system comprising: a remote data-logging server; a mobile telecommunications device including a user interface, a processor, a memory, and a sensor set comprising at least an accelerometer and a positioning module; and an application comprising computer-executable instructions downloaded onto the memory, wherein the computer-executable instructions, when executed by the processor, cause the mobile telecommunications device to: process, using the processor, raw sensor data from the sensor set representing at least acceleration of the vehicle and position of the vehicle to generate derived driving information representing how safely the vehicle is being driven by the driver the driving period, wherein the driving period is defined by a duration of a vehicle journey comprising a

plurality of portions of time, and wherein the incident the-processing of the raw sensor data, by the processor, includes determining a driving incident occurring within the driving period by comparing the raw sensor data against at least one predetermined threshold value and detecting the driving incident when the raw sensor data exceeds the at least one predetermined threshold, the driving incident including at least one of harsh breaking, harsh acceleration, harsh swerving or a vehicle accident; generate the derived driving information without data from vehicle sensors during throughout the driving period in which the mobile telecommunications device is within the vehicle and the vehicle is being driven by the driver; and transmit at least some of the derived driving information including the driving incident to the remote data-logging; wherein the remote data-logging server is configured to log at least some of the derived driving information, including the driving incident, received from the mobile telecommunications device and comprises: a database for storing a plurality of accounts, at least one of the plurality of accounts having a unique identifier, and the database being configured to store the selection of the derived driving information, associated by the unique identifier to the vehicle and the driver, to the at least one account; and a communications interface configured to communicate with the mobile telecommunications device, and receive therefrom: the unique identifier for association of the mobile telecommunications device with the at least one of the plurality of accounts; and the derived driving information transmitted from the mobile telecommunications device to be logged to the at least one of the plurality of accounts, and wherein the remote data-logging server is further configured to process the derived driving information logged to the at least one of the plurality of accounts to determine a risk profile for at least one of the vehicle and driver. This limitation, in combination with the other elements of the claim, is not shown or suggested in the prior art of record.

6. None of the references of record either alone or in combination teaches or suggest the following limitations as claimed in claim 52, A data-logging system configured to monitor how safely a vehicle is being driven by a driver throughout a driving period and to log driving information representing behaviour movement of the vehicle whilst the vehicle is being driven by the driver during the driving period, the data-logging system comprising: a remote data-logging server; a mobile telecommunications device including a user interface, a processor, a memory, and a sensor set comprising at least an accelerometer and a positioning module; an application comprising computer-executable instructions downloaded onto the memory, wherein the computer-executable instructions, when executed by the processor, cause the mobile telecommunications device to: process, using the processor, raw sensor data from the sensor set representing at least acceleration of the vehicle and position of the vehicle, to generate derived driving information representing how safely the vehicle is being driven by the driver throughout the driving period, wherein the driving period is defined by a duration of a vehicle journey comprising a plurality of portions of time, and wherein the driving information includes at least one driving incident, the at least one driving incident being determined by the processor establishing by an occurrence of the raw sensor data exceeding a predetermined value during the driving period, the driving incident including at least one of harsh braking, harsh acceleration, harsh swerving, or a vehicle accident; generate the derived driving information without data from vehicle sensors throughout the driving period in which the mobile telecommunications device is within the vehicle and the vehicle is being driven by the driver; store the raw sensor data relating to the at least one driving incident; and transmit at least some of the derived driving information, including the at least one driving incident, and the stored raw sensor data corresponding to the at least one driving incident; wherein the remote data-logging server is configured to log the

derived driving information and the raw sensor data received from the mobile telecommunications device and comprises: a database for storing a plurality of accounts, at least one of the plurality of accounts having a unique identifier and the database being configured to store the selection of the derived driving information associated by the unique identifier to the vehicle and the driver, and the raw sensor data, to the at least one of the plurality of accounts; a communications interface configured to communicate with the mobile telecommunications device, and receive therefrom: the unique identifier for association of the mobile telecommunications device with the at least one of the plurality of accounts; and the selection of the derived driving information and the raw sensor data to be logged to the at least one of the plurality of accounts, wherein the remote data-logging server is further configured to process the derived driving information and the raw sensor data logged to the at least one of the plurality of accounts to determine a risk profile for at least one of the vehicle and driver. This limitation, in combination with the other elements of the claim, is not shown or suggested in the prior art of record.

7. None of the references of record either alone or in combination teaches or suggest the following limitations as claimed in claim 53, A mobile telecommunications device configured to log driving information associated with how safely a vehicle is being driven, the mobile telecommunications device comprising: a sensor set comprising at least an accelerometer and a positioning module; a processor; a memory; and an application comprising computer-executable instructions downloaded onto the memory, wherein the computer-executable instructions, when executed by the processor, cause the mobile telecommunications device to: determine, based on the raw sensor data from the sensor set, a start of a driving period at which the mobile telecommunications device is within the vehicle and the vehicle is in use, wherein the driving

period is defined by a duration from tke a start to an end of a vehicle journey and the duration is comprised of a plurality of portions of time; process, using the processor, the raw sensor data from the sensor set representing at least acceleration of the vehicle and position of the vehicle throughout the driving period to derive driving information associated with how safely the vehicle is by the driver, the driving information representing movement of the vehicle whilst the vehicle is being driven by the driver throughout the driving period, wherein the processing of the raw sensor data, by the processor, includes determining a driving incident occurring within the driving period by comparing the raw sensor data against at least one predetermined threshold value, and detecting the driving incident when the raw sensor data exceeds the at least one predetermined threshold, the driving incident including at least one of harsh braking, harsh acceleration, harsh swerving or a vehicle accident; wherein the driving information is derived without data from vehicle sensors throughout the driving period transmit at least of the derived driving information including the driving incident to a remote data-logging server; and wherein the mobile telecommunications device is controlled by a downloaded application to register the start of the driving period in response to an initialization input generated automatically in response to the raw sensor data having a predetermined start value . This limitation, in combination with the other elements of the claim, is not shown or suggested in the prior art of record.

8. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submission should be clearly labeled, "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TYLER D PAIGE whose telephone number is (571)270-5425. The examiner can normally be reached M-F 7:00am - 6:00pm (mst).

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Black can be reached on 571-272-6956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TYLER D PAIGE/
Primary Examiner, Art Unit 3664

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/676,284	Wright, Andrew William
	Examiner	Art Unit
	TYLER D PAIGE	3664

CPC						
Symbol					Type	Version
G07C	/	5	/	02	F	2013-01-01
G07C	/	5	/	0858	I	2013-01-01
G07C	/	5	/	0866	I	2013-01-01
H04M	/	1	/	72406	I	2021-01-01
H04M	/	1	/	72454	I	2021-01-01
H04M	/	1	/	724098	I	2022-02-01
G07C	/	5	/	008	I	2013-01-01
G06F	/	17	/	00	I	2013-01-01
G09B	/	19	/	14	I	2013-01-01
G06Q	/	40	/	08	I	2013-01-01
H04M	/	1	/	6075	I	2013-01-01
H04M	/	1	/	6041	I	2013-01-01
G09B	/	5	/	02	I	2013-01-01
H04M	/	1	/	72412	A	2021-01-01
H04M	/	2201	/	36	A	2013-01-01
H04M	/	2250	/	12	A	2013-01-01
H04M	/	2250	/	74	A	2013-01-01

CPC Combination Sets								
Symbol					Type	Set	Ranking	Version
	/		/					

Use images from artifact folder? (•) Yes ( ) No

NONE (Assistant Examiner)	(Date)	Total Claims Allowed: 29	
/TYLER D PAIGE/ Examiner, Art Unit 3664 (Primary Examiner)	07 November 2024 (Date)	O.G. Print Claim(s) 24	O.G. Print Figure 1

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/676,284	Wright, Andrew William
	Examiner	**Art Unit**
	TYLER D PAIGE	3664

INTERNATIONAL CLASSIFICATION				
CLAIMED				
G07C	/	5	/	02
G06F	/	17	/	00
G06Q	/	40	/	08
G07C	/	5	/	00
G07C	/	5	/	08
H04M	/	1	/	60

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**
701	33.4

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

Use images from artifact folder? ◉ Yes ○ No

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 29	
/TYLER D PAIGE/ Examiner, Art Unit 3664 (Primary Examiner)	07 November 2024 (Date)	O.G. Print Claim(s) 24	O.G. Print Figure 1

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/676,284	Wright, Andrew William
	Examiner	**Art Unit**
	TYLER D PAIGE	3664

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	24	21	33	10	42	18	51								
-	25	22	34	11	43	25	52								
-	26	23	35	12	44	26	53								
-	27	24	36	-	45	27	54								
-	28	4	37	13	46	28	55								
2	29	8	38	14	47	29	56								
3	30	-	39	15	48	5	57								
20	31	9	40	16	49	6	58								
-	32	-	41	17	50	7	59								

Use images from artifact folder? ◉ Yes ○ No

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 29	
/TYLER D PAIGE/ Examiner, Art Unit 3664 (Primary Examiner)	07 November 2024 (Date)	O.G. Print Claim(s) 24	O.G. Print Figure 1

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/676,284	Wright, Andrew William
	Examiner	Art Unit
	TYLER D PAIGE	3664

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	07/26/2024	11/07/2024							
1	24	✓	=							
-	25	✓	-							
-	26	✓	-							
-	27	✓	-							
-	28	✓	-							
2	29	✓	=							
3	30	✓	=							
20	31	✓	=							
-1	32	✓	-							
21	33	✓	=							
22	34	✓	=							
23	35	✓	=							
24	36	✓	=							
4	37	✓	=							
8	38	✓	=							
-	39	✓	-							
9	40	✓	=							
-	41	✓	-							
10	42	✓	=							
11	43	✓	=							
12	44	✓	=							
-	45	✓	-							
13	46	✓	=							
14	47	✓	=							
15	48	✓	=							
16	49	✓	=							
17	50	✓	=							
18	51	✓	=							
25	52	✓	=							
26	53	✓	=							
27	54		=							
28	55		=							
29	56		=							
5	57		=							
6	58		=							
7	59		=							

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/676,284	Wright, Andrew William
	Examiner	Art Unit
	TYLER D PAIGE	3664

CPC - Searched*		
Symbol	Date	Examiner

CPC Combination Sets - Searched*		
Symbol	Date	Examiner
G07C5/02 or G06F17/00 or G06Q40/08 or G07C5/008 or G07C5/0858 or G07C5/0866 or G09B5/02 or G09B19/14 or H04M1/6041 or H04M1/6075 or H04M1/72406 or H04M1/724098 or H04M1/72454 or H04M1/72412 or H04M2201/36 or H04M2250/12 or H04M2250/74	07/26/2024	tdp

US Classification - Searched*			
Class	Subclass	Date	Examiner
701	33.4	07/26/2024	tdp

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Inventor Search	07/26/2024	tdp
NPL Search	07/26/2024	tdp
PE2E Search	07/26/2024	tdp

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
701	33.4	11/07/2024	tdp

/TYLER D PAIGE/ Examiner, Art Unit 3666	

METHOD AND SYSTEM FOR LOGGING VEHICLE BEHAVIOUR

Cross-Reference to Related Applications

[0001] This application is a continuation of U.S. patent application no. 17/729,962, filed April 26, 2022, which is a continuation of U.S. patent application no. 16/665,746, filed October 28, 2019, which is a continuation of U.S. patent application no. 16/222,893 filed December 17, 2018, which is a continuation of U.S. patent application no. 15/454,944 filed March 9, 2017, which is a continuation of U.S. Patent Application no. 15/061,910 filed March 4, 2016 and now issued as U.S. 9,633,487, which is a continuation of U.S. patent application no. 13/994,455 filed July 24, 2013 and now issued as U.S. 9,311,271, which is a 371 of international patent application PCT/GB2011/052491 filed December 15, 2011, which claims foreign priority to GB patent application no. 1118777.0 filed October 31, 2011, GB patent application no. 1109759.9 filed June 10, 2011, GB patent application no. 1101259.8 filed January 25, 2011, and GB patent application no. 1021292.6 filed December 15, 2010, the contents of which are incorporated in their entirety as if fully presented herein.

Field of the invention

[0002] The present invention relates to methods and systems for logging driving information associated with vehicle behaviour. Moreover, the present invention relates to a mobile device adapted for installation to a vehicle and configured to log such driving information, for example, video footage associated with how the vehicle is driven. Such driving information may subsequently be utilised to determine the cause of an event such as an accident, to modify driver behaviour and/or to determine insurance premiums.

Background

[0003] Data logging devices are commonly installed on aircraft that log data about events associated with the behaviour of the aircraft and also the crew controlling the aircraft. Such data logging devices are commonly termed "black boxes" and are very useful for determining the cause of problems that have affected the aircraft, especially when no other record of a significant event such as a crash exists.

[0004] Similar data logging devices exist for road vehicles, and can be used to realise similar advantages. Vehicle users as well as authorities can use such devices to determine the cause of traffic accidents or other vehicle-related events, whether these stem from vehicle malfunction or driver negligence.

[0005] Some of these data logging devices can be integrated with the car data network, and so may take inputs from sensors integrated with the vehicle, such as those measuring the speed of the vehicle. However, these can be difficult and costly to install. Others having their own internal sensor set are more readily retrofitted to a vehicle. Nonetheless, such data logging devices for road vehicles are less prevalent perhaps due to their unjustifiable expense. Accordingly, the uptake of data logging devices that can be retrofitted to road vehicles, as are known in the art, has been minimal.

[0006] It is an object of the present invention to alleviate the above-mentioned problems, at least in part.

Summary of the invention

[0007] According to a first aspect of the present invention there is provided a mobile telecommunications device configured to log driving information associated with a vehicle is described. The mobile telecommunications device comprises: a sensor set comprising an image sensor and at least one of an audio sensor, an accelerometer or a positioning module, or a combination thereof; a user interface; a processor; and a memory. The mobile telecommunications device is configured to: determine, based on the inputs received by the user interface and sensor data from the device's sensor set, a start of a driving period during which the mobile device is removably affixed to the vehicle and the vehicle is in use, wherein the start of the driving period is determined without data from sensors of the vehicle; process the sensor data from the sensor set during the driving period to derive driving information associated with how the vehicle is driven; and store a selection of the driving information to the memory. The driving information comprises images captured by the image sensor and the mobile telecommunications device is controlled by a downloaded application to process the captured images to make a safety determination for the vehicle and in response to making an unsafe determination for the vehicle, to issue an alert signal.

[0008] Advantageously, the use of a mobile telecommunication device enables a data logging device to be conveniently and inexpensively retrofitted to a vehicle. Mobile telecommunication devices such as "smart-phones" are becoming increasingly widespread, and these devices tend to have the requisite sensor sets to capture data concerning vehicle behaviour. Thus, a generic mobile telecommunication device already owned by a driver of the vehicle can be loaded with the application to provide such data logging functionality that

would otherwise necessitate a dedicated black-box. Thus, the functionality of a black-box can be realised without additional expense.

[0009] Following on from this, it will be appreciated that the mobile device is ideally a portable mobile telecommunication device. Ideally, the mobile device is a hand-portable mobile device. Advantageously, the portability permits the mobile device to be conveniently fitted to and removed from the vehicle.

[0010] Furthermore, such a mobile telecommunication device presents additional advantages over known dedicated black-box systems as the data logging functionality of the mobile telecommunication device can be continually refined. This can be achieved without physically upgrading the hardware of the device, and also without significant user intervention. Specifically, the application may be arranged to determine whether a software update exists and if so, control the mobile device to download at least portions of an improved version of the application. Conveniently, downloading may be via the wireless telecommunication module. Said downloading may be automatic, or may be user-confirmed. For the avoidance of doubt, the application will typically be stored on a portion of the memory of the mobile device and executed therefrom, as is known in the art. Also, it will be appreciated that the application, or portion thereof, may be downloaded via the wireless telecommunication module and/or via an intermediary device. For example, the application may be side loaded to the mobile device from an intermediary computing device.

[0011] The application may be sourced from an application store and/or content provider. For example, the content provider may comprise the Apple® Appstore®. The content provider may comprise a cloud computing provider.

[0012] It will be appreciated that the use of such a generic mobile device in this context may be counter-intuitive to a person skilled in the art - such generic devices are not designed to withstand events such as catastrophic crashes. Furthermore, such generic devices are usually not necessarily configured to appropriately detect conditions that may need to be recorded. Such devices are usually kept in a user's pocket or bag, and so are not best placed to generate sensor data associated with the behaviour of a vehicle. However, the inventor of the present invention has realised that such a mobile device that is adapted for installation to the vehicle can overcome such drawbacks and fulfil a role similar to a black box. To this end, the mobile telecommunication device may comprise an adapter arranged to hold the device securely to the vehicle.

[0013] Advantageously, as well as protecting the device from damage, the adapter improves the suitability and reliability of the sensor data and so the driving information associated with when and/or how the vehicle is being driven. For example, if the sensor set comprises an accelerometer, the acceleration of the vehicle can be more accurately measured due to the mobile device being firmly attached to the vehicle. Similarly, if the sensor set comprises an image sensor, for example, for capturing video footage of the road ahead, better footage can be obtained as the mobile device can be held in the correct position and orientation relative to the vehicle. In particular, the mobile device may be positioned by the adapter so that its image sensor views the road ahead through a windshield of the vehicle.

[0014] As mentioned, the device is arranged to log driving information associated with the vehicle, when that vehicle is being driven. This is realised by registering the start of the driving period during which the mobile device is installed to the vehicle and the vehicle is being driven by the driver. Advantageously, this prevents driving information from being needlessly recorded. As will be appreciated the mobile device has only a finite storage capacity and so registering the start of the driving period is useful for minimising the unnecessary usage of memory. In particular, where the mobile device comprises an image sensor, and the sensor data comprises a sequence of images (e.g., a video) the storage space can be very quickly filled by the memory.

[0015] To this end, it is preferred that when the application is executed, it controls the mobile device to register the start of a driving period in response to an initialisation input. The initialisation input may comprise a user input - for example, the user manually executing the application on the mobile device. The initialisation input is also generated automatically in response to the mobile device being installed to the vehicle and/or the vehicle being driven. The initialisation input may be generated automatically in response to the sensor data having predetermined values. For example, if the sensor data reflects a detected speed above a predetermined threshold – for example, 20 kilometres per hour – then this can be used to trigger the start of the driving period. Similarly, if the sensor data reflects that the mobile device is held securely to the vehicle in a predetermined position (for example, via the adapter) this can also be used to trigger the start of the driving period. To this end, the adapter and/or the mobile device may comprise a registration module configured to register the installation of the mobile device to the vehicle and/or the adapter. The registration module may comprise a proximity sensor to detect the proximity of the mobile device to the

vehicle. The registration module may comprise a NFC (near field communication) device. The registration module may be arranged to determine a match between the location of the mobile device and the location of the vehicle. The match may be performed by receiving and comparing a first positioning input associated with the position of the vehicle and a second positioning input associated with the position of the mobile device. The registration module and/or adapter may be a smart holster.

[0016] Preferably, the executed application controls the mobile device to manage voice-calls incoming to the mobile device during a driving period. For example, said voice-call management may comprise temporarily disabling and/or diverting voice-calls incoming to the mobile device during a driving period. Advantageously, this safety feature discourages users from making or receiving phone calls whilst driving. It will be appreciated that a driver is less able to control a vehicle effectively whilst also manipulating a mobile device, and in many countries doing so is illegal. However, the provision of a 'hands-free' mode or accessory – as are well known in the art - may obviate the need for a user to manipulate the mobile device. Accordingly, the executed application may be arranged to control the mobile device to selectively disable and/or divert voice-calls incoming to the mobile device during a driving period, in dependence on the detection of a hands-free accessory or hands-free mode enabled on the mobile device.

[0017] Furthermore, the executed application may be arranged to control the mobile device to enable a hands-free mode of operation on detection of a driving period. For example, the enabled hands-free mode of operation may comprise enabling voice-activated commands. In light of this, it is preferred that the adapter is configured to hold the mobile device in a way that facilitates reception of voice commands from the user. In particular, the mobile device may be held in a position relative to the user to permit clear reception of the user's voice. Typically, this position is about the dashboard in a vehicle such as car or van. Furthermore, the adapter is configured with an opening through which an audio sensor of the mobile device is able to receive the user's voice.

[0018] Also, even though a driver's control of a vehicle may be affected by manipulating the mobile device, under certain circumstances, this may not be objectionable – for example, when the vehicle is stationary. Accordingly, the executed application may be arranged to control the mobile device to selectively disable and/or divert voice-calls

incoming to the mobile device during a driving period, in dependence on the driving information – for example, the speed and location of the vehicle.

[0019] Furthermore, it will be appreciated that the driver may not be the only user within the vehicle, and so disabling functions of the mobile device may not be appropriate under all circumstances, as a passenger of the vehicle may want to use the mobile device whilst the driver is driving. Under these circumstances, the executed application is arranged to control the mobile device to register the presence of a non-driver (for example, via image recognition, or entry of an unlock code) and unlock, or retain the original functionality of the mobile device. Furthermore, the executed application may be arranged to run in the background. Accordingly, the mobile device may be used for other purposes, such as making or receiving a telephone call.

[0020] It is advantageous to store only selected driving information for the purpose of logging how a vehicle is being driven during the driving period. Whilst it may be possible to sample and process sensor data at a relatively high rate (i.e. many times a second), continually storing driving information derived from that sensor data at such a high rate can use up a lot of storage space on the mobile device, the majority of which is likely to be redundant. Therefore, by being selective about the driving information that is stored, storage utilisation can be made more efficient.

[0021] In particular, the executed application may control the mobile device to store a summary of the driving period. The summary may comprise compressed and/or summarised driving information. For example, the sensor data can be processed at a first sampling rate and then down-sampled to a fraction of the first sampling rate for storage as driving information. Put another way, the mobile device can be controlled by the executed application to down-sample sensor data from a first sampling rate to a second sampling and store the sensor data as driving information at said second sampling rate. Advantageously, this retains a snapshot of when and/or how the vehicle is being driven, but with fewer data points, and so requiring less storage space.

[0022] Nonetheless, under certain circumstances, it is more useful to retain information at higher or the highest possible sampling rates. In particular, it is more important to have detailed information associated with the behaviour of a vehicle during a crash than when the vehicle is being driven normally.

[0023] Accordingly, the executed application may be arranged to control the mobile device to detect the occurrence of a predetermined event of significance (such as a crash) and in response store driving information associated with that event to the memory. Preferably, said driving information associated with that event comprises driving information in the lead up to and immediately following the event. In particular, detailed driving information in the lead up to, and immediately following a predetermined event of significance is preferably stored. It will be understood that the driving information associated with the detected event may be transmitted via the wireless telecommunication module in addition to, or instead of storing said data. Said transmitted driving information may be transmitted to a remote data logging system.

[0024] To this end the mobile device may comprise an event detector for detecting the occurrence of an event.

[0025] Preferably, the event detector is arranged to detect the occurrence of a predetermined event by correlating data, such as sensor data, against an event indication model. The application may comprise the event indication model.

[0026] Preferably, the event indication model comprises a set of predetermined data values corresponding to a predetermined event. Accordingly, the event detector is arranged to compare the set of predetermined data values against corresponding sensor data to determine whether the predetermined event has occurred.

[0027] For example, the event indication model may indicate that a serious crash has occurred if values returned by an accelerometer sensor exceed predetermined data values of the event indication model, thereby representing a sustained vehicle deceleration beyond a threshold level. Following on from this, it will be appreciated that detection of an event may be dependent on matching a sequence of data values that have occurred over time. Moreover, the event indication model may comprise a sequence of predetermined data values, the sequence being associated by a function of time. Thus, the event detector may be arranged to compare the sequence of predetermined data values against corresponding sensor data that have been generated over a given time period. Put another way, the event detector and event indication model are arranged to indicate the occurrence of an event in dependence on the correlation between a set of predetermined data values occurring over time. Thus, a set of values returned from sensor data over a period of time are compared against a corresponding

sequence of predetermined data values of the event indication model. Typically, this is to determine a rate of change of variables associated with a sensor set.

[0028] It will be understood that an event indication model may comprise a plurality of sets of predetermined data values, each set corresponding to different sensor data. For example, an event indication model associated with a serious accident event may contain data values corresponding to both the deceleration of the vehicle, and the orientation of the vehicle. Thus, if a vehicle is involved in a serious impact, and overturns, this is represented by the model, and so can be detected by the event detector.

[0029] Preferably, the event indication model comprises a pattern of predetermined data values. Preferably, the event detector is arranged to detect the occurrence of an event by carrying out pattern recognition by matching sensor data values to the pattern of predetermined data values of the event indication model. Preferably, there is a plurality of event indication models. Each event indication model may be associated with a separate predetermined event.

[0030] Preferably, the executed application may be arranged to control the mobile device to process sensor data from the sensor set during a plurality of driving periods to derive driving information associated with when and/or how the vehicle is driven for each of the driving periods. Preferably, sensor data processed during a first set of driving periods define a benchmark against which sensor data is compared during subsequent sets of driving periods. In particular, the executed application may be arranged to control the mobile to modify one or more event indication models in response to the benchmark. Advantageously, such a benchmark ensures that the event indication models may be tailored to the standard behaviour of a particular vehicle. As will be appreciated, different sensor types, mobile devices, mounting positions, vehicles, drivers and road conditions may generate different sets of sensor data for driving behaviour that is considered standard or safe. Accordingly, the benchmark allows the mobile device to account for variable driving conditions.

[0031] Preferably, a plurality of benchmarks may be defined. A benchmark may be defined for each driver. A benchmark may be defined for each vehicle to which the mobile device is to be installed. Ideally, a benchmark is defined for each driver-vehicle pair. To this end, the mobile device may be arranged to receive an input to specify a driver, a vehicle or a driver-vehicle pair. Advantageously, this ensures that different drivers and vehicles do not disrupt the accurate event detecting capabilities of the event detector.

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[0032] Once a predetermined event has been detected by the event detector, it is desirable to take an appropriate action in response to that detected event. Accordingly, the executed application may be arranged to control the mobile device to take at least one predetermined action in response to a detected event. The action taken may comprise transmitting driving information and/or sensor data, via the wireless telecommunication module of the mobile device, to a remote system. Advantageously, this enables a remote system to be notified of the occurrence of a particular event, and the details associated with that event. For example, the remote system may be arranged to deploy emergency services based on a transmitted notification concerning the occurrence of a crash, and also the location of the mobile device (and so the vehicle) are also included in the transmitted information. A further advantage of transmitting driving information and/or sensor data to a remote system is that such data then does not need to be stored on or processed by the mobile device. Thus, this can free the storage space on the mobile device, and also allow the processor of the mobile device to carry out other tasks.

[0033] A further advantage associated with sending driving information to a remote system is that the driving information can be assessed remotely. This assessment can be performed automatically or manually - either way it advantageously removes the processing burden from the mobile device. Alternatively, if transmission bandwidths are small, the processing can be executed automatically on the processing device. In this case, the use of virtual neural networks can be used to determine whether the driving information represents acceptable or unacceptable driving patterns.

[0034] The action taken may comprise storing data captured at a higher (or the highest possible) sampling rate than when an event is not detected. Thus, as described above, this may involve preventing the down-sampling of sensor data. Furthermore, the action taken may comprise protecting said driving information from being overwritten.

[0035] The action taken may comprise providing feedback to a user to indicate that an event has been detected. Preferably, the mobile device is configured to receive a user interaction to confirm or deny whether the detected event has actually occurred following said feedback. Advantageously, such user feedback can be used to modify event indication models thereby to refine the effectiveness of the event detector. The mobile device may comprise a speaker. Accordingly, such feedback may be provided via an audio prompt. The mobile device may comprise a display screen. Accordingly, such feedback may be provided

via a visual prompt. The feedback may comprise notifying a user that a further action has been scheduled, and will be taken within a predetermined period. For example, the feedback may indicate to a user that an event such as a serious crash has been detected, and so the next action to be taken will be to contact emergency services within 10 seconds. Preferably, the feedback includes a prompt to receive a user input. For example, the prompt may be arranged to receive a user input to cancel a subsequently scheduled action. Advantageously, this prevents actions being taken needlessly as a result of an incorrect determination of an event.

[0036] The feedback may provide reassurance and/or guidance to a user. For example, a user may be provided with an important checklist of things to do following an accident or incident. For example, the user may be guided to use a camera (image sensor) on the mobile device to take photographs of the vehicles involved in the incident, including the number plates of those vehicles. The user may be guided to use a text input device on the mobile device to note the name, address, etc of third parties involved in incident.

[0037] The action taken may comprise communicating to a remote system that an incident has been detected (e.g. via a low bandwidth data connection or via text message). If appropriate – or in response to a request from a communication to the mobile device from the remote system – the action taken may comprise transmitting all or selected portions of the driving information associated with the detected event.

[0038] Preferably, the executed application is arranged to control the mobile device to prioritise essential communications, such as calls to the emergency services.

[0039] Preferably, the memory comprises a long term memory for persistently storing driving information and/or sensor data. Preferably the memory comprises a buffer. The buffer may comprise a short term memory for transiently storing driving information and/or sensor data. Preferably, the short term memory is arranged to receive driving information and/or sensor data at a higher update rate than the long term memory. Preferably, the long term memory has a larger capacity than the short term memory.

[0040] Preferably, the executed application controls the mobile device to write driving information and/or sensor data to the short term memory at a predetermined update rate during the driving period. Ideally, the driving information and/or sensor data is written to the short term memory in a predetermined sequence, ideally a chronological sequence. Preferably, the executed application controls the mobile device to overwrite driving information and/or sensor data previously written to the short term memory. Advantageously,

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this ensures that recording of sensor data and/or driving information, especially data that is recorded at a relatively high update rate, is not prevented during the driving period due to the short term memory becoming full.

[0041] Preferably, the driving information and/or sensor data is overwritten in accordance with the predetermined sequence. Advantageously, this can ensure that the most relevant, up-to-date data is retained in the short-term memory.

[0042] Preferably, the action taken in response to a detected event comprises transferring data from the short-term memory to the long-term memory. Advantageously, this can ensure that the most recent information associated with an event is persistently stored in the long term memory, and is not overwritten.

[0043] Preferably, the sensor set comprises an accelerometer for detecting the acceleration of the mobile device. Accordingly, the corresponding sensor data may comprise acceleration data generated by the accelerometer. The accelerometer may be a single axis or dual axis accelerometer. However, it is preferable that the accelerometer is a three-axis accelerometer so that movement of the vehicle may be determined in three-dimensional space. Furthermore, as the mobile device may be mounted by a user in one of a number of different orientations relative to the vehicle, a three-axis accelerometer ensures that acceleration along the axis aligned with the general forward movement of the vehicle may be effectively detected. This is particularly important to determine an event such as heavy braking of the vehicle and/or a crash.

[0044] Preferably, the sensor set comprises an image sensor such as a camera. Accordingly, the corresponding sensor data may comprise images and/or a sequence of images generated from the image sensor. Said sequence of images may be processed and/or stored in the form of a video. Advantageously, this can improve the space utilisation of the sequence of images. Preferably, the mobile device is arranged to receive a user input to store a user-selected image or sequence of images to the memory. The image sensor data may be processed to determine safety information and feedback said safety information to the driver. For example, the mobile device may be controlled to determine the proximity of the mobile device to other vehicles. Said determination may be via comparing the apparent size of the number plate of other vehicles in an image with a known size of a standard number-plate, and from that the distance to those other vehicles. Thus, the mobile device can make a determination that another vehicle is too close, and issue a warning to the driver to slow

down to avoid a collision. Similarly, images of the road ahead may be processed to determine whether a vehicle is drifting out of lane (e.g. because the driver is falling asleep). In response to such a determination, an alert can be issued. Similarly, images of road signs may be processed to assess driver behaviour.

[0045] It will be appreciated that the mobile device may comprise a plurality of image sensors. For example, the mobile device may have a forward-facing camera and a rear-facing camera. Accordingly, it may be possible to view images of the road ahead, external to the vehicle, and also from inside the vehicle. In particular, the mobile device may be arranged to capture images or a sequence of images of the driver. Images of the driver according to the present aspect of the present invention processed to make a safety determination. For example, the images may be processed to detect whether the driver is falling asleep. In particular, a blink rate of the driver may be detected by processing the image data. Similarly, a determination may be made whether the driver has their eyes closed. In response to such a determination that a driver is falling asleep, the mobile device may be arranged to issue an alert so as to wake the driver.

[0046] Preferably, the sensor set comprises an audio sensor such as a microphone. Accordingly, the corresponding sensor data may comprise audio data.

[0047] Advantageously, an image sensor and/or an audio sensor can provide an important record of an event such as a crash.

[0048] Preferably, the sensor set comprises a positioning module arranged to determine the position of the mobile device. The positioning module may comprise a GPS module. The positioning module may be arranged to utilise the wireless telecommunication module to self-localise, for example by determining a position relative to one or more mobile telecommunication cell towers. Advantageously, the positioning module can allow the mobile device to determine its position (and so the position of the vehicle) over time. Accordingly, the positioning module can thus determine the speed of the mobile device and vehicle. Thus, the corresponding sensor data may comprise latitude, longitude, elevation, speed and other data obtainable from positioning modules such as GPS modules as is known in the art.

[0049] Preferably, the sensor set comprises an orientation sensor for determining the orientation of the mobile device. Said orientation sensor may comprise an electronic compass for determining a bearing, and so the direction in which the mobile device is facing.

Accordingly, the corresponding sensor data may comprise orientation and bearing data. Advantageously, such data can be used to augment the data of the positioning module. Furthermore, the executed application may be arranged to use the data from the orientation sensor to determine whether the mobile device has been fitted to vehicle, and whether the mobile device has been fitted in the correct orientation. Advantageously, the data from the orientation sensor may also be used to determine whether a significant event has occurred, such as the vehicle overturning.

[0050] Preferably, the sensor set comprises a user-input device arranged to receive an input from a user. The user input device may comprise at least one of buttons and a touch-sensitive display screen. Advantageously, this allows a user to input data to the mobile device.

[0051] Preferably, the mobile device comprises a timer. Preferably, the executed application is arranged to control the mobile device to record sensor data and/or driving information against time as determined by the timer. Accordingly, the timer can be used to time-synchronise sensor data and/or driving information.

[0052] Preferably, the executed application is arranged to encrypt the driving information stored on the memory. Advantageously, this reduces the possibility of said driving information being modified without authorisation. This is an important consideration when such driving data may be used as evidence, for example, when determining the cause of an accident.

[0053] Preferably, the mobile device is arranged to interface with an external device to receive external driving information from said external device. It will be appreciated that the sensor set onboard the mobile device may be supplemented by a sensor set external to the mobile device. For example, the external device may be an engine management system of the vehicle and/or the external device may be arranged to connect to the on-car data network of the vehicle. Thus, the external device may have access to information associated with the behaviour of the vehicle (for example, the speed of the vehicle, how much the brake pedal is being pressed, etc). Such driving information can be processed and/or stored by the mobile device under control of the executed application in a manner similar to driving information derived from sensor data internal to the mobile device.

[0054] Preferably, the mobile device is arranged to interface with an external device wirelessly, for example via a Bluetooth® connection. Advantageously, this removes the need

for the mobile device to be physically connected to the external device. As will be appreciated, following a driving period, a user may want to leave the vehicle and so take a personal mobile telecommunication device with them, and so a wireless interface with such an external device obviates the inconvenience of physically detaching and then subsequently re-attaching the mobile device.

[0055] Preferably, the mobile device is further controlled by the application to determine a unique identifier associated with the mobile device and retrieve from the memory and transmit via the wireless telecommunication module to a remote system said driving information paired with said unique identifier.

[0056] Advantageously, by pairing an identifier uniquely associated with the mobile device enables the remote system to unambiguously determine the source of the driving information. Accordingly, said driving information can be matched to a particular driver and/or vehicle. This is particularly useful when assessing a risk profile of said driver.

[0057] Preferably, the mobile device is controlled by the executed application to process the driving information to generate a driving score. The driving information may comprise the driving score.

[0058] Preferably, the mobile device comprises a display screen. Preferably, the display screen is touch-sensitive. Advantageously, the display screen may thereby be user-interactable. Preferably, the mobile device comprises a graphical user interface (GUI). The graphical user interface comprises user-interactable artefacts such as buttons. Preferably, the user-interactable artefacts may be displayed on the screen and receive a user input for selection or control of those artefacts. The mobile device may be controlled to selectively hide those artefacts in dependence on the state of the mobile device.

[0059] Preferably, the mobile device is controlled by the application to provide feedback about the driving information and/or values of the sensor data. Ideally, such feedback is via the display screen. For example, a detected speed may be displayed, a time elapsed may be displayed, a bearing/heading may be displayed, a detected position may be displayed and/or a detected image or sequence of images may be displayed (e.g. via a video feed).

[0060] In some embodiments there is provided a mobile telecommunications device adapted for installation to a vehicle and configured to log driving information associated with the vehicle when driven, the mobile device comprising: a sensor set comprising at least one

of an image sensor, an audio sensor, an accelerometer and a positioning module; a processor for processing sensor data from at least the sensor set to derive said driving information; a memory for storing said derived driving information; a wireless telecommunications module operable to download a controlling application; and a registration means for registering the start of a driving period during which the mobile device is installed to the vehicle and the vehicle is being driven by a driver; wherein, the processor is arranged to process sensor data from the sensor set during the driving period to derive driving information associated with when and/or how the vehicle is driven and store a selection of the driving information to the memory.

[0061] In another embodiment there is provided a mobile telecommunications device adapted for installation to a vehicle and configured to log driving information associated with the vehicle when driven, the mobile device comprising: a sensor interface arranged to receive sensor data from a sensor set; a processor for processing the sensor data to derive said driving information; a memory for storing said derived driving information; a wireless telecommunications module operable to download a controlling application; and a registration means for registering the start of a driving period during which the mobile device is installed to the vehicle and the vehicle is being driven by a driver; wherein, the processor is arranged to process sensor data from the sensor set during the driving period to derive driving information associated with when and/or how the vehicle is driven and store a selection of the driving information to the memory.

[0062] Preferably, the sensor interface is arranged to receive sensor data from a sensor set external to the mobile device. Preferably, the sensor interface is arranged to interface with an external device as described in relation to the first aspect of the present invention. Advantageously, this enables a mobile device to utilise a richer or better equipped sensor set than that local to the mobile device.

[0063] In another embodiment there is provided a mobile device adapted for installation to a vehicle and configured to log driving information associated with the vehicle when driven. Preferably, the mobile device comprises a sensor interface arranged to receive sensor data from an external sensor set. The mobile device may comprise an internal sensor set. Preferably, the mobile device comprises a processor for processing the sensor data to derive said driving information. Preferably, the mobile device comprises a memory for storing said derived driving information. Preferably, the mobile device is a mobile

telecommunication device, comprising a wireless telecommunications module. Preferably, the wireless telecommunications module is operable to download an application. Preferably, the mobile device comprises a registration means for registering the start of a driving period during which the mobile device is installed to the vehicle and the vehicle is being driven by a driver. Preferably, the processor is arranged to process sensor data from the sensor set during the driving period to derive driving information associated with when and/or how the vehicle is driven. Preferably, the mobile device is arranged to store a selection of the driving information to the memory. Preferably, the mobile device is arranged to transmit a selection of the driving information via the wireless telecommunication module. The mobile device may be arranged to transmit a selection of the driving information via the wireless telecommunication module to a remote system such as a remote data-logging system. Advantageously, transmitting (rather than storing) selected driving information prevents storage space local to the mobile device being used up.

[0064] In another embodiment there is provided a method of logging driving information associated with a vehicle when driven, the method comprising: adapting and installing a mobile device to the vehicle, the mobile device comprising a memory; registering the start of a driving period during which the mobile device is installed to the vehicle and the vehicle is being driven by a driver; processing sensor data from a sensor set during the driving period to derive driving information associated with when and/or how the vehicle is driven; and storing a selection of the driving information to the memory of the mobile device.

[0065] In another embodiment there is provided a data-logging system for logging driving information comprising: a database for storing a plurality of accounts, each account having a unique identifier and the database being arranged to store driving information associated with at least one of a vehicle and a driver; a communications interface arranged to communicate with a remote mobile device, and receive therefrom: a unique identifier for association of the mobile device with a corresponding one of the plurality of accounts; and driving information to be logged to that corresponding account.

[0066] The remote mobile device may be a mobile device in accordance with one of the first to fourth aspects of the present invention.

[0067] Preferably, the driving information comprises a driving score. Preferably, the driving information comprises sensor data captured and processed by the mobile device

during a driving period during which the mobile device is installed to a vehicle being driven by a driver.

[0068] Preferably, the system is arranged to process the driving information logged to the corresponding account to generate a driving score. The driving score may be used to determine a risk profile for at least one of the vehicle and driver.

[0069] According to a second aspect of the present invention there is provided a method of using a mobile telecommunications device to make a safety determination for a vehicle when in use, the method comprising: downloading a software program to the mobile telecommunications device, the software program in use configuring a processor of the mobile telecommunications device when the mobile telecommunications device is removably affixed to the vehicle, to: register the start of a driving period during which the mobile telecommunications device is removably affixed to the vehicle and the vehicle is being driven by a driver; the start of the driving period being determined based on the inputs received by a user interface of the mobile telecommunications device and sensor data from a sensor set of the device, the sensor set comprising a plurality of sensors selected from a group of sensors including an image sensor, and at least one of an audio sensor, an accelerometer and a positioning module, the start of the driving period also being determined without data from sensors of the vehicle; process, at the mobile telecommunications device, sensor data from the sensor set during the driving period to derive driving information associated with how the vehicle is driven; the driving information including images captured by the image sensor; and store a selection of the driving information to a memory of the mobile telecommunications device; processing the captured images to make a safety determination for the vehicle; and issuing an alert signal in response to making an unsafe determination for the vehicle from the processing step.

[0070] According to a third aspect of the present invention there is provided a non-transitory computer-readable medium having instructions comprising a software application stored thereon, wherein the instructions are configured to be executed on a processor of a mobile telecommunications device to enable the mobile telecommunications device to log driving information associated with a driver of a vehicle, the mobile telecommunications device including a display; a sensor set comprising a plurality of sensors selected from a group of sensors including an image sensor, and at least one of an audio sensor, an accelerometer and a positioning module; the processor; a user interface and a memory,

wherein the instructions, upon execution by the processor, enable the mobile telecommunications device to:register the start of a driving period during which the mobile telecommunications device is removably affixed to the vehicle and the vehicle is being driven by a driver; the start of the driving period being determined based on the inputs received by the user interface of the mobile telecommunications device and sensor data from the sensor set, the start of the driving period also being determined without data from sensors of the vehicle; process, at the mobile telecommunications device, sensor data from the sensor set during the driving period to derive driving information associated with how the vehicle is driven; the driving information including images captured by the image sensor; store a selection of the driving information to the memory of the mobile telecommunications device; process the captured images to make a safety determination for the vehicle; and issue an alert signal in response to making an unsafe determination for the vehicle from the processing step.

[0071] For brevity, it will be understood that features, functions and advantages of different aspects of the present invention may be combined or substituted where context allows. For example, features, functions or advantages of the mobile device described in relation to the first to fourth aspects of the present invention may be provided as method steps in the method of logging driving information according to the fifth aspect of the present invention.

Brief Description of the Drawings

[0072] In order that the invention may be more readily understood, reference will now be made, by way of example, to the accompanying drawings in which:

[0073] Figure 1 is a schematic illustration of a system within which the mobile device of various embodiments of the present invention may be used;

[0074] Figure 2 is an illustration of the automobile of Figure 1 configured with a mobile device in accordance various embodiments of the present invention;

[0075] Figure 3 is a schematic illustration of the functional components of the mobile device of Figure 2;

[0076] Figure 4a is a process flow chart, illustrating method steps executable by the mobile device of Figures 2 and 3;

[0077] Figure 4b is a more detailed process flow chart, providing an example of how a driving incident or event may be detected in accordance with embodiments of the present invention; and

[0078] Figures 5 to 24 illustrate a graphical user interface of the mobile device according to Figures 1 to 4b.

Detailed Description of the Embodiments

[0079] Specific embodiments are now described with reference to the appended figures.

[0080] A preferred embodiment of the present invention relates to a mobile telecommunications device for recording events associated with a vehicle, such as a car. In particular, the mobile telecommunications device is loaded with an application – a 'mobile app' – which is arranged to record and document the events surrounding an incident involving the vehicle (a 'driving incident'), such as a vehicle collision. The mobile application may be referred to as the 'Witness' application in the ensuing description.

[0081] Figure 1 illustrates a system 1 within which a vehicle, such as an automobile 3 configured with a mobile telecommunications device executing the Witness application, may communicate with one or more remotely located devices or systems. Such devices may relate to one or more servers, such as, an emergency services server 7, a content provider server 9, and a personal computer 11. Communication between the automobile 3 and the one or more remotely located devices 5, 7, 9, 11 may be effected via a shared communication network 13. The shared communication network may relate to a wide area network (WAN) such as the Internet, and may also comprise telecommunications networks. For example, the mobile telecommunications device of the present embodiments may be arranged to communicate with any one of the remotely located devices 5, 7, 9, 11 via a mobile telecommunications base station 15, which is coupled to the shared mobile telecommunications network 13.

[0082] A main purpose of the mobile telecommunications device, when arranged within a vehicle in motion, such as the illustrated automobile 3, is to monitor and process sensor data captured by the mobile device, to derive driving information associated with the moving automobile 3. As mentioned previously, this driving information is subsequently used by the mobile device to determine if a driving incident or event has occurred. The term

"driving incident" as used within the present context may relate to an event such as a collision, a near-miss, dangerous driving, erratic driving or similar. Similarly, the driving information may be used as a means for monitoring a driver's driving performance, and determining a driving characteristic, or user profile for the subject driver. In other words, the sensor data and/or the driving information may be used to determine for example, if the driver is a cautious driver, or a reckless driver. Further details of this alternative embodiment are described below.

[0083] The mobile telecommunication device's functionality is provided by the Witness application, which is installed in the device's local non-volatile storage, and which is executed by the device's native processor. The application may be downloaded to the mobile device via the shared communications network 13 and telephone base station 15, from the content provider server 9.

[0084] In use (once the application has been configured for execution on the mobile telecommunications device), when a driving incident has been detected by the mobile telecommunications device, data, comprising one or more of mobile device sensor data, derived driving information, and captured image data may be automatically forwarded to one or more of the remotely located devices 5, 7, 9, 11. For example, the mobile device may be configured such that when a driving incident is detected, such as a collision involving an automobile 3, driving information (including image data captured by the mobile device) derived from the sensor data is automatically forwarded ~~to the insurance server 5,~~ via the base station 15 and shared communications network 13.

[0085] Similarly, once a driving incident has been detected, data may also be automatically forwarded to the emergency services server 7. For example, such data may comprise the position information of the automobile 3, along with an automated S.O.S. message requesting assistance from the emergency services. Forwarded data may also comprise sensor data, and any relevant derived driving information, such as speed of impact, the g-forces the vehicle was subjected to during the collision, or any other information wherefrom the severity of the collision may be determined, and which may be used to assist the emergency services in coordinating the appropriate level of response.

[0086] Optionally, an electronic message may be sent to a personal contact preselected by the user. For example, an automated message, such as an e-mail, may be forwarded to the PC 11 of the user nominated personal contact, informing the personal

contact that the user of the vehicle 3 has been involved in a driving incident. Similarly, and due to the mobile device's telecommunications functionality, an electronic text message, such as an SMS (Short Message Service) may be forwarded to the telephone of the user selected personal contact, informing the contact of the driving incident. The mobile device may be equally be arranged to communicate with a personal contact via any known electronic messaging service and/or instant messaging service too. For example, via Apple's® iMessage, or RIM's® BlackBerry Messenger (BBM) service.

[0087] This functionality of forwarding a message to a nominated contact, may also be of particular benefit for managing large fleets of vehicles. For example, a car hire service. In this way, if any of the vehicles comprised in the fleet are involved in a driving incident, the car hire service may be automatically notified of the identity of the specific vehicle involved in the driving incident. In such embodiments, the nominated personal contact would be preselected by the vehicle fleet manager. The option of providing a second user selected personal contact is also envisaged. In this way, a message may be forwarded to both the car hire service for example, and to the driver's selected personal contact.

[0088] In preferred embodiments the mobile telecommunications device relates to a mobile telephone having native processing functionality, and preferably relates to a smartphone. Preferably, the mobile telephone comprises a camera arranged to enable image capture, and preferably arranged to enable a sequence of images to be captured taken in temporal succession. In other words, in preferred embodiments the mobile telephone comprises a camera configured to enable video footage of a sequence of events to be captured.

[0089] Alternatively, the mobile telecommunications device may relate to a PDA, a notepad such as an iPad®, or any other mobile device comprising local processing means and means for communicating with a telecommunications network.

[0090] Figure 2 provides a more detailed view of the automobile 3 of Figure 1, and illustrates a preferred arrangement of the mobile telecommunications device 17 within the automobile 3. In the illustrated embodiment, the mobile telecommunications device 17 relates to a smartphone configured with an image capture device, such as a camera. Preferably, the device 17 is arranged within the vehicle, such that the camera has a clear line of sight of the road in the principle direction of travel of the automobile 3. For example, the device 17 may be attached to the windshield 19 of the automobile 3 in an adapter 21. The

adapter 21 may comprise a flexible telescopic arm, configured with a suction cup at one end for affixing the adapter to the windshield 19, and a dock arranged at the opposite end for securely holding the telecommunications device 17 in place. The telescopic arm enables the position of the device 17 to be varied, such that a clear line of sight in the direction of travel may be obtained.

[0091] The details of the adapter 21 are irrelevant for present purposes, with the exception that it must enable a clear line of sight in the principle direction of travel of the vehicle to be obtained, and it must firmly affix the mobile to the vehicle. Affixing the mobile telecommunications device 17 to the automobile 3, ensures that the mobile device 17 is able to accurately capture the automobile's state of motion. By principle direction of travel is intended the main direction of travel of the vehicle when operated in a conventional way, indicated by the arrow A in Figure 2. In other words, the forward direction of travel. The skilled reader will appreciate that whilst most vehicles, such as an automobile, may have more than one direction of travel (e.g. travelling backwards when in reverse gear), the majority of vehicles have a primary direction of travel, which is the intended direction of travel for any transit of substantial length and/or distance. Arranging the telecommunications device 17 relative to the direction of principal travel, ensures that the camera (not shown) of the telecommunications device 17 is well placed to capture any image data which may be pertinent to a subsequently detected driving incident, such as a collision.

[0092] Figure 3 is a schematic of the modular components of the mobile telecommunications device 17 of Figure 2. Preferably the mobile telecommunications device 17 comprises: an image capture module 21, an accelerometer 23, a GPS receiver 25, an audio capture module 27, a communications module 29, a processor module 31 and a storage module 33. The image capture module 21, accelerometer 23, GPS receiver 25, and audio capture module 27 form a sensor set and are generically referred to as data capture modules in the ensuing description, and are differentiated from the communications module 29, processor module 31 and storage module 33, in that they comprise sensors for sampling physical data.

[0093] This sampled physical data, which is also referred to as sensor data, is subsequently processed by the processor module 31 and stored in the storage module 33.

[0094] The image capture module 21 may relate to any image capture device, such as an integrated camera commonly found in smartphones or similar mobile devices. As

mentioned previously, the image capture module 21 is preferably configured to capture a plurality of images taken in temporal succession, such as provided by a video camera.

[0095] The accelerometer 23 is arranged to provide information regarding the motion of the automobile 3 along all three dimensional axes. For example, the accelerometer 23 provides information regarding the pitch, yaw and roll of the automobile 3. Sensor data captured from the accelerometer 23 may be used to determine the g-forces the automobile has been subjected to. This is particularly useful in determining the severity of a collision. In general, the greater the g-forces experienced in a collision, the greater the risk of serious injury to the passengers of the vehicle. This information may assist the emergency services in forming an initial assessment of the severity of a collision. Furthermore, this type of data may also assist the emergency services and/or insurance provider to obtain a better understanding of the driving incident. For example, in the event of a collision, this data may assist the emergency services to obtain a better understanding of how the collision occurred. This information may subsequently be used for dispute resolution, and/or for determining culpability.

[0096] The GPS receiver 25 is arranged to provide location information, such as positional coordinates, and can also provide velocity information. When combined with the accelerometer sensor data, the GPS receiver data can be used to provide a very accurate model of a driving incident, such as a collision. In particular, the GPS sensor data provides velocity data, such as the velocity of impact. The velocity data enables one to determine if a vehicle was being driven at speeds greater than the legally permitted maximum speeds.

[0097] The audio capture module 27 provides means, such as a microphone, for recording audio data, which might be generated by a driving incident. This includes any sounds generated externally to the vehicle, for example the sound of an impact, or the sound of the crumple zone being crushed. Additionally, sounds generated internally to the vehicle are also recorded. Such audio data may also help to recreate a driving incident, and understanding the causes of the incident.

[0098] The communication module 29 provides the mobile telecommunications device 17 with functionality for communicating with the remotely located devices 5, 7, 9, 11 of Figure 1. The communication module 29 comprises a wireless telecommunications sub-module 31 enabling communication over a telecommunications network. An optional wi-fi communication sub-module is also envisaged. Similarly, the presence of wired

communication modules are also envisaged, such as a USB port and/or an IEEE 1394 interface (more commonly known as FireWire™) to support wired communication with a remote device, such as a personal computer or similar. Such a connection may be useful for the purposes of side-loading the application to the mobile device.

[0099] As mentioned previously, sensor data captured from any one of the aforementioned data capture modules 21, 23, 25, 27 is processed by the processor module 33, to generate driving information. By driving information is intended any data which may be derived from raw sensor data captured by any one of the aforementioned modules 21, 23, 25, 27. For example, g-force data is driving information which is derived from the sensor data sampled by the accelerometer 23. The skilled reader will be familiar with the plurality of types of driving information that may be derived from sensor data sampled by the aforementioned modules, and accordingly a complete list of the different types of driving information that may be derived from sampled sensor data is omitted for brevity.

[00100] The processor module 33 is also configured to analyse sampled sensor data and generated driving information to determine if a driving incident has occurred (described in more detail below).

[00101] Sampled sensor data is stored in storage 34, which is operatively coupled to the processor module 33, along with any generated driving information. The storage 34 is preferably configured with a FIFO (First In First Out) storage buffer 34a, and a permanent storage component 34b. In preferred embodiments, the data capture modules are configured to sample data at periodic intervals. Preferably, these intervals are sufficiently small, of the order of milliseconds, such that for practical purposes the data capture modules may be considered to sample data continuously. The sampled data, along with any derived driving information is preferably stored in the storage buffer 34a, unless a driving incident has been identified, in which case the associated sensor data and driving information is stored in the permanent storage component 34b to avoid undesirable overwriting.

[00102] In preferred embodiments, the FIFO storage buffer 34a is provided with a finite amount of storage space. Nonetheless, said storage space may be predefined by the user as will be described below. In any case, once this storage space has been exhausted, the oldest recorded data is overwritten by newly sampled data, and this cycle of overwriting older data with newly sampled data is continuously carried out during operation of the telecommunications device 17, unless a driving incident has been detected, in which case,

and as mentioned previously, all data related to the driving incident is stored in a long term protected storage 34b to safeguard it from being overwritten by newer data.

[00103] In preferred embodiments, the mobile telecommunications device 17 may be configured with a data recording strategy by the user. This might define the frequency with which sensor data is sampled. In other words, how many measurements are made per unit of time. Furthermore, the recording strategy also defines how data is recorded. In preferred embodiments, sampled sensor data is stored in data files in the buffer 34a. Each data file represents a plurality of sequentially sampled sensor data, captured over a defined period of time, which will be referred to as a 'data file period'. This is best illustrated by considering captured image data, such as video footage. A video period may be defined, which period defines the unit of physical time covered by captured video footage comprised in a single video data file – this is the data file period for image data. The video data file is subsequently stored in the buffer 34a. For example, a five minute video period setting, instructs the processor 33 to store all sequentially captured image data captured by the image capture module 21 over a period of five minutes, in a separate video data file. It is to be understood that whilst the image capture module 21 is continuously sampling image data (in other words, it is continuously capturing image data), this plurality of captured image data is grouped together for storage in video data files, each data file representing a five minute data file period.

[00104] Sampled sensor data and derived driving information is also continuously analysed by the processor module 33 for the purposes of detecting a driving incident. As soon as a driving incident is identified, the associated sensor data and derived driving information is stored in a data file in accordance with the data recording strategy. Returning to the example described in the preceding paragraph, this entails combining the video footage captured within a temporal window of five minutes leading up to the detected driving incident, in a single video file, and storing this data file in protected storage 34b. Whilst each different type of sensor data may be recorded in separate data files, in preferred embodiments all the different types of sensor data sampled by the mobile telecommunications device 17 are stored together in a single data file in accordance with the user selected data recording strategy. This means that the five minute data file referred to above, preferably also comprises GPS data, accelerometer data, and audio data sampled over the five minute time period.

[00105] Data files are stored in the buffer 34a, unless they are associated with a driving incident, in which case they are then stored in protected storage 34b, which cannot be overwritten. Once the storage space comprised in the buffer 34a has been exhausted, the oldest data file is overwritten by a newer data file.

[00106] Data compression methods may also be used in conjunction with the present invention to improve the use of storage. For example, data comprised in data files which have not been associated with a driving incident may be compressed using compression techniques, which techniques will be known to the skilled reader. Similarly, within a data file associated with a driving incident, sensor data captured at time coordinates which are distant from the determined driving incident may be compressed. In this way, the resolution of sensor data which is directly pertinent to a driving incident is maintained, whilst sensor data which may be less relevant to the driving incident is maintained at a lower resolution.

[00107] Since the sensors of the mobile telecommunications device 17 are continuously recording sensor data, even when a driving incident is detected, the device 17 may be configured to comprise sensor data and/or driving information recorded/derived shortly after the driving incident in the same data file, since this data may also be relevant for understanding a driving incident. Furthermore, this also enables the mobile telecommunications device to record multiple driving incidents. For example, a multiple collision.

[00108] The processor module 33 may be configured with encryption means, enabling stored data files to be encrypted to prevent data tampering. Envisaged encryption means may comprise both software solutions and hardware solutions. For example, the processor module may comprise a cryptoprocessor, or the processor may be configured with code to carry out a cryptographic process.

[00109] Figure 4a is a flow chart outlining the method carried out by the mobile telecommunications device 17, to determine if a driving incident has occurred, in accordance with a preferred embodiment. An application is downloaded from the content provider server 9 of Figure 1, onto the mobile telecommunications device 17, at step 36, as previously described. This may be done over a telecommunications network. The application provides the mobile telecommunications device 17 with the previously described functionality, when executed on the device. The mobile telecommunications device is configured within the

vehicle, at step 38. This may comprise affixing the mobile telecommunications device 17 to the vehicle via an adapter, as described previously.

[00110] The recording strategy is specified at step 40. As mentioned previously, this comprises setting the period of time that each recorded data file represents. Furthermore, it may also comprise defining the size of the buffer 34a and/or the number of data files that are to be stored within the buffer. Preferably, the recording strategy is specified only once, upon first use of the mobile telecommunications device 17. Where the recording strategy has already been defined, method step 40 is skipped, and the method continues with step 42.

[00111] The start of a driving period is registered, at step 42. The start of the driving period determines when the recording of sampled sensor data begins. The start of a driving period may be manually entered by the user via the application's graphical user interface (GUI). Alternatively, the start of the driving period may be automated. For example, the mobile device 17 may be configured to initiate the driving period once sensor data above a minimum threshold value is recorded, indicative of the vehicle being in motion. For example, once a velocity greater than 20 kilometres per hour is detected.

[00112] Alternatively, the start of the driving period may be initiated once the application determines that the mobile telecommunications device 17 has been affixed to the vehicle. For example, the adapter 21 may comprise a registration module (not shown) arranged to register the installation and fixation of the mobile device to the vehicle and/or adapter. The registration module may comprise an NFC device. When the mobile device is brought into close proximity with the registration module, a driving period is initiated.

[00113] Once the driving period has been initiated, sensor data is sampled and recorded in storage 34, at step 44. Additionally, the sampled sensor data is used to generate driving information by the processor module 33. The sampled sensor data and the driving information is continuously analysed by the processor module 33, at step 46.

[00114] The processor module 33 determines if a driving incident has been detected, at step 48. This is determined on the basis of the analysis carried out at step 46. If a driving incident has been detected, all the sensor data and driving information associated with the data file period, is stored in a data file in protected storage 34b, at step 50.

[00115] There are several ways in which a driving incident may be detected. Preferably, this is an automated process, wherein the processor module 33 determines a driving incident has occurred on the basis of an observed marked variation in sensor data

and/or driving information. The term 'marked variation' is to be understood to relate to a significant change in sensor data and/or driving information occurring over a very short time period. In other words, a detected impulse in recorded sensor data and/or driving information, indicative of a significant change in the state of motion of the vehicle occurring over a short time period. For example, a sudden increase in the g-forces the vehicle is subjected to, may be indicative of a collision and if observed, result in a driving incident being determined to have occurred by the processor module 33.

[00116] Predefined threshold values may also be used to automate the detection of a driving incident. For example, each data type and/or derived driving information (e.g. acceleration, velocity, g-force, pitch, roll, yaw etc.) may be associated with a threshold value. When any one of these threshold values is exceeded, the processor module 33 may be configured to determine that a driving incident has occurred. Similarly, the automated detection of a driving incident may require that a threshold condition associated with a combination of predefined threshold values, each threshold value being associated with a different data type and/or type of driving information, must be exceeded, in order for the processor module 33 to automatically determine that a driving incident has occurred. For example, in the event of a collision, it is reasonable to expect to observe a marked variation in g-force, accompanied by a marked variation in velocity. Accordingly, the threshold condition may require that in order for a collision to be automatically detected, both a marked variation in g-force and a marked variation in speed, in excess of predefined threshold values must be observed.

[00117] Similarly, the occurrence of a driving incident may also be recorded manually by the user via the application GUI. This may be beneficial for the purposes of documenting data associated with a low velocity collision - colloquially referred to as a 'fender-bender' - which may not result in any marked variations in sampled sensor data, and therefore may not be automatically detected.

[00118] Similarly, once a driving incident has been detected, an S.O.S. message may be automatically forwarded from the mobile telecommunications device 17 to the emergency services server 7, at step 54. The S.O.S. message may also comprise sensor data and derived driving information, which may assist the emergency services in coordinating their response.

[00119] As mentioned previously, the mobile telecommunications device 17 will continue to sample and record sensor data even once a driving incident has been detected, unless the mobile telecommunications device 17 detects that the driving period has terminated, at step 56. If the driving period has terminated, the present method is terminated and the device stops recording sensor data. The end of a driving period may be automatically detected by the processor module 33, if certain conditions are met. For example, if the measured velocity of the vehicle remains zero for a predetermined period of time, the processor module 33 may infer that the vehicle is stationary and no longer being driven, and accordingly ceases recording sensor data, and the method is terminated. If instead the processor determines that the driving period has not yet terminated, a new data file period is initiated, at step 58, and steps 44 through 62 are repeated.

[00120] Where a driving incident is not detected at step 48, the processor module 33 will determine if the data file period has expired, at step 60. If the data file period has expired, then the sensor data and the derived driving information generated during the data file period is combined and stored in a single data file, for storage in the buffer 34b, at step 62. The processor 3 then determines, at step 56, if the driving period has terminated. If the driving period has not terminated, a new data file period is initiated, at step 58. The mobile telecommunications device 17 continues to sample sensor data, to derive driving information, and steps 44 through 62 are repeated, until the driving period is determined to have terminated.

[00121] Figure 4b provides more detail regarding how a driving incident may be automatically detected (i.e. steps 46 and 48 of Figure 4a) in a preferred embodiment, where the mobile telecommunications device 17 is configured to sample audio data, accelerometer data, and GPS data only. Each one of these types of data is analysed in turn, at steps 64, 66 and 68. The analysis may comprise comparing measured sensor data and/or derived driving information with a data model. The model may comprise defined threshold values for different data types. Sampled sensor data and/or driving information may be compared with the data model to determine if a driving incident has occurred.

[00122] For example, the analysis of sampled audio data, at step 64, may comprise comparing the recorded audio data with predetermined audio data models representing specific sounds. Such sounds may relate to the sound of tyre squeals, the sound of deforming metal, the sound of breaking glass, passenger screaming and/or shouting, the sound of airbag

deployment, and any other sound which may be associated with a driving incident. Effectively, this may be considered audio fingerprinting, which serves to identify specific sounds associated with a driving incident by carrying out a signal profile analyses of the audio signal captured by the audio capture module 27. To achieve this, the storage device 34 may comprise a database of prestored audio sound files. The audio sound files represent sounds associated with a driving incident. The captured audio signal is compared with the sound files comprised in the database, to identify matches between the captured audio signal and the database of sound files. This facilitates the audio fingerprinting of specific sounds, indicative of a driving incident, present within the captured audio data signal captured by the audio capture module 27.

[00123] Similarly, the analysis of sampled accelerometer data, at step 66, may comprise comparing the sampled data with predetermined accelerometer data models. The data models represent specific states of motion of the vehicle. For example, this might comprise defining threshold values for yaw, pitch and roll, which if exceeded, indicate a state of motion of the vehicle indicative of a driving incident. For example, a measured yaw value above a predetermined threshold value may be indicative of the vehicle having lost traction and is fishtailing and/or skidding. Similarly, a roll and/or pitch value above a predetermined threshold value may be indicative of the vehicle having overturned.

[00124] Accelerometer sensor data is also used for deriving driving information such as g-forces. Analysis of g-force data is also used to determine if a driving incident has occurred. For example, approximate g-force values for detecting certain driving incidents are as follows:

[00125] Harsh braking – a deceleration of greater than 2.5 m/s^2 or forward G-force of greater than 0.7G for more than 400msec.

[00126] Harsh acceleration – from stationary, an acceleration greater than 2.5 m/s^2 or backward G-force of greater than 0.7G for more than 800msec.

[00127] Harsh swerving - lateral G-forces greater than 0.7G for more than 400msec.

[00128] The data models are preferably preconfigured and are comprised within the application executed on the mobile telecommunications device. Different data models are used depending on the type of vehicle the telecommunications device is being used with. Different vehicle types will experience different states of motion during regular operation,

which must be considered in determining if a driving incident has occurred. For example, a motorcycle will display more roll and/or pitch than an automobile during regular operation. Accordingly, different data models and/or threshold values must be used to automate the identification of a driving incident for different vehicle types. The specific data models used may be selected during an initial configuration of the mobile telecommunications device, by indicating the type of vehicle the device is being used with.

[00129] On the basis of the audio data analysis and the accelerometer data analysis, the mobile telecommunications device determines, at step 72, if a driving incident has occurred. If it is determined that a driving incident has occurred, then the telecommunications device proceeds with step 50 of Figure 4a. If instead a driving incident is not detected, the telecommunications device proceeds with step 60 of Figure 4a.

[00130] The GPS data analysis, at step 68, comprises analysing positional data and velocity data for any anomalous readings. For example, a sudden deceleration followed by a zero-velocity reading lasting a predetermined period of time, may be indicative of a collision. If such a zero-velocity reading is observed at step 70, in conjunction with anomalous audio and/or accelerometer sensor at step 72, then a driving incident is determined and the mobile telecommunications device proceeds with step 50 of Figure 4a. This is a further example of a threshold condition, discussed previously.

[00131] The previously described mobile telecommunications device and method may also be used to monitor and generate a driver profile. The driver profile may be indicative of the type of driver a user is. For example, this may comprise determining if a user is a calm and patient driver, or an aggressive driver. Also, this may comprise determining whether a user regularly flouts speed limits, and/or ignores safety distances.

[00132] For example, analysis of captured image data, such as video footage, may be used to determine if a user regularly flouts safety distances. In preferred embodiments, the mobile telecommunications device is arranged within the subject vehicle to have a clear line of sight of the road in the direction of principle motion. Accordingly, the number plate of any vehicle preceding the subject vehicle will be captured by the image capture module. Since the physical dimensions of number plates are standardised and known in each country, they may be used as a metric to scale the captured image. When combined with the known optical characteristics of the image capture module, this enables the distance of the image capture module from the image object (i.e. the preceding vehicle) to be determined at the time of

image capture. This information may then be used to see if a user adheres to recommended safety distances.

[00133] Image analysis can also be used to determine driving conditions and the driving environments. For example, image processing can detect road signs, such as stop signs or traffic lights. Furthermore, driving conditions, as affected by the weather can be determined. For example, if the windscreen wipers are detected to be in motion, it can be inferred to be raining. Once the driving conditions are so determined, an assessment of the driving performance of a user can be made by determining whether the user reacts or behaves appropriately to the driving conditions. For example, if the driver is seen to be jumping red lights, or driving dangerously in rain or snow, then a higher risk profile may be assigned to that driver.

[00134] Similarly, accelerometer and g-force data may be used to determine if a user has an erratic driving style. For example, a user that generates sharp variations in g-force data and accelerometer data during regular operation of a vehicle, may be considered to drive erratically, and therefore at greater risk of being involved in an accident,

[00135] The mobile telecommunications device may also be configured to interface and communicate directly with a vehicles native telemetry systems. For example, the majority of modern cars have inbuilt electronic control systems or engine management systems, arranged to collect data regarding vehicle system performance. This data may be communicated to the mobile telecommunications device either via a wired physical connection, such as USB (Universal Serial Bus), or via a wireless communication protocol such as Bluetooth®. This data may subsequently be used by the mobile telecommunications device to complement sensor data captured directly by the telecommunications device. In this way a more accurate model of a driving incident, and/or of a user profile may be generated. For example, native vehicle telemetric systems may comprise electronic tyre pressure sensors, and are able to detect if a tyre is under and/or over-inflated. This information may be communicated to the mobile telecommunications device and may help to explain the causes for a driving incident, such as a sudden loss of traction resulting from a burst tyre.

[00136] Further features of the Witness application, are set out below.

Benchmarking

[00137] It will be appreciated that different sensor types, phones, mounting positions, vehicles, drivers and road conditions may generate differing outputs for driving behaviour that is 'safe'. To account for this, the Witness application may have the following functionality:

[00138] During a 'training mode' (e.g. first week of enabling the Witness application) the input from the sensors are used to build up a 'benchmark' for a particular driver's typical driving conditions.

[00139] Assuming an accident does not occur during this training mode, the benchmark data can be subsequently used to assess the occurrence of driving incident.

[00140] There is preferably an option to notify the Witness application of a change in parameters (e.g. different driver, driving off-road etc). Thus a number of 'profiles' may be set up. Each profile may require an independent training mode period.

[00141] If the Witness application incorrectly detects that a driving incident has occurred, it can receive feedback from the user to modify its sensitivities. E.g. a more aggressive driver is actually driving.

Crash/Collision Management

[00142] On detection of a crash (or other driving incident) the Witness application is arranged to take one or more of the following actions:

[00143] Announce that it has detected an accident (audio/screen prompt)

[00144] Call the emergency services (with option to cancel) – e.g: Audio/screen prompt: 'Witness has detected that you have been involved in a (serious) accident and will call the emergency services. If this is not the case, please cancel within 10 seconds.'

[00145] Provide reassurance

[00146] Provide the user with a checklist of things to do:

[00147] Take photographs of vehicles involved in the incident (inc number plates)

[00148] Take down name, address, insurance details etc of 3rd parties involved in incident

[00149] Communicate to the insurance company that an incident has been detected (e.g. low bandwidth data or text message)

[00150] Protect the high quality recorded data so it is not overwritten

[00151] If appropriate – or in response to a request from a communication to the phone from the insurance company – transmit all or selected portions of the recorded data associated with the incident.**Data processing for generating a user profile**

[00152] Further features of the user profile generation embodiment are summarised:

[00153] If the Witness application incorrectly detects an event or incident of significance, and receives feedback that the vehicle was not involved in an accident (but was in a near miss) – this could alter the risk profile of the driver. For example – if this happens frequently, but no accident occurs over a given period, this could be an indicator that the driver is good at reacting to potential hazards.

[00154] Erratic driving (e.g. jerky steering or braking detected by G-force sensor).

[00155] Driving faster than the speed limit allocated to a given road (detected by GPS).

[00156] Further details regarding the features and functionality of the Witness application, in particular the graphical user interface of the Witness application, are now described.

[00157] Referring to Figure 5, a first page 80 of the Witness application user manual is shown in which an image of the Main Menu (the top-level menu) 82 is displayed. The Main Menu is displayed when a user first runs the application on a smart-phone, such as the iPhone® 4. The main menu includes the following user-selectable buttons:

[00158] Recording Screen 84

[00159] File Management 86

[00160] Settings 88

[00161] Accident Management 90

[00162] Information 92 (displays up a manual, as shown in Figures 5 to 14).

[00163] Selecting the Recording Screen button 84 opens the Recording Screen 94 – the second image shown in Figure 5. The Recording Screen 94 contains a video feed 96 from the camera of the smart-phone, which occupies the majority of the visible screen area. Overlaid on to the video feed is the detected speed of the vehicle 98 (e.g. 0 mph), heading 100 (e.g. south by south-west) and the elapsed recorded time 102 (e.g. 00:00). Displayed in a left column of the Recording Screen are additional user selectable buttons:

[00164] Keep current video 104 (pressing this button will automatically copy the current video - and the previous video segment - to the protected storage 34b, and prevents that information from being overwritten. The user is advised to press this button in the event of a driving incident that needs to be recorded).

[00165] Take photo 106 (captures a still photograph).

[00166] Exit Recorder 108 (returns to main screen).

[00167] Start / Stop Recording 110 (starts recording video footage - and other data).

[00168] Referring to Figure 6, a second page 112 of the Witness application user manual is shown, in which an image of the Recording Screen 114 is shown and described operating in a map-displaying mode rather than a video-feed mode.

[00169] During recording, (i.e. when the 'Start / Stop Recording' button 110 is pressed) the Exit Recorder button in the Recording Screen is substituted with a Map Display button 116. Pressing it will toggle between the modes showing the video feed and a map of the current location.

[00170] Referring to Figure 7, a third page 118 of the Witness application user manual is shown, in which the File Management Screen 120 is shown and described. The File Management Screen 120 can be accessed by pressing the File Management Button 86 in the Main Menu.

[00171] The File Management Screen 120 displays video and associated data (e.g. telemetry data) that has been previously recorded. The stored data is contained in either a protected area of storage or in a "Recording Stack". Data files in the protected area are saved and so not overwritten as part of a Recording Strategy. In contrast, data files in the Recording Stack may be overwritten as part of the Recording Strategy.

[00172] As illustrated in Figure 7, the bottom section of the list represents the "Kept" data files 122, whereas the top section of the list represents the "Recording Stack" 124. "Kept" data files 122 can be edited and deleted from the File Management Screen 120, whereas "Recording Stack" data files cannot. Editing "Kept" data files can involve renaming them.

[00173] The recorded data files are listed on screen along with the time and date of the recording and the electronic size of the data file. Accordingly, the user is provided with feedback about how big the data files are, and so if the smart-phone is low in storage, the

user can elect to delete certain "Kept" data files. "Recording Stack" data files will be automatically overridden by the Recording Strategy.

[00174] The controls on the toolbar at the bottom of the recordings screen allow a user to change the selection mode of the video stack and includes:

[00175] Video 126 (when highlighted, if a data file is selected, a video recording playback screen will be displayed).

[00176] Map 128 (when highlighted, if a data file is selected, then a map will be displayed showing the area over which the recording was made).

[00177] Export 130 (when highlighted, a selected data file will be passed to an Export Screen where export options will be provided).

[00178] Keep 132 (when highlighted, if a "Recording Stack" data file is selected, then a user will be prompted to name it, and then it will be stored as a "Kept" data file).

[00179] The icons in the File Management Screen change in dependence on the selected mode. For example, Figure 20 shows the icons 134 displayed when the Video selection mode is highlighted; Figure 21 shows the icons 136 displayed when the Map selection mode is highlighted; Figure 22 shows the icons 138 displayed when the Export selection mode is highlighted and Figure 23 shows the icons 140 displayed when the Keep selection mode is highlighted. Advantageously, this provides improved feedback to a user about what selection mode is highlighted and so what action is likely from the selection of a data file.

[00180] Referring to Figure 8, a fourth page 142 of the Witness application user manual is shown, in which an image of a Recording Playback screen 144 is shown and described. The Recording Playback screen is invoked by highlighting the Video Mode 126 in the File Management Screen 120 and selecting an appropriate data file.

[00181] In the Recording Playback screen 144 it is possible to play back a pre-recorded video feed associated with a chosen data file. As well as playing back the recorded video feed, the Recording Playback screen also displays other associated data such as telemetry data 146. For example, date, time, speed, forward/backward G-forces, latitude, longitude and heading information is overlaid onto the video feed. As the video is played back, these values will typically change depending on the behaviour of the vehicle, as recorded by the mobile device.

[00182] Forward and backward G-forces are those that correspond to the forward and backward movement of the vehicle and are the primary metric for determining an event such as a crash. However, other G-forces (e.g. up/down and side-to-side) may also be measured by the device – even if they are not necessarily displayed on the mobile screen.

[00183] As recited in Figure 8, the Recording Playback screen provides further user controls in the form of:

[00184] Playback Position Scrub Bar 148 (horizontal bar at bottom of screen)

[00185] Playback Speed Bar 150 (vertical bar at left side of screen)

[00186] Pause 152 (pauses playback)

[00187] Eject 154 (return to previous screen)

[00188] Loop 156 (plays the data file continuously)

[00189] The Playback Position Scrub Bar 148 allows a user to jump to different positions within the recording without necessarily needing to watch all of the recorded footage. Advantageously, this allows a user to more quickly locate a desired item of footage within a given data file. Also, the Playback Speed Bar 150 can be used to speed up or slow down the playback of the data file. This allows a desired item of footage to be found more quickly through sped-up playback, and also allows an item of footage to be more carefully analysed through slowed-down playback. Furthermore, it is possible to zoom in and out of a region of the video file using a 'pinch and zoom' movement as is standard with most multi-touch touch-screen devices.

[00190] Referring to Figure 9, a fifth page 158 of the Witness application user manual is shown, in which a different type of Recording Playback screen 160 is shown and described. Specifically, the image represents playback of a pre-recorded data file as can be invoked by highlighting the Map Mode 128 in the File Management Screen 120 and selecting an appropriate data file.

[00191] In contrast with the Video Mode playback, this Map Mode playback shows a map of the area 162 where the recording took place. A blue breadcrumb trail 164 is overlaid on to the map showing the extent of movement of the vehicle during the recorded period. A scrub slider 166 is shown, which is user-operable to adjust the time within the recorded period. As the slider is adjusted, a pin 168 moves along the blue breadcrumb 164 to

show the position of the vehicle at the time as specified by the slider 166. Tapping the pin 168 displays associated telemetry data 170 at that position and time.

[00192] Referring to Figure 10, a sixth page 172 of the Witness application user manual is shown, in which an image of a Video Export Screen 174 is described. The Video Export Screen 174 may be invoked by highlighting the Export button 130 in the File Management Screen 120 and selecting an appropriate data file.

[00193] The Video Export Screen 174 allows the quality of the video associated with the selected data file to be adjusted, before that video is exported. Advantageously, this can allow the user to control the size of the data to be exported. Telemetry data (i.e. sensor data) is also exported, embedded within the video file. Video data can be exported with or without sound, depending on the permissions of the user. Export typically involves copying data files from the mobile device to a local computer (e.g. via a data cable) or a remote server (e.g. via a wireless connection).

[00194] Referring to Figure 11, a seventh page 176 of the Witness application user manual is shown, in which an image of the Settings Screen 178 is displayed and described. The Settings Screen 178 allows the operation of the Recording Strategy to be controlled. Specifically, the Settings Screen allows a user to select the number of video segments that the application should store, and the size of those segments (i.e. a data file period). Accordingly, the user is able to set a limit to the storage usage of the Recording Stack (i.e. the size of the buffer 34a) part of the program. The user can also control the storage usage of the Recording Stack through the use of the video quality buttons.

[00195] Note that the Witness application may be arranged to calculate the remaining memory available on the smart-phone and suggest the appropriate settings automatically.

[00196] The Recording Strategy involves maintaining a user-controlled number of video segments. When a new video recording is initialised – instantiating a new segment – this is written over the oldest video segment. Thus only the most recently recorded videos are maintained in the Recording Stack.

[00197] Another setting that can be controlled in the Settings Screen 178 is the G-force threshold at which the Witness application will assume that a crash has taken place. It is expected that different vehicles and driving styles will need different G-force thresholds to be set to ensure a reasonable sensitivity to crash forces whilst also prevent crash detection false

positives. It should be noted that although the manual recites "*Raise the sensitivity if you find that crash detection is triggered during normal driving...*" it is the sensitivity *threshold* that is to be raised, and not the sensitivity itself. A slider 180 allows the sensitivity threshold to be set via the touch-sensitive screen.

[00198] The Settings Screen 178 also has a button 182 to allow a user to define more settings via a More Settings Screen.

[00199] Referring to Figure 12, an eighth page 184 of the Witness application user manual is shown, in which an image of the More Settings Screen 186 is displayed and described. Here, it is possible for the user to select speed units 188 and also select whether the map should be displayed during recording 190, and at which speed it should be displayed in favour of the video feed. This is a safety feature of the Witness application that hides the video feed during recording when the vehicle is detected as travelling above a predetermined speed. The video feed is replaced by a map of the location of the vehicle – as is typical with in-vehicle GPS devices. Note that although the on-screen video feed is replaced with a map, video recording continues in the background.

[00200] In alternatives, the application may be arranged to detect the vehicle speed, and at a particular speed, switch off the screen entirely. It should be understood that the device will continue to record video, telemetry and other information even when the screen is switched off. Entirely switching off the screen of the device is advantageous as it significantly reduces the drain on the battery of the mobile device.

[00201] Note that the Witness application is also arranged to interface with the phone to detect low-light conditions and in response change the brightness of the screen to prevent the user/driver being dazzled. This can also save battery life.

[00202] The More Settings Screen 186 also includes a Personal Details button 192 which, when pressed invokes a Personal Details Screen.

[00203] Referring to Figure 13, a ninth page 194 of the Witness application user manual is shown, in which an image of the Personal Details Screen 196 is displayed and described.

[00204] Here, the name 198, vehicle registration number 200, mobile number 202 and email address 204 to be used in an emergency, can be specified by the user. In the event of a detected incident, these details, along with information regarding the detected incident (e.g. time of incident, location and optionally telemetry data) will be emailed to the specified

email address automatically. This can ensure that the chosen recipient of that email will be informed immediately about the occurrence and nature of the detected incident.

[00205] This Personal Details Screen 196 also allows the user to set whether it is possible for the video stack to be deleted 206. A security PIN protects the changing of this option so that if a first user having the PIN (for example, a parent) can review the driving style and behaviour of a second user not having the PIN (for example, their son or daughter) by reviewing the Recording Stack – as the Recording Stack cannot be deleted by that second user. As shown in Figure 24, the PIN can be set for the first time by entering it twice into the appropriate PIN fields 208.

[00206] Referring to Figure 14, a tenth page 210 of the Witness application user manual is shown, in which images of an Accident Management Screen 212 and Witness Details Screen 214 are displayed and described.

[00207] The Accident Management Screen 212 can be invoked by the user selecting the accident management button 90 on the Main Menu , or can be automatically switched to after the Witness application has detected that there has been an incident (e.g. via G-forces exceeding a threshold level). Similarly, data can automatically be permanently stored as "Kept" and/or sent if high G-forces are detected.

[00208] As can be seen on the Accident Management Screen 212, there are the following user selectable buttons:

[00209] Accident Advice / What to do 214

This option provides guidance as to what to do during an accident – see Figures 15 and 16 for the displayed Accident Advice Screens.

[00210] Witnesses 216

This option invokes functionality to allow the collection of information from or about witnesses to an incident. An image of the Witnesses Detail information summary screen 214 is shown in Figure 14. Figure 17 shows the Witness Detail information collection screen 218. Voice notes can also be taken via the microphone of the smart-phone.

[00211] Photos 220

This option enables the camera to allow a user to capture images associated with an incident.

[00212] Drivers 222

This option invokes functionality to allow collection about the other drivers involved in an incident. The Drivers Detail information collection screen 224 is shown in Figure 18.

[00213] Your Details 226

This option provides a readily available store of the details of the user - as to be provided to other drivers – and can contain name and address. The 'Your Details' screen 228 is shown in Figure 19.

[00214] Details recorded via the Accident Management Screen 212 are electronically authenticated and feature a time-stamp. In alternatives, this data may be encrypted to ensure the integrity of the stored data.

[00215] Furthermore, in alternatives, the exchange of the details of the drivers and witnesses can be conducted, at least in part, via Bluetooth® (for example, between mobile devices) – and/or via email. Relevant information associated with the driver is pre-stored on the Witness application in a format that can be sent readily, via a communication channel such as Bluetooth® or email.

[00216] Finally, note that in each Screen or Menu, there is a button 230 provided to go back to the previous menu. Also, when certain actions are performed or selected by a user, the Witness application is arranged to provide an audible feedback signal (for example, a beep). For example, this could be in response to starting a recording, keeping a video segment and/or a stopped recording.

Alternatives and extensions

[00217] The Witness application can be extended to interface with remote users to allow them to control the operation of the application as well as view information logged by the application.

[00218] With such a monitoring system, it is unpractical to actively monitor each and every mobile device and receiving and handling the sheer quantity of data from each and every device would also be very difficult.

[00219] Consequently, the device monitoring system and the mobile devices are advantageously arranged to automatically and intelligently interface with one another in a way that minimises the computational and bandwidth burden on the device monitoring system.

[00220] In particular, each mobile device running the Witness application is arranged to make a determination as to whether there is a need to transfer data to the device

monitoring system. For example, the Witness application may be arranged to automatically send data to the device monitoring system that only has high G-force activity associated with it, as this may be indicative of a crash or another driving incident. Alternatively, the Witness application may be arranged to send detailed or high-bandwidth information if a user indicates that an accident has occurred.

[00221] In either case, the video segments and associated sensor and/or derived driving information data associated with the relevant event will be sent. However, no other data (for example, from another date) will be sent.

[00222] Alternatively, less computationally or bandwidth intensive information may be sent on a periodic basis – for example, every day, week or month. Such general information may be sent to establish a profile of a particular user. For example, many high G-force related activities may indicate that the driver is driving aggressively. A determination about the profile can be made automatically by requesting and automatically analysing further data. For example, the location and speed information can be used to determine whether a vehicle is found to frequently break the speed limit. If this is the case, then the profile of the user can be set accordingly.

[00223] Such general and periodically obtained information can also be used to remotely adjust the settings of the application. For example, many high G-force related activities may instead indicate that the set up of the car is such that the mobile device is subjected to high G forces (rather than the driver driving aggressively). If the driving is determined to be safe, but the mobile device is setting off many false positives, then the device monitoring system can automatically adjust the settings of the application. For example, the G-force sensitivity threshold may be increased remotely.

[00224] Thus, the initial data that is automatically transmitted from the mobile device to the vehicle monitoring system is limited in bandwidth so as not to overload the vehicle monitoring system as a whole. However, after processing or analysis is performed on the initial data, further information may be requested. For example, further information may be requested automatically by the system or manually by a controller. Such further information may include high resolution video logs and sensor data and derived driving information such as G-force measurements.

[00225] It will be understood that the mobile device may also automatically keep certain data at random. Furthermore, the reason for keeping certain data may also be logged

(e.g. logged as a result of a manual request by the user, or in response to a high G-force event).

[00226] However, so that users do not wrongfully benefit from such incentives, it is necessary to enforce the correct and consistent use of the Witness application.

[00227] Accordingly, the application may include measures to guarantee that the application is enabled whenever a given insured vehicle is being driven.

[00228] Such measures may involve matching data recorded by the Witness application with that recorded independently by the vehicle. For example, the Witness application records the distance travelled during every journey. To ensure the summed distances of all journeys tracked by the Witness application tally with the total travelled distance of the vehicle, the user may be prompted to enter the odometer mileage periodically.

[00229] It will be appreciated that such a tallying exercise depends on the Witness application being used every time one particular vehicle is driven. However, in alternatives, if the Witness application is used with different vehicles, the Witness application may be arranged to register the different vehicles so that their respective odometer readings can be tallied with distance recordings associated with each respective vehicle.

[00230] Other measures can be implemented in conjunction with the Witness application to guarantee that the application is enabled whenever a given vehicle is being driven. For example, the mobile device on which the Witness application is installed may comprise an NFC device, such as an RFID tag. The NFC device may be compatible with a complementary device on a so-called 'smart-holster' into which the mobile device may be fitted during operation.

[00231] The smart-holster interacts with the NFC device on the smart-phone to determine whether or not the smart-phone is inserted into the smart-holster. The smart-holster can then be interfaced with the engine management system of the vehicle so that the vehicle may be activated and driven only when the mobile device is in place within the smart-holster.

[00232] It will be appreciated that the mobile device has so far been described in the context of a smart-phone. However, it will be appreciated by a person skilled in the art that other devices may also be suitable for performing the functions described in relation to the Witness application. For example, the Witness application may be adapted to run on a general purpose tablet-style computing device, such as an iPad®.

[00233] Furthermore, it will be understood that features, advantages and functionality of the different embodiments described herein may be combined where context allows. In addition, a skilled person will appreciated that the functionality described above may be implemented using the mobile device suitably programmed.

Having described several exemplary embodiments of the present invention and the implementation of different functions of the device in detail, it is to be appreciated that the skilled addressee will readily be able to adapt the basic configuration of the device to carry out described functionality without requiring detailed explanation of how this would be achieved. Therefore, in the present specification several functions of the device have been described in different places without an explanation of the required detailed implementation as this not necessary given the abilities of the skilled addressee to code functionality into the device.

Bibliographic Data

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35 USC 119 (a-d) conditions met: ☑ Yes ☐ No ☐ Met After Allowance

Verified and Acknowledged: /TYLER D PAIGE/ (Examiner's Signature) | (Initials)

Title: Method and System for Logging Vehicle Behaviour

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
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RULE			

APPLICANTS

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CONTINUING DATA

This application is a CON of 17729962 04/26/2022 PAT 12002301

17729962 is a CON of 16665746 10/28/2019 PAT 11321970

16665746 is a CON of 16222893 12/17/2018 PAT 10950068

16222893 is a CON of 15454944 03/09/2017 PAT 10198878

15454944 is a CON of 15061910 03/04/2016 PAT 9633487

15061910 is a CON of 13994455 07/24/2013 PAT 9311271

13994455 is a 371 of PCT/GB2011/052491 12/15/2011

FOREIGN APPLICATIONS

UNITED KINGDOM GB1021292.6 12/15/2010

UNITED KINGDOM GB1101259.8 01/25/2011

UNITED KINGDOM GB1109759.9 06/10/2011

UNITED KINGDOM GB1118777.0 10/31/2011

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06/12/2024

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FILING FEE RECEIVED

$2,656

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	906	((("WRIGHT") near3 ("Andrew"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/23 01:06 PM
L2	2566	701/33.4.ccls.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/23 01:06 PM
L3	393384	(G07C5/02 or G06F17/00 or G06Q40/08 or G07C5/008 or G07C5/0858 or G07C5/0866 or G09B5/02 or G09B19/14 or H04M1/6041 or H04M1/6075 or H04M1/72406 or H04M1/724098 or H04M1/72454 or H04M1/72412 or H04M2201/36 or H04M2250/12 or H04M2250/74).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:07 PM
L4	159731	(smartphone OR mobile ADJ device) SAME (windshield OR front window)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:17 PM
L5	159731	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:17 PM
L6	159754	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:17 PM
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L8	144	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:20 PM

		AND (blackbox OR black ADJ box) AND (time OR period) AND insurance ADJ premium AND offer					
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L11	1469	L10 NOT L9	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:21 PM
L12	1613	L10	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:21 PM
L13	1304	L10 AND application AND (start OR initiate)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:22 PM
L14	1304	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen) AND (blackbox OR black ADJ box) AND (time OR period) AND application AND (start OR initiate)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:22 PM
L15	641	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen) AND (blackbox OR black ADJ box) AND (time OR period) AND application AND (start OR initiate) AND (collision OR accident	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:23 PM

		OR aggressive OR wreckless OR dangerous)					
L16	172	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen) AND (blackbox OR black ADJ box) AND (time OR period) AND download SAME application AND (start OR initiate) AND (collision OR accident OR aggressive OR wreckless OR dangerous)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:23 PM
L17	641	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen) AND (blackbox OR black ADJ box) AND (time OR period) AND (start OR initiate) AND (collision OR accident OR aggressive OR wreckless OR dangerous)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:24 PM
L18	494	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen) AND (blackbox OR black ADJ box) AND (time OR period) SAME (start OR initiate) AND (collision OR accident OR aggressive OR wreckless OR dangerous)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:24 PM
L19	51	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen) AND (blackbox OR black ADJ box) AND (time OR period) SAME (start OR initiate) SAME (collision OR accident OR aggressive OR wreckless OR	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:24 PM

		dangerous)					
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L21	3	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen) SAME (time OR period) SAME (start OR initiate) SAME (collision OR accident OR aggressive OR wreckless OR dangerous) AND camera SAME (forward near2 facing OR forward ADJ fac$3)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:25 PM
L22	64	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen) SAME (collision OR accident OR aggressive OR wreckless OR dangerous) AND camera SAME (forward near2 facing OR forward ADJ fac$3)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:26 PM
L23	339	"9311271"	(US-PGPUB; USPAT)	OR	ON	ON	2024/10/23 12:06 PM
L24	12	(smartphone OR mobile ADJ device) SAME (collision OR accident OR aggressive OR wreckless OR dangerous) AND blackbox	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2024/11/07 02:25 PM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N1	81806	(G07C5/02 OR G06F17/00 OR G06Q40/08 OR	(US-PGPUB; USPAT)	OR	ON	ON	2024/11/07 02:22 PM

		G07C5/008 OR G07C5/0858 OR G07C5/0866 OR G09B5/02 OR G09B19/14 OR H04M1/6041 OR H04M1/6075 OR H04M1/72406 OR H04M1/724098 OR H04M1/72454 OR H04M1/72412 OR H04M2201/36 OR H04M2250/12 OR H04M2250/74).cpc.					
N2	1451	701/33.4.ccls.	(US-PGPUB; USPAT)	OR	ON	ON	2024/11/07 02:22 PM
N3	6	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen) SAME (collision OR accident OR aggressive OR wreckless OR dangerous) AND camera AND blackbox	(US-PGPUB; USPAT)	OR	ON	ON	2024/11/07 02:23 PM
N4	12	(smartphone OR mobile ADJ device) SAME (collision OR accident OR aggressive OR wreckless OR dangerous) AND camera AND blackbox	(US-PGPUB; USPAT)	OR	ON	ON	2024/11/07 02:23 PM
N5	12	(smartphone OR mobile ADJ device) SAME (collision OR accident OR aggressive OR wreckless OR dangerous) AND blackbox	(US-PGPUB; USPAT)	OR	ON	ON	2024/11/07 02:25 PM
N6	12	(smartphone OR mobile ADJ device) SAME (collision OR accident OR aggressive OR wreckless OR dangerous) AND blackbox	(US-PGPUB; USPAT)	OR	ON	ON	2024/11/07 02:26 PM

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APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
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Title of Invention

Method and System for Logging Vehicle Behaviour

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7645	FILED BY	Mara Rodriguez
PATENT CENTER #	67802826	FILING DATE	05/28/2024
CUSTOMER #	30734	FIRST NAMED INVENTOR	Andrew William Wright
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Mark Krietzman

Documents

TOTAL DOCUMENTS: 3

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
044228_111208_Response_NFOA_dtd_7-31-2024.pdf	25	Amendment/Request for Reconsideration-After Non-Final Rejection	219 KB
044228_111208_Marked-Up_Specification_2024-10-31-SPEC.docx	46	Specification	67 KB
044228_111208_Clean_Specification_2024-10-31-SPEC.docx	44	Specification	66 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)

044228_111208_Response_NFOA_dtd_7-31-2024.pdf	548A76A1F5DB6C66EB80D896039B02A039C26A379692FD71F6BBE98668F96BFF1D5BA378D8706FAF92DCB6E8DFFDDC6F99FCA125AF1E4FBBD97188056B095A01
044228_111208_Marked-Up_Specification_2024-10-31-SPEC.docx	A82EEFA13A9E92E898B08A736C4E600C708742B1433CBE94DE4AC66736156212C6EA6385D5BB749AB4FFD7EC4859901AC37ACE9B67DA331380611D297F2C7BDD
044228_111208_Clean_Specification_2024-10-31-SPEC.docx	CFA56ED79B0C33EA817319AC24643EAFC38505BB6AD40B4FC0800F9E6858ABDDC9F29E8AD91C6D9DBC5D298D6E4269234824AB482646A9B1D3FEEAF98F7B7F8E

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

METHOD AND SYSTEM FOR LOGGING VEHICLE BEHAVIOUR

Cross-Reference to Related Applications

[0001] This application is a continuation of U.S. patent application no. 17/729,962, filed April 26, 2022, which is a continuation of U.S. patent application no. 16/665,746, filed October 28, 2019, which is a continuation of U.S. patent application no. 16/222,893 filed December 17, 2018, which is a continuation of U.S. patent application no. 15/454,944 filed March 9, 2017, which is a continuation of U.S. Patent Application no. 15/061,910 filed March 4, 2016 and now issued as U.S. 9,633,487, which is a continuation of U.S. patent application no. 13/994,455 filed July 24, 2013 and now issued as U.S. 9,311,271, which is a 371 of international patent application PCT/GB2011/052491 filed December 15, 2011, which claims foreign priority to GB patent application no. 1118777.0 filed October 31, 2011, GB patent application no. 1109759.9 filed June 10, 2011, GB patent application no. 1101259.8 filed January 25, 2011, and GB patent application no. 1021292.6 filed December 15, 2010, the contents of which are incorporated in their entirety as if fully presented herein.

Field of the invention

[0002] The present invention relates to methods and systems for logging driving information associated with vehicle behaviour. Moreover, the present invention relates to a mobile device adapted for installation to a vehicle and configured to log such driving information, for example, video footage associated with how the vehicle is driven. Such driving information may subsequently be utilised to determine the cause of an event such as an accident, to modify driver behaviour and/or to determine insurance premiums.

Background

[0003] Data logging devices are commonly installed on aircraft that log data about events associated with the behaviour of the aircraft and also the crew controlling the aircraft. Such data logging devices are commonly termed "black boxes" and are very useful for determining the cause of problems that have affected the aircraft, especially when no other record of a significant event such as a crash exists.

[0004] Similar data logging devices exist for road vehicles, and can be used to realise similar advantages. Vehicle users as well as authorities can use such devices to determine the cause of traffic accidents or other vehicle-related events, whether these stem from vehicle malfunction or driver negligence.

[0005] Some of these data logging devices can be integrated with the car data network, and so may take inputs from sensors integrated with the vehicle, such as those measuring the speed of the vehicle. However, these can be difficult and costly to install. Others having their own internal sensor set are more readily retrofitted to a vehicle. Nonetheless, such data logging devices for road vehicles are less prevalent perhaps due to their unjustifiable expense. Accordingly, the uptake of data logging devices that can be retrofitted to road vehicles, as are known in the art, has been minimal.

[0006] It is an object of the present invention to alleviate the above-mentioned problems, at least in part.

Summary of the invention

[0007] According to a first aspect of the present invention there is provided a mobile telecommunications device configured to log driving information associated with a vehicle is described. The mobile telecommunications device comprises: a sensor set comprising an image sensor and at least one of an audio sensor, an accelerometer or a positioning module, or a combination thereof; a user interface; a processor; and a memory. The mobile telecommunications device is configured to: determine, based on the inputs received by the user interface and sensor data from the device's sensor set, a start of a driving period during which the mobile device is removably affixed to the vehicle and the vehicle is in use, wherein the start of the driving period is determined without data from sensors of the vehicle; process the sensor data from the sensor set during the driving period to derive driving information associated with how the vehicle is driven; and store a selection of the driving information to the memory. The driving information comprises images captured by the image sensor and the mobile telecommunications device is controlled by a downloaded application to process the captured images to make a safety determination for the vehicle and in response to making an unsafe determination for the vehicle, to issue an alert signal.

[0008] Advantageously, the use of a mobile telecommunication device enables a data logging device to be conveniently and inexpensively retrofitted to a vehicle. Mobile telecommunication devices such as "smart-phones" are becoming increasingly widespread, and these devices tend to have the requisite sensor sets to capture data concerning vehicle behaviour. Thus, a generic mobile telecommunication device already owned by a driver of the vehicle can be loaded with the application to provide such data logging functionality that

would otherwise necessitate a dedicated black-box. Thus, the functionality of a black-box can be realised without additional expense.

[0009] Following on from this, it will be appreciated that the mobile device is ideally a portable mobile telecommunication device. Ideally, the mobile device is a hand-portable mobile device. Advantageously, the portability permits the mobile device to be conveniently fitted to and removed from the vehicle.

[0010] Furthermore, such a mobile telecommunication device presents additional advantages over known dedicated black-box systems as the data logging functionality of the mobile telecommunication device can be continually refined. This can be achieved without physically upgrading the hardware of the device, and also without significant user intervention. Specifically, the application may be arranged to determine whether a software update exists and if so, control the mobile device to download at least portions of an improved version of the application. Conveniently, downloading may be via the wireless telecommunication module. Said downloading may be automatic, or may be user-confirmed. For the avoidance of doubt, the application will typically be stored on a portion of the memory of the mobile device and executed therefrom, as is known in the art. Also, it will be appreciated that the application, or portion thereof, may be downloaded via the wireless telecommunication module and/or via an intermediary device. For example, the application may be side loaded to the mobile device from an intermediary computing device.

[0011] The application may be sourced from an application store and/or content provider. For example, the content provider may comprise the Apple® Appstore®. The content provider may comprise a cloud computing provider.

[0012] It will be appreciated that the use of such a generic mobile device in this context may be counter-intuitive to a person skilled in the art - such generic devices are not designed to withstand events such as catastrophic crashes. Furthermore, such generic devices are usually not necessarily configured to appropriately detect conditions that may need to be recorded. Such devices are usually kept in a user's pocket or bag, and so are not best placed to generate sensor data associated with the behaviour of a vehicle. However, the inventor of the present invention has realised that such a mobile device that is adapted for installation to the vehicle can overcome such drawbacks and fulfil a role similar to a black box. To this end, the mobile telecommunication device may comprise an adapter arranged to hold the device securely to the vehicle.

[0013] Advantageously, as well as protecting the device from damage, the adapter improves the suitability and reliability of the sensor data and so the driving information associated with when and/or how the vehicle is being driven. For example, if the sensor set comprises an accelerometer, the acceleration of the vehicle can be more accurately measured due to the mobile device being firmly attached to the vehicle. Similarly, if the sensor set comprises an image sensor, for example, for capturing video footage of the road ahead, better footage can be obtained as the mobile device can be held in the correct position and orientation relative to the vehicle. In particular, the mobile device may be positioned by the adapter so that its image sensor views the road ahead through a windshield of the vehicle.

[0014] As mentioned, the device is arranged to log driving information associated with the vehicle, when that vehicle is being driven. This is realised by registering the start of the driving period during which the mobile device is installed to the vehicle and the vehicle is being driven by the driver. Advantageously, this prevents driving information from being needlessly recorded. As will be appreciated the mobile device has only a finite storage capacity and so registering the start of the driving period is useful for minimising the unnecessary usage of memory. In particular, where the mobile device comprises an image sensor, and the sensor data comprises a sequence of images (e.g., a video) the storage space can be very quickly filled by the memory.

[0015] To this end, it is preferred that when the application is executed, it controls the mobile device to register the start of a driving period in response to an initialisation input. The initialisation input may comprise a user input - for example, the user manually executing the application on the mobile device. The initialisation input is also generated automatically in response to the mobile device being installed to the vehicle and/or the vehicle being driven. The initialisation input may be generated automatically in response to the sensor data having predetermined values. For example, if the sensor data reflects a detected speed above a predetermined threshold – for example, 20 kilometres per hour – then this can be used to trigger the start of the driving period. Similarly, if the sensor data reflects that the mobile device is held securely to the vehicle in a predetermined position (for example, via the adapter) this can also be used to trigger the start of the driving period. To this end, the adapter and/or the mobile device may comprise a registration module configured to register the installation of the mobile device to the vehicle and/or the adapter. The registration module may comprise a proximity sensor to detect the proximity of the mobile device to the

vehicle. The registration module may comprise a NFC (near field communication) device. The registration module may be arranged to determine a match between the location of the mobile device and the location of the vehicle. The match may be performed by receiving and comparing a first positioning input associated with the position of the vehicle and a second positioning input associated with the position of the mobile device. The registration module and/or adapter may be a smart holster.

[0016] Preferably, the executed application controls the mobile device to manage voice-calls incoming to the mobile device during a driving period. For example, said voice-call management may comprise temporarily disabling and/or diverting voice-calls incoming to the mobile device during a driving period. Advantageously, this safety feature discourages users from making or receiving phone calls whilst driving. It will be appreciated that a driver is less able to control a vehicle effectively whilst also manipulating a mobile device, and in many countries doing so is illegal. However, the provision of a 'hands-free' mode or accessory – as are well known in the art - may obviate the need for a user to manipulate the mobile device. Accordingly, the executed application may be arranged to control the mobile device to selectively disable and/or divert voice-calls incoming to the mobile device during a driving period, in dependence on the detection of a hands-free accessory or hands-free mode enabled on the mobile device.

[0017] Furthermore, the executed application may be arranged to control the mobile device to enable a hands-free mode of operation on detection of a driving period. For example, the enabled hands-free mode of operation may comprise enabling voice-activated commands. In light of this, it is preferred that the adapter is configured to hold the mobile device in a way that facilitates reception of voice commands from the user. In particular, the mobile device may be held in a position relative to the user to permit clear reception of the user's voice. Typically, this position is about the dashboard in a vehicle such as car or van. Furthermore, the adapter is configured with an opening through which an audio sensor of the mobile device is able to receive the user's voice.

[0018] Also, even though a driver's control of a vehicle may be affected by manipulating the mobile device, under certain circumstances, this may not be objectionable – for example, when the vehicle is stationary. Accordingly, the executed application may be arranged to control the mobile device to selectively disable and/or divert voice-calls

incoming to the mobile device during a driving period, in dependence on the driving information – for example, the speed and location of the vehicle.

[0019] Furthermore, it will be appreciated that the driver may not be the only user within the vehicle, and so disabling functions of the mobile device may not be appropriate under all circumstances, as a passenger of the vehicle may want to use the mobile device whilst the driver is driving. Under these circumstances, the executed application is arranged to control the mobile device to register the presence of a non-driver (for example, via image recognition, or entry of an unlock code) and unlock, or retain the original functionality of the mobile device. Furthermore, the executed application may be arranged to run in the background. Accordingly, the mobile device may be used for other purposes, such as making or receiving a telephone call.

[0020] It is advantageous to store only selected driving information for the purpose of logging how a vehicle is being driven during the driving period. Whilst it may be possible to sample and process sensor data at a relatively high rate (i.e. many times a second), continually storing driving information derived from that sensor data at such a high rate can use up a lot of storage space on the mobile device, the majority of which is likely to be redundant. Therefore, by being selective about the driving information that is stored, storage utilisation can be made more efficient.

[0021] In particular, the executed application may control the mobile device to store a summary of the driving period. The summary may comprise compressed and/or summarised driving information. For example, the sensor data can be processed at a first sampling rate and then down-sampled to a fraction of the first sampling rate for storage as driving information. Put another way, the mobile device can be controlled by the executed application to down-sample sensor data from a first sampling rate to a second sampling and store the sensor data as driving information at said second sampling rate. Advantageously, this retains a snapshot of when and/or how the vehicle is being driven, but with fewer data points, and so requiring less storage space.

[0022] Nonetheless, under certain circumstances, it is more useful to retain information at higher or the highest possible sampling rates. In particular, it is more important to have detailed information associated with the behaviour of a vehicle during a crash than when the vehicle is being driven normally.

[0023] Accordingly, the executed application may be arranged to control the mobile device to detect the occurrence of a predetermined event of significance (such as a crash) and in response store driving information associated with that event to the memory. Preferably, said driving information associated with that event comprises driving information in the lead up to and immediately following the event. In particular, detailed driving information in the lead up to, and immediately following a predetermined event of significance is preferably stored. It will be understood that the driving information associated with the detected event may be transmitted via the wireless telecommunication module in addition to, or instead of storing said data. Said transmitted driving information may be transmitted to a remote data logging system.

[0024] To this end the mobile device may comprise an event detector for detecting the occurrence of an event.

[0025] Preferably, the event detector is arranged to detect the occurrence of a predetermined event by correlating data, such as sensor data, against an event indication model. The application may comprise the event indication model.

[0026] Preferably, the event indication model comprises a set of predetermined data values corresponding to a predetermined event. Accordingly, the event detector is arranged to compare the set of predetermined data values against corresponding sensor data to determine whether the predetermined event has occurred.

[0027] For example, the event indication model may indicate that a serious crash has occurred if values returned by an accelerometer sensor exceed predetermined data values of the event indication model, thereby representing a sustained vehicle deceleration beyond a threshold level. Following on from this, it will be appreciated that detection of an event may be dependent on matching a sequence of data values that have occurred over time. Moreover, the event indication model may comprise a sequence of predetermined data values, the sequence being associated by a function of time. Thus, the event detector may be arranged to compare the sequence of predetermined data values against corresponding sensor data that have been generated over a given time period. Put another way, the event detector and event indication model are arranged to indicate the occurrence of an event in dependence on the correlation between a set of predetermined data values occurring over time. Thus, a set of values returned from sensor data over a period of time are compared against a corresponding

sequence of predetermined data values of the event indication model. Typically, this is to determine a rate of change of variables associated with a sensor set.

[0028] It will be understood that an event indication model may comprise a plurality of sets of predetermined data values, each set corresponding to different sensor data. For example, an event indication model associated with a serious accident event may contain data values corresponding to both the deceleration of the vehicle, and the orientation of the vehicle. Thus, if a vehicle is involved in a serious impact, and overturns, this is represented by the model, and so can be detected by the event detector.

[0029] Preferably, the event indication model comprises a pattern of predetermined data values. Preferably, the event detector is arranged to detect the occurrence of an event by carrying out pattern recognition by matching sensor data values to the pattern of predetermined data values of the event indication model. Preferably, there is a plurality of event indication models. Each event indication model may be associated with a separate predetermined event.

[0030] Preferably, the executed application may be arranged to control the mobile device to process sensor data from the sensor set during a plurality of driving periods to derive driving information associated with when and/or how the vehicle is driven for each of the driving periods. Preferably, sensor data processed during a first set of driving periods define a benchmark against which sensor data is compared during subsequent sets of driving periods. In particular, the executed application may be arranged to control the mobile to modify one or more event indication models in response to the benchmark. Advantageously, such a benchmark ensures that the event indication models may be tailored to the standard behaviour of a particular vehicle. As will be appreciated, different sensor types, mobile devices, mounting positions, vehicles, drivers and road conditions may generate different sets of sensor data for driving behaviour that is considered standard or safe. Accordingly, the benchmark allows the mobile device to account for variable driving conditions.

[0031] Preferably, a plurality of benchmarks may be defined. A benchmark may be defined for each driver. A benchmark may be defined for each vehicle to which the mobile device is to be installed. Ideally, a benchmark is defined for each driver-vehicle pair. To this end, the mobile device may be arranged to receive an input to specify a driver, a vehicle or a driver-vehicle pair. Advantageously, this ensures that different drivers and vehicles do not disrupt the accurate event detecting capabilities of the event detector.

[0032] Once a predetermined event has been detected by the event detector, it is desirable to take an appropriate action in response to that detected event. Accordingly, the executed application may be arranged to control the mobile device to take at least one predetermined action in response to a detected event. The action taken may comprise transmitting driving information and/or sensor data, via the wireless telecommunication module of the mobile device, to a remote system. Advantageously, this enables a remote system to be notified of the occurrence of a particular event, and the details associated with that event. For example, the remote system may be arranged to deploy emergency services based on a transmitted notification concerning the occurrence of a crash, and also the location of the mobile device (and so the vehicle) are also included in the transmitted information. A further advantage of transmitting driving information and/or sensor data to a remote system is that such data then does not need to be stored on or processed by the mobile device. Thus, this can free the storage space on the mobile device, and also allow the processor of the mobile device to carry out other tasks.

[0033] A further advantage associated with sending driving information to a remote system is that the driving information can be assessed remotely. This assessment can be performed automatically or manually - either way it advantageously removes the processing burden from the mobile device. Alternatively, if transmission bandwidths are small, the processing can be executed automatically on the processing device. In this case, the use of virtual neural networks can be used to determine whether the driving information represents acceptable or unacceptable driving patterns.

[0034] The action taken may comprise storing data captured at a higher (or the highest possible) sampling rate than when an event is not detected. Thus, as described above, this may involve preventing the down-sampling of sensor data. Furthermore, the action taken may comprise protecting said driving information from being overwritten.

[0035] The action taken may comprise providing feedback to a user to indicate that an event has been detected. Preferably, the mobile device is configured to receive a user interaction to confirm or deny whether the detected event has actually occurred following said feedback. Advantageously, such user feedback can be used to modify event indication models thereby to refine the effectiveness of the event detector. The mobile device may comprise a speaker. Accordingly, such feedback may be provided via an audio prompt. The mobile device may comprise a display screen. Accordingly, such feedback may be provided

via a visual prompt. The feedback may comprise notifying a user that a further action has been scheduled, and will be taken within a predetermined period. For example, the feedback may indicate to a user that an event such as a serious crash has been detected, and so the next action to be taken will be to contact emergency services within 10 seconds. Preferably, the feedback includes a prompt to receive a user input. For example, the prompt may be arranged to receive a user input to cancel a subsequently scheduled action. Advantageously, this prevents actions being taken needlessly as a result of an incorrect determination of an event.

[0036] The feedback may provide reassurance and/or guidance to a user. For example, a user may be provided with an important checklist of things to do following an accident or incident. For example, the user may be guided to use a camera (image sensor) on the mobile device to take photographs of the vehicles involved in the incident, including the number plates of those vehicles. The user may be guided to use a text input device on the mobile device to note the name, address, etc of third parties involved in incident.

[0037] The action taken may comprise communicating to a remote system that an incident has been detected (e.g. via a low bandwidth data connection or via text message). If appropriate – or in response to a request from a communication to the mobile device from the remote system – the action taken may comprise transmitting all or selected portions of the driving information associated with the detected event.

[0038] Preferably, the executed application is arranged to control the mobile device to prioritise essential communications, such as calls to the emergency services.

[0039] Preferably, the memory comprises a long term memory for persistently storing driving information and/or sensor data. Preferably the memory comprises a buffer. The buffer may comprise a short term memory for transiently storing driving information and/or sensor data. Preferably, the short term memory is arranged to receive driving information and/or sensor data at a higher update rate than the long term memory. Preferably, the long term memory has a larger capacity than the short term memory.

[0040] Preferably, the executed application controls the mobile device to write driving information and/or sensor data to the short term memory at a predetermined update rate during the driving period. Ideally, the driving information and/or sensor data is written to the short term memory in a predetermined sequence, ideally a chronological sequence. Preferably, the executed application controls the mobile device to overwrite driving information and/or sensor data previously written to the short term memory. Advantageously,

this ensures that recording of sensor data and/or driving information, especially data that is recorded at a relatively high update rate, is not prevented during the driving period due to the short term memory becoming full.

[0041] Preferably, the driving information and/or sensor data is overwritten in accordance with the predetermined sequence. Advantageously, this can ensure that the most relevant, up-to-date data is retained in the short-term memory.

[0042] Preferably, the action taken in response to a detected event comprises transferring data from the short-term memory to the long-term memory. Advantageously, this can ensure that the most recent information associated with an event is persistently stored in the long term memory, and is not overwritten.

[0043] Preferably, the sensor set comprises an accelerometer for detecting the acceleration of the mobile device. Accordingly, the corresponding sensor data may comprise acceleration data generated by the accelerometer. The accelerometer may be a single axis or dual axis accelerometer. However, it is preferable that the accelerometer is a three-axis accelerometer so that movement of the vehicle may be determined in three-dimensional space. Furthermore, as the mobile device may be mounted by a user in one of a number of different orientations relative to the vehicle, a three-axis accelerometer ensures that acceleration along the axis aligned with the general forward movement of the vehicle may be effectively detected. This is particularly important to determine an event such as heavy braking of the vehicle and/or a crash.

[0044] Preferably, the sensor set comprises an image sensor such as a camera. Accordingly, the corresponding sensor data may comprise images and/or a sequence of images generated from the image sensor. Said sequence of images may be processed and/or stored in the form of a video. Advantageously, this can improve the space utilisation of the sequence of images. Preferably, the mobile device is arranged to receive a user input to store a user-selected image or sequence of images to the memory. The image sensor data may be processed to determine safety information and feedback said safety information to the driver. For example, the mobile device may be controlled to determine the proximity of the mobile device to other vehicles. Said determination may be via comparing the apparent size of the number plate of other vehicles in an image with a known size of a standard number-plate, and from that the distance to those other vehicles. Thus, the mobile device can make a determination that another vehicle is too close, and issue a warning to the driver to slow

down to avoid a collision. Similarly, images of the road ahead may be processed to determine whether a vehicle is drifting out of lane (e.g. because the driver is falling asleep). In response to such a determination, an alert can be issued. Similarly, images of road signs may be processed to assess driver behaviour.

[0045] It will be appreciated that the mobile device may comprise a plurality of image sensors. For example, the mobile device may have a forward-facing camera and a rear-facing camera. Accordingly, it may be possible to view images of the road ahead, external to the vehicle, and also from inside the vehicle. In particular, the mobile device may be arranged to capture images or a sequence of images of the driver. Images of the driver according to the present aspect of the present invention processed to make a safety determination. For example, the images may be processed to detect whether the driver is falling asleep. In particular, a blink rate of the driver may be detected by processing the image data. Similarly, a determination may be made whether the driver has their eyes closed. In response to such a determination that a driver is falling asleep, the mobile device may be arranged to issue an alert so as to wake the driver.

[0046] Preferably, the sensor set comprises an audio sensor such as a microphone. Accordingly, the corresponding sensor data may comprise audio data.

[0047] Advantageously, an image sensor and/or an audio sensor can provide an important record of an event such as a crash.

[0048] Preferably, the sensor set comprises a positioning module arranged to determine the position of the mobile device. The positioning module may comprise a GPS module. The positioning module may be arranged to utilise the wireless telecommunication module to self-localise, for example by determining a position relative to one or more mobile telecommunication cell towers. Advantageously, the positioning module can allow the mobile device to determine its position (and so the position of the vehicle) over time. Accordingly, the positioning module can thus determine the speed of the mobile device and vehicle. Thus, the corresponding sensor data may comprise latitude, longitude, elevation, speed and other data obtainable from positioning modules such as GPS modules as is known in the art.

[0049] Preferably, the sensor set comprises an orientation sensor for determining the orientation of the mobile device. Said orientation sensor may comprise an electronic compass for determining a bearing, and so the direction in which the mobile device is facing.

Accordingly, the corresponding sensor data may comprise orientation and bearing data. Advantageously, such data can be used to augment the data of the positioning module. Furthermore, the executed application may be arranged to use the data from the orientation sensor to determine whether the mobile device has been fitted to vehicle, and whether the mobile device has been fitted in the correct orientation. Advantageously, the data from the orientation sensor may also be used to determine whether a significant event has occurred, such as the vehicle overturning.

[0050] Preferably, the sensor set comprises a user-input device arranged to receive an input from a user. The user input device may comprise at least one of buttons and a touch-sensitive display screen. Advantageously, this allows a user to input data to the mobile device.

[0051] Preferably, the mobile device comprises a timer. Preferably, the executed application is arranged to control the mobile device to record sensor data and/or driving information against time as determined by the timer. Accordingly, the timer can be used to time-synchronise sensor data and/or driving information.

[0052] Preferably, the executed application is arranged to encrypt the driving information stored on the memory. Advantageously, this reduces the possibility of said driving information being modified without authorisation. This is an important consideration when such driving data may be used as evidence, for example, when determining the cause of an accident.

[0053] Preferably, the mobile device is arranged to interface with an external device to receive external driving information from said external device. It will be appreciated that the sensor set onboard the mobile device may be supplemented by a sensor set external to the mobile device. For example, the external device may be an engine management system of the vehicle and/or the external device may be arranged to connect to the on-car data network of the vehicle. Thus, the external device may have access to information associated with the behaviour of the vehicle (for example, the speed of the vehicle, how much the brake pedal is being pressed, etc). Such driving information can be processed and/or stored by the mobile device under control of the executed application in a manner similar to driving information derived from sensor data internal to the mobile device.

[0054] Preferably, the mobile device is arranged to interface with an external device wirelessly, for example via a Bluetooth® connection. Advantageously, this removes the need

for the mobile device to be physically connected to the external device. As will be appreciated, following a driving period, a user may want to leave the vehicle and so take a personal mobile telecommunication device with them, and so a wireless interface with such an external device obviates the inconvenience of physically detaching and then subsequently re-attaching the mobile device.

[0055] Preferably, the mobile device is further controlled by the application to determine a unique identifier associated with the mobile device and retrieve from the memory and transmit via the wireless telecommunication module to a remote system said driving information paired with said unique identifier.

[0056] Advantageously, by pairing an identifier uniquely associated with the mobile device enables the remote system to unambiguously determine the source of the driving information. Accordingly, said driving information can be matched to a particular driver and/or vehicle. This is particularly useful when assessing a risk profile of said driver.

[0057] Preferably, the mobile device is controlled by the executed application to process the driving information to generate a driving score. The driving information may comprise the driving score.

[0058] Preferably, the mobile device comprises a display screen. Preferably, the display screen is touch-sensitive. Advantageously, the display screen may thereby be user-interactable. Preferably, the mobile device comprises a graphical user interface (GUI). The graphical user interface comprises user-interactable artefacts such as buttons. Preferably, the user-interactable artefacts may be displayed on the screen and receive a user input for selection or control of those artefacts. The mobile device may be controlled to selectively hide those artefacts in dependence on the state of the mobile device.

[0059] Preferably, the mobile device is controlled by the application to provide feedback about the driving information and/or values of the sensor data. Ideally, such feedback is via the display screen. For example, a detected speed may be displayed, a time elapsed may be displayed, a bearing/heading may be displayed, a detected position may be displayed and/or a detected image or sequence of images may be displayed (e.g. via a video feed).

[0060] In some embodiments there is provided a mobile telecommunications device adapted for installation to a vehicle and configured to log driving information associated with the vehicle when driven, the mobile device comprising: a sensor set comprising at least one

of an image sensor, an audio sensor, an accelerometer and a positioning module; a processor for processing sensor data from at least the sensor set to derive said driving information; a memory for storing said derived driving information; a wireless telecommunications module operable to download a controlling application; and a registration means for registering the start of a driving period during which the mobile device is installed to the vehicle and the vehicle is being driven by a driver; wherein, the processor is arranged to process sensor data from the sensor set during the driving period to derive driving information associated with when and/or how the vehicle is driven and store a selection of the driving information to the memory.

[0061] In another embodiment there is provided a mobile telecommunications device adapted for installation to a vehicle and configured to log driving information associated with the vehicle when driven, the mobile device comprising: a sensor interface arranged to receive sensor data from a sensor set; a processor for processing the sensor data to derive said driving information; a memory for storing said derived driving information; a wireless telecommunications module operable to download a controlling application; and a registration means for registering the start of a driving period during which the mobile device is installed to the vehicle and the vehicle is being driven by a driver; wherein, the processor is arranged to process sensor data from the sensor set during the driving period to derive driving information associated with when and/or how the vehicle is driven and store a selection of the driving information to the memory.

[0062] Preferably, the sensor interface is arranged to receive sensor data from a sensor set external to the mobile device. Preferably, the sensor interface is arranged to interface with an external device as described in relation to the first aspect of the present invention. Advantageously, this enables a mobile device to utilise a richer or better equipped sensor set than that local to the mobile device.

[0063] In another embodiment there is provided a mobile device adapted for installation to a vehicle and configured to log driving information associated with the vehicle when driven. Preferably, the mobile device comprises a sensor interface arranged to receive sensor data from an external sensor set. The mobile device may comprise an internal sensor set. Preferably, the mobile device comprises a processor for processing the sensor data to derive said driving information. Preferably, the mobile device comprises a memory for storing said derived driving information. Preferably, the mobile device is a mobile

telecommunication device, comprising a wireless telecommunications module. Preferably, the wireless telecommunications module is operable to download an application. Preferably, the mobile device comprises a registration means for registering the start of a driving period during which the mobile device is installed to the vehicle and the vehicle is being driven by a driver. Preferably, the processor is arranged to process sensor data from the sensor set during the driving period to derive driving information associated with when and/or how the vehicle is driven. Preferably, the mobile device is arranged to store a selection of the driving information to the memory. Preferably, the mobile device is arranged to transmit a selection of the driving information via the wireless telecommunication module. The mobile device may be arranged to transmit a selection of the driving information via the wireless telecommunication module to a remote system such as a remote data-logging system. Advantageously, transmitting (rather than storing) selected driving information prevents storage space local to the mobile device being used up.

[0064] In another embodiment there is provided a method of logging driving information associated with a vehicle when driven, the method comprising: adapting and installing a mobile device to the vehicle, the mobile device comprising a memory; registering the start of a driving period during which the mobile device is installed to the vehicle and the vehicle is being driven by a driver; processing sensor data from a sensor set during the driving period to derive driving information associated with when and/or how the vehicle is driven; and storing a selection of the driving information to the memory of the mobile device.

[0065] In another embodiment there is provided a data-logging system for logging driving information comprising: a database for storing a plurality of accounts, each account having a unique identifier and the database being arranged to store driving information associated with at least one of a vehicle and a driver; a communications interface arranged to communicate with a remote mobile device, and receive therefrom: a unique identifier for association of the mobile device with a corresponding one of the plurality of accounts; and driving information to be logged to that corresponding account.

[0066] The remote mobile device may be a mobile device in accordance with one of the first to fourth aspects of the present invention.

[0067] Preferably, the driving information comprises a driving score. Preferably, the driving information comprises sensor data captured and processed by the mobile device

during a driving period during which the mobile device is installed to a vehicle being driven by a driver.

[0068] Preferably, the system is arranged to process the driving information logged to the corresponding account to generate a driving score. The driving score may be used to determine a risk profile for at least one of the vehicle and driver.

[0069] According to a second aspect of the present invention there is provided a method of using a mobile telecommunications device to make a safety determination for a vehicle when in use, the method comprising: downloading a software program to the mobile telecommunications device, the software program in use configuring a processor of the mobile telecommunications device when the mobile telecommunications device is removably affixed to the vehicle, to: register the start of a driving period during which the mobile telecommunications device is removably affixed to the vehicle and the vehicle is being driven by a driver; the start of the driving period being determined based on the inputs received by a user interface of the mobile telecommunications device and sensor data from a sensor set of the device, the sensor set comprising a plurality of sensors selected from a group of sensors including an image sensor, and at least one of an audio sensor, an accelerometer and a positioning module, the start of the driving period also being determined without data from sensors of the vehicle; process, at the mobile telecommunications device, sensor data from the sensor set during the driving period to derive driving information associated with how the vehicle is driven; the driving information including images captured by the image sensor; and store a selection of the driving information to a memory of the mobile telecommunications device; processing the captured images to make a safety determination for the vehicle; and issuing an alert signal in response to making an unsafe determination for the vehicle from the processing step.

[0070] According to a third aspect of the present invention there is provided a non-transitory computer-readable medium having instructions comprising a software application stored thereon, wherein the instructions are configured to be executed on a processor of a mobile telecommunications device to enable the mobile telecommunications device to log driving information associated with a driver of a vehicle, the mobile telecommunications device including a display; a sensor set comprising a plurality of sensors selected from a group of sensors including an image sensor, and at least one of an audio sensor, an accelerometer and a positioning module; the processor; a user interface and a memory,

wherein the instructions, upon execution by the processor, enable the mobile telecommunications device to:register the start of a driving period during which the mobile telecommunications device is removably affixed to the vehicle and the vehicle is being driven by a driver; the start of the driving period being determined based on the inputs received by the user interface of the mobile telecommunications device and sensor data from the sensor set, the start of the driving period also being determined without data from sensors of the vehicle; process, at the mobile telecommunications device, sensor data from the sensor set during the driving period to derive driving information associated with how the vehicle is driven; the driving information including images captured by the image sensor; store a selection of the driving information to the memory of the mobile telecommunications device; process the captured images to make a safety determination for the vehicle; and issue an alert signal in response to making an unsafe determination for the vehicle from the processing step.

[0071] For brevity, it will be understood that features, functions and advantages of different aspects of the present invention may be combined or substituted where context allows. For example, features, functions or advantages of the mobile device described in relation to the first to fourth aspects of the present invention may be provided as method steps in the method of logging driving information according to the fifth aspect of the present invention.

Brief Description of the Drawings

[0072] In order that the invention may be more readily understood, reference will now be made, by way of example, to the accompanying drawings in which:

[0073] Figure 1 is a schematic illustration of a system within which the mobile device of various embodiments of the present invention may be used;

[0074] Figure 2 is an illustration of the automobile of Figure 1 configured with a mobile device in accordance various embodiments of the present invention;

[0075] Figure 3 is a schematic illustration of the functional components of the mobile device of Figure 2;

[0076] Figure 4a is a process flow chart, illustrating method steps executable by the mobile device of Figures 2 and 3;

[0077] Figure 4b is a more detailed process flow chart, providing an example of how a driving incident or event may be detected in accordance with embodiments of the present invention; and

[0078] Figures 5 to 24 illustrate a graphical user interface of the mobile device according to Figures 1 to 4b.

Detailed Description of the Embodiments

[0079] Specific embodiments are now described with reference to the appended figures.

[0080] A preferred embodiment of the present invention relates to a mobile telecommunications device for recording events associated with a vehicle, such as a car. In particular, the mobile telecommunications device is loaded with an application – a 'mobile app' – which is arranged to record and document the events surrounding an incident involving the vehicle (a 'driving incident'), such as a vehicle collision. The mobile application may be referred to as the 'Witness' application in the ensuing description.

[0081] Figure 1 illustrates a system 1 within which a vehicle, such as an automobile 3 configured with a mobile telecommunications device executing the Witness application, may communicate with one or more remotely located devices or systems. Such devices may relate to one or more servers, such as, an emergency services server 7, a content provider server 9, and a personal computer 11. Communication between the automobile 3 and the one or more remotely located devices 5, 7, 9, 11 may be effected via a shared communication network 13. The shared communication network may relate to a wide area network (WAN) such as the Internet, and may also comprise telecommunications networks. For example, the mobile telecommunications device of the present embodiments may be arranged to communicate with any one of the remotely located devices 5, 7, 9, 11 via a mobile telecommunications base station 15, which is coupled to the shared mobile telecommunications network 13.

[0082] A main purpose of the mobile telecommunications device, when arranged within a vehicle in motion, such as the illustrated automobile 3, is to monitor and process sensor data captured by the mobile device, to derive driving information associated with the moving automobile 3. As mentioned previously, this driving information is subsequently used by the mobile device to determine if a driving incident or event has occurred. The term

"driving incident" as used within the present context may relate to an event such as a collision, a near-miss, dangerous driving, erratic driving or similar. Similarly, the driving information may be used as a means for monitoring a driver's driving performance, and determining a driving characteristic, or user profile for the subject driver. In other words, the sensor data and/or the driving information may be used to determine for example, if the driver is a cautious driver, or a reckless driver. Further details of this alternative embodiment are described below.

[0083] The mobile telecommunication device's functionality is provided by the Witness application, which is installed in the device's local non-volatile storage, and which is executed by the device's native processor. The application may be downloaded to the mobile device via the shared communications network 13 and telephone base station 15, from the content provider server 9.

[0084] In use (once the application has been configured for execution on the mobile telecommunications device), when a driving incident has been detected by the mobile telecommunications device, data, comprising one or more of mobile device sensor data, derived driving information, and captured image data may be automatically forwarded to one or more of the remotely located devices 5, 7, 9, 11. For example, the mobile device may be configured such that when a driving incident is detected, such as a collision involving an automobile 3, driving information (including image data captured by the mobile device) derived from the sensor data is automatically forwarded ~~to the insurance server 5,~~ via the base station 15 and shared communications network 13.

[0085] Similarly, once a driving incident has been detected, data may also be automatically forwarded to the emergency services server 7. For example, such data may comprise the position information of the automobile 3, along with an automated S.O.S. message requesting assistance from the emergency services. Forwarded data may also comprise sensor data, and any relevant derived driving information, such as speed of impact, the g-forces the vehicle was subjected to during the collision, or any other information wherefrom the severity of the collision may be determined, and which may be used to assist the emergency services in coordinating the appropriate level of response.

[0086] Optionally, an electronic message may be sent to a personal contact preselected by the user. For example, an automated message, such as an e-mail, may be forwarded to the PC 11 of the user nominated personal contact, informing the personal

contact that the user of the vehicle 3 has been involved in a driving incident. Similarly, and due to the mobile device's telecommunications functionality, an electronic text message, such as an SMS (Short Message Service) may be forwarded to the telephone of the user selected personal contact, informing the contact of the driving incident. The mobile device may be equally be arranged to communicate with a personal contact via any known electronic messaging service and/or instant messaging service too. For example, via Apple's® iMessage, or RIM's® BlackBerry Messenger (BBM) service.

[0087] This functionality of forwarding a message to a nominated contact, may also be of particular benefit for managing large fleets of vehicles. For example, a car hire service. In this way, if any of the vehicles comprised in the fleet are involved in a driving incident, the car hire service may be automatically notified of the identity of the specific vehicle involved in the driving incident. In such embodiments, the nominated personal contact would be preselected by the vehicle fleet manager. The option of providing a second user selected personal contact is also envisaged. In this way, a message may be forwarded to both the car hire service for example, and to the driver's selected personal contact.

[0088] In preferred embodiments the mobile telecommunications device relates to a mobile telephone having native processing functionality, and preferably relates to a smartphone. Preferably, the mobile telephone comprises a camera arranged to enable image capture, and preferably arranged to enable a sequence of images to be captured taken in temporal succession. In other words, in preferred embodiments the mobile telephone comprises a camera configured to enable video footage of a sequence of events to be captured.

[0089] Alternatively, the mobile telecommunications device may relate to a PDA, a notepad such as an iPad®, or any other mobile device comprising local processing means and means for communicating with a telecommunications network.

[0090] Figure 2 provides a more detailed view of the automobile 3 of Figure 1, and illustrates a preferred arrangement of the mobile telecommunications device 17 within the automobile 3. In the illustrated embodiment, the mobile telecommunications device 17 relates to a smartphone configured with an image capture device, such as a camera. Preferably, the device 17 is arranged within the vehicle, such that the camera has a clear line of sight of the road in the principle direction of travel of the automobile 3. For example, the device 17 may be attached to the windshield 19 of the automobile 3 in an adapter 21. The

adapter 21 may comprise a flexible telescopic arm, configured with a suction cup at one end for affixing the adapter to the windshield 19, and a dock arranged at the opposite end for securely holding the telecommunications device 17 in place. The telescopic arm enables the position of the device 17 to be varied, such that a clear line of sight in the direction of travel may be obtained.

[0091] The details of the adapter 21 are irrelevant for present purposes, with the exception that it must enable a clear line of sight in the principle direction of travel of the vehicle to be obtained, and it must firmly affix the mobile to the vehicle. Affixing the mobile telecommunications device 17 to the automobile 3, ensures that the mobile device 17 is able to accurately capture the automobile's state of motion. By principle direction of travel is intended the main direction of travel of the vehicle when operated in a conventional way, indicated by the arrow A in Figure 2. In other words, the forward direction of travel. The skilled reader will appreciate that whilst most vehicles, such as an automobile, may have more than one direction of travel (e.g. travelling backwards when in reverse gear), the majority of vehicles have a primary direction of travel, which is the intended direction of travel for any transit of substantial length and/or distance. Arranging the telecommunications device 17 relative to the direction of principal travel, ensures that the camera (not shown) of the telecommunications device 17 is well placed to capture any image data which may be pertinent to a subsequently detected driving incident, such as a collision.

[0092] Figure 3 is a schematic of the modular components of the mobile telecommunications device 17 of Figure 2. Preferably the mobile telecommunications device 17 comprises: an image capture module 21, an accelerometer 23, a GPS receiver 25, an audio capture module 27, a communications module 29, a processor module 31 and a storage module 33. The image capture module 21, accelerometer 23, GPS receiver 25, and audio capture module 27 form a sensor set and are generically referred to as data capture modules in the ensuing description, and are differentiated from the communications module 29, processor module 31 and storage module 33, in that they comprise sensors for sampling physical data.

[0093] This sampled physical data, which is also referred to as sensor data, is subsequently processed by the processor module 31 and stored in the storage module 33.

[0094] The image capture module 21 may relate to any image capture device, such as an integrated camera commonly found in smartphones or similar mobile devices. As

mentioned previously, the image capture module 21 is preferably configured to capture a plurality of images taken in temporal succession, such as provided by a video camera.

[0095] The accelerometer 23 is arranged to provide information regarding the motion of the automobile 3 along all three dimensional axes. For example, the accelerometer 23 provides information regarding the pitch, yaw and roll of the automobile 3. Sensor data captured from the accelerometer 23 may be used to determine the g-forces the automobile has been subjected to. This is particularly useful in determining the severity of a collision. In general, the greater the g-forces experienced in a collision, the greater the risk of serious injury to the passengers of the vehicle. This information may assist the emergency services in forming an initial assessment of the severity of a collision. Furthermore, this type of data may also assist the emergency services and/or insurance provider to obtain a better understanding of the driving incident. For example, in the event of a collision, this data may assist the emergency services to obtain a better understanding of how the collision occurred. This information may subsequently be used for dispute resolution, and/or for determining culpability.

[0096] The GPS receiver 25 is arranged to provide location information, such as positional coordinates, and can also provide velocity information. When combined with the accelerometer sensor data, the GPS receiver data can be used to provide a very accurate model of a driving incident, such as a collision. In particular, the GPS sensor data provides velocity data, such as the velocity of impact. The velocity data enables one to determine if a vehicle was being driven at speeds greater than the legally permitted maximum speeds.

[0097] The audio capture module 27 provides means, such as a microphone, for recording audio data, which might be generated by a driving incident. This includes any sounds generated externally to the vehicle, for example the sound of an impact, or the sound of the crumple zone being crushed. Additionally, sounds generated internally to the vehicle are also recorded. Such audio data may also help to recreate a driving incident, and understanding the causes of the incident.

[0098] The communication module 29 provides the mobile telecommunications device 17 with functionality for communicating with the remotely located devices 5, 7, 9, 11 of Figure 1. The communication module 29 comprises a wireless telecommunications sub-module 31 enabling communication over a telecommunications network. An optional wi-fi communication sub-module is also envisaged. Similarly, the presence of wired

communication modules are also envisaged, such as a USB port and/or an IEEE 1394 interface (more commonly known as FireWire™) to support wired communication with a remote device, such as a personal computer or similar. Such a connection may be useful for the purposes of side-loading the application to the mobile device.

[0099] As mentioned previously, sensor data captured from any one of the aforementioned data capture modules 21, 23, 25, 27 is processed by the processor module 33, to generate driving information. By driving information is intended any data which may be derived from raw sensor data captured by any one of the aforementioned modules 21, 23, 25, 27. For example, g-force data is driving information which is derived from the sensor data sampled by the accelerometer 23. The skilled reader will be familiar with the plurality of types of driving information that may be derived from sensor data sampled by the aforementioned modules, and accordingly a complete list of the different types of driving information that may be derived from sampled sensor data is omitted for brevity.

[00100] The processor module 33 is also configured to analyse sampled sensor data and generated driving information to determine if a driving incident has occurred (described in more detail below).

[00101] Sampled sensor data is stored in storage 34, which is operatively coupled to the processor module 33, along with any generated driving information. The storage 34 is preferably configured with a FIFO (First In First Out) storage buffer 34a, and a permanent storage component 34b. In preferred embodiments, the data capture modules are configured to sample data at periodic intervals. Preferably, these intervals are sufficiently small, of the order of milliseconds, such that for practical purposes the data capture modules may be considered to sample data continuously. The sampled data, along with any derived driving information is preferably stored in the storage buffer 34a, unless a driving incident has been identified, in which case the associated sensor data and driving information is stored in the permanent storage component 34b to avoid undesirable overwriting.

[00102] In preferred embodiments, the FIFO storage buffer 34a is provided with a finite amount of storage space. Nonetheless, said storage space may be predefined by the user as will be described below. In any case, once this storage space has been exhausted, the oldest recorded data is overwritten by newly sampled data, and this cycle of overwriting older data with newly sampled data is continuously carried out during operation of the telecommunications device 17, unless a driving incident has been detected, in which case,

and as mentioned previously, all data related to the driving incident is stored in a long term protected storage 34b to safeguard it from being overwritten by newer data.

[00103] In preferred embodiments, the mobile telecommunications device 17 may be configured with a data recording strategy by the user. This might define the frequency with which sensor data is sampled. In other words, how many measurements are made per unit of time. Furthermore, the recording strategy also defines how data is recorded. In preferred embodiments, sampled sensor data is stored in data files in the buffer 34a. Each data file represents a plurality of sequentially sampled sensor data, captured over a defined period of time, which will be referred to as a 'data file period'. This is best illustrated by considering captured image data, such as video footage. A video period may be defined, which period defines the unit of physical time covered by captured video footage comprised in a single video data file – this is the data file period for image data. The video data file is subsequently stored in the buffer 34a. For example, a five minute video period setting, instructs the processor 33 to store all sequentially captured image data captured by the image capture module 21 over a period of five minutes, in a separate video data file. It is to be understood that whilst the image capture module 21 is continuously sampling image data (in other words, it is continuously capturing image data), this plurality of captured image data is grouped together for storage in video data files, each data file representing a five minute data file period.

[00104] Sampled sensor data and derived driving information is also continuously analysed by the processor module 33 for the purposes of detecting a driving incident. As soon as a driving incident is identified, the associated sensor data and derived driving information is stored in a data file in accordance with the data recording strategy. Returning to the example described in the preceding paragraph, this entails combining the video footage captured within a temporal window of five minutes leading up to the detected driving incident, in a single video file, and storing this data file in protected storage 34b. Whilst each different type of sensor data may be recorded in separate data files, in preferred embodiments all the different types of sensor data sampled by the mobile telecommunications device 17 are stored together in a single data file in accordance with the user selected data recording strategy. This means that the five minute data file referred to above, preferably also comprises GPS data, accelerometer data, and audio data sampled over the five minute time period.

[00105] Data files are stored in the buffer 34a, unless they are associated with a driving incident, in which case they are then stored in protected storage 34b, which cannot be overwritten. Once the storage space comprised in the buffer 34a has been exhausted, the oldest data file is overwritten by a newer data file.

[00106] Data compression methods may also be used in conjunction with the present invention to improve the use of storage. For example, data comprised in data files which have not been associated with a driving incident may be compressed using compression techniques, which techniques will be known to the skilled reader. Similarly, within a data file associated with a driving incident, sensor data captured at time coordinates which are distant from the determined driving incident may be compressed. In this way, the resolution of sensor data which is directly pertinent to a driving incident is maintained, whilst sensor data which may be less relevant to the driving incident is maintained at a lower resolution.

[00107] Since the sensors of the mobile telecommunications device 17 are continuously recording sensor data, even when a driving incident is detected, the device 17 may be configured to comprise sensor data and/or driving information recorded/derived shortly after the driving incident in the same data file, since this data may also be relevant for understanding a driving incident. Furthermore, this also enables the mobile telecommunications device to record multiple driving incidents. For example, a multiple collision.

[00108] The processor module 33 may be configured with encryption means, enabling stored data files to be encrypted to prevent data tampering. Envisaged encryption means may comprise both software solutions and hardware solutions. For example, the processor module may comprise a cryptoprocessor, or the processor may be configured with code to carry out a cryptographic process.

[00109] Figure 4a is a flow chart outlining the method carried out by the mobile telecommunications device 17, to determine if a driving incident has occurred, in accordance with a preferred embodiment. An application is downloaded from the content provider server 9 of Figure 1, onto the mobile telecommunications device 17, at step 36, as previously described. This may be done over a telecommunications network. The application provides the mobile telecommunications device 17 with the previously described functionality, when executed on the device. The mobile telecommunications device is configured within the

vehicle, at step 38. This may comprise affixing the mobile telecommunications device 17 to the vehicle via an adapter, as described previously.

[00110] The recording strategy is specified at step 40. As mentioned previously, this comprises setting the period of time that each recorded data file represents. Furthermore, it may also comprise defining the size of the buffer 34a and/or the number of data files that are to be stored within the buffer. Preferably, the recording strategy is specified only once, upon first use of the mobile telecommunications device 17. Where the recording strategy has already been defined, method step 40 is skipped, and the method continues with step 42.

[00111] The start of a driving period is registered, at step 42. The start of the driving period determines when the recording of sampled sensor data begins. The start of a driving period may be manually entered by the user via the application's graphical user interface (GUI). Alternatively, the start of the driving period may be automated. For example, the mobile device 17 may be configured to initiate the driving period once sensor data above a minimum threshold value is recorded, indicative of the vehicle being in motion. For example, once a velocity greater than 20 kilometres per hour is detected.

[00112] Alternatively, the start of the driving period may be initiated once the application determines that the mobile telecommunications device 17 has been affixed to the vehicle. For example, the adapter 21 may comprise a registration module (not shown) arranged to register the installation and fixation of the mobile device to the vehicle and/or adapter. The registration module may comprise an NFC device. When the mobile device is brought into close proximity with the registration module, a driving period is initiated.

[00113] Once the driving period has been initiated, sensor data is sampled and recorded in storage 34, at step 44. Additionally, the sampled sensor data is used to generate driving information by the processor module 33. The sampled sensor data and the driving information is continuously analysed by the processor module 33, at step 46.

[00114] The processor module 33 determines if a driving incident has been detected, at step 48. This is determined on the basis of the analysis carried out at step 46. If a driving incident has been detected, all the sensor data and driving information associated with the data file period, is stored in a data file in protected storage 34b, at step 50.

[00115] There are several ways in which a driving incident may be detected. Preferably, this is an automated process, wherein the processor module 33 determines a driving incident has occurred on the basis of an observed marked variation in sensor data

and/or driving information. The term 'marked variation' is to be understood to relate to a significant change in sensor data and/or driving information occurring over a very short time period. In other words, a detected impulse in recorded sensor data and/or driving information, indicative of a significant change in the state of motion of the vehicle occurring over a short time period. For example, a sudden increase in the g-forces the vehicle is subjected to, may be indicative of a collision and if observed, result in a driving incident being determined to have occurred by the processor module 33.

[00116] Predefined threshold values may also be used to automate the detection of a driving incident. For example, each data type and/or derived driving information (e.g. acceleration, velocity, g-force, pitch, roll, yaw etc.) may be associated with a threshold value. When any one of these threshold values is exceeded, the processor module 33 may be configured to determine that a driving incident has occurred. Similarly, the automated detection of a driving incident may require that a threshold condition associated with a combination of predefined threshold values, each threshold value being associated with a different data type and/or type of driving information, must be exceeded, in order for the processor module 33 to automatically determine that a driving incident has occurred. For example, in the event of a collision, it is reasonable to expect to observe a marked variation in g-force, accompanied by a marked variation in velocity. Accordingly, the threshold condition may require that in order for a collision to be automatically detected, both a marked variation in g-force and a marked variation in speed, in excess of predefined threshold values must be observed.

[00117] Similarly, the occurrence of a driving incident may also be recorded manually by the user via the application GUI. This may be beneficial for the purposes of documenting data associated with a low velocity collision - colloquially referred to as a 'fender-bender' - which may not result in any marked variations in sampled sensor data, and therefore may not be automatically detected.

[00118] Similarly, once a driving incident has been detected, an S.O.S. message may be automatically forwarded from the mobile telecommunications device 17 to the emergency services server 7, at step 54. The S.O.S. message may also comprise sensor data and derived driving information, which may assist the emergency services in coordinating their response.

[00119] As mentioned previously, the mobile telecommunications device 17 will continue to sample and record sensor data even once a driving incident has been detected, unless the mobile telecommunications device 17 detects that the driving period has terminated, at step 56. If the driving period has terminated, the present method is terminated and the device stops recording sensor data. The end of a driving period may be automatically detected by the processor module 33, if certain conditions are met. For example, if the measured velocity of the vehicle remains zero for a predetermined period of time, the processor module 33 may infer that the vehicle is stationary and no longer being driven, and accordingly ceases recording sensor data, and the method is terminated. If instead the processor determines that the driving period has not yet terminated, a new data file period is initiated, at step 58, and steps 44 through 62 are repeated.

[00120] Where a driving incident is not detected at step 48, the processor module 33 will determine if the data file period has expired, at step 60. If the data file period has expired, then the sensor data and the derived driving information generated during the data file period is combined and stored in a single data file, for storage in the buffer 34b, at step 62. The processor 3 then determines, at step 56, if the driving period has terminated. If the driving period has not terminated, a new data file period is initiated, at step 58. The mobile telecommunications device 17 continues to sample sensor data, to derive driving information, and steps 44 through 62 are repeated, until the driving period is determined to have terminated.

[00121] Figure 4b provides more detail regarding how a driving incident may be automatically detected (i.e. steps 46 and 48 of Figure 4a) in a preferred embodiment, where the mobile telecommunications device 17 is configured to sample audio data, accelerometer data, and GPS data only. Each one of these types of data is analysed in turn, at steps 64, 66 and 68. The analysis may comprise comparing measured sensor data and/or derived driving information with a data model. The model may comprise defined threshold values for different data types. Sampled sensor data and/or driving information may be compared with the data model to determine if a driving incident has occurred.

[00122] For example, the analysis of sampled audio data, at step 64, may comprise comparing the recorded audio data with predetermined audio data models representing specific sounds. Such sounds may relate to the sound of tyre squeals, the sound of deforming metal, the sound of breaking glass, passenger screaming and/or shouting, the sound of airbag

deployment, and any other sound which may be associated with a driving incident. Effectively, this may be considered audio fingerprinting, which serves to identify specific sounds associated with a driving incident by carrying out a signal profile analyses of the audio signal captured by the audio capture module 27. To achieve this, the storage device 34 may comprise a database of prestored audio sound files. The audio sound files represent sounds associated with a driving incident. The captured audio signal is compared with the sound files comprised in the database, to identify matches between the captured audio signal and the database of sound files. This facilitates the audio fingerprinting of specific sounds, indicative of a driving incident, present within the captured audio data signal captured by the audio capture module 27.

[00123] Similarly, the analysis of sampled accelerometer data, at step 66, may comprise comparing the sampled data with predetermined accelerometer data models. The data models represent specific states of motion of the vehicle. For example, this might comprise defining threshold values for yaw, pitch and roll, which if exceeded, indicate a state of motion of the vehicle indicative of a driving incident. For example, a measured yaw value above a predetermined threshold value may be indicative of the vehicle having lost traction and is fishtailing and/or skidding. Similarly, a roll and/or pitch value above a predetermined threshold value may be indicative of the vehicle having overturned.

[00124] Accelerometer sensor data is also used for deriving driving information such as g-forces. Analysis of g-force data is also used to determine if a driving incident has occurred. For example, approximate g-force values for detecting certain driving incidents are as follows:

[00125] Harsh braking – a deceleration of greater than 2.5 m/s^2 or forward G-force of greater than 0.7G for more than 400msec.

[00126] Harsh acceleration – from stationary, an acceleration greater than 2.5 m/s^2 or backward G-force of greater than 0.7G for more than 800msec.

[00127] Harsh swerving - lateral G-forces greater than 0.7G for more than 400msec.

[00128] The data models are preferably preconfigured and are comprised within the application executed on the mobile telecommunications device. Different data models are used depending on the type of vehicle the telecommunications device is being used with. Different vehicle types will experience different states of motion during regular operation,

which must be considered in determining if a driving incident has occurred. For example, a motorcycle will display more roll and/or pitch than an automobile during regular operation. Accordingly, different data models and/or threshold values must be used to automate the identification of a driving incident for different vehicle types. The specific data models used may be selected during an initial configuration of the mobile telecommunications device, by indicating the type of vehicle the device is being used with.

[00129] On the basis of the audio data analysis and the accelerometer data analysis, the mobile telecommunications device determines, at step 72, if a driving incident has occurred. If it is determined that a driving incident has occurred, then the telecommunications device proceeds with step 50 of Figure 4a. If instead a driving incident is not detected, the telecommunications device proceeds with step 60 of Figure 4a.

[00130] The GPS data analysis, at step 68, comprises analysing positional data and velocity data for any anomalous readings. For example, a sudden deceleration followed by a zero-velocity reading lasting a predetermined period of time, may be indicative of a collision. If such a zero-velocity reading is observed at step 70, in conjunction with anomalous audio and/or accelerometer sensor at step 72, then a driving incident is determined and the mobile telecommunications device proceeds with step 50 of Figure 4a. This is a further example of a threshold condition, discussed previously.

[00131] The previously described mobile telecommunications device and method may also be used to monitor and generate a driver profile. The driver profile may be indicative of the type of driver a user is. For example, this may comprise determining if a user is a calm and patient driver, or an aggressive driver. Also, this may comprise determining whether a user regularly flouts speed limits, and/or ignores safety distances.

[00132] For example, analysis of captured image data, such as video footage, may be used to determine if a user regularly flouts safety distances. In preferred embodiments, the mobile telecommunications device is arranged within the subject vehicle to have a clear line of sight of the road in the direction of principle motion. Accordingly, the number plate of any vehicle preceding the subject vehicle will be captured by the image capture module. Since the physical dimensions of number plates are standardised and known in each country, they may be used as a metric to scale the captured image. When combined with the known optical characteristics of the image capture module, this enables the distance of the image capture module from the image object (i.e. the preceding vehicle) to be determined at the time of

image capture. This information may then be used to see if a user adheres to recommended safety distances.

[00133] Image analysis can also be used to determine driving conditions and the driving environments. For example, image processing can detect road signs, such as stop signs or traffic lights. Furthermore, driving conditions, as affected by the weather can be determined. For example, if the windscreen wipers are detected to be in motion, it can be inferred to be raining. Once the driving conditions are so determined, an assessment of the driving performance of a user can be made by determining whether the user reacts or behaves appropriately to the driving conditions. For example, if the driver is seen to be jumping red lights, or driving dangerously in rain or snow, then a higher risk profile may be assigned to that driver.

[00134] Similarly, accelerometer and g-force data may be used to determine if a user has an erratic driving style. For example, a user that generates sharp variations in g-force data and accelerometer data during regular operation of a vehicle, may be considered to drive erratically, and therefore at greater risk of being involved in an accident,

[00135] The mobile telecommunications device may also be configured to interface and communicate directly with a vehicles native telemetry systems. For example, the majority of modern cars have inbuilt electronic control systems or engine management systems, arranged to collect data regarding vehicle system performance. This data may be communicated to the mobile telecommunications device either via a wired physical connection, such as USB (Universal Serial Bus), or via a wireless communication protocol such as Bluetooth®. This data may subsequently be used by the mobile telecommunications device to complement sensor data captured directly by the telecommunications device. In this way a more accurate model of a driving incident, and/or of a user profile may be generated. For example, native vehicle telemetric systems may comprise electronic tyre pressure sensors, and are able to detect if a tyre is under and/or over-inflated. This information may be communicated to the mobile telecommunications device and may help to explain the causes for a driving incident, such as a sudden loss of traction resulting from a burst tyre.

[00136] Further features of the Witness application, are set out below.

Benchmarking

[00137] It will be appreciated that different sensor types, phones, mounting positions, vehicles, drivers and road conditions may generate differing outputs for driving behaviour that is 'safe'. To account for this, the Witness application may have the following functionality:

[00138] During a 'training mode' (e.g. first week of enabling the Witness application) the input from the sensors are used to build up a 'benchmark' for a particular driver's typical driving conditions.

[00139] Assuming an accident does not occur during this training mode, the benchmark data can be subsequently used to assess the occurrence of driving incident.

[00140] There is preferably an option to notify the Witness application of a change in parameters (e.g. different driver, driving off-road etc). Thus a number of 'profiles' may be set up. Each profile may require an independent training mode period.

[00141] If the Witness application incorrectly detects that a driving incident has occurred, it can receive feedback from the user to modify its sensitivities. E.g. a more aggressive driver is actually driving.

Crash/Collision Management

[00142] On detection of a crash (or other driving incident) the Witness application is arranged to take one or more of the following actions:

[00143] Announce that it has detected an accident (audio/screen prompt)

[00144] Call the emergency services (with option to cancel) – e.g: Audio/screen prompt: 'Witness has detected that you have been involved in a (serious) accident and will call the emergency services. If this is not the case, please cancel within 10 seconds.'

[00145] Provide reassurance

[00146] Provide the user with a checklist of things to do:

[00147] Take photographs of vehicles involved in the incident (inc number plates)

[00148] Take down name, address, insurance details etc of 3rd parties involved in incident

[00149] Communicate to the insurance company that an incident has been detected (e.g. low bandwidth data or text message)

[00150] Protect the high quality recorded data so it is not overwritten

[00151] If appropriate – or in response to a request from a communication to the phone from the insurance company – transmit all or selected portions of the recorded data associated with the incident.**Data processing for generating a user profile**

[00152] Further features of the user profile generation embodiment are summarised:

[00153] If the Witness application incorrectly detects an event or incident of significance, and receives feedback that the vehicle was not involved in an accident (but was in a near miss) – this could alter the risk profile of the driver. For example – if this happens frequently, but no accident occurs over a given period, this could be an indicator that the driver is good at reacting to potential hazards.

[00154] Erratic driving (e.g. jerky steering or braking detected by G-force sensor).

[00155] Driving faster than the speed limit allocated to a given road (detected by GPS).

[00156] Further details regarding the features and functionality of the Witness application, in particular the graphical user interface of the Witness application, are now described.

[00157] Referring to Figure 5, a first page 80 of the Witness application user manual is shown in which an image of the Main Menu (the top-level menu) 82 is displayed. The Main Menu is displayed when a user first runs the application on a smart-phone, such as the iPhone® 4. The main menu includes the following user-selectable buttons:

[00158] Recording Screen 84

[00159] File Management 86

[00160] Settings 88

[00161] Accident Management 90

[00162] Information 92 (displays up a manual, as shown in Figures 5 to 14).

[00163] Selecting the Recording Screen button 84 opens the Recording Screen 94 – the second image shown in Figure 5. The Recording Screen 94 contains a video feed 96 from the camera of the smart-phone, which occupies the majority of the visible screen area. Overlaid on to the video feed is the detected speed of the vehicle 98 (e.g. 0 mph), heading 100 (e.g. south by south-west) and the elapsed recorded time 102 (e.g. 00:00). Displayed in a left column of the Recording Screen are additional user selectable buttons:

[00164] Keep current video 104 (pressing this button will automatically copy the current video - and the previous video segment - to the protected storage 34b, and prevents that information from being overwritten. The user is advised to press this button in the event of a driving incident that needs to be recorded).

[00165] Take photo 106 (captures a still photograph).

[00166] Exit Recorder 108 (returns to main screen).

[00167] Start / Stop Recording 110 (starts recording video footage - and other data).

[00168] Referring to Figure 6, a second page 112 of the Witness application user manual is shown, in which an image of the Recording Screen 114 is shown and described operating in a map-displaying mode rather than a video-feed mode.

[00169] During recording, (i.e. when the 'Start / Stop Recording' button 110 is pressed) the Exit Recorder button in the Recording Screen is substituted with a Map Display button 116. Pressing it will toggle between the modes showing the video feed and a map of the current location.

[00170] Referring to Figure 7, a third page 118 of the Witness application user manual is shown, in which the File Management Screen 120 is shown and described. The File Management Screen 120 can be accessed by pressing the File Management Button 86 in the Main Menu.

[00171] The File Management Screen 120 displays video and associated data (e.g. telemetry data) that has been previously recorded. The stored data is contained in either a protected area of storage or in a "Recording Stack". Data files in the protected area are saved and so not overwritten as part of a Recording Strategy. In contrast, data files in the Recording Stack may be overwritten as part of the Recording Strategy.

[00172] As illustrated in Figure 7, the bottom section of the list represents the "Kept" data files 122, whereas the top section of the list represents the "Recording Stack" 124. "Kept" data files 122 can be edited and deleted from the File Management Screen 120, whereas "Recording Stack" data files cannot. Editing "Kept" data files can involve renaming them.

[00173] The recorded data files are listed on screen along with the time and date of the recording and the electronic size of the data file. Accordingly, the user is provided with feedback about how big the data files are, and so if the smart-phone is low in storage, the

user can elect to delete certain "Kept" data files. "Recording Stack" data files will be automatically overridden by the Recording Strategy.

[00174] The controls on the toolbar at the bottom of the recordings screen allow a user to change the selection mode of the video stack and includes:

[00175] Video 126 (when highlighted, if a data file is selected, a video recording playback screen will be displayed).

[00176] Map 128 (when highlighted, if a data file is selected, then a map will be displayed showing the area over which the recording was made).

[00177] Export 130 (when highlighted, a selected data file will be passed to an Export Screen where export options will be provided).

[00178] Keep 132 (when highlighted, if a "Recording Stack" data file is selected, then a user will be prompted to name it, and then it will be stored as a "Kept" data file).

[00179] The icons in the File Management Screen change in dependence on the selected mode. For example, Figure 20 shows the icons 134 displayed when the Video selection mode is highlighted; Figure 21 shows the icons 136 displayed when the Map selection mode is highlighted; Figure 22 shows the icons 138 displayed when the Export selection mode is highlighted and Figure 23 shows the icons 140 displayed when the Keep selection mode is highlighted. Advantageously, this provides improved feedback to a user about what selection mode is highlighted and so what action is likely from the selection of a data file.

[00180] Referring to Figure 8, a fourth page 142 of the Witness application user manual is shown, in which an image of a Recording Playback screen 144 is shown and described. The Recording Playback screen is invoked by highlighting the Video Mode 126 in the File Management Screen 120 and selecting an appropriate data file.

[00181] In the Recording Playback screen 144 it is possible to play back a pre-recorded video feed associated with a chosen data file. As well as playing back the recorded video feed, the Recording Playback screen also displays other associated data such as telemetry data 146. For example, date, time, speed, forward/backward G-forces, latitude, longitude and heading information is overlaid onto the video feed. As the video is played back, these values will typically change depending on the behaviour of the vehicle, as recorded by the mobile device.

[00182] Forward and backward G-forces are those that correspond to the forward and backward movement of the vehicle and are the primary metric for determining an event such as a crash. However, other G-forces (e.g. up/down and side-to-side) may also be measured by the device – even if they are not necessarily displayed on the mobile screen.

[00183] As recited in Figure 8, the Recording Playback screen provides further user controls in the form of:

[00184] Playback Position Scrub Bar 148 (horizontal bar at bottom of screen)

[00185] Playback Speed Bar 150 (vertical bar at left side of screen)

[00186] Pause 152 (pauses playback)

[00187] Eject 154 (return to previous screen)

[00188] Loop 156 (plays the data file continuously)

[00189] The Playback Position Scrub Bar 148 allows a user to jump to different positions within the recording without necessarily needing to watch all of the recorded footage. Advantageously, this allows a user to more quickly locate a desired item of footage within a given data file. Also, the Playback Speed Bar 150 can be used to speed up or slow down the playback of the data file. This allows a desired item of footage to be found more quickly through sped-up playback, and also allows an item of footage to be more carefully analysed through slowed-down playback. Furthermore, it is possible to zoom in and out of a region of the video file using a 'pinch and zoom' movement as is standard with most multi-touch touch-screen devices.

[00190] Referring to Figure 9, a fifth page 158 of the Witness application user manual is shown, in which a different type of Recording Playback screen 160 is shown and described. Specifically, the image represents playback of a pre-recorded data file as can be invoked by highlighting the Map Mode 128 in the File Management Screen 120 and selecting an appropriate data file.

[00191] In contrast with the Video Mode playback, this Map Mode playback shows a map of the area 162 where the recording took place. A blue breadcrumb trail 164 is overlaid on to the map showing the extent of movement of the vehicle during the recorded period. A scrub slider 166 is shown, which is user-operable to adjust the time within the recorded period. As the slider is adjusted, a pin 168 moves along the blue breadcrumb 164 to

show the position of the vehicle at the time as specified by the slider 166. Tapping the pin 168 displays associated telemetry data 170 at that position and time.

[00192] Referring to Figure 10, a sixth page 172 of the Witness application user manual is shown, in which an image of a Video Export Screen 174 is described. The Video Export Screen 174 may be invoked by highlighting the Export button 130 in the File Management Screen 120 and selecting an appropriate data file.

[00193] The Video Export Screen 174 allows the quality of the video associated with the selected data file to be adjusted, before that video is exported. Advantageously, this can allow the user to control the size of the data to be exported. Telemetry data (i.e. sensor data) is also exported, embedded within the video file. Video data can be exported with or without sound, depending on the permissions of the user. Export typically involves copying data files from the mobile device to a local computer (e.g. via a data cable) or a remote server (e.g. via a wireless connection).

[00194] Referring to Figure 11, a seventh page 176 of the Witness application user manual is shown, in which an image of the Settings Screen 178 is displayed and described. The Settings Screen 178 allows the operation of the Recording Strategy to be controlled. Specifically, the Settings Screen allows a user to select the number of video segments that the application should store, and the size of those segments (i.e. a data file period). Accordingly, the user is able to set a limit to the storage usage of the Recording Stack (i.e. the size of the buffer 34a) part of the program. The user can also control the storage usage of the Recording Stack through the use of the video quality buttons.

[00195] Note that the Witness application may be arranged to calculate the remaining memory available on the smart-phone and suggest the appropriate settings automatically.

[00196] The Recording Strategy involves maintaining a user-controlled number of video segments. When a new video recording is initialised – instantiating a new segment – this is written over the oldest video segment. Thus only the most recently recorded videos are maintained in the Recording Stack.

[00197] Another setting that can be controlled in the Settings Screen 178 is the G-force threshold at which the Witness application will assume that a crash has taken place. It is expected that different vehicles and driving styles will need different G-force thresholds to be set to ensure a reasonable sensitivity to crash forces whilst also prevent crash detection false

positives. It should be noted that although the manual recites "*Raise the sensitivity if you find that crash detection is triggered during normal driving...*" it is the sensitivity *threshold* that is to be raised, and not the sensitivity itself. A slider 180 allows the sensitivity threshold to be set via the touch-sensitive screen.

[00198] The Settings Screen 178 also has a button 182 to allow a user to define more settings via a More Settings Screen.

[00199] Referring to Figure 12, an eighth page 184 of the Witness application user manual is shown, in which an image of the More Settings Screen 186 is displayed and described. Here, it is possible for the user to select speed units 188 and also select whether the map should be displayed during recording 190, and at which speed it should be displayed in favour of the video feed. This is a safety feature of the Witness application that hides the video feed during recording when the vehicle is detected as travelling above a predetermined speed. The video feed is replaced by a map of the location of the vehicle – as is typical with in-vehicle GPS devices. Note that although the on-screen video feed is replaced with a map, video recording continues in the background.

[00200] In alternatives, the application may be arranged to detect the vehicle speed, and at a particular speed, switch off the screen entirely. It should be understood that the device will continue to record video, telemetry and other information even when the screen is switched off. Entirely switching off the screen of the device is advantageous as it significantly reduces the drain on the battery of the mobile device.

[00201] Note that the Witness application is also arranged to interface with the phone to detect low-light conditions and in response change the brightness of the screen to prevent the user/driver being dazzled. This can also save battery life.

[00202] The More Settings Screen 186 also includes a Personal Details button 192 which, when pressed invokes a Personal Details Screen.

[00203] Referring to Figure 13, a ninth page 194 of the Witness application user manual is shown, in which an image of the Personal Details Screen 196 is displayed and described.

[00204] Here, the name 198, vehicle registration number 200, mobile number 202 and email address 204 to be used in an emergency, can be specified by the user. In the event of a detected incident, these details, along with information regarding the detected incident (e.g. time of incident, location and optionally telemetry data) will be emailed to the specified

email address automatically. This can ensure that the chosen recipient of that email will be informed immediately about the occurrence and nature of the detected incident.

[00205] This Personal Details Screen 196 also allows the user to set whether it is possible for the video stack to be deleted 206. A security PIN protects the changing of this option so that if a first user having the PIN (for example, a parent) can review the driving style and behaviour of a second user not having the PIN (for example, their son or daughter) by reviewing the Recording Stack – as the Recording Stack cannot be deleted by that second user. As shown in Figure 24, the PIN can be set for the first time by entering it twice into the appropriate PIN fields 208.

[00206] Referring to Figure 14, a tenth page 210 of the Witness application user manual is shown, in which images of an Accident Management Screen 212 and Witness Details Screen 214 are displayed and described.

[00207] The Accident Management Screen 212 can be invoked by the user selecting the accident management button 90 on the Main Menu , or can be automatically switched to after the Witness application has detected that there has been an incident (e.g. via G-forces exceeding a threshold level). Similarly, data can automatically be permanently stored as "Kept" and/or sent if high G-forces are detected.

[00208] As can be seen on the Accident Management Screen 212, there are the following user selectable buttons:

[00209] Accident Advice / What to do 214

This option provides guidance as to what to do during an accident – see Figures 15 and 16 for the displayed Accident Advice Screens.

[00210] Witnesses 216

This option invokes functionality to allow the collection of information from or about witnesses to an incident. An image of the Witnesses Detail information summary screen 214 is shown in Figure 14. Figure 17 shows the Witness Detail information collection screen 218. Voice notes can also be taken via the microphone of the smart-phone.

[00211] Photos 220

This option enables the camera to allow a user to capture images associated with an incident.

[00212] Drivers 222

This option invokes functionality to allow collection about the other drivers involved in an incident. The Drivers Detail information collection screen 224 is shown in Figure 18.

[00213] Your Details 226

This option provides a readily available store of the details of the user - as to be provided to other drivers – and can contain name and address. The 'Your Details' screen 228 is shown in Figure 19.

[00214] Details recorded via the Accident Management Screen 212 are electronically authenticated and feature a time-stamp. In alternatives, this data may be encrypted to ensure the integrity of the stored data.

[00215] Furthermore, in alternatives, the exchange of the details of the drivers and witnesses can be conducted, at least in part, via Bluetooth® (for example, between mobile devices) – and/or via email. Relevant information associated with the driver is pre-stored on the Witness application in a format that can be sent readily, via a communication channel such as Bluetooth® or email.

[00216] Finally, note that in each Screen or Menu, there is a button 230 provided to go back to the previous menu. Also, when certain actions are performed or selected by a user, the Witness application is arranged to provide an audible feedback signal (for example, a beep). For example, this could be in response to starting a recording, keeping a video segment and/or a stopped recording.

Alternatives and extensions

[00217] The Witness application can be extended to interface with remote users to allow them to control the operation of the application as well as view information logged by the application.

[00218] With such a monitoring system, it is unpractical to actively monitor each and every mobile device and receiving and handling the sheer quantity of data from each and every device would also be very difficult.

[00219] Consequently, the device monitoring system and the mobile devices are advantageously arranged to automatically and intelligently interface with one another in a way that minimises the computational and bandwidth burden on the device monitoring system.

[00220] In particular, each mobile device running the Witness application is arranged to make a determination as to whether there is a need to transfer data to the device

monitoring system. For example, the Witness application may be arranged to automatically send data to the device monitoring system that only has high G-force activity associated with it, as this may be indicative of a crash or another driving incident. Alternatively, the Witness application may be arranged to send detailed or high-bandwidth information if a user indicates that an accident has occurred.

[00221] In either case, the video segments and associated sensor and/or derived driving information data associated with the relevant event will be sent. However, no other data (for example, from another date) will be sent.

[00222] Alternatively, less computationally or bandwidth intensive information may be sent on a periodic basis – for example, every day, week or month. Such general information may be sent to establish a profile of a particular user. For example, many high G-force related activities may indicate that the driver is driving aggressively. A determination about the profile can be made automatically by requesting and automatically analysing further data. For example, the location and speed information can be used to determine whether a vehicle is found to frequently break the speed limit. If this is the case, then the profile of the user can be set accordingly.

[00223] Such general and periodically obtained information can also be used to remotely adjust the settings of the application. For example, many high G-force related activities may instead indicate that the set up of the car is such that the mobile device is subjected to high G forces (rather than the driver driving aggressively). If the driving is determined to be safe, but the mobile device is setting off many false positives, then the device monitoring system can automatically adjust the settings of the application. For example, the G-force sensitivity threshold may be increased remotely.

[00224] Thus, the initial data that is automatically transmitted from the mobile device to the vehicle monitoring system is limited in bandwidth so as not to overload the vehicle monitoring system as a whole. However, after processing or analysis is performed on the initial data, further information may be requested. For example, further information may be requested automatically by the system or manually by a controller. Such further information may include high resolution video logs and sensor data and derived driving information such as G-force measurements.

[00225] It will be understood that the mobile device may also automatically keep certain data at random. Furthermore, the reason for keeping certain data may also be logged

(e.g. logged as a result of a manual request by the user, or in response to a high G-force event).

[00226] However, so that users do not wrongfully benefit from such incentives, it is necessary to enforce the correct and consistent use of the Witness application.

[00227] Accordingly, the application may include measures to guarantee that the application is enabled whenever a given insured vehicle is being driven.

[00228] Such measures may involve matching data recorded by the Witness application with that recorded independently by the vehicle. For example, the Witness application records the distance travelled during every journey. To ensure the summed distances of all journeys tracked by the Witness application tally with the total travelled distance of the vehicle, the user may be prompted to enter the odometer mileage periodically.

[00229] It will be appreciated that such a tallying exercise depends on the Witness application being used every time one particular vehicle is driven. However, in alternatives, if the Witness application is used with different vehicles, the Witness application may be arranged to register the different vehicles so that their respective odometer readings can be tallied with distance recordings associated with each respective vehicle.

[00230] Other measures can be implemented in conjunction with the Witness application to guarantee that the application is enabled whenever a given vehicle is being driven. For example, the mobile device on which the Witness application is installed may comprise an NFC device, such as an RFID tag. The NFC device may be compatible with a complementary device on a so-called 'smart-holster' into which the mobile device may be fitted during operation.

[00231] The smart-holster interacts with the NFC device on the smart-phone to determine whether or not the smart-phone is inserted into the smart-holster. The smart-holster can then be interfaced with the engine management system of the vehicle so that the vehicle may be activated and driven only when the mobile device is in place within the smart-holster.

[00232] It will be appreciated that the mobile device has so far been described in the context of a smart-phone. However, it will be appreciated by a person skilled in the art that other devices may also be suitable for performing the functions described in relation to the Witness application. For example, the Witness application may be adapted to run on a general purpose tablet-style computing device, such as an iPad®.

[00233] Furthermore, it will be understood that features, advantages and functionality of the different embodiments described herein may be combined where context allows. In addition, a skilled person will appreciated that the functionality described above may be implemented using the mobile device suitably programmed.

Having described several exemplary embodiments of the present invention and the implementation of different functions of the device in detail, it is to be appreciated that the skilled addressee will readily be able to adapt the basic configuration of the device to carry out described functionality without requiring detailed explanation of how this would be achieved. Therefore, in the present specification several functions of the device have been described in different places without an explanation of the required detailed implementation as this not necessary given the abilities of the skilled addressee to code functionality into the device.

METHOD AND SYSTEM FOR LOGGING VEHICLE BEHAVIOUR

Cross-Reference to Related Applications

[0001] This application is a continuation of U.S. patent application no. 17/729,962, filed April 26, 2022, which is a continuation of U.S. patent application no. 16/665,746, filed October 28, 2019, which is a continuation of U.S. patent application no. 16/222,893 filed December 17, 2018, which is a continuation of U.S. patent application no. 15/454,944 filed March 9, 2017, which is a continuation of U.S. Patent Application no. 15/061,910 filed March 4, 2016 and now issued as U.S. 9,633,487, which is a continuation of U.S. patent application no. 13/994,455 filed July 24, 2013 and now issued as U.S. 9,311,271, which is a 371 of international patent application PCT/GB2011/052491 filed December 15, 2011, which claims foreign priority to GB patent application no. 1118777.0 filed October 31, 2011, GB patent application no. 1109759.9 filed June 10, 2011, GB patent application no. 1101259.8 filed January 25, 2011, and GB patent application no. 1021292.6 filed December 15, 2010, the contents of which are incorporated in their entirety as if fully presented herein.

Field of the invention

[0002] The present invention relates to methods and systems for logging driving information associated with vehicle behaviour. Moreover, the present invention relates to a mobile device adapted for installation to a vehicle and configured to log such driving information, for example, video footage associated with how the vehicle is driven. Such driving information may subsequently be utilised to determine the cause of an event such as an accident, to modify driver behaviour and/or to determine insurance premiums.

Background

[0003] Data logging devices are commonly installed on aircraft that log data about events associated with the behaviour of the aircraft and also the crew controlling the aircraft. Such data logging devices are commonly termed "black boxes" and are very useful for determining the cause of problems that have affected the aircraft, especially when no other record of a significant event such as a crash exists.

[0004] Similar data logging devices exist for road vehicles, and can be used to realise similar advantages. Vehicle users as well as authorities can use such devices to determine the cause of traffic accidents or other vehicle-related events, whether these stem from vehicle malfunction or driver negligence. ~~For example, the data logged by these devices~~

~~can be used as evidence for insurance claims and so potentially to determine insurance premiums.~~

[0005] Some of these data logging devices can be integrated with the car data network, and so may take inputs from sensors integrated with the vehicle, such as those measuring the speed of the vehicle. However, these can be difficult and costly to install. Others having their own internal sensor set are more readily retrofitted to a vehicle. Nonetheless, such data logging devices for road vehicles are less prevalent perhaps due to their unjustifiable expense. Accordingly, the uptake of data logging devices that can be retrofitted to road vehicles, as are known in the art, has been minimal.

[0006] It is an object of the present invention to alleviate the above-mentioned problems, at least in part.

Summary of the invention

[0007] According to a first aspect of the present invention there is provided a mobile telecommunications device configured to log driving information associated with a vehicle is described. The mobile telecommunications device comprises: a sensor set comprising an image sensor and at least one of an audio sensor, an accelerometer or a positioning module, or a combination thereof; a user interface; a processor; and a memory. The mobile telecommunications device is configured to: determine, based on the inputs received by the user interface and sensor data from the device's sensor set, a start of a driving period during which the mobile device is removably affixed to the vehicle and the vehicle is in use, wherein the start of the driving period is determined without data from sensors of the vehicle; process the sensor data from the sensor set during the driving period to derive driving information associated with how the vehicle is driven; and store a selection of the driving information to the memory. The driving information comprises images captured by the image sensor and the mobile telecommunications device is controlled by a downloaded application to process the captured images to make a safety determination for the vehicle and in response to making an unsafe determination for the vehicle, to issue an alert signal.

[0008] Advantageously, the use of a mobile telecommunication device enables a data logging device to be conveniently and inexpensively retrofitted to a vehicle. Mobile telecommunication devices such as "smart-phones" are becoming increasingly widespread, and these devices tend to have the requisite sensor sets to capture data concerning vehicle behaviour. Thus, a generic mobile telecommunication device already owned by a driver of

the vehicle can be loaded with the application to provide such data logging functionality that would otherwise necessitate a dedicated black-box. Thus, the functionality of a black-box can be realised without additional expense.

[0009] Following on from this, it will be appreciated that the mobile device is ideally a portable mobile telecommunication device. Ideally, the mobile device is a hand-portable mobile device. Advantageously, the portability permits the mobile device to be conveniently fitted to and removed from the vehicle.

[0010] Furthermore, such a mobile telecommunication device presents additional advantages over known dedicated black-box systems as the data logging functionality of the mobile telecommunication device can be continually refined. This can be achieved without physically upgrading the hardware of the device, and also without significant user intervention. Specifically, the application may be arranged to determine whether a software update exists and if so, control the mobile device to download at least portions of an improved version of the application. Conveniently, downloading may be via the wireless telecommunication module. Said downloading may be automatic, or may be user-confirmed. For the avoidance of doubt, the application will typically be stored on a portion of the memory of the mobile device and executed therefrom, as is known in the art. Also, it will be appreciated that the application, or portion thereof, may be downloaded via the wireless telecommunication module and/or via an intermediary device. For example, the application may be side loaded to the mobile device from an intermediary computing device.

[0011] The application may be sourced from an application store and/or content provider. For example, the content provider may comprise the Apple® Appstore®. The content provider may comprise a cloud computing provider.

[0012] It will be appreciated that the use of such a generic mobile device in this context may be counter-intuitive to a person skilled in the art - such generic devices are not designed to withstand events such as catastrophic crashes. Furthermore, such generic devices are usually not necessarily configured to appropriately detect conditions that may need to be recorded. Such devices are usually kept in a user's pocket or bag, and so are not best placed to generate sensor data associated with the behaviour of a vehicle. However, the inventor of the present invention has realised that such a mobile device that is adapted for installation to the vehicle can overcome such drawbacks and fulfil a role similar to a black box. To this end,

the mobile telecommunication device may comprise an adapter arranged to hold the device securely to the vehicle.

[0013] Advantageously, as well as protecting the device from damage, the adapter improves the suitability and reliability of the sensor data and so the driving information associated with when and/or how the vehicle is being driven. For example, if the sensor set comprises an accelerometer, the acceleration of the vehicle can be more accurately measured due to the mobile device being firmly attached to the vehicle. Similarly, if the sensor set comprises an image sensor, for example, for capturing video footage of the road ahead, better footage can be obtained as the mobile device can be held in the correct position and orientation relative to the vehicle. In particular, the mobile device may be positioned by the adapter so that its image sensor views the road ahead through a windshield of the vehicle.

[0014] As mentioned, the device is arranged to log driving information associated with the vehicle, when that vehicle is being driven. This is realised by registering the start of the driving period during which the mobile device is installed to the vehicle and the vehicle is being driven by the driver. Advantageously, this prevents driving information from being needlessly recorded. As will be appreciated the mobile device has only a finite storage capacity and so registering the start of the driving period is useful for minimising the unnecessary usage of memory. In particular, where the mobile device comprises an image sensor, and the sensor data comprises a sequence of images (e.g., a video) the storage space can be very quickly filled by the memory.

[0015] To this end, it is preferred that when the application is executed, it controls the mobile device to register the start of a driving period in response to an initialisation input. The initialisation input may comprise a user input - for example, the user manually executing the application on the mobile device. The initialisation input is also generated automatically in response to the mobile device being installed to the vehicle and/or the vehicle being driven. The initialisation input may be generated automatically in response to the sensor data having predetermined values. For example, if the sensor data reflects a detected speed above a predetermined threshold – for example, 20 kilometres per hour – then this can be used to trigger the start of the driving period. Similarly, if the sensor data reflects that the mobile device is held securely to the vehicle in a predetermined position (for example, via the adapter) this can also be used to trigger the start of the driving period. To this end, the adapter and/or the mobile device may comprise a registration module configured to register

the installation of the mobile device to the vehicle and/or the adapter. The registration module may comprise a proximity sensor to detect the proximity of the mobile device to the vehicle. The registration module may comprise a NFC (near field communication) device. The registration module may be arranged to determine a match between the location of the mobile device and the location of the vehicle. The match may be performed by receiving and comparing a first positioning input associated with the position of the vehicle and a second positioning input associated with the position of the mobile device. The registration module and/or adapter may be a smart holster.

[0016] Preferably, the executed application controls the mobile device to manage voice-calls incoming to the mobile device during a driving period. For example, said voice-call management may comprise temporarily disabling and/or diverting voice-calls incoming to the mobile device during a driving period. Advantageously, this safety feature discourages users from making or receiving phone calls whilst driving. It will be appreciated that a driver is less able to control a vehicle effectively whilst also manipulating a mobile device, and in many countries doing so is illegal. However, the provision of a 'hands-free' mode or accessory – as are well known in the art - may obviate the need for a user to manipulate the mobile device. Accordingly, the executed application may be arranged to control the mobile device to selectively disable and/or divert voice-calls incoming to the mobile device during a driving period, in dependence on the detection of a hands-free accessory or hands-free mode enabled on the mobile device.

[0017] Furthermore, the executed application may be arranged to control the mobile device to enable a hands-free mode of operation on detection of a driving period. For example, the enabled hands-free mode of operation may comprise enabling voice-activated commands. In light of this, it is preferred that the adapter is configured to hold the mobile device in a way that facilitates reception of voice commands from the user. In particular, the mobile device may be held in a position relative to the user to permit clear reception of the user's voice. Typically, this position is about the dashboard in a vehicle such as car or van. Furthermore, the adapter is configured with an opening through which an audio sensor of the mobile device is able to receive the user's voice.

[0018] Also, even though a driver's control of a vehicle may be affected by manipulating the mobile device, under certain circumstances, this may not be objectionable – for example, when the vehicle is stationary. Accordingly, the executed application may be

arranged to control the mobile device to selectively disable and/or divert voice-calls incoming to the mobile device during a driving period, in dependence on the driving information – for example, the speed and location of the vehicle.

[0019] Furthermore, it will be appreciated that the driver may not be the only user within the vehicle, and so disabling functions of the mobile device may not be appropriate under all circumstances, as a passenger of the vehicle may want to use the mobile device whilst the driver is driving. Under these circumstances, the executed application is arranged to control the mobile device to register the presence of a non-driver (for example, via image recognition, or entry of an unlock code) and unlock, or retain the original functionality of the mobile device. Furthermore, the executed application may be arranged to run in the background. Accordingly, the mobile device may be used for other purposes, such as making or receiving a telephone call.

[0020] It is advantageous to store only selected driving information for the purpose of logging how a vehicle is being driven during the driving period. Whilst it may be possible to sample and process sensor data at a relatively high rate (i.e. many times a second), continually storing driving information derived from that sensor data at such a high rate can use up a lot of storage space on the mobile device, the majority of which is likely to be redundant. Therefore, by being selective about the driving information that is stored, storage utilisation can be made more efficient.

[0021] In particular, the executed application may control the mobile device to store a summary of the driving period. The summary may comprise compressed and/or summarised driving information. For example, the sensor data can be processed at a first sampling rate and then down-sampled to a fraction of the first sampling rate for storage as driving information. Put another way, the mobile device can be controlled by the executed application to down-sample sensor data from a first sampling rate to a second sampling and store the sensor data as driving information at said second sampling rate. Advantageously, this retains a snapshot of when and/or how the vehicle is being driven, but with fewer data points, and so requiring less storage space.

[0022] Nonetheless, under certain circumstances, it is more useful to retain information at higher or the highest possible sampling rates. In particular, it is more important to have detailed information associated with the behaviour of a vehicle during a crash than when the vehicle is being driven normally.

[0023] Accordingly, the executed application may be arranged to control the mobile device to detect the occurrence of a predetermined event of significance (such as a crash) and in response store driving information associated with that event to the memory. Preferably, said driving information associated with that event comprises driving information in the lead up to and immediately following the event. In particular, detailed driving information in the lead up to, and immediately following a predetermined event of significance is preferably stored. It will be understood that the driving information associated with the detected event may be transmitted via the wireless telecommunication module in addition to, or instead of storing said data. Said transmitted driving information may be transmitted to a remote data logging system.

[0024] To this end the mobile device may comprise an event detector for detecting the occurrence of an event.

[0025] Preferably, the event detector is arranged to detect the occurrence of a predetermined event by correlating data, such as sensor data, against an event indication model. The application may comprise the event indication model.

[0026] Preferably, the event indication model comprises a set of predetermined data values corresponding to a predetermined event. Accordingly, the event detector is arranged to compare the set of predetermined data values against corresponding sensor data to determine whether the predetermined event has occurred.

[0027] For example, the event indication model may indicate that a serious crash has occurred if values returned by an accelerometer sensor exceed predetermined data values of the event indication model, thereby representing a sustained vehicle deceleration beyond a threshold level. Following on from this, it will be appreciated that detection of an event may be dependent on matching a sequence of data values that have occurred over time. Moreover, the event indication model may comprise a sequence of predetermined data values, the sequence being associated by a function of time. Thus, the event detector may be arranged to compare the sequence of predetermined data values against corresponding sensor data that have been generated over a given time period. Put another way, the event detector and event indication model are arranged to indicate the occurrence of an event in dependence on the correlation between a set of predetermined data values occurring over time. Thus, a set of values returned from sensor data over a period of time are compared against a corresponding

sequence of predetermined data values of the event indication model. Typically, this is to determine a rate of change of variables associated with a sensor set.

[0028] It will be understood that an event indication model may comprise a plurality of sets of predetermined data values, each set corresponding to different sensor data. For example, an event indication model associated with a serious accident event may contain data values corresponding to both the deceleration of the vehicle, and the orientation of the vehicle. Thus, if a vehicle is involved in a serious impact, and overturns, this is represented by the model, and so can be detected by the event detector.

[0029] Preferably, the event indication model comprises a pattern of predetermined data values. Preferably, the event detector is arranged to detect the occurrence of an event by carrying out pattern recognition by matching sensor data values to the pattern of predetermined data values of the event indication model. Preferably, there is a plurality of event indication models. Each event indication model may be associated with a separate predetermined event.

[0030] Preferably, the executed application may be arranged to control the mobile device to process sensor data from the sensor set during a plurality of driving periods to derive driving information associated with when and/or how the vehicle is driven for each of the driving periods. Preferably, sensor data processed during a first set of driving periods define a benchmark against which sensor data is compared during subsequent sets of driving periods. In particular, the executed application may be arranged to control the mobile to modify one or more event indication models in response to the benchmark. Advantageously, such a benchmark ensures that the event indication models may be tailored to the standard behaviour of a particular vehicle. As will be appreciated, different sensor types, mobile devices, mounting positions, vehicles, drivers and road conditions may generate different sets of sensor data for driving behaviour that is considered standard or safe. Accordingly, the benchmark allows the mobile device to account for variable driving conditions.

[0031] Preferably, a plurality of benchmarks may be defined. A benchmark may be defined for each driver. A benchmark may be defined for each vehicle to which the mobile device is to be installed. Ideally, a benchmark is defined for each driver-vehicle pair. To this end, the mobile device may be arranged to receive an input to specify a driver, a vehicle or a driver-vehicle pair. Advantageously, this ensures that different drivers and vehicles do not disrupt the accurate event detecting capabilities of the event detector.

[0032] Once a predetermined event has been detected by the event detector, it is desirable to take an appropriate action in response to that detected event. Accordingly, the executed application may be arranged to control the mobile device to take at least one predetermined action in response to a detected event. The action taken may comprise transmitting driving information and/or sensor data, via the wireless telecommunication module of the mobile device, to a remote system. Advantageously, this enables a remote system to be notified of the occurrence of a particular event, and the details associated with that event. For example, the remote system may be arranged to deploy emergency services based on a transmitted notification concerning the occurrence of a crash, and also the location of the mobile device (and so the vehicle) are also included in the transmitted information. A further advantage of transmitting driving information and/or sensor data to a remote system is that such data then does not need to be stored on or processed by the mobile device. Thus, this can free the storage space on the mobile device, and also allow the processor of the mobile device to carry out other tasks. ~~A remote system may comprise or be interfaced with an insurance company database.~~

[0033] A further advantage associated with sending driving information to a remote system is that the driving information can be assessed remotely. This assessment can be performed automatically or manually - either way it advantageously removes the processing burden from the mobile device. Alternatively, if transmission bandwidths are small, the processing can be executed automatically on the processing device. In this case, the use of virtual neural networks can be used to determine whether the driving information represents acceptable or unacceptable driving patterns.

[0034] The action taken may comprise storing data captured at a higher (or the highest possible) sampling rate than when an event is not detected. Thus, as described above, this may involve preventing the down-sampling of sensor data. Furthermore, the action taken may comprise protecting said driving information from being overwritten.

[0035] The action taken may comprise providing feedback to a user to indicate that an event has been detected. Preferably, the mobile device is configured to receive a user interaction to confirm or deny whether the detected event has actually occurred following said feedback. Advantageously, such user feedback can be used to modify event indication models thereby to refine the effectiveness of the event detector. The mobile device may comprise a speaker. Accordingly, such feedback may be provided via an audio prompt. The

mobile device may comprise a display screen. Accordingly, such feedback may be provided via a visual prompt. The feedback may comprise notifying a user that a further action has been scheduled, and will be taken within a predetermined period. For example, the feedback may indicate to a user that an event such as a serious crash has been detected, and so the next action to be taken will be to contact emergency services within 10 seconds. Preferably, the feedback includes a prompt to receive a user input. For example, the prompt may be arranged to receive a user input to cancel a subsequently scheduled action. Advantageously, this prevents actions being taken needlessly as a result of an incorrect determination of an event.

[0036] The feedback may provide reassurance and/or guidance to a user. For example, a user may be provided with an important checklist of things to do following an accident or incident. For example, the user may be guided to use a camera (image sensor) on the mobile device to take photographs of the vehicles involved in the incident, including the number plates of those vehicles. The user may be guided to use a text input device on the mobile device to note the name, address, ~~insurance details~~ etc of third parties involved in incident.

[0037] The action taken may comprise communicating to a remote system ~~associated with an insurance company~~ that an incident has been detected (e.g. via a low bandwidth data connection or via text message). If appropriate – or in response to a request from a communication to the mobile device from the remote system – the action taken may comprise transmitting all or selected portions of the driving information associated with the detected event.

[0038] Preferably, the executed application is arranged to control the mobile device to prioritise essential communications, such as calls to the emergency services.

[0039] Preferably, the memory comprises a long term memory for persistently storing driving information and/or sensor data. Preferably the memory comprises a buffer. The buffer may comprise a short term memory for transiently storing driving information and/or sensor data. Preferably, the short term memory is arranged to receive driving information and/or sensor data at a higher update rate than the long term memory. Preferably, the long term memory has a larger capacity than the short term memory.

[0040] Preferably, the executed application controls the mobile device to write driving information and/or sensor data to the short term memory at a predetermined update rate during the driving period. Ideally, the driving information and/or sensor data is written to

the short term memory in a predetermined sequence, ideally a chronological sequence. Preferably, the executed application controls the mobile device to overwrite driving information and/or sensor data previously written to the short term memory. Advantageously, this ensures that recording of sensor data and/or driving information, especially data that is recorded at a relatively high update rate, is not prevented during the driving period due to the short term memory becoming full.

[0041] Preferably, the driving information and/or sensor data is overwritten in accordance with the predetermined sequence. Advantageously, this can ensure that the most relevant, up-to-date data is retained in the short-term memory.

[0042] Preferably, the action taken in response to a detected event comprises transferring data from the short-term memory to the long-term memory. Advantageously, this can ensure that the most recent information associated with an event is persistently stored in the long term memory, and is not overwritten.

[0043] Preferably, the sensor set comprises an accelerometer for detecting the acceleration of the mobile device. Accordingly, the corresponding sensor data may comprise acceleration data generated by the accelerometer. The accelerometer may be a single axis or dual axis accelerometer. However, it is preferable that the accelerometer is a three-axis accelerometer so that movement of the vehicle may be determined in three-dimensional space. Furthermore, as the mobile device may be mounted by a user in one of a number of different orientations relative to the vehicle, a three-axis accelerometer ensures that acceleration along the axis aligned with the general forward movement of the vehicle may be effectively detected. This is particularly important to determine an event such as heavy braking of the vehicle and/or a crash.

[0044] Preferably, the sensor set comprises an image sensor such as a camera. Accordingly, the corresponding sensor data may comprise images and/or a sequence of images generated from the image sensor. Said sequence of images may be processed and/or stored in the form of a video. Advantageously, this can improve the space utilisation of the sequence of images. Preferably, the mobile device is arranged to receive a user input to store a user-selected image or sequence of images to the memory. The image sensor data may be processed to determine safety information and feedback said safety information to the driver. For example, the mobile device may be controlled to determine the proximity of the mobile device to other vehicles. Said determination may be via comparing the apparent size of the

number plate of other vehicles in an image with a known size of a standard number-plate, and from that the distance to those other vehicles. Thus, the mobile device can make a determination that another vehicle is too close, and issue a warning to the driver to slow down to avoid a collision. Similarly, images of the road ahead may be processed to determine whether a vehicle is drifting out of lane (e.g. because the driver is falling asleep). In response to such a determination, an alert can be issued. Similarly, images of road signs may be processed to assess driver behaviour.

[0045] It will be appreciated that the mobile device may comprise a plurality of image sensors. For example, the mobile device may have a forward-facing camera and a rear-facing camera. Accordingly, it may be possible to view images of the road ahead, external to the vehicle, and also from inside the vehicle. In particular, the mobile device may be arranged to capture images or a sequence of images of the driver. Images of the driver according to the present aspect of the present invention processed to make a safety determination. For example, the images may be processed to detect whether the driver is falling asleep. In particular, a blink rate of the driver may be detected by processing the image data. Similarly, a determination may be made whether the driver has their eyes closed. In response to such a determination that a driver is falling asleep, the mobile device may be arranged to issue an alert so as to wake the driver.

[0046] Preferably, the sensor set comprises an audio sensor such as a microphone. Accordingly, the corresponding sensor data may comprise audio data.

[0047] Advantageously, an image sensor and/or an audio sensor can provide an important record of an event such as a crash.

[0048] Preferably, the sensor set comprises a positioning module arranged to determine the position of the mobile device. The positioning module may comprise a GPS module. The positioning module may be arranged to utilise the wireless telecommunication module to self-localise, for example by determining a position relative to one or more mobile telecommunication cell towers. Advantageously, the positioning module can allow the mobile device to determine its position (and so the position of the vehicle) over time. Accordingly, the positioning module can thus determine the speed of the mobile device and vehicle. Thus, the corresponding sensor data may comprise latitude, longitude, elevation, speed and other data obtainable from positioning modules such as GPS modules as is known in the art.

[0049] Preferably, the sensor set comprises an orientation sensor for determining the orientation of the mobile device. Said orientation sensor may comprise an electronic compass for determining a bearing, and so the direction in which the mobile device is facing. Accordingly, the corresponding sensor data may comprise orientation and bearing data. Advantageously, such data can be used to augment the data of the positioning module. Furthermore, the executed application may be arranged to use the data from the orientation sensor to determine whether the mobile device has been fitted to vehicle, and whether the mobile device has been fitted in the correct orientation. Advantageously, the data from the orientation sensor may also be used to determine whether a significant event has occurred, such as the vehicle overturning.

[0050] Preferably, the sensor set comprises a user-input device arranged to receive an input from a user. The user input device may comprise at least one of buttons and a touch-sensitive display screen. Advantageously, this allows a user to input data to the mobile device.

[0051] Preferably, the mobile device comprises a timer. Preferably, the executed application is arranged to control the mobile device to record sensor data and/or driving information against time as determined by the timer. Accordingly, the timer can be used to time-synchronise sensor data and/or driving information.

[0052] Preferably, the executed application is arranged to encrypt the driving information stored on the memory. Advantageously, this reduces the possibility of said driving information being modified without authorisation. This is an important consideration when such driving data may be used as evidence, for example, when determining the cause of an accident.

[0053] Preferably, the mobile device is arranged to interface with an external device to receive external driving information from said external device. It will be appreciated that the sensor set onboard the mobile device may be supplemented by a sensor set external to the mobile device. For example, the external device may be an engine management system of the vehicle and/or the external device may be arranged to connect to the on-car data network of the vehicle. Thus, the external device may have access to information associated with the behaviour of the vehicle (for example, the speed of the vehicle, how much the brake pedal is being pressed, etc). Such driving information can be processed and/or stored by the mobile

device under control of the executed application in a manner similar to driving information derived from sensor data internal to the mobile device.

[0054] Preferably, the mobile device is arranged to interface with an external device wirelessly, for example via a Bluetooth® connection. Advantageously, this removes the need for the mobile device to be physically connected to the external device. As will be appreciated, following a driving period, a user may want to leave the vehicle and so take a personal mobile telecommunication device with them, and so a wireless interface with such an external device obviates the inconvenience of physically detaching and then subsequently re-attaching the mobile device.

[0055] Preferably, the mobile device is further controlled by the application to determine a unique identifier associated with the mobile device and retrieve from the memory and transmit via the wireless telecommunication module to a remote system said driving information paired with said unique identifier.

[0056] Advantageously, by pairing an identifier uniquely associated with the mobile device enables the remote system to unambiguously determine the source of the driving information. Accordingly, said driving information can be matched to a particular driver and/or vehicle. This is particularly useful when assessing a risk profile of said driver.

[0057] Preferably, the mobile device is controlled by the executed application to process the driving information to generate a driving score. The driving information may comprise the driving score.

[0058] Preferably, the mobile device comprises a display screen. Preferably, the display screen is touch-sensitive. Advantageously, the display screen may thereby be user-interactable. Preferably, the mobile device comprises a graphical user interface (GUI). The graphical user interface comprises user-interactable artefacts such as buttons. Preferably, the user-interactable artefacts may be displayed on the screen and receive a user input for selection or control of those artefacts. The mobile device may be controlled to selectively hide those artefacts in dependence on the state of the mobile device.

[0059] Preferably, the mobile device is controlled by the application to provide feedback about the driving information and/or values of the sensor data. Ideally, such feedback is via the display screen. For example, a detected speed may be displayed, a time elapsed may be displayed, a bearing/heading may be displayed, a detected position may be

displayed and/or a detected image or sequence of images may be displayed (e.g. via a video feed).

[0060] In some embodiments there is provided a mobile telecommunications device adapted for installation to a vehicle and configured to log driving information associated with the vehicle when driven, the mobile device comprising: a sensor set comprising at least one of an image sensor, an audio sensor, an accelerometer and a positioning module; a processor for processing sensor data from at least the sensor set to derive said driving information; a memory for storing said derived driving information; a wireless telecommunications module operable to download a controlling application; and a registration means for registering the start of a driving period during which the mobile device is installed to the vehicle and the vehicle is being driven by a driver; wherein, the processor is arranged to process sensor data from the sensor set during the driving period to derive driving information associated with when and/or how the vehicle is driven and store a selection of the driving information to the memory.

[0061] In another embodiment there is provided a mobile telecommunications device adapted for installation to a vehicle and configured to log driving information associated with the vehicle when driven, the mobile device comprising: a sensor interface arranged to receive sensor data from a sensor set; a processor for processing the sensor data to derive said driving information; a memory for storing said derived driving information; a wireless telecommunications module operable to download a controlling application; and a registration means for registering the start of a driving period during which the mobile device is installed to the vehicle and the vehicle is being driven by a driver; wherein, the processor is arranged to process sensor data from the sensor set during the driving period to derive driving information associated with when and/or how the vehicle is driven and store a selection of the driving information to the memory.

[0062] Preferably, the sensor interface is arranged to receive sensor data from a sensor set external to the mobile device. Preferably, the sensor interface is arranged to interface with an external device as described in relation to the first aspect of the present invention. Advantageously, this enables a mobile device to utilise a richer or better equipped sensor set than that local to the mobile device.

[0063] In another embodiment there is provided a mobile device adapted for installation to a vehicle and configured to log driving information associated with the vehicle

when driven. Preferably, the mobile device comprises a sensor interface arranged to receive sensor data from an external sensor set. The mobile device may comprise an internal sensor set. Preferably, the mobile device comprises a processor for processing the sensor data to derive said driving information. Preferably, the mobile device comprises a memory for storing said derived driving information. Preferably, the mobile device is a mobile telecommunication device, comprising a wireless telecommunications module. Preferably, the wireless telecommunications module is operable to download an application. Preferably, the mobile device comprises a registration means for registering the start of a driving period during which the mobile device is installed to the vehicle and the vehicle is being driven by a driver. Preferably, the processor is arranged to process sensor data from the sensor set during the driving period to derive driving information associated with when and/or how the vehicle is driven. Preferably, the mobile device is arranged to store a selection of the driving information to the memory. Preferably, the mobile device is arranged to transmit a selection of the driving information via the wireless telecommunication module. The mobile device may be arranged to transmit a selection of the driving information via the wireless telecommunication module to a remote system such as a remote data-logging system. Advantageously, transmitting (rather than storing) selected driving information prevents storage space local to the mobile device being used up.

[0064] In another embodiment there is provided a method of logging driving information associated with a vehicle when driven, the method comprising: adapting and installing a mobile device to the vehicle, the mobile device comprising a memory; registering the start of a driving period during which the mobile device is installed to the vehicle and the vehicle is being driven by a driver; processing sensor data from a sensor set during the driving period to derive driving information associated with when and/or how the vehicle is driven; and storing a selection of the driving information to the memory of the mobile device.

[0065] In another embodiment there is provided a data-logging system for logging driving information comprising: a database for storing a plurality of accounts, each account having a unique identifier and the database being arranged to store driving information associated with at least one of a vehicle and a driver; a communications interface arranged to communicate with a remote mobile device, and receive therefrom: a unique identifier for association of the mobile device with a corresponding one of the plurality of accounts; and driving information to be logged to that corresponding account.

[0066] The remote mobile device may be a mobile device in accordance with one of the first to fourth aspects of the present invention.

[0067] Preferably, the driving information comprises a driving score. Preferably, the driving information comprises sensor data captured and processed by the mobile device during a driving period during which the mobile device is installed to a vehicle being driven by a driver.

[0068] Preferably, the system is arranged to process the driving information logged to the corresponding account to generate a driving score. The driving score may be used to determine a risk profile for at least one of the vehicle and driver. ~~The driving score may be used to define an insurance premium associated with the account.~~

[0069] ~~Preferably, the system is further arranged to communicate to a mobile device an insurance offer generated in response to the driving information received from the mobile device. The data logging system may be further arranged to receive from the mobile device a user acceptance of the insurance offer.~~

[0070] ~~The mobile device may be arranged to generate an insurance offer in response to a predetermined set of conditions being met. For example, driving information over a plurality of driving period adhering to predetermined models. Such models may comprise safe driving parameters and/or thresholds.~~

[0071] According to a second aspect of the present invention there is provided a method of using a mobile telecommunications device to make a safety determination for a vehicle when in use, the method comprising: downloading a software program to the mobile telecommunications device, the software program in use configuring a processor of the mobile telecommunications device when the mobile telecommunications device is removably affixed to the vehicle, to: register the start of a driving period during which the mobile telecommunications device is removably affixed to the vehicle and the vehicle is being driven by a driver; the start of the driving period being determined based on the inputs received by a user interface of the mobile telecommunications device and sensor data from a sensor set of the device, the sensor set comprising a plurality of sensors selected from a group of sensors including an image sensor, and at least one of an audio sensor, an accelerometer and a positioning module, the start of the driving period also being determined without data from sensors of the vehicle; process, at the mobile telecommunications device, sensor data from the sensor set during the driving period to derive driving information associated with

how the vehicle is driven; the driving information including images captured by the image sensor; and store a selection of the driving information to a memory of the mobile telecommunications device; processing the captured images to make a safety determination for the vehicle; and issuing an alert signal in response to making an unsafe determination for the vehicle from the processing step.

[0072] According to a third aspect of the present invention there is provided a non-transitory computer-readable medium having instructions comprising a software application stored thereon, wherein the instructions are configured to be executed on a processor of a mobile telecommunications device to enable the mobile telecommunications device to log driving information associated with a driver of a vehicle, the mobile telecommunications device including a display; a sensor set comprising a plurality of sensors selected from a group of sensors including an image sensor, and at least one of an audio sensor, an accelerometer and a positioning module; the processor; a user interface and a memory, wherein the instructions, upon execution by the processor, enable the mobile telecommunications device to:register the start of a driving period during which the mobile telecommunications device is removably affixed to the vehicle and the vehicle is being driven by a driver; the start of the driving period being determined based on the inputs received by the user interface of the mobile telecommunications device and sensor data from the sensor set, the start of the driving period also being determined without data from sensors of the vehicle; process, at the mobile telecommunications device, sensor data from the sensor set during the driving period to derive driving information associated with how the vehicle is driven; the driving information including images captured by the image sensor; store a selection of the driving information to the memory of the mobile telecommunications device; process the captured images to make a safety determination for the vehicle; and issue an alert signal in response to making an unsafe determination for the vehicle from the processing step.

[0073] For brevity, it will be understood that features, functions and advantages of different aspects of the present invention may be combined or substituted where context allows. For example, features, functions or advantages of the mobile device described in relation to the first to fourth aspects of the present invention may be provided as method steps in the method of logging driving information according to the fifth aspect of the present invention.

Brief Description of the Drawings

[0074] In order that the invention may be more readily understood, reference will now be made, by way of example, to the accompanying drawings in which:

[0075] Figure 1 is a schematic illustration of a system within which the mobile device of various embodiments of the present invention may be used;

[0076] Figure 2 is an illustration of the automobile of Figure 1 configured with a mobile device in accordance various embodiments of the present invention;

[0077] Figure 3 is a schematic illustration of the functional components of the mobile device of Figure 2;

[0078] Figure 4a is a process flow chart, illustrating method steps executable by the mobile device of Figures 2 and 3;

[0079] Figure 4b is a more detailed process flow chart, providing an example of how a driving incident or event may be detected in accordance with embodiments of the present invention; and

[0080] Figures 5 to 24 illustrate a graphical user interface of the mobile device according to Figures 1 to 4b.

Detailed Description of the Embodiments

[0081] Specific embodiments are now described with reference to the appended figures.

[0082] A preferred embodiment of the present invention relates to a mobile telecommunications device for recording events associated with a vehicle, such as a car. In particular, the mobile telecommunications device is loaded with an application – a 'mobile app' – which is arranged to record and document the events surrounding an incident involving the vehicle (a 'driving incident'), such as a vehicle collision. The mobile application may be referred to as the 'Witness' application in the ensuing description.

[0083] Figure 1 illustrates a system 1 within which a vehicle, such as an automobile 3 configured with a mobile telecommunications device executing the Witness application, may communicate with one or more remotely located devices or systems. Such devices may relate to one or more servers, such as ~~an insurance server 5~~, an emergency services server 7, a content provider server 9, and a personal computer 11. Communication between the

automobile 3 and the one or more remotely located devices 5, 7, 9, 11 may be effected via a shared communication network 13. The shared communication network may relate to a wide area network (WAN) such as the Internet, and may also comprise telecommunications networks. For example, the mobile telecommunications device of the present embodiments may be arranged to communicate with any one of the remotely located devices 5, 7, 9, 11 via a mobile telecommunications base station 15, which is coupled to the shared mobile telecommunications network 13.

[0084] A main purpose of the mobile telecommunications device, when arranged within a vehicle in motion, such as the illustrated automobile 3, is to monitor and process sensor data captured by the mobile device, to derive driving information associated with the moving automobile 3. As mentioned previously, this driving information is subsequently used by the mobile device to determine if a driving incident or event has occurred. The term "driving incident" as used within the present context may relate to an event such as a collision, a near-miss, dangerous driving, erratic driving or similar. Similarly, the driving information may be used as a means for monitoring a driver's driving performance, and determining a driving characteristic, or user profile for the subject driver. In other words, the sensor data and/or the driving information may be used to determine for example, if the driver is a cautious driver, or a reckless driver. ~~This information may be used, for example by an insurance provider, to conduct a risk assessment and to tailor an insurance premium to the subject driver on the basis of a determined driving characteristic.~~ Further details of this alternative embodiment are described below.

[0085] The mobile telecommunication device's functionality is provided by the Witness application, which is installed in the device's local non-volatile storage, and which is executed by the device's native processor. The application may be downloaded to the mobile device via the shared communications network 13 and telephone base station 15, from the content provider server 9.

[0086] In use (once the application has been configured for execution on the mobile telecommunications device), when a driving incident has been detected by the mobile telecommunications device, data, comprising one or more of mobile device sensor data, derived driving information, and captured image data may be automatically forwarded to one or more of the remotely located devices 5, 7, 9, 11. For example, the mobile device may be configured such that when a driving incident is detected, such as a collision involving an

automobile 3, driving information (including image data captured by the mobile device) derived from the sensor data is automatically forwarded ~~to the insurance server 5,~~ via the base station 15 and shared communications network 13. ~~In this way, data relating to the driving incident (a collision in this example), is automatically forwarded to the automobile user's insurance provider, for use in claim settlement, and/or to determine culpability.~~

[0087] Similarly, once a driving incident has been detected, data may also be automatically forwarded to the emergency services server 7. For example, such data may comprise the position information of the automobile 3, along with an automated S.O.S. message requesting assistance from the emergency services. Forwarded data may also comprise sensor data, and any relevant derived driving information, such as speed of impact, the g-forces the vehicle was subjected to during the collision, or any other information wherefrom the severity of the collision may be determined, and which may be used to assist the emergency services in coordinating the appropriate level of response.

[0088] Optionally, an electronic message may be sent to a personal contact preselected by the user. For example, an automated message, such as an e-mail, may be forwarded to the PC 11 of the user nominated personal contact, informing the personal contact that the user of the vehicle 3 has been involved in a driving incident. Similarly, and due to the mobile device's telecommunications functionality, an electronic text message, such as an SMS (Short Message Service) may be forwarded to the telephone of the user selected personal contact, informing the contact of the driving incident. The mobile device may be equally be arranged to communicate with a personal contact via any known electronic messaging service and/or instant messaging service too. For example, via Apple's® iMessage, or RIM's® BlackBerry Messenger (BBM) service.

[0089] This functionality of forwarding a message to a nominated contact, may also be of particular benefit for managing large fleets of vehicles. For example, a car hire service. In this way, if any of the vehicles comprised in the fleet are involved in a driving incident, the car hire service may be automatically notified of the identity of the specific vehicle involved in the driving incident. In such embodiments, the nominated personal contact would be preselected by the vehicle fleet manager. The option of providing a second user selected personal contact is also envisaged. In this way, a message may be forwarded to both the car hire service for example, and to the driver's selected personal contact.

[0090] In preferred embodiments the mobile telecommunications device relates to a mobile telephone having native processing functionality, and preferably relates to a smartphone. Preferably, the mobile telephone comprises a camera arranged to enable image capture, and preferably arranged to enable a sequence of images to be captured taken in temporal succession. In other words, in preferred embodiments the mobile telephone comprises a camera configured to enable video footage of a sequence of events to be captured.

[0091] Alternatively, the mobile telecommunications device may relate to a PDA, a notepad such as an iPad®, or any other mobile device comprising local processing means and means for communicating with a telecommunications network.

[0092] Figure 2 provides a more detailed view of the automobile 3 of Figure 1, and illustrates a preferred arrangement of the mobile telecommunications device 17 within the automobile 3. In the illustrated embodiment, the mobile telecommunications device 17 relates to a smartphone configured with an image capture device, such as a camera. Preferably, the device 17 is arranged within the vehicle, such that the camera has a clear line of sight of the road in the principle direction of travel of the automobile 3. For example, the device 17 may be attached to the windshield 19 of the automobile 3 in an adapter 21. The adapter 21 may comprise a flexible telescopic arm, configured with a suction cup at one end for affixing the adapter to the windshield 19, and a dock arranged at the opposite end for securely holding the telecommunications device 17 in place. The telescopic arm enables the position of the device 17 to be varied, such that a clear line of sight in the direction of travel may be obtained.

[0093] The details of the adapter 21 are irrelevant for present purposes, with the exception that it must enable a clear line of sight in the principle direction of travel of the vehicle to be obtained, and it must firmly affix the mobile to the vehicle. Affixing the mobile telecommunications device 17 to the automobile 3, ensures that the mobile device 17 is able to accurately capture the automobile's state of motion. By principle direction of travel is intended the main direction of travel of the vehicle when operated in a conventional way, indicated by the arrow A in Figure 2. In other words, the forward direction of travel. The skilled reader will appreciate that whilst most vehicles, such as an automobile, may have more than one direction of travel (e.g. travelling backwards when in reverse gear), the majority of vehicles have a primary direction of travel, which is the intended direction of

travel for any transit of substantial length and/or distance. Arranging the telecommunications device 17 relative to the direction of principal travel, ensures that the camera (not shown) of the telecommunications device 17 is well placed to capture any image data which may be pertinent to a subsequently detected driving incident, such as a collision.

[0094] Figure 3 is a schematic of the modular components of the mobile telecommunications device 17 of Figure 2. Preferably the mobile telecommunications device 17 comprises: an image capture module 21, an accelerometer 23, a GPS receiver 25, an audio capture module 27, a communications module 29, a processor module 31 and a storage module 33. The image capture module 21, accelerometer 23, GPS receiver 25, and audio capture module 27 form a sensor set and are generically referred to as data capture modules in the ensuing description, and are differentiated from the communications module 29, processor module 31 and storage module 33, in that they comprise sensors for sampling physical data.

[0095] This sampled physical data, which is also referred to as sensor data, is subsequently processed by the processor module 31 and stored in the storage module 33.

[0096] The image capture module 21 may relate to any image capture device, such as an integrated camera commonly found in smartphones or similar mobile devices. As mentioned previously, the image capture module 21 is preferably configured to capture a plurality of images taken in temporal succession, such as provided by a video camera.

[0097] The accelerometer 23 is arranged to provide information regarding the motion of the automobile 3 along all three dimensional axes. For example, the accelerometer 23 provides information regarding the pitch, yaw and roll of the automobile 3. Sensor data captured from the accelerometer 23 may be used to determine the g-forces the automobile has been subjected to. This is particularly useful in determining the severity of a collision. In general, the greater the g-forces experienced in a collision, the greater the risk of serious injury to the passengers of the vehicle. This information may assist the emergency services in forming an initial assessment of the severity of a collision. Furthermore, this type of data may also assist the emergency services and/or insurance provider to obtain a better understanding of the driving incident. For example, in the event of a collision, this data may assist the emergency services ~~and/or insurance provider~~ to obtain a better understanding of how the collision occurred. This information may subsequently be used for dispute resolution, and/or for determining culpability.

[0098] The GPS receiver 25 is arranged to provide location information, such as positional coordinates, and can also provide velocity information. When combined with the accelerometer sensor data, the GPS receiver data can be used to provide a very accurate model of a driving incident, such as a collision. In particular, the GPS sensor data provides velocity data, such as the velocity of impact. The velocity data enables one to determine if a vehicle was being driven at speeds greater than the legally permitted maximum speeds.

[0099] The audio capture module 27 provides means, such as a microphone, for recording audio data, which might be generated by a driving incident. This includes any sounds generated externally to the vehicle, for example the sound of an impact, or the sound of the crumple zone being crushed. Additionally, sounds generated internally to the vehicle are also recorded. Such audio data may also help to recreate a driving incident, and understanding the causes of the incident.

[00100] The communication module 29 provides the mobile telecommunications device 17 with functionality for communicating with the remotely located devices 5, 7, 9, 11 of Figure 1. The communication module 29 comprises a wireless telecommunications sub-module 31 enabling communication over a telecommunications network. An optional wi-fi communication sub-module is also envisaged. Similarly, the presence of wired communication modules are also envisaged, such as a USB port and/or an IEEE 1394 interface (more commonly known as FireWire™) to support wired communication with a remote device, such as a personal computer or similar. Such a connection may be useful for the purposes of side-loading the application to the mobile device.

[00101] As mentioned previously, sensor data captured from any one of the aforementioned data capture modules 21, 23, 25, 27 is processed by the processor module 33, to generate driving information. By driving information is intended any data which may be derived from raw sensor data captured by any one of the aforementioned modules 21, 23, 25, 27. For example, g-force data is driving information which is derived from the sensor data sampled by the accelerometer 23. The skilled reader will be familiar with the plurality of types of driving information that may be derived from sensor data sampled by the aforementioned modules, and accordingly a complete list of the different types of driving information that may be derived from sampled sensor data is omitted for brevity.

[00102] The processor module 33 is also configured to analyse sampled sensor data and generated driving information to determine if a driving incident has occurred (described in more detail below).

[00103] Sampled sensor data is stored in storage 34, which is operatively coupled to the processor module 33, along with any generated driving information. The storage 34 is preferably configured with a FIFO (First In First Out) storage buffer 34a, and a permanent storage component 34b. In preferred embodiments, the data capture modules are configured to sample data at periodic intervals. Preferably, these intervals are sufficiently small, of the order of milliseconds, such that for practical purposes the data capture modules may be considered to sample data continuously. The sampled data, along with any derived driving information is preferably stored in the storage buffer 34a, unless a driving incident has been identified, in which case the associated sensor data and driving information is stored in the permanent storage component 34b to avoid undesirable overwriting.

[00104] In preferred embodiments, the FIFO storage buffer 34a is provided with a finite amount of storage space. Nonetheless, said storage space may be predefined by the user as will be described below. In any case, once this storage space has been exhausted, the oldest recorded data is overwritten by newly sampled data, and this cycle of overwriting older data with newly sampled data is continuously carried out during operation of the telecommunications device 17, unless a driving incident has been detected, in which case, and as mentioned previously, all data related to the driving incident is stored in a long term protected storage 34b to safeguard it from being overwritten by newer data.

[00105] In preferred embodiments, the mobile telecommunications device 17 may be configured with a data recording strategy by the user. This might define the frequency with which sensor data is sampled. In other words, how many measurements are made per unit of time. Furthermore, the recording strategy also defines how data is recorded. In preferred embodiments, sampled sensor data is stored in data files in the buffer 34a. Each data file represents a plurality of sequentially sampled sensor data, captured over a defined period of time, which will be referred to as a 'data file period'. This is best illustrated by considering captured image data, such as video footage. A video period may be defined, which period defines the unit of physical time covered by captured video footage comprised in a single video data file – this is the data file period for image data. The video data file is subsequently stored in the buffer 34a. For example, a five minute video period setting,

instructs the processor 33 to store all sequentially captured image data captured by the image capture module 21 over a period of five minutes, in a separate video data file. It is to be understood that whilst the image capture module 21 is continuously sampling image data (in other words, it is continuously capturing image data), this plurality of captured image data is grouped together for storage in video data files, each data file representing a five minute data file period.

[00106] Sampled sensor data and derived driving information is also continuously analysed by the processor module 33 for the purposes of detecting a driving incident. As soon as a driving incident is identified, the associated sensor data and derived driving information is stored in a data file in accordance with the data recording strategy. Returning to the example described in the preceding paragraph, this entails combining the video footage captured within a temporal window of five minutes leading up to the detected driving incident, in a single video file, and storing this data file in protected storage 34b. Whilst each different type of sensor data may be recorded in separate data files, in preferred embodiments all the different types of sensor data sampled by the mobile telecommunications device 17 are stored together in a single data file in accordance with the user selected data recording strategy. This means that the five minute data file referred to above, preferably also comprises GPS data, accelerometer data, and audio data sampled over the five minute time period.

[00107] Data files are stored in the buffer 34a, unless they are associated with a driving incident, in which case they are then stored in protected storage 34b, which cannot be overwritten. Once the storage space comprised in the buffer 34a has been exhausted, the oldest data file is overwritten by a newer data file.

[00108] Data compression methods may also be used in conjunction with the present invention to improve the use of storage. For example, data comprised in data files which have not been associated with a driving incident may be compressed using compression techniques, which techniques will be known to the skilled reader. Similarly, within a data file associated with a driving incident, sensor data captured at time coordinates which are distant from the determined driving incident may be compressed. In this way, the resolution of sensor data which is directly pertinent to a driving incident is maintained, whilst sensor data which may be less relevant to the driving incident is maintained at a lower resolution.

[00109] Since the sensors of the mobile telecommunications device 17 are continuously recording sensor data, even when a driving incident is detected, the device 17 may be configured to comprise sensor data and/or driving information recorded/derived shortly after the driving incident in the same data file, since this data may also be relevant for understanding a driving incident. Furthermore, this also enables the mobile telecommunications device to record multiple driving incidents. For example, a multiple collision.

[00110] The processor module 33 may be configured with encryption means, enabling stored data files to be encrypted to prevent data tampering. Envisaged encryption means may comprise both software solutions and hardware solutions. For example, the processor module may comprise a cryptoprocessor, or the processor may be configured with code to carry out a cryptographic process.

[00111] Figure 4a is a flow chart outlining the method carried out by the mobile telecommunications device 17, to determine if a driving incident has occurred, in accordance with a preferred embodiment. An application is downloaded from the content provider server 9 of Figure 1, onto the mobile telecommunications device 17, at step 36, as previously described. This may be done over a telecommunications network. The application provides the mobile telecommunications device 17 with the previously described functionality, when executed on the device. The mobile telecommunications device is configured within the vehicle, at step 38. This may comprise affixing the mobile telecommunications device 17 to the vehicle via an adapter, as described previously.

[00112] The recording strategy is specified at step 40. As mentioned previously, this comprises setting the period of time that each recorded data file represents. Furthermore, it may also comprise defining the size of the buffer 34a and/or the number of data files that are to be stored within the buffer. Preferably, the recording strategy is specified only once, upon first use of the mobile telecommunications device 17. Where the recording strategy has already been defined, method step 40 is skipped, and the method continues with step 42.

[00113] The start of a driving period is registered, at step 42. The start of the driving period determines when the recording of sampled sensor data begins. The start of a driving period may be manually entered by the user via the application's graphical user interface (GUI). Alternatively, the start of the driving period may be automated. For example, the mobile device 17 may be configured to initiate the driving period once sensor data above

a minimum threshold value is recorded, indicative of the vehicle being in motion. For example, once a velocity greater than 20 kilometres per hour is detected.

[00114] Alternatively, the start of the driving period may be initiated once the application determines that the mobile telecommunications device 17 has been affixed to the vehicle. For example, the adapter 21 may comprise a registration module (not shown) arranged to register the installation and fixation of the mobile device to the vehicle and/or adapter. The registration module may comprise an NFC device. When the mobile device is brought into close proximity with the registration module, a driving period is initiated.

[00115] Once the driving period has been initiated, sensor data is sampled and recorded in storage 34, at step 44. Additionally, the sampled sensor data is used to generate driving information by the processor module 33. The sampled sensor data and the driving information is continuously analysed by the processor module 33, at step 46.

[00116] The processor module 33 determines if a driving incident has been detected, at step 48. This is determined on the basis of the analysis carried out at step 46. If a driving incident has been detected, all the sensor data and driving information associated with the data file period, is stored in a data file in protected storage 34b, at step 50.

[00117] There are several ways in which a driving incident may be detected. Preferably, this is an automated process, wherein the processor module 33 determines a driving incident has occurred on the basis of an observed marked variation in sensor data and/or driving information. The term 'marked variation' is to be understood to relate to a significant change in sensor data and/or driving information occurring over a very short time period. In other words, a detected impulse in recorded sensor data and/or driving information, indicative of a significant change in the state of motion of the vehicle occurring over a short time period. For example, a sudden increase in the g-forces the vehicle is subjected to, may be indicative of a collision and if observed, result in a driving incident being determined to have occurred by the processor module 33.

[00118] Predefined threshold values may also be used to automate the detection of a driving incident. For example, each data type and/or derived driving information (e.g. acceleration, velocity, g-force, pitch, roll, yaw etc.) may be associated with a threshold value. When any one of these threshold values is exceeded, the processor module 33 may be configured to determine that a driving incident has occurred. Similarly, the automated detection of a driving incident may require that a threshold condition associated with a

combination of predefined threshold values, each threshold value being associated with a different data type and/or type of driving information, must be exceeded, in order for the processor module 33 to automatically determine that a driving incident has occurred. For example, in the event of a collision, it is reasonable to expect to observe a marked variation in g-force, accompanied by a marked variation in velocity. Accordingly, the threshold condition may require that in order for a collision to be automatically detected, both a marked variation in g-force and a marked variation in speed, in excess of predefined threshold values must be observed.

[00119] Similarly, the occurrence of a driving incident may also be recorded manually by the user via the application GUI. This may be beneficial for the purposes of documenting data associated with a low velocity collision - colloquially referred to as a 'fender-bender' - which may not result in any marked variations in sampled sensor data, and therefore may not be automatically detected.

[00120] ~~Once a driving incident, such as a collision, has been detected, and the data file comprising the associated sensor data and driving information has been securely stored in protected storage 34b, the data file is transmitted to the insurance server 5 of Figure 1, at step 52. The data file informs the insurance provider that a driving incident has occurred and provides the insurance provider with the sensor data and derived driving information. This data assists the insurance provider in better understanding the collision, in addition to assisting with determining culpability, where more than one vehicle are involved.~~

[00121] Similarly, once a driving incident has been detected, an S.O.S. message may be automatically forwarded from the mobile telecommunications device 17 to the emergency services server 7, at step 54. The S.O.S. message may also comprise sensor data and derived driving information, which may assist the emergency services in coordinating their response.

[00122] As mentioned previously, the mobile telecommunications device 17 will continue to sample and record sensor data even once a driving incident has been detected, unless the mobile telecommunications device 17 detects that the driving period has terminated, at step 56. If the driving period has terminated, the present method is terminated and the device stops recording sensor data. The end of a driving period may be automatically detected by the processor module 33, if certain conditions are met. For example, if the measured velocity of the vehicle remains zero for a predetermined period of time, the

processor module 33 may infer that the vehicle is stationary and no longer being driven, and accordingly ceases recording sensor data, and the method is terminated. If instead the processor determines that the driving period has not yet terminated, a new data file period is initiated, at step 58, and steps 44 through 62 are repeated.

[00123] Where a driving incident is not detected at step 48, the processor module 33 will determine if the data file period has expired, at step 60. If the data file period has expired, then the sensor data and the derived driving information generated during the data file period is combined and stored in a single data file, for storage in the buffer 34b, at step 62. The processor 3 then determines, at step 56, if the driving period has terminated. If the driving period has not terminated, a new data file period is initiated, at step 58. The mobile telecommunications device 17 continues to sample sensor data, to derive driving information, and steps 44 through 62 are repeated, until the driving period is determined to have terminated.

[00124] Figure 4b provides more detail regarding how a driving incident may be automatically detected (i.e. steps 46 and 48 of Figure 4a) in a preferred embodiment, where the mobile telecommunications device 17 is configured to sample audio data, accelerometer data, and GPS data only. Each one of these types of data is analysed in turn, at steps 64, 66 and 68. The analysis may comprise comparing measured sensor data and/or derived driving information with a data model. The model may comprise defined threshold values for different data types. Sampled sensor data and/or driving information may be compared with the data model to determine if a driving incident has occurred.

[00125] For example, the analysis of sampled audio data, at step 64, may comprise comparing the recorded audio data with predetermined audio data models representing specific sounds. Such sounds may relate to the sound of tyre squeals, the sound of deforming metal, the sound of breaking glass, passenger screaming and/or shouting, the sound of airbag deployment, and any other sound which may be associated with a driving incident. Effectively, this may be considered audio fingerprinting, which serves to identify specific sounds associated with a driving incident by carrying out a signal profile analyses of the audio signal captured by the audio capture module 27. To achieve this, the storage device 34 may comprise a database of prestored audio sound files. The audio sound files represent sounds associated with a driving incident. The captured audio signal is compared with the sound files comprised in the database, to identify matches between the captured audio signal

and the database of sound files. This facilitates the audio fingerprinting of specific sounds, indicative of a driving incident, present within the captured audio data signal captured by the audio capture module 27.

[00126] Similarly, the analysis of sampled accelerometer data, at step 66, may comprise comparing the sampled data with predetermined accelerometer data models. The data models represent specific states of motion of the vehicle. For example, this might comprise defining threshold values for yaw, pitch and roll, which if exceeded, indicate a state of motion of the vehicle indicative of a driving incident. For example, a measured yaw value above a predetermined threshold value may be indicative of the vehicle having lost traction and is fishtailing and/or skidding. Similarly, a roll and/or pitch value above a predetermined threshold value may be indicative of the vehicle having overturned.

[00127] Accelerometer sensor data is also used for deriving driving information such as g-forces. Analysis of g-force data is also used to determine if a driving incident has occurred. For example, approximate g-force values for detecting certain driving incidents are as follows:

[00128] Harsh braking – a deceleration of greater than 2.5 m/s^2 or forward G-force of greater than 0.7G for more than 400msec.

[00129] Harsh acceleration – from stationary, an acceleration greater than 2.5 m/s^2 or backward G-force of greater than 0.7G for more than 800msec.

[00130] Harsh swerving - lateral G-forces greater than 0.7G for more than 400msec.

[00131] The data models are preferably preconfigured and are comprised within the application executed on the mobile telecommunications device. Different data models are used depending on the type of vehicle the telecommunications device is being used with. Different vehicle types will experience different states of motion during regular operation, which must be considered in determining if a driving incident has occurred. For example, a motorcycle will display more roll and/or pitch than an automobile during regular operation. Accordingly, different data models and/or threshold values must be used to automate the identification of a driving incident for different vehicle types. The specific data models used may be selected during an initial configuration of the mobile telecommunications device, by indicating the type of vehicle the device is being used with.

[00132] On the basis of the audio data analysis and the accelerometer data analysis, the mobile telecommunications device determines, at step 72, if a driving incident has occurred. If it is determined that a driving incident has occurred, then the telecommunications device proceeds with step 50 of Figure 4a. If instead a driving incident is not detected, the telecommunications device proceeds with step 60 of Figure 4a.

[00133] The GPS data analysis, at step 68, comprises analysing positional data and velocity data for any anomalous readings. For example, a sudden deceleration followed by a zero-velocity reading lasting a predetermined period of time, may be indicative of a collision. If such a zero-velocity reading is observed at step 70, in conjunction with anomalous audio and/or accelerometer sensor at step 72, then a driving incident is determined and the mobile telecommunications device proceeds with step 50 of Figure 4a. This is a further example of a threshold condition, discussed previously.

[00134] The previously described mobile telecommunications device and method may also be used to monitor and generate a driver profile. The driver profile may be indicative of the type of driver a user is. For example, this may comprise determining if a user is a calm and patient driver, or an aggressive driver. Also, this may comprise determining whether a user regularly flouts speed limits, and/or ignores safety distances. ~~This type of information may be used by an insurance provider to conduct a personalised risk assessment for individual users. Insurance premium rates may then be tailored to the specific user on the basis of the personalised risk assessment.~~

[00135] For example, analysis of captured image data, such as video footage, may be used to determine if a user regularly flouts safety distances. In preferred embodiments, the mobile telecommunications device is arranged within the subject vehicle to have a clear line of sight of the road in the direction of principle motion. Accordingly, the number plate of any vehicle preceding the subject vehicle will be captured by the image capture module. Since the physical dimensions of number plates are standardised and known in each country, they may be used as a metric to scale the captured image. When combined with the known optical characteristics of the image capture module, this enables the distance of the image capture module from the image object (i.e. the preceding vehicle) to be determined at the time of image capture. This information may then be used to see if a user adheres to recommended safety distances. ~~A user that is observed to regularly flout recommended safety distances,~~

~~may be considered to represent a greater risk, and accordingly may be required to pay a greater insurance premium than a user who regularly respects recommended safety distances.~~

[00136] Image analysis can also be used to determine driving conditions and the driving environments. For example, image processing can detect road signs, such as stop signs or traffic lights. Furthermore, driving conditions, as affected by the weather can be determined. For example, if the windscreen wipers are detected to be in motion, it can be inferred to be raining. Once the driving conditions are so determined, an assessment of the driving performance of a user can be made by determining whether the user reacts or behaves appropriately to the driving conditions. For example, if the driver is seen to be jumping red lights, or driving dangerously in rain or snow, then a higher risk profile may be assigned to that driver.

[00137] Similarly, accelerometer and g-force data may be used to determine if a user has an erratic driving style. For example, a user that generates sharp variations in g-force data and accelerometer data during regular operation of a vehicle, may be considered to drive erratically, and therefore at greater risk of being involved in an accident, ~~and insurance premium rates for the user may be tailored accordingly.~~

[00138] The mobile telecommunications device may also be configured to interface and communicate directly with a vehicles native telemetry systems. For example, the majority of modern cars have inbuilt electronic control systems or engine management systems, arranged to collect data regarding vehicle system performance. This data may be communicated to the mobile telecommunications device either via a wired physical connection, such as USB (Universal Serial Bus), or via a wireless communication protocol such as Bluetooth®. This data may subsequently be used by the mobile telecommunications device to complement sensor data captured directly by the telecommunications device. In this way a more accurate model of a driving incident, and/or of a user profile may be generated. For example, native vehicle telemetric systems may comprise electronic tyre pressure sensors, and are able to detect if a tyre is under and/or over-inflated. This information may be communicated to the mobile telecommunications device and may help to explain the causes for a driving incident, such as a sudden loss of traction resulting from a burst tyre.

[00139] Further features of the Witness application, are set out below.

Benchmarking

[00140] It will be appreciated that different sensor types, phones, mounting positions, vehicles, drivers and road conditions may generate differing outputs for driving behaviour that is 'safe'. To account for this, the Witness application may have the following functionality:

[00141] During a 'training mode' (e.g. first week of enabling the Witness application) the input from the sensors are used to build up a 'benchmark' for a particular driver's typical driving conditions.

[00142] Assuming an accident does not occur during this training mode, the benchmark data can be subsequently used to assess the occurrence of driving incident.

[00143] There is preferably an option to notify the Witness application of a change in parameters (e.g. different driver, driving off-road etc). Thus a number of 'profiles' may be set up. Each profile may require an independent training mode period.

[00144] If the Witness application incorrectly detects that a driving incident has occurred, it can receive feedback from the user to modify its sensitivities. E.g. a more aggressive driver is actually driving.

Crash/Collision Management

[00145] On detection of a crash (or other driving incident) the Witness application is arranged to take one or more of the following actions:

[00146] Announce that it has detected an accident (audio/screen prompt)

[00147] Call the emergency services (with option to cancel) – e.g:
Audio/screen prompt: 'Witness has detected that you have been involved in a (serious) accident and will call the emergency services. If this is not the case, please cancel within 10 seconds.'

[00148] Provide reassurance

[00149] Provide the user with a checklist of things to do:

[00150] Take photographs of vehicles involved in the incident (inc number plates)

[00151] Take down name, address, insurance details etc of 3rd parties involved in incident

[00152] Communicate to the insurance company that an incident has been detected (e.g. low bandwidth data or text message)

[00153] Protect the high quality recorded data so it is not overwritten

[00154] If appropriate – or in response to a request from a communication to the phone from the insurance company – transmit all or selected portions of the recorded data associated with the incident.

[00155] ~~N.B. Use of the communication channels is controlled by the Witness application to prioritise essential communications such as calls to the emergency services.~~

[00156] ~~Note that data transmission from the mobile telephone to the insurance company may be automatic (for example, triggered by a detected incident) or manual (for example, in response to a request from the insurance company). In the latter case, the Witness application may include functionality to allow the insurance company to browse through the data files available on the mobile telephone so as to select one or more for transmission to the insurance company.~~

Data processing for generating a user profile

[00157] Further features of the user profile generation embodiment are summarised:

[00158] If the Witness application incorrectly detects an event or incident of significance, and receives feedback that the vehicle was not involved in an accident (but was in a near miss) – this could alter the risk profile of the driver. For example – if this happens frequently, but no accident occurs over a given period, this could be an indicator that the driver is good at reacting to potential hazards.

[00159] Erratic driving (e.g. jerky steering or braking detected by G-force sensor).

[00160] Driving faster than the speed limit allocated to a given road (detected by GPS).

[00161] Further details regarding the features and functionality of the Witness application, in particular the graphical user interface of the Witness application, are now described.

[00162] Referring to Figure 5, a first page 80 of the Witness application user manual is shown in which an image of the Main Menu (the top-level menu) 82 is displayed. The Main Menu is displayed when a user first runs the application on a smart-phone, such as the iPhone® 4. The main menu includes the following user-selectable buttons:

[00163] Recording Screen 84

[00164] File Management 86

[00165] Settings 88

[00166] Accident Management 90

[00167] Information 92 (displays up a manual, as shown in Figures 5 to 14).

[00168] Selecting the Recording Screen button 84 opens the Recording Screen 94 – the second image shown in Figure 5. The Recording Screen 94 contains a video feed 96 from the camera of the smart-phone, which occupies the majority of the visible screen area. Overlaid on to the video feed is the detected speed of the vehicle 98 (e.g. 0 mph), heading 100 (e.g. south by south-west) and the elapsed recorded time 102 (e.g. 00:00). Displayed in a left column of the Recording Screen are additional user selectable buttons:

[00169] Keep current video 104 (pressing this button will automatically copy the current video - and the previous video segment - to the protected storage 34b, and prevents that information from being overwritten. The user is advised to press this button in the event of a driving incident that needs to be recorded).

[00170] Take photo 106 (captures a still photograph).

[00171] Exit Recorder 108 (returns to main screen).

[00172] Start / Stop Recording 110 (starts recording video footage - and other data).

[00173] Referring to Figure 6, a second page 112 of the Witness application user manual is shown, in which an image of the Recording Screen 114 is shown and described operating in a map-displaying mode rather than a video-feed mode.

[00174] During recording, (i.e. when the 'Start / Stop Recording' button 110 is pressed) the Exit Recorder button in the Recording Screen is substituted with a Map Display button 116. Pressing it will toggle between the modes showing the video feed and a map of the current location.

[00175] Referring to Figure 7, a third page 118 of the Witness application user manual is shown, in which the File Management Screen 120 is shown and described. The File Management Screen 120 can be accessed by pressing the File Management Button 86 in the Main Menu.

[00176] The File Management Screen 120 displays video and associated data (e.g. telemetry data) that has been previously recorded. The stored data is contained in either a

protected area of storage or in a "Recording Stack". Data files in the protected area are saved and so not overwritten as part of a Recording Strategy. In contrast, data files in the Recording Stack may be overwritten as part of the Recording Strategy.

[00177] As illustrated in Figure 7, the bottom section of the list represents the "Kept" data files 122, whereas the top section of the list represents the "Recording Stack" 124. "Kept" data files 122 can be edited and deleted from the File Management Screen 120, whereas "Recording Stack" data files cannot. Editing "Kept" data files can involve renaming them.

[00178] The recorded data files are listed on screen along with the time and date of the recording and the electronic size of the data file. Accordingly, the user is provided with feedback about how big the data files are, and so if the smart-phone is low in storage, the user can elect to delete certain "Kept" data files. "Recording Stack" data files will be automatically overridden by the Recording Strategy.

[00179] The controls on the toolbar at the bottom of the recordings screen allow a user to change the selection mode of the video stack and includes:

[00180] Video 126 (when highlighted, if a data file is selected, a video recording playback screen will be displayed).

[00181] Map 128 (when highlighted, if a data file is selected, then a map will be displayed showing the area over which the recording was made).

[00182] Export 130 (when highlighted, a selected data file will be passed to an Export Screen where export options will be provided).

[00183] Keep 132 (when highlighted, if a "Recording Stack" data file is selected, then a user will be prompted to name it, and then it will be stored as a "Kept" data file).

[00184] The icons in the File Management Screen change in dependence on the selected mode. For example, Figure 20 shows the icons 134 displayed when the Video selection mode is highlighted; Figure 21 shows the icons 136 displayed when the Map selection mode is highlighted; Figure 22 shows the icons 138 displayed when the Export selection mode is highlighted and Figure 23 shows the icons 140 displayed when the Keep selection mode is highlighted. Advantageously, this provides improved feedback to a user about what selection mode is highlighted and so what action is likely from the selection of a data file.

[00185] Referring to Figure 8, a fourth page 142 of the Witness application user manual is shown, in which an image of a Recording Playback screen 144 is shown and described. The Recording Playback screen is invoked by highlighting the Video Mode 126 in the File Management Screen 120 and selecting an appropriate data file.

[00186] In the Recording Playback screen 144 it is possible to play back a pre-recorded video feed associated with a chosen data file. As well as playing back the recorded video feed, the Recording Playback screen also displays other associated data such as telemetry data 146. For example, date, time, speed, forward/backward G-forces, latitude, longitude and heading information is overlaid onto the video feed. As the video is played back, these values will typically change depending on the behaviour of the vehicle, as recorded by the mobile device.

[00187] Forward and backward G-forces are those that correspond to the forward and backward movement of the vehicle and are the primary metric for determining an event such as a crash. However, other G-forces (e.g. up/down and side-to-side) may also be measured by the device – even if they are not necessarily displayed on the mobile screen.

[00188] As recited in Figure 8, the Recording Playback screen provides further user controls in the form of:

[00189] Playback Position Scrub Bar 148 (horizontal bar at bottom of screen)

[00190] Playback Speed Bar 150 (vertical bar at left side of screen)

[00191] Pause 152 (pauses playback)

[00192] Eject 154 (return to previous screen)

[00193] Loop 156 (plays the data file continuously)

[00194] The Playback Position Scrub Bar 148 allows a user to jump to different positions within the recording without necessarily needing to watch all of the recorded footage. Advantageously, this allows a user to more quickly locate a desired item of footage within a given data file. Also, the Playback Speed Bar 150 can be used to speed up or slow down the playback of the data file. This allows a desired item of footage to be found more quickly through sped-up playback, and also allows an item of footage to be more carefully analysed through slowed-down playback. Furthermore, it is possible to zoom in and out of a region of the video file using a 'pinch and zoom' movement as is standard with most multi-touch touch-screen devices.

[00195] Referring to Figure 9, a fifth page 158 of the Witness application user manual is shown, in which a different type of Recording Playback screen 160 is shown and described. Specifically, the image represents playback of a pre-recorded data file as can be invoked by highlighting the Map Mode 128 in the File Management Screen 120 and selecting an appropriate data file.

[00196] In contrast with the Video Mode playback, this Map Mode playback shows a map of the area 162 where the recording took place. A blue breadcrumb trail 164 is overlaid on to the map showing the extent of movement of the vehicle during the recorded period. A scrub slider 166 is shown, which is user-operable to adjust the time within the recorded period. As the slider is adjusted, a pin 168 moves along the blue breadcrumb 164 to show the position of the vehicle at the time as specified by the slider 166. Tapping the pin 168 displays associated telemetry data 170 at that position and time.

[00197] Referring to Figure 10, a sixth page 172 of the Witness application user manual is shown, in which an image of a Video Export Screen 174 is described. The Video Export Screen 174 may be invoked by highlighting the Export button 130 in the File Management Screen 120 and selecting an appropriate data file.

[00198] The Video Export Screen 174 allows the quality of the video associated with the selected data file to be adjusted, before that video is exported. Advantageously, this can allow the user to control the size of the data to be exported. Telemetry data (i.e. sensor data) is also exported, embedded within the video file. Video data can be exported with or without sound, depending on the permissions of the user. Export typically involves copying data files from the mobile device to a local computer (e.g. via a data cable) or a remote server (e.g. via a wireless connection).

[00199] Referring to Figure 11, a seventh page 176 of the Witness application user manual is shown, in which an image of the Settings Screen 178 is displayed and described. The Settings Screen 178 allows the operation of the Recording Strategy to be controlled. Specifically, the Settings Screen allows a user to select the number of video segments that the application should store, and the size of those segments (i.e. a data file period). Accordingly, the user is able to set a limit to the storage usage of the Recording Stack (i.e. the size of the buffer 34a) part of the program. The user can also control the storage usage of the Recording Stack through the use of the video quality buttons.

[00200] Note that the Witness application may be arranged to calculate the remaining memory available on the smart-phone and suggest the appropriate settings automatically.

[00201] The Recording Strategy involves maintaining a user-controlled number of video segments. When a new video recording is initialised – instantiating a new segment – this is written over the oldest video segment. Thus only the most recently recorded videos are maintained in the Recording Stack.

[00202] Another setting that can be controlled in the Settings Screen 178 is the G-force threshold at which the Witness application will assume that a crash has taken place. It is expected that different vehicles and driving styles will need different G-force thresholds to be set to ensure a reasonable sensitivity to crash forces whilst also prevent crash detection false positives. It should be noted that although the manual recites "*Raise the sensitivity if you find that crash detection is triggered during normal driving...*" it is the sensitivity *threshold* that is to be raised, and not the sensitivity itself. A slider 180 allows the sensitivity threshold to be set via the touch-sensitive screen.

[00203] The Settings Screen 178 also has a button 182 to allow a user to define more settings via a More Settings Screen.

[00204] Referring to Figure 12, an eighth page 184 of the Witness application user manual is shown, in which an image of the More Settings Screen 186 is displayed and described. Here, it is possible for the user to select speed units 188 and also select whether the map should be displayed during recording 190, and at which speed it should be displayed in favour of the video feed. This is a safety feature of the Witness application that hides the video feed during recording when the vehicle is detected as travelling above a predetermined speed. The video feed is replaced by a map of the location of the vehicle – as is typical with in-vehicle GPS devices. Note that although the on-screen video feed is replaced with a map, video recording continues in the background.

[00205] In alternatives, the application may be arranged to detect the vehicle speed, and at a particular speed, switch off the screen entirely. It should be understood that the device will continue to record video, telemetry and other information even when the screen is switched off. Entirely switching off the screen of the device is advantageous as it significantly reduces the drain on the battery of the mobile device.

[00206] Note that the Witness application is also arranged to interface with the phone to detect low-light conditions and in response change the brightness of the screen to prevent the user/driver being dazzled. This can also save battery life.

[00207] The More Settings Screen 186 also includes a Personal Details button 192 which, when pressed invokes a Personal Details Screen.

[00208] Referring to Figure 13, a ninth page 194 of the Witness application user manual is shown, in which an image of the Personal Details Screen 196 is displayed and described.

[00209] Here, the name 198, vehicle registration number 200, mobile number 202 and email address 204 to be used in an emergency, can be specified by the user. In the event of a detected incident, these details, along with information regarding the detected incident (e.g. time of incident, location and optionally telemetry data) will be emailed to the specified email address automatically. This can ensure that the chosen recipient of that email will be informed immediately about the occurrence and nature of the detected incident.

[00210] This Personal Details Screen 196 also allows the user to set whether it is possible for the video stack to be deleted 206. A security PIN protects the changing of this option so that if a first user having the PIN (for example, a parent) can review the driving style and behaviour of a second user not having the PIN (for example, their son or daughter) by reviewing the Recording Stack – as the Recording Stack cannot be deleted by that second user. As shown in Figure 24, the PIN can be set for the first time by entering it twice into the appropriate PIN fields 208.

[00211] Referring to Figure 14, a tenth page 210 of the Witness application user manual is shown, in which images of an Accident Management Screen 212 and Witness Details Screen 214 are displayed and described.

[00212] The Accident Management Screen 212 can be invoked by the user selecting the accident management button 90 on the Main Menu , or can be automatically switched to after the Witness application has detected that there has been an incident (e.g. via G-forces exceeding a threshold level). Similarly, data can automatically be permanently stored as “Kept” and/or sent if high G-forces are detected.

[00213] As can be seen on the Accident Management Screen 212, there are the following user selectable buttons:

[00214] Accident Advice / What to do 214

This option provides guidance as to what to do during an accident – see Figures 15 and 16 for the displayed Accident Advice Screens.

[00215] Witnesses 216

This option invokes functionality to allow the collection of information from or about witnesses to an incident. An image of the Witnesses Detail information summary screen 214 is shown in Figure 14. Figure 17 shows the Witness Detail information collection screen 218. Voice notes can also be taken via the microphone of the smart-phone.

[00216] Photos 220

This option enables the camera to allow a user to capture images associated with an incident.

[00217] Drivers 222

This option invokes functionality to allow collection about the other drivers involved in an incident~~, such as their vehicle and insurance details~~. The Drivers Detail information collection screen 224 is shown in Figure 18.

[00218] Your Details 226

This option provides a readily available store of the details of the user - as to be provided to other drivers – and can contain name[[,]] address ~~and insurance details~~. The 'Your Details' screen 228 is shown in Figure 19.

[00219] Details recorded via the Accident Management Screen 212 are electronically authenticated and feature a time-stamp. In alternatives, this data may be encrypted to ensure the integrity of the stored data.

[00220] Furthermore, in alternatives, the exchange of the details of the drivers and witnesses can be conducted, at least in part, via Bluetooth® (for example, between mobile devices) – and/or via email. Relevant information associated with the driver is pre-stored on the Witness application in a format that can be sent readily, via a communication channel such as Bluetooth® or email.

[00221] Finally, note that in each Screen or Menu, there is a button 230 provided to go back to the previous menu. Also, when certain actions are performed or selected by a user, the Witness application is arranged to provide an audible feedback signal (for example, a beep). For example, this could be in response to starting a recording, keeping a video segment and/or a stopped recording.

Alternatives and extensions

[00222] The Witness application can be extended to interface with remote users to allow them to control the operation of the application as well as view information logged by the application.

[00223] ~~In particular, the present application can be extended to a scenario where the Witness application is under the control of an insurance company. Such an insurance company may provide insurance to the user, and so may have an interest in the behaviour of that user, and moreover, a vehicle under the control of that user, as described previously.~~

[00224] ~~In such a scenario, the insurance company will maintain a device monitoring system that can interface with a mobile device running the Witness application. In fact, the device monitoring system may interface with a large number of mobile devices, each running an individual copy of the Witness application, logging respective user/vehicle behaviours. This could the insurance provider server 5 of Figure 1.~~

[00225] With such a monitoring system, it is unpractical to actively monitor each and every mobile device and receiving and handling the sheer quantity of data from each and every device would also be very difficult.

[00226] Consequently, the device monitoring system and the mobile devices are advantageously arranged to automatically and intelligently interface with one another in a way that minimises the computational and bandwidth burden on the device monitoring system.

[00227] In particular, each mobile device running the Witness application is arranged to make a determination as to whether there is a need to transfer data to the device monitoring system. For example, the Witness application may be arranged to automatically send data to the device monitoring system that only has high G-force activity associated with it, as this may be indicative of a crash or another driving incident. Alternatively, the Witness application may be arranged to send detailed or high-bandwidth information if a user indicates that an accident has occurred.

[00228] In either case, the video segments and associated sensor and/or derived driving information data associated with the relevant event will be sent. However, no other data (for example, from another date) will be sent.

[00229] Alternatively, less computationally or bandwidth intensive information may be sent on a periodic basis – for example, every day, week or month. Such general information may be sent to establish a profile of a particular user. For example, many high G-force related activities may indicate that the driver is driving aggressively. A determination about the profile can be made automatically by requesting and automatically analysing further data. For example, the location and speed information can be used to determine whether a vehicle is found to frequently break the speed limit. If this is the case, then the profile of the user can be set accordingly.

[00230] Such general and periodically obtained information can also be used to remotely adjust the settings of the application. For example, many high G-force related activities may instead indicate that the set up of the car is such that the mobile device is subjected to high G forces (rather than the driver driving aggressively). If the driving is determined to be safe, but the mobile device is setting off many false positives, then the device monitoring system can automatically adjust the settings of the application. For example, the G-force sensitivity threshold may be increased remotely.

[00231] Thus, the initial data that is automatically transmitted from the mobile device to the vehicle monitoring system is limited in bandwidth so as not to overload the vehicle monitoring system as a whole. However, after processing or analysis is performed on the initial data, further information may be requested. For example, further information may be requested automatically by the system or manually by a controller ~~acting for the insurance company~~. Such further information may include high resolution video logs and sensor data and derived driving information such as G-force measurements.

[00232] It will be understood that the mobile device may also automatically keep certain data at random. Furthermore, the reason for keeping certain data may also be logged (e.g. logged as a result of a manual request by the user, or in response to a high G-force event).

[00233] ~~The mobile device and device monitoring system may also be arranged to highlight detected transgressions. For example, driving during curfew hours, or driving at locations where insurance is not valid (e.g. other countries, off-road, race tracks etc).~~

[00234] ~~As will be appreciated, the interaction of the mobile device and the device monitoring system has the advantage of actively improving user driving behaviour. That is, if the user knows that their logged driving behaviour may adversely effect their insurance~~

~~policy, then it is likely that the user will be dissuaded from driving recklessly. In view of this, an insurance company may be able to incentivise users through lower insurance premiums.~~

[00235] However, so that users do not wrongfully benefit from such incentives, it is necessary to enforce the correct and consistent use of the Witness application.

[00236] ~~It would not be beneficial from the perspective of the insurance company if the user could choose when to enable the application. For example, if a user could choose to disable the application when speeding then the effectiveness of the application would be reduced.~~

[00237] Accordingly, the application may include measures to guarantee that the application is enabled whenever a given insured vehicle is being driven.

[00238] Such measures may involve matching data recorded by the Witness application with that recorded independently by the vehicle. For example, the Witness application records the distance travelled during every journey. To ensure the summed distances of all journeys tracked by the Witness application tally with the total travelled distance of the vehicle, the user may be prompted to enter the odometer mileage periodically.

[00239] ~~If the distance recorded by the Witness application does not correlate with the difference between odometer readings, then the discrepancy will be flagged to the user and/or the insurance company. A substantial discrepancy will typically indicate that the Witness application has not been monitoring all vehicle journeys and the appropriate action can be taken (e.g. the user can be warned, insurance premium may be raised etc).~~

[00240] It will be appreciated that such a tallying exercise depends on the Witness application being used every time one particular vehicle is driven. However, in alternatives, if the Witness application is used with different vehicles, the Witness application may be arranged to register the different vehicles so that their respective odometer readings can be tallied with distance recordings associated with each respective vehicle.

[00241] Other measures can be implemented in conjunction with the Witness application to guarantee that the application is enabled whenever a given vehicle is being driven. For example, the mobile device on which the Witness application is installed may comprise an NFC device, such as an RFID tag. The NFC device may be compatible with a complementary device on a so-called ‘smart-holster’ into which the mobile device may be fitted during operation.

[00242] The smart-holster interacts with the NFC device on the smart-phone to determine whether or not the smart-phone is inserted into the smart-holster. The smart-holster can then be interfaced with the engine management system of the vehicle so that the vehicle may be activated and driven only when the mobile device is in place within the smart-holster.

[00243] It will be appreciated that the mobile device has so far been described in the context of a smart-phone. However, it will be appreciated by a person skilled in the art that other devices may also be suitable for performing the functions described in relation to the Witness application. For example, the Witness application may be adapted to run on a general purpose tablet-style computing device, such as an iPad®.

[00244] Furthermore, it will be understood that features, advantages and functionality of the different embodiments described herein may be combined where context allows. In addition, a skilled person will appreciated that the functionality described above may be implemented using the mobile device suitably programmed.

Having described several exemplary embodiments of the present invention and the implementation of different functions of the device in detail, it is to be appreciated that the skilled addressee will readily be able to adapt the basic configuration of the device to carry out described functionality without requiring detailed explanation of how this would be achieved. Therefore, in the present specification several functions of the device have been described in different places without an explanation of the required detailed implementation as this not necessary given the abilities of the skilled addressee to code functionality into the device.

DOCKET NO.: 044228.111208 **PATENT**
Application No.: 18/676,284
Office Action Dated: July 31, 2024

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **Andrew William Wright**	**Confirmation No.: 7645**
Application No.: 18/676,284	**Group Art Unit: 3666**
Filing Date: May 28, 2024	**Examiner: TYLER D PAIGE**

For: Method and System for Logging Vehicle Behaviour

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

REPLY PURSUANT TO 37 CFR § 1.111

In response to the Official Action dated July 31, 2024, reconsideration is respectfully requested in view of the amendments and/or remarks as indicated below:

☒ **Amendments to the Specification** begin on page 2 of this paper.

☐ **Amendments to the Abstract** begin on page of this paper.

☒ **Amendments to the Claims** are reflected in the listing of the claims which begins on page 5 of this paper.

☐ **Amendments to the Drawings** begin on page of this paper and include an attached replacement sheet.

☒ **Remarks** begin on page 16 of this paper.

☒ The Commissioner is hereby authorized to charge any fee deficiency, charge any additional fees, or credit any overpayment of fees, associated with this application in connection with this filing, or any future filing, submitted to the U.S. Patent and Trademark Office during the pendency of this application, to Deposit Account No. 23-3050.

Amendments to the Specification

Please amend the Specification as indicated by the marked-up and clean Substitute Specifications submitted herewith. No new matter has been added.

Attachments: Marked-up Specification

Clean Specification

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1-23. (Canceled)

24. (Currently Amended) A data-logging system configured to monitor how safely a vehicle is being driven by a driver ~~during~~ throughout a driving period and to log, during the driving period, driving information representing ~~behavior~~ movement of the vehicle whilst the vehicle is being driven by the driver ~~during the driving period~~, the data-logging system comprising:

a remote data-logging server;

a mobile telecommunications device including a user interface, a processor, a memory, and a sensor set comprising at least an accelerometer and a positioning module; and

an application comprising computer-executable instructions downloaded onto the memory, wherein the computer-executable instructions, when executed by the processor, cause the mobile telecommunications device to:

process, using the processor, raw sensor data representing at least acceleration of the vehicle and position of the vehicle from the sensor set to generate derived driving information representing how safely the vehicle is being driven by the driver ~~during~~ throughout the driving period, wherein the driving period is defined by a duration of a vehicle journey ~~comprising a plurality of portions of time~~, and ~~wherein~~ the derived driving information includes a driving score, and wherein the processing of the raw sensor data, by the processor, includes determining a driving incident occurring within the driving period by comparing the raw sensor data against at least one predetermined threshold value and detecting the driving incident when the raw sensor data exceeds the at least one predetermined threshold, the driving incident including at least one of harsh braking, harsh acceleration, harsh swerving or a vehicle accident;;

generate the derived driving information without data from vehicle sensors throughout ~~during~~ the driving period in which the mobile telecommunications device is within the vehicle and the vehicle is being driven by the driver; and

transmit at least some ~~selection~~ of the derived driving information including the driving incident to the remote data-logging server~~, wherein the selection is determined by~~

~~identifying a portion of the plurality of portions of time, and the selection includes the driving score~~,

wherein the remote data-logging server is configured to log the at least some of the derived driving information received from the mobile telecommunications device and comprises:

a database for storing a plurality of accounts, at least one of the plurality of accounts having a unique identifier, and the database being configured to store the selection of the derived driving information transmitted from the mobile telecommunications device to the at least one account, the ~~selection~~ derived driving information being associated by the unique identifier to the vehicle and the driver; and

a communications interface configured to communicate with the mobile telecommunications device and receive therefrom:

the unique identifier for association of the mobile telecommunications device with the at least one of the plurality of accounts; and

the ~~selection of the~~ at least some of the derived driving information transmitted from the mobile telecommunications device to be logged to the at least one of the plurality of accounts~~, and~~

~~wherein the remote data-logging server is further configured to process the derived driving information logged to the at least one of the plurality of accounts over a plurality of driving periods including the driving period to generate an aggregated driving score used to determine a risk profile for at least one of the vehicle and the driver~~.

25. (Canceled)

26. (Canceled)

27. (Canceled)

28. (Canceled)

29. (Currently Amended) The data-logging system of Claim [[27]] 24 , wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to:

store the raw sensor data relating to the driving incident; and

transmit the stored raw sensor data to the remote data-logging server.

30. (Currently Amended) The data-logging system of Claim 29, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to store the raw sensor data generated before, during, and after the driving incident that is continuously collected, associated with the driving incident~~, and included within at least a portion of the plurality of portions of time~~.

31. (Currently Amended) The data-logging system of Claim ~~24~~58, wherein ~~execution of the computer-executable instructions by the processor to generate the derived driving information further causes the mobile telecommunications device to determine a driving incident as part of the derived driving information,~~ the driving incident, determined by the processor, is defined by a marked variation in a change of the raw sensor data over at least a portion of the plurality of portions of time during the driving period indicative of a difference in a state of motion of the vehicle occurring over the at least a portion of the plurality of portions.

32. (Canceled)

33. (Currently Amended) The data-logging system of Claim 31, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to select, prior to transmitting ~~the selection of~~ the derived driving information, the raw sensor data relating to the driving incident.

34. (Currently Amended) The data-logging system of Claim 33, wherein, to select the raw sensor data relating to the driving incident, execution of the computer-executable instructions by

the processor further cause the mobile telecommunications device to select the raw sensor data generated before, during, and after the driving incident.

35. (Currently Amended) The data-logging system of Claim 34, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to transmit the selected raw sensor data to the remote data-logging server.

36. (Previously Presented) The data-logging system of Claim 31, wherein the at least a portion of the plurality of portions comprises a five-minute time period.

37. (Currently Amended) The data-logging system of Claim 24, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to register a start of the driving period in response to an initialization input generated automatically in response to the raw sensor data having predetermined values.

38. (Currently Amended) A data-logging system configured to monitor how safely a vehicle is being driven by a driver ~~during~~ throughout a driving period and to log driving information representing movement ~~behavior~~ of the vehicle whilst the vehicle is being driven by the driver during the driving period, the data-logging system comprising:

a remote data-logging server;

a mobile telecommunications device including a user interface, a processor, a memory, and a sensor set comprising at least an accelerometer and a positioning module; and

an application comprising computer-executable instructions downloaded onto the memory, wherein the computer-executable instructions, when executed by the processor, cause the mobile telecommunications device to:

process, using the processor, raw sensor data from the sensor set representing at least acceleration of the vehicle and position of the vehicle to generate derived driving information representing how safely the vehicle is being driven by the driver ~~during~~ the driving period, wherein the driving period is defined by a duration of a vehicle journey comprising a plurality of portions of time, and wherein ~~the derived driving information~~

~~includes at least one driving incident~~ ~~the~~ processing of the raw sensor data, by the processor, includes determining a driving incident occurring within the driving period by comparing the raw sensor data against at least one predetermined threshold value and detecting the driving incident when the raw sensor data exceeds the at least one predetermined threshold, the driving incident including at least one of harsh breaking, harsh acceleration, harsh swerving or a vehicle accident;

generate the derived driving information without data from vehicle sensors ~~during~~ throughout the driving period in which the mobile telecommunications device is within the vehicle and the vehicle is being driven by the driver; and

transmit at least some ~~selection~~ of the derived driving information including the driving incident to the remote data-logging server~~, wherein the selection is determined by identifying a portion of the plurality of portions of time, and the selection includes the at least one driving incident~~;

wherein the remote data-logging server is configured to log at least some of the derived driving information, including the driving incident, received from the mobile telecommunications device and comprises:

a database for storing a plurality of accounts, at least one of the plurality of accounts having a unique identifier, and the database being configured to store the selection of the derived driving information, associated by the unique identifier to the vehicle and the driver, to the at least one account; and

a communications interface configured to communicate with the mobile telecommunications device, and receive therefrom:

the unique identifier for association of the mobile telecommunications device with the at least one of the plurality of accounts; and

the ~~selection of the~~ derived driving information transmitted from the mobile telecommunications device to be logged to the at least one of the plurality of accounts, and

wherein the remote data-logging server is further configured to process the derived driving information logged to the at least one of the plurality of accounts to determine a risk profile for at least one of the vehicle and driver.

39. (Canceled)

40. (Currently Amended) The data-logging system of Claim 38, wherein the at least one driving incident is defined by an occurrence of the raw sensor data exceeding a predetermined value during the driving period.

41. (Canceled)

42. (Currently Amended) The data-logging system of Claim 40, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to:

store the raw sensor data relating to the at least one driving incident; and

transmit the stored raw sensor data to the remote data-logging server.

43. (Currently Amended) The data-logging system of Claim 42, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to store the raw sensor data generated before, during, and after the at least one driving incident.

44. (Currently Amended) The data-logging system of Claim 38, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to determine the at least one driving incident as a marked variation in a change of the raw sensor data over at least a portion of the plurality of portions of time during the driving period indicative of a difference in a state of motion of the vehicle occurring over the at least a portion of the plurality of portions.

45. (Canceled)

46. (Currently Amended) The data-logging system of Claim 44, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to select, prior to transmitting the selection of the derived driving information, the raw sensor data relating to the at least one driving incident.

47. (Currently Amended) The data-logging system of Claim 46, wherein to select the raw sensor data relating to the at least one driving incident, execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to select the raw sensor data generated before, during, and after the at least one driving incident.

48. (Currently Amended) The data-logging system of Claim 47, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to transmit the selected raw sensor data to the remote data-logging server.

49. (Previously Presented) The data-logging system of Claim 38, wherein the sensor set further comprises an image sensor.

50. (Currently Amended) The data-logging system of Claim 38, wherein the driving information further comprises one or more of velocity, direction of travel, an indication of exceeding a velocity limit, or data representing jerky steering.

51. (Currently Amended) The data-logging system of Claim 38, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to register the start of the driving period in response to an initialization input generated automatically in response to the raw sensor data having predetermined values.

52. (Currently Amended) A data-logging system configured to monitor how safely a vehicle is being driven by a driver ~~during~~ throughout a driving period and to log driving information representing ~~behaviour~~ movement of the vehicle whilst the vehicle is being driven by the driver during the driving period, the data-logging system comprising:

a remote data-logging server;

a mobile telecommunications device including a user interface, a processor, a memory, and a sensor set comprising at least an accelerometer and a positioning module;

an application comprising computer-executable instructions downloaded onto the memory, wherein the computer-executable instructions, when executed by the processor, cause the mobile telecommunications device to:

process, using the processor, raw sensor data from the sensor set representing at least acceleration of the vehicle and position of the vehicle, to generate derived driving information representing how safely the vehicle is being driven by the driver ~~during~~ throughout the driving period, wherein the driving period is defined by a duration of a vehicle journey comprising a plurality of portions of time, and wherein the driving information includes at least one driving incident, the at least one driving incident being ~~defined~~ determined by the processor establishing ~~by~~ an occurrence of the raw sensor data exceeding a predetermined value during the driving period, the driving incident including at least one of harsh braking, harsh acceleration, harsh swerving, or a vehicle accident;

generate the derived driving information without data from vehicle sensors ~~during~~ throughout the driving period in which the mobile telecommunications device is within the vehicle and the vehicle is being driven by the driver;

store the raw sensor data relating to the at least one driving incident; and

transmit ~~a selection~~ at least some of the derived driving information, including the at least one driving incident, and the stored raw sensor data corresponding to the ~~selected derived driving information to the remote data-logging server, wherein the selection is determined by identifying a portion of the plurality of portions of time, and the selection includes the at least one driving incident~~ at least one driving incident;

wherein the remote data-logging server is configured to log the derived driving information and the raw sensor data received from the mobile telecommunications device and comprises:

a database for storing a plurality of accounts, at least one of the plurality of accounts having a unique identifier and the database being configured to store the selection of the derived driving information associated by the unique identifier to the

vehicle and the driver, and the raw sensor data, to the at least one of the plurality of accounts;

a communications interface configured to communicate with the mobile telecommunications device, and receive therefrom:

the unique identifier for association of the mobile telecommunications device with the at least one of the plurality of accounts; and

the selection of the derived driving information and the raw sensor data to be logged to the at least one of the plurality of accounts,

wherein the remote data-logging server is further configured to process the derived driving information and the raw sensor data logged to the at least one of the plurality of accounts to determine a risk profile for at least one of the vehicle and driver.

53. (Currently Amended) A mobile telecommunications device configured to log driving information associated with how safely a vehicle is being driven, the mobile telecommunications device comprising:

a sensor set comprising at least an accelerometer and a positioning module;

a processor;

a memory; and

an application comprising computer-executable instructions downloaded onto the memory, wherein the computer-executable instructions, when executed by the processor, cause the mobile telecommunications device to:

determine, based on the raw sensor data from the sensor set, a start of a driving period at which the mobile telecommunications device is within the vehicle and the vehicle is in use, wherein the driving period is defined by a duration from ~~the~~ a start to an end of a vehicle journey and the duration is comprised of a plurality of portions of time;

process, using the processor, the raw sensor data from the sensor set ~~during~~ representing at least acceleration of the vehicle and position of the vehicle throughout the driving period to derive driving information associated with how safely the vehicle is driven~~, including vehicle behavior and user behavior~~ by the driver, the driving information representing movement of the vehicle whilst the vehicle is being driven by

the driver throughout the driving period, wherein the processing of the raw sensor data, by the processor, includes determining a driving incident occurring within the driving period by comparing the raw sensor data against at least one predetermined threshold value, and detecting the driving incident when the raw sensor data exceeds the at least one predetermined threshold, the driving incident including at least one of harsh braking, harsh acceleration, harsh swerving or a vehicle accident;

~~store a selection of the driving information to the memory,~~ wherein the driving information is derived without data from vehicle sensors throughout the driving period ~~and wherein the selection is determined by identifying a portion of the plurality of portions of time~~;

transmit at least some ~~the selection~~ of the derived driving information including the driving incident to a remote data-logging server; and

wherein the mobile telecommunications device is controlled by a downloaded application to register the start of the driving period in response to an initialization input generated automatically in response to the raw sensor data having a predetermined start value.

54. (New) The mobile telecommunications device of Claim 53, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to detect the end of the driving period in response to an ending input generated automatically in response to the raw sensor data having a predetermined end value.

55. (New) The mobile telecommunications device of Claim 53,wherein the driving period comprises a plurality of portions of time throughout the driving period, and the execution of the computer executable instructions by the processor further causes the processor to select a portion of time related to the driving incident from the plurality of portions of time for transmission to the remote logging server and to reduce the amount of data transmitted by transmitting raw sensor data relating to the selected portion of time to the remote data logging server.

56. (New) The mobile telecommunications device of Claim 53, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications

device to determine the at least one driving incident as a marked variation in a change of the raw sensor data over at least a portion of the plurality of portions of time during the driving period indicative of a difference in a state of motion of the vehicle occurring over the at least a portion of the plurality of portions.

57. (New) The data logging system of Claim 24,wherein the remote data-logging server is further configured to process the derived driving information logged to the at least one of the plurality of accounts over a plurality of driving periods, including the driving period, to generate an aggregated driving score used to determine a risk profile for at least one of the vehicle and the driver.

58. (New) The data logging system of Claim 24, wherein the driving period comprises a plurality of portions of time throughout the driving period, and the execution of the computer executable instructions by the processor further causes the processor to select a portion of time related to the driving incident from the plurality of portions of time for transmission to the remote logging server and to reduce the amount of data transmitted by transmitting raw sensor data relating to the selected portion of time to the remote data logging server.

59. (New) The data logging system of Claim 26, wherein the remote-logging server is configured to store the raw data relating to the selected portion of time related to the driving incident to the at least one account.

REMARKS

Claims 24-53 are pending, with claims 24, 38, 52 and 53 being independent.

Claims 24-53 stand rejected.

Claims 24, 29-31, 33-35, 37-38, 40, 42-44, 46-48, and 52-53 are currently amended. Claims 54-59 are new. No new subject matter has been added.

Applicant sincerely believes the numbering of claims is complaint with 37 C.F.R. 1.126 in particular with reference to claims 31 and those depending thereform, although claims 31 is now dependent on claim "new" 58 , claim 58 also depends from independent claim 24.

Examiner Interview Summary

Applicant thanks Examiner Paige for the courtesy extended during the examiner interview held on October 23, 2024. During the interview, the 35 U.S.C. § 101 rejection was discussed along with potential amendments to the claims and specification. The Examiner noted:

> *"Issues Discussed: 35U.S.C. 101 Examiner explained the rationale for the rejection. Specification states 47 times the use of the invention for insurance purposes. Examiner identified examples 40 and 42 as a possible template to amend the claims to conform with the 209 guidance."*

Applicant has herewith amended the specification to follow the Examiner's suggestion and removed references to insurance and updated the claims in accordance with the Examiner's suggestions. No agreement was reached during the interview, however Applicant believes that the claims are in condition for allowance, at least in view of the present amendments.

Amendments to the Claims and Specification

Firstly previous claims which were directed to insurance premiums have been deleted, namely previous Claims 25, 26 and 39.

The independent claims have been revised to incorporate some of the features recited in dependent claims. Amended Claim 24 has incorporated the subject matter of previous Claims 27,

28 and 32. These claims specify the processing of the raw sensor data by the processor to generate derived driving information by determining driving incidents by comparison of raw sensor data against predetermined thresholds and the detection of a driving incident when the raw sensor data exceeds the predetermined threshold. Also, a list of driving incidents is now explicitly recited.

Also, further clarification has been added to overcome the 101 objection. For example, the claim is now directed to a data logging system which is configured to monitor how safely a vehicle is being driven by a driver throughout a driving period. Also, specifically, it has been specified that the raw sensor data represents at least acceleration and position of the vehicle.

Also, Claim 24 has been amended to move the feature of the remote data-logging server processing the derived driving information logged to an account over a plurality of driving periods to generate an aggregated driving score used to determine a risk profile for at least one of the vehicle and the driver. This feature is still claimed but is now in new Claim 57.

Similarly, Claim 24 has been amended to move the feature of the driving period comprising a plurality of portions of time and the selection by the processor of a portion of time relating to the driving incident. In this case the raw data relating to that time period is transmitted but not all of the raw data thereby reducing the amount of data that would need to be transmitted.

Finally, the last feature of previous Claim 24, namely the remote server processing the derived driving information over a plurality of driving periods and generating a risk profile has been placed into new Claim 58. This has been accompanied by the recitation that the raw data relating to the selected portion of time is transmitted, thereby reducing the amount of raw data, and indeed overall data, that needs to be transmitted.

Applicant submits that this independent claim is much closer to the examiner-referenced examples and hopefully will be better placed to progress the case to allowance.

Similar amendments have been made to the other independent Claims 38 (data logging system), 52 (data logging system) and 53 (mobile telecommunications device). This has resulted in the deletion of previous Claims 41 and 44.

New Claim 59 is directed to the storage of the raw data relating to the driving incident transmitted from the mobile telecommunications device to the at least one account in the database.

New Claim 54 is directed to the mobile telecommunications device automatically detecting the end of a driving period from the raw sensor data.

New Claim 55 is directed to the mobile telecommunications device selecting a portion of time related to the driving incident and sending only the raw sensor data of that time period to the remote logging server. This reduces the amount of data needing to be transmitted.

Claim 56 is directed to a marked variation in the change of raw data over at least a portion of the plurality of driving periods.

Claim Rejections – 35 U.S.C. § 101

Claims 24-53 stand rejected under 35 U.S.C. § 101 for allegedly being directed to fundamental economic principles or practices of insurance without significantly more. *Office Action*, at 2.

The Examiner rejected claims 24-53 under 35 U.S.C. §101, asserting that the claims are directed to fundamental economic principals or practices of insurance without significantly more. Applicant respectfully traverses and requests reconsideration and withdrawal of the rejection in light of the following comments.

First, we have amended the claims to be more aligned with Examples 40 and 42, as suggested during the examiner interview. The claims now explicitly state that the derived driving information comprises driving incidents and at least one of several specific examples is recited. The present claims further recite a data logging system to monitor how safely a vehicle is being driven. This moves away from the insurance application mentioned by the examiner and more towards a safety application for example for monitoring how a fleet of drivers are performing to provide them with feedback to improve their driving techniques. Furthermore, even though it was implicit that the processing was being carried out by the processor of the mobile telecommunications device, this is now explicitly stated.

Furthermore, Applicant notes that the claims are directed to a specific technological improvement. The claimed data-logging system provides a technical solution to the problem of efficiently and accurately monitoring vehicle behavior, such as vehicle speed and how much the

vehicle's brake pedal is pressed (specification page 13), harsh braking, harsh acceleration, harsh swerving, as well as vehicle reactions or effects that can be determined through audio processing, such as squealing tires, deforming metal, glass breaking, airbag deployment, loss of traction (fishtailing and/or skidding), and overturning (specification pages 30-31), all using a mobile telecommunications device. This system integrates various hardware components (accelerometer, positioning module) of the mobile telecommunications device with specialized software to generate derived driving information without relying on vehicle sensors.

The specification describes how this approach overcomes limitations of traditional vehicle data logging systems:

> Advantageously, the use of a mobile telecommunication device enables a data logging device to be conveniently and inexpensively retrofitted to a vehicle. Mobile telecommunication devices such as "smart-phones" are becoming increasingly widespread, and these devices tend to have the requisite sensor sets to capture data concerning vehicle behaviour. Thus, a generic mobile telecommunication device already owned by a driver of the vehicle can be loaded with the application to provide such data logging functionality that would otherwise necessitate a dedicated black-box.

This represents a clear improvement in the technological field of vehicle monitoring and data logging.

Second, the claims clearly recite a practical application of any alleged abstract idea by reciting a specific manner of generating and processing sensor data to monitor vehicle behavior. Key elements that demonstrate a practical application include at least:

- Processing sensor data from the mobile device's sensor set to generate derived driving information without data from vehicle sensors;
- Transmitting a selection of the derived driving information determined by identifying specific portions of time and/or specific vehicle behavior;

- Storing and associating the derived driving information with unique identifiers for vehicles and drivers; and
- Processing the logged driving information to generate an aggregated driving score used to determine a risk profile.
-

These elements go well beyond merely linking the use of an abstract idea to a particular technological environment. They recite a specific implementation of specific hardware and software components that transforms the mobile device into a specialized vehicle monitoring system. Specifically, the claims are all directed to identifying and taking particularized actions in response to the detection of the unsafe operation of a vehicle (particularly as determined by the collection, processing, and analysis of specific sensor data from particular sensors on a mobile telecommunications device), thereby enhancing road safety and modifying driver behavior.

Third, to any extent that the claims recite an abstract idea, the combination of elements in the claims, and particularly the interaction between the mobile device and the remote server to generate, transmit, store, and process derived driving information, amounts to significantly more than an abstract idea. This system provides a solution to the technological problem of efficiently monitoring vehicle behavior without requiring dedicated in-vehicle sensors or data logging devices.

The claims recite unconventional steps that confine the alleged abstract idea to a particular useful application:

- Generating derived driving information using only the mobile device's sensors, without vehicle sensor data;
- Selecting and transmitting specific portions of the derived driving information based on identified time periods and/or specific vehicle behavior; and
- Processing the logged information to generate an aggregated driving score and risk profile.

These steps, when viewed as an ordered combination, provide an inventive concept that transforms any purported abstract idea into a patent-eligible application.

In this regard, the claimed invention is similar to the invention held to be directed toward patent eligible subject matter by the Federal Circuit in *Thales Visionix, Inc. v. United States*, 850 F. 3d 1343 (Fed. Cir. 2017). In that matter, the patent at issue was directed to an inertial tracking system for tracking the motion of an object relative to a moving reference frame. In particular, sensors, such as accelerometers and gyroscopes, were used to measure the specific forces associated with changes in the sensors' positions and orientation relative to a known starting position. *Id.* at 1344. The Court held that these claims were "directed to systems and methods that use inertial sensors in a non-conventional manner to reduce errors in measuring the relative position and orientation of a moving object on a moving reference frame." *See also*, *Finjan, Inc. v. Blue Coat Systems, Inc.*, 879 F.3d 1299, 1305 (Fed. Cir. 2018) (claims directed to "behavior-based virus scanning" not abstract); *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1314 (Fed. Cir. 2016) (patents that automated a preexisting method for 3D facial expression animation not directed to abstract ideas); *Enfish*, 822 F.3d at 1336 (claims directed to a self-referential table for a computer database not abstract); *Data Engine Techs. LLC v. Google LLC*, 906 F.3d 999, 1002 (Fed. Cir. 2018) ("patents claiming systems and methods for making complex electronic spreadsheets more accessible were not abstract, as they were directed to "a specific method for navigating through ... electronic spreadsheets"). Here, the claimed invention uses a mobile telecommunications device's sensor set, including accelerometers and positioning modules, to track the motion of an object (*e.g.*, a vehicle) to identify, among other things, specific forces acting on the vehicle based on data received from the device's sensor set.

Further, the claimed invention does not simply accomplish a result through any means, but rather, recites a specific method to accomplish the claimed result. The Federal Circuit in *McRO* made clear that a patent is not directed to patent eligible subject matter where "it matters not by what process or machinery the result is accomplished." 837 F.3d at 1314. A patent may, however, issue "for the means or method of producing a certain result, or effect, and not for the result or effect produced." *Id.* This is the case here.

Fourth, Applicant notes that the claims do not preempt all ways of performing the alleged abstract idea of "processing insurance claims for a covered loss or policy event under an insurance policy." The specific implementation recited in the claims, involving the particular arrangement of the mobile device, remote server, and data processing steps, clearly does not preempt all ways of monitoring vehicle behavior or determining insurance risk profiles. The claims are limited to a specific technical solution using a mobile telecommunications device and remote server, leaving room for other implementations.

While the Office Action asserts that the claims are directed to "fundamental economic principles or practices of insurance," this characterization oversimplifies the nature of the claimed invention. While the system may have applications in the insurance industry, the core of the invention is a technical solution for efficiently monitoring and logging vehicle behavior using a mobile telecommunications device.

The mere presence of features that may be relevant to insurance (e.g., driving score, risk profile) does not negate the technical nature of the claimed system. The Federal Circuit has held that claims are not rendered ineligible merely because they involve a concept that may relate to a business practice (*see Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327 (Fed. Cir. 2016)).
Furthermore, the Examiner's assertion that "[t]here is no other purpose identified in the claims or specification for using the claimed structure and computer program applications" is incorrect. The specification clearly describes the technical advantages of the system, including the ability to retrofit vehicles with data logging capabilities using widely available mobile devices.

In conclusion, when viewed as a whole, the claims recite a specific implementation of a vehicle monitoring system that represents an improvement in technology, integrates any abstract idea into a practical application, and amounts to significantly more than an abstract idea, such that Applicant respectfully requests that the rejection of claims 24-53 under 35 U.S.C. §101 be withdrawn.

Claim Rejections – 35 U.S.C. § 112

Claims 24, 38, 52 and 53 stand rejected under 35 U.S.C. § 112(b), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter. *Office Action*, at 3.

In view of the present amendments, Applicant submits that the 35 U.S.C. § 112(b) rejection of claims 24, 38, 52, and 53 are moot. Applicant respectfully requests that the rejection of claims 24, 38, 52, and 53 under 35 U.S.C. §112(b) be withdrawn.

Claim Rejections – 35 U.S.C. § 102

Claims 24-53 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Publication No. 2010/0131304 (hereinafter "Collopy"). *Office Action*, at 4.

The single reference is Collopy. Whilst Collopy does show the combination of a mobile telecommunications device and a data logging server, the Collopy system is primarily a system which still relies heavily on the vehicle sensors. Much has been made of part of this system where a mobile device is used with the on-board monitoring system 125 and particularly where the GPS sensor 210 and the accelerometer 220 are located in the mobile device (Para [0051] Collopy). However, the sensor data from these sensors (even if located within the mobile device) is not processed on the mobile device itself but rather by the driving analysis component 150 of the insurance provider system 135 (see Figures 1, 2, and 6 and Para [0035] Collopy). Para [0035] states that the on-board monitoring system gathers information regarding the driver driving skills habits etc. and forwards this information to the insurance provider 135. There is simply no processing of the sensor data on a processor of the mobile device as is required by revised Claim 24. The reference to Paragraph [0044] is only a disclosure with reference to a device used in conjunction with the on-boarding system to identify the driver. Nowhere does it say that this processor can process the raw sensor data to determine driving incidents (derived driving data).

The Examiner has referred to Para [0038] of Collopy to say that the processing carried out by the mobile device is shown. However, this paragraph clearly states that the real-time monitoring system gathers the data in real time and the analysis component 150 (on the server) analyses the data also in real time. This clearly indicates that the sensor data is gathered as quickly as possible and forwarded to the server for real-time processing rather than being processed on the mobile telecommunications device. Furthermore, there is no disclosure in Collopy of the processor of the mobile telecommunications device determining a driving score from the processed sensor data. Paragraph [0038] used by the Examiner to support this objection is simply silent regarding this.

Similarly, Paragraph [0035] of Collopy is also referred to by the Examiner to support the processing being carried out by the processor of the mobile device. However, this paragraph has been discussed above and also clearly states that the processing is carried out at the insurance provider system 135 which is at the remote insurance server 135 and not on the mobile telecommunication device 105.

The original Claim 24 referred to transmission of a selection of the derived driving information to the remote logging server wherein the selection was determined by identifying one of the plurality of time periods. This feature is now in a dependent claim (new Claim 26) but is not disclosed by the Paragraphs [0035] and [0038] of Collopy recited by the Examiner. There is simply no disclosure of a plurality of time periods and any selection of processed data. Also it is noted that in Claim 24, the transmission of data to the remote logging data is of derived driving information and not raw sensor data. In Collopy, at best raw sensor data is transmitted and not derived driving information. This is important as the derived driving information is only relating to sensor data which defines a predetermined incident such as sharp cornering. Accordingly, when looking at the amount of raw sensor data generated by the sensors and the amount required to be transmitted only relating to driving incidents, it can be clearly seen that there is a significant amount of reduction of data that is transmitted. This in turn advantageously reduces the required bandwidth for such data transmission to the remote data server.

In this regard, the amendments to Claim 24 further clarify differences between the present invention and Collopy. More particularly, amended Claim 24 now explicitly recites the processing of raw sensor data (to determine derived driving information) is carried out by the processor of the mobile device and that includes determining a specific driving incident (event) by comparison of the raw sensor data against a predetermined threshold value with the incident being detected if the raw sensor data exceeds the threshold value. Furthermore, the driving incident is specified as being on of a list of specific incidents (harsh braking, harsh acceleration, harsh swerving or a vehicle accident). None of these incidents is explicitly mentioned in Collopy.

As some of the features now recited in revised Claim 24 were previously claimed in Claims 27, 28 and 32, the Examiner's objections to these claims is now addressed. In Paragraph [0075], which was used to support the Examiner's view that Collopy disclosed determination of driving incidents, there is nothing that clearly explains where this analysis is carried out and indeed if it is carried out by a system or by a human. There is clearly no disclosure of the features of previous Claim 27 being carried out by the processor of the mobile telecommunication device. Similarly, for previous Claim 28, there no clear an unambiguous disclosure in Collopy of the specific events mentioned in the claim. A broad generic reference to 'driving skills' and 'driver habits' is not the same as the specifically recited incidents which reflect the safety of the driving. Furthermore, in Collopy, this information is merely gathered and forwarded to the insurance provider system 135 (namely the remote server). There is no disclosure of processing of the raw sensor data using the processor of the mobile telecommunications device to generate derived driving information including driving incidents.

Many of the dependent claims which have been retained in the claims set are not disclosed by Collopy. For example previous Claims 30 and 31 were objected to and paragraphs [0035], [0075] were cited as anticipating their features. However, the common feature in these claims of there being a plurality of portions of time and there being a selection of a portion of time related to an incident (the subject of New Claim 26) is simply not disclosed. The Examiner reference to Paragraph [0055] with respect to previous Claim 33, is not relevant as that data relates to video data whereas the present claims are direct to accelerometer and positioning data. Also there is no actual selection of derived (processed) driving data by the processor of the

mobile telecommunications device as Collopy only describes a simple overwrite buffer of raw data. All of the video stream which is stored in the buffer is sent to the insurance provider system 135 for analysis, there being no selection. Finally, Claim 37 (and for that matter Independent Claim 53 which shares the same feature) is simply not disclosed in Collopy. Initialization of a system (Paragraphs [0049], [0063], and [0090] all registering a user) are not the same as registering the start of a driving period automatically in response to sensor data (from the accelerometer and position sensor) having predetermined values.

The presently claimed invention is inventive in that it is a system that is clearly independent of the vehicle in which it is used. There is no need to connect to any of the vehicle sensors for any of the raw data which is used to determine incidents. This enables the device to be carried from vehicle to vehicle and still monitor the same driver's driving safety. Also as so much processing of raw data is carried out on-board the mobile device itself, the amount of data to be transmitted to the remote data logging server can be significantly lower.

For at least the reasons given above, Applicant contends that independent claim 1 is not anticipated by Collopy. Independent claims 38, 52, and 53, which recite similar features as claim 24, are likewise not anticipated by Collopy for at least the reasons given above. The claims which depend from claims 1, 38, 52, and 53 are likewise not anticipated at least based on their dependency. Accordingly, Applicant requests reconsideration and withdrawal of the 35 U.S.C. § 102 rejection of claims 24-53.

CONCLUSION

Applicant respectfully submits that the present application is in condition for allowance. Reconsideration of the application and an early Notice of Allowance are respectfully requested. In the event that the Examiner cannot allow the application for any reason, the Examiner is encouraged to contact Applicant's representative.

Date: October 31, 2024

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 18/676,284	Filing Date 05/28/2024	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $40 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $ 192 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

AMENDMENT	10/31/2024	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 28	Minus	** 30	= 0		x $40 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 4	= 0		x $ 192 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/BURNELL L ROSS/
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This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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EXAMINER	
PAIGE, TYLER D	

ART UNIT	PAPER NUMBER
3664	

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10/28/2024	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

edervis@bakerlaw.com
eofficemonitor@bakerlaw.com
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Applicant-Initiated Interview Summary	**Application No.** 18/676,284	**Applicant(s)** Wright, Andrew William		
	Examiner TYLER D PAIGE	**Art Unit** 3664	**AIA (First Inventor to File) Status** No	**Page** 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	**Title**	**Type**
TYLER D PAIGE	Primary Examiner	Telephonic
NIKKI SANFORD reg#75310		

Date of Interview: 23 October 2024

Issues Discussed:

35 U.S.C. 101

Examiner explained the rationale for the rejection. Specification states 47 times the use of the invention for insurance purposes. Examiner identified examples 40 and 42 as a possible template to amend the claims to conform with the 209 guidance.

35 U.S.C. 102

Examiner explained the rationale for the rejection and how the claims were interpreted to perform the functions identified by applicant's representative as new and improvement. The claims do not identify what performs the selection operation of what data is transmitted or how the data is filtered.

/TYLER D PAIGE/ Examiner, Art Unit 3664	

Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04
Please further see:
MPEP 713.04
Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)
37 CFR § 1.2 Business to be transacted in writing

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

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USPTO Automated Interview Request (AIR)

Oct 10 2024

This paper requesting to schedule and/or conduct an interview is appropriate because:

This submission is requested to be accepted as an authorization for this interview to communicate via the internet. Recognizing that Internet communications are not secure, I hereby authorize the USPTO to communicate with the undersigned concerning scheduling of the interview via video conference, instant messaging, or electronic mail, and to conduct the interview in accordance with office practice including video conferencing.

Name(s):
Nikki Sanford

S-signature:
/Nikki Sanford/

Registration Number:
75310

U.S. Application Number:
18676284

Confirmation Number:
7645

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Proposed Time of Interview:
10-17-2024 12:00 PM ET

Alternative Proposed Time(s) of Interview:
10-18-2024 12:00 PM ET

Alternative Proposed Time(s) of Interview:
10-17-2024 11:30 AM ET

Prefered Interview Type:
Telephonic

I am the applicant or applicant's representative for this application.

Topic for Discussion:
Rejections under 35 USC 101, 102

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
18/676,284	05/28/2024	Andrew William Wright	044228.111208

CONFIRMATION NO. 7645

30734
BakerHostetler
Washington Square, Suite 1100
1050 Connecticut Ave. N.W.
Washington, DC 20036-5304

PUBLICATION NOTICE

OC000000078149106

Date Mailed: 09/19/2024

Title: Method and System for Logging Vehicle Behaviour

Publication No.US-2024-0312262-A1
Publication Date:09/19/2024

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be viewed using the USPTO's publicly available Searchable Databases via the Patent Public Search tool at www.uspto.gov. The direct link to access the Patent Public Search tool is currently https://ppubs.uspto.gov/pubwebapp/static/pages/ppubsbasic.html.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through Patent Center, the USPTO's electronic patent application filing and management system. The direct link to access this status information is currently https://patentcenter.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of Patent Center.

Further assistance in electronically accessing the publication, or about Patent Center, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/676,284	05/28/2024	Andrew William Wright	044228.111208	7645

30734 7590 07/31/2024

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1050 Connecticut Ave. N.W.
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EXAMINER	
PAIGE, TYLER D	

ART UNIT	PAPER NUMBER
3666	

NOTIFICATION DATE	DELIVERY MODE
07/31/2024	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

edervis@bakerlaw.com
eofficemonitor@bakerlaw.com
patents@bakerlaw.com

Office Action Summary	**Application No.** 18/676,284	**Applicant(s)** Wright, Andrew William	
	Examiner TYLER D PAIGE	**Art Unit** 3666	**AIA (FITF) Status** No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 05/28/2024.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 24-53 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 24-53 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 05/28/2024 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☑ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☑ All b)☐ Some** c)☐ None of the:

1.☑ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☑ Other: October 2019 Subject Matter Guidance.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application is being examined under the pre-AIA first to invent provisions. This office action is in response to an application filed on 05/28/2024. The applicant submits an Information Disclosure Statement dated 05/28/2024 and 05/29/2024. The applicant claims Domestic priority to applications starting on 12/15/2011. The applicant claims Foreign priority to applications starting from the first date of 12/15/2010. Claims 1 – 23 are canceled.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

1. Claims 24 - 53 rejected under 35 U.S.C. 101 because the claimed invention is directed to fundamental economic principles or practices of insurance without significantly more.

The claims recite three variation of a data-logging system and a mobile telecommunications device. The claims pass the first prong of the 2019 Subject Matter Guidance by stating one of the four statutory categories. The as a whole are evaluated under the October 2019 Subject Matter Guidance, which applies the following guidance relating to processing insurance claims for a covered loss or policy event under an insurance policy (i.e., an agreement in the form of a contract), *Accenture Global Services GmbH v. Guidewire Software*, Inc.30, pages 5 and 6 of the guidance. Independent claim 24 is listed below as a representation of the claims and features claimed. Dependent claims 25, 26, and 39 have the features of insurance

premium, insurance company, insurance policy, and insurance offer. Thus, the intent of the invention is directed to fundamental economic practices of insurance.

This judicial exception is not integrated into a practical application because the claims are used to calculate insurance premiums and offers for a driver. There is no other purpose identified in the claims or specification for using the claimed structure and computer program applications. The software that controls the coordinated structure does so to measure the performance of a driver against a standard to determine insurance premiums. Thus, the claims fail prong 2A.

The claims do not include additional elements that are sufficient to amount to significantly more than the judicial exception because the claims do not identify a purpose for the data collection other than to determine insurance premiums and generate insurance offers. The data collections is not claimed to be for any other purpose, therefore, the claims fail prong 2B and are not eligible for patent protection.

Claim Rejections - 35 USC § 112

The following is a quotation of 35 U.S.C. 112(b):
(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 24, 38, 52, and 53 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor (or for applications subject to pre-AIA 35 U.S.C. 112, the applicant), regards as the invention. The claims contain the feature of

"behaviour" without identifying what operational features of operation define the feature. Therefore, one of ordinary skill in the art would not know the scope of the feature.

Claim Rejections - 35 USC § 102

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis (i.e., changing from AIA to pre-AIA) for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim(s) 24 - 53 are rejected under pre-AIA 35 U.S.C. 102(e) as being anticipated by Collopy US 20100131304.

2. As per claim 24, A data-logging system configured to monitor how a vehicle is being driven by a driver during a driving period and to log driving information representing behavior of the vehicle whilst the vehicle is being driven by the driver during the driving period, the data-logging system comprising:

a remote data-logging server; (Collopy paragraph 0101 discloses, "The system 800 also includes one or more server(s) 804. The server(s) 804 can also be hardware and/or software (e.g.,

threads, processes, computing devices). The servers 804 can house threads to perform transformations by employing the specification, for example. One possible communication between a client 802 and a server 804 can be in the form of a data packet adapted to be transmitted between two or more computer processes.")

a mobile telecommunications device including a user interface, a processor, a memory, and a sensor set comprising at least an accelerometer and a positioning module; (Collopy paragraph 0035 discloses, "System 100 includes an insurance policy holder, operator 110, utilizing a mobile device 105 to associate the operator 110 with an on-board monitoring system 125 and a vehicle 130. By employing wireless communications, the mobile device 105 is in communication with an insurance provider system 135 via a transceiver 140 and a communication component 145. As vehicle 130 is being driven by operator 110 the driver's driving habits, skills, route of travel, activity, etc., can be monitored by the on-board monitoring system 125 in conjunction with the mobile device 105." And Collopy paragraph 0044 discloses, "Any suitable device to assist in identifying a driver can be employed in conjunction with the on-board monitoring system 125. The suitable device can comprise of, but not limited to, any combination of an interface to locate with the on-board monitoring system 125, a memory for storing device/user identification, one or more applications employed as part of the monitoring process, a processor to implement the application(s), process any data, store new data, etc., a transceiver to transmit or receive data as required in performing the monitoring process, display/communication device(s) to convey information to the driver, and input device(s) to allow the user to interact with presented information and provide feedback, e.g., such feedback could be acceptance of a new insurance rate or entering of a password for authentication purposes.") and

an application comprising computer-executable instructions downloaded onto the memory, wherein the computer-executable instructions, when executed by the processor, cause the mobile telecommunications device to: (Collopy paragraph 0104)

process sensor data from the sensor set to generate derived driving information representing how the vehicle is being driven by the driver during the driving period, wherein the driving period is defined by a duration comprising a plurality of portions of time, and wherein the derived driving information includes a driving score; (Collopy paragraph 0038, "The gathering of data by the on-board monitoring system 125 can be in real-time thereby allowing the driving analysis component 150 to analyze the received data in real-time/near real-time and, accordingly, a dynamic rate determination component 155 to dynamically determine an insurance rate(s) based upon the gathered data and data analysis." And Collopy paragraph 0035, "Data received at the insurance provider system 135 can be collected by an aggregation component 148. The aggregation component can compile received data to facilitate processing by the data analysis component 150. The insurance provider 135 employs various analytical methods (by utilizing driving analysis component 150) to facilitate determination of an appropriate insurance rate and any other pertinent information concerning the driving habits of the driver.")

generate the derived driving information without data from vehicle sensors during the driving period in which the mobile telecommunications device is within the vehicle and the vehicle is being driven by the driver; (Collopy paragraphs 0035 and 0038) and

transmit a selection of the derived driving information to the remote data-logging server, wherein the selection is determined by identifying a portion of the plurality of portions of time, and the selection includes the driving score, wherein the remote data-logging server is configured

to log the derived driving information received from the mobile telecommunications device and comprises: (Collopy paragraphs 0035 and 0038)

a database for storing a plurality of accounts, at least one of the plurality of accounts having a unique identifier, and the database being configured to store the selection of the derived driving information to the at least one account, the selection associated by the unique identifier to the vehicle and the driver; (Collopy paragraph 0036 discloses, "Data can also be obtained from a database 160 which stores information pertaining to the vehicle operator 110, e.g., previous driving history, along with other data as required. Furthermore, the aggregation component 148 can obtain information as required from the insurance provider as well as any third party entities such as other insurance companies, parents of the vehicle operator, and the like." and Collopy paragraph 0061 discloses, "During start up of the on-board monitoring system 125, which can include associating the mobile device 105 with the on-board monitoring system 125, various methods can be employed to identify and authenticate the user associated with mobile device 105. In one embodiment, user identification information can be retrieved from the mobile device 105 and forwarded to the identification component 320." And Collopy paragraph 0049 , "It is to be appreciated that the mobile device 105 employed by the driver as part of the system 100 can comprise of any combination of components that allow gathering, processing, transmission, presentation, evaluation, determination of insurance rates and any pertinent information, and any components to assist and enable the identification of the driver to the insurance provider system 135.") and

a communications interface configured to communicate with the mobile telecommunications device and receive therefrom:

the unique identifier for association of the mobile telecommunications device with the at least one of the plurality of accounts; (Collopy paragraph 0061 , "Such user identification information can comprise of an IMSI number retrieved from a SIM (not shown) located on the mobile device 105, e.g., in device ID 160. The identification component 320 can access storage device 350, retrieve any user account information contained therein that is associated with the IMSI number, and, using the retrieved information, identify the user associated with the mobile device 105 and accordingly the prospective driver of vehicle 130 (ref. FIG. 1).") and

the selection of the derived driving information to be logged to the at least one of the plurality of accounts, and wherein the remote data-logging server is further configured to process the derived driving information logged to the at least one of the plurality of accounts over a plurality of driving periods including the driving period to generate an aggregated driving score used to determine a risk profile for at least one of the vehicle and the driver. (Collopy paragraph 0036 , "the aggregation component 148 can obtain data from the various components of system 100 to assist in the determination of insurance rates. Such components can include the on-board monitoring system 125, mobile device 105, the device ID 106, and/or the vehicle operator 110 with the obtained data being forwarded to the driving analysis component 150 and/or the dynamic rate determination component 155. Data can also be obtained from a database 160 which stores information pertaining to the vehicle operator 110, e.g., previous driving history, along with other data as required." And Collopy paragraph 0037 , "The database 160 which can be employed to store any information gathered or generated by the various components of system 100. Such information can include data gathered by the on-board monitoring system 125, information provided by operator 110, information retrieved from the mobile device 105 or information associated therewith, information collected or generated by the various components

of the insurance provider system 135, information provided by third party systems and/or users (not shown), and the like.")

3. As per claim 25, The data-logging system of Claim 24, wherein the aggregated driving score is used to define an insurance premium associated with the at least one of the plurality of accounts, and the data-logging system is further configured to communicate to the mobile telecommunications device an insurance offer generated in response to the derived driving information received from the mobile telecommunications device. (Collopy paragraphs 0035, 0038, 0041 and Collopy paragraph 0078 discloses, "The on-board monitoring system 125 can include an intelligent insurance selection component (not shown) which can review the insurance rates being offered by a plurality of insurance companies and automatically select, in real-time, the best insurance plan. Selection can be based on any factors that determine insurance coverage costs including driving habits, vehicle being driven, location, driver, etc.")

4. As per claim 26, The data-logging system of Claim 25, wherein the application is provided from an insurance company and the application links the driver to an insurance policy associated with the at least one of the plurality of accounts. (Collopy paragraph 0058 discloses, "Further, the on-board monitoring system 125 or the mobile device 105 can include one or more local applications 280 to facilitate monitoring, processing, and generation of data for insurance purposes. The local applications 280 can be substantially similar to any of the applications operating in the various components that comprise systems 100, 200, and 300. By having the one or more applications 280 functioning local to the vehicle 130, insurance rate information and feedback can be presented to a driver which can be beneficial when communications between the various components that comprise systems 100, 200, and 300 are unavailable." And Collopy paragraph 0062 discloses, "o enable the correlation of a unique identifier (e.g., IMSI number) to

identify an individual, associated with mobile device 105 and driver data stored in database 350 some form of registration process may have previously been performed. The registration process, for example, can involve a driver informing their insurance provider of the IMSI number associated with their personal cell phone (mobile device 105), along with any other pertinent information such as address of the driver, social security number, insurance policy number, etc.")

5. As per claim 27, The data-logging system of Claim 24, wherein execution of the computer- executable instructions by the processor further causes the mobile telecommunications device to determine a driving incident as part of the derived driving information, the driving incident being defined by an occurrence of the sensor data exceeding a predetermined value during the driving period. (Collopy paragraph 0075 discloses, "The on-board monitoring system 125 can also be employed to assist with reconstruction of accidents. By reviewing the data gathered by real-time data gathering system 100 it is possible to determine how the vehicle was being driven prior to an accident. Data can be retrieved from the on-board monitoring system 125, buffer 270 or from the insurance provider system 135 and analyzed. The analysis can assist in determining who was at fault in the accident, whether a vehicle was speeding, cell phone usage, had the driver made a prohibited turn?, etc. Such data analysis could greatly enhance the insurance accident investigation allowing the insurance claims assessor to expeditiously assess the accident, make insurance payouts and any claims associated with the accident, forward information that might be of use to the law and legal professions, etc.")

6. As per claim 28, The data-logging system of Claim 27, wherein the driving incident comprises one or more of harsh breaking, harsh acceleration, harsh swerving, or an accident. (Collopy paragraph 0035 discloses, "As vehicle 130 is being driven by operator 110 the driver's driving habits, skills, route of travel, activity, etc., can be monitored by the on-board monitoring

system 125 in conjunction with the mobile device 105. The on-board monitoring system 125 monitors and gathers information regarding driver 110's driving skills, habits, etc. and forwards the information to the insurance provider 135." And Collopy paragraph 0075)

7. As per claim 29, The data-logging system of Claim 27, wherein execution of the computer- executable instructions by the processor further causes the mobile telecommunications device to:

store the sensor data relating to the driving incident; (Collopy paragraphs 0035 and 0075) and

transmit the stored sensor data to the remote data-logging server. (Collopy paragraph 0036 discloses, "Data can also be obtained from a database 160 which stores information pertaining to the vehicle operator 110, e.g., previous driving history, along with other data as required. Furthermore, the aggregation component 148 can obtain information as required from the insurance provider as well as any third party entities such as other insurance companies, parents of the vehicle operator, and the like.")

8. As per claim 30, The data-logging system of Claim 29, wherein execution of the computer- executable instructions by the processor further causes the mobile telecommunications device to store the sensor data generated before, during, and after the driving incident that is continuously collected, associated with the driving incident, and included within at least a portion of the plurality of portions of time. (Collopy paragraphs 0035 and 0075)

9. As per claim 31, The data-logging system of Claim 24, wherein execution of the computer- executable instructions by the processor to generate the derived driving information further causes the mobile telecommunications device to determine a driving incident as part of the derived driving information, the driving incident defined by a marked variation in a change

of the sensor data over at least a portion of the plurality of portions of time during the driving period indicative of a difference in a state of motion of the vehicle occurring over the at least a portion of the plurality of portions. (Collopy paragraph 0035 discloses, "As vehicle 130 is being driven by operator 110 the driver's driving habits, skills, route of travel, activity, etc., can be monitored by the on-board monitoring system 125 in conjunction with the mobile device 105. The on-board monitoring system 125 monitors and gathers information regarding driver 110's driving skills, habits, etc. and forwards the information to the insurance provider 135." And Collopy paragraph 0075)

10. As per claim 32, The data-logging system of Claim 31, wherein the driving incident comprises one or more of harsh breaking, harsh acceleration, harsh swerving, or an accident. (Collopy paragraphs 0035 and 0075)

11. As per claim 33, The data-logging system of Claim 31, wherein execution of the computer- executable instructions by the processor further causes the mobile telecommunications device to select, prior to transmitting the selection of the derived driving information, the sensor data relating to the driving incident. (Collopy paragraph 0055 discloses, "One or more video cameras 240 can be located on a vehicle 130 to record visual information. In an embodiment comprising of a single camera 240 the camera could be placed in the vehicle 130 to be forward facing to the direction of travel and captures visual information regarding the journey. Alternatively, a plurality of cameras 240 can be located on the vehicle 130 allowing video to be acquired from a variety of viewpoints from the vehicle 130, e.g., a second camera can be recording information in a rearward viewpoint gathering information for use in accident analysis such as when the vehicle is reversing or has been involved in an accident, e.g., rear-ended. The visual data acquired by the camera can be streamed to the insurance provider system 135 via the

on-board monitoring system 125 and/or mobile device 105 for data analysis. Alternatively the acquired visual data can be stored local to the vehicle 130, before sending to the insurance provider system 135, in memory 260 associated with the on-board monitoring system and/or in memory (not shown) located with the video camera 240. The various memory buffers can be programmed to retain a specific amount of data, e.g., the last X minutes, or until the memory capacity is exceeded, whereupon the first stored video is replaced by most recently acquired video. The acquired video data can be used for a variety of purposes regarding collection of contextual data and/or analysis. Examples of such purposes include the video stream can be analyzed to assist in the determination of the current weather conditions (e.g., it is snowing, windscreen wipers are operating, etc.), during post-collision review the gathered video can be reviewed to determine cause of collision, blame, etc., and the like.")

12. As per claim 34, The data-logging system of Claim 33, wherein, to select the sensor data relating to the driving incident, execution of the computer-executable instructions by the processor further cause the mobile telecommunications device to select the sensor data generated before, during, and after the driving incident. (Collopy paragraph 0055 discloses, "One or more video cameras 240 can be located on a vehicle 130 to record visual information. In an embodiment comprising of a single camera 240 the camera could be placed in the vehicle 130 to be forward facing to the direction of travel and captures visual information regarding the journey. Alternatively, a plurality of cameras 240 can be located on the vehicle 130 allowing video to be acquired from a variety of viewpoints from the vehicle 130, e.g., a second camera can be recording information in a rearward viewpoint gathering information for use in accident analysis such as when the vehicle is reversing or has been involved in an accident, e. g., rear-ended. The visual data acquired by the camera can be streamed to the insurance provider system

135 via the on-board monitoring system 125 and/or mobile device 105 for data analysis. Alternatively the acquired visual data can be stored local to the vehicle 130, before sending to the insurance provider system 135, in memory 260 associated with the on-board monitoring system and/or in memory (not shown) located with the video camera 240. The various memory buffers can be programmed to retain a specific amount of data, e.g., the last X minutes, or until the memory capacity is exceeded, whereupon the first stored video is replaced by most recently acquired video. The acquired video data can be used for a variety of purposes regarding collection of contextual data and/or analysis. Examples of such purposes include the video stream can be analyzed to assist in the determination of the current weather conditions (e.g., it is snowing, windscreen wipers are operating, etc.), during post-collision review the gathered video can be reviewed to determine cause of collision, blame, etc., and the like.")

13. As per claim 35, The data-logging system of Claim 34, wherein execution of the computer- executable instructions by the processor further causes the mobile telecommunications device to transmit the selected sensor data to the remote data-logging server. (Collopy paragraphs 0049, 0101, and 0102)

14. As per claim 36, The data-logging system of Claim 31, wherein the at least a portion of the plurality of portions comprises a five-minute time period. (Collopy paragraph 0055)

15. As per claim 37, The data-logging system of Claim 24, wherein execution of the computer- executable instructions by the processor further causes the mobile telecommunications device to register a start of the driving period in response to an initialization input generated automatically in response to the sensor data having predetermined values. (Collopy paragraph 0063 and 0090)

16. As per claim 38, A data-logging system configured to monitor how a vehicle is being driven by a driver during a driving period and to log driving information representing behaviour of the vehicle whilst the vehicle is being driven by the driver during the driving period, the data-logging system comprising:

a remote data-logging server; (Collopy paragraph 0101 discloses, "The system 800 also includes one or more server(s) 804. The server(s) 804 can also be hardware and/or software (e.g., threads, processes, computing devices). The servers 804 can house threads to perform transformations by employing the specification, for example. One possible communication between a client 802 and a server 804 can be in the form of a data packet adapted to be transmitted between two or more computer processes.")

a mobile telecommunications device including a user interface, a processor, a memory, and a sensor set comprising at least an accelerometer and a positioning module; (Collopy paragraph 0035 discloses, "System 100 includes an insurance policy holder, operator 110, utilizing a mobile device 105 to associate the operator 110 with an on-board monitoring system 125 and a vehicle 130. By employing wireless communications, the mobile device 105 is in communication with an insurance provider system 135 via a transceiver 140 and a communication component 145. As vehicle 130 is being driven by operator 110 the driver's driving habits, skills, route of travel, activity, etc., can be monitored by the on-board monitoring system 125 in conjunction with the mobile device 105." And Collopy paragraph 0044 discloses, "Any suitable device to assist in identifying a driver can be employed in conjunction with the on-board monitoring system 125. The suitable device can comprise of, but not limited to, any combination of an interface to locate with the on-board monitoring system 125, a memory for storing device/user identification, one or more applications employed as part of the monitoring

process, a processor to implement the application(s), process any data, store new data, etc., a transceiver to transmit or receive data as required in performing the monitoring process, display/communication device(s) to convey information to the driver, and input device(s) to allow the user to interact with presented information and provide feedback, e.g., such feedback could be acceptance of a new insurance rate or entering of a password for authentication purposes.") and

an application comprising computer-executable instructions downloaded onto the memory, wherein the computer-executable instructions, when executed by the processor, cause the mobile telecommunications device to: (Collopy paragraph 0104)

process sensor data from the sensor set to generate derived driving information representing how the vehicle is being driven by the driver during the driving period, wherein the driving period is defined by a duration comprising a plurality of portions of time, and wherein the derived driving information includes at least one driving incident; (Collopy paragraphs 0035 and 0075)

generate the derived driving information without data from vehicle sensors during the driving period in which the mobile telecommunications device is within the vehicle and the vehicle is being driven by the driver; (Collopy paragraph 0052) and

transmit a selection of the derived driving information to the remote data-logging server, wherein the selection is determined by identifying a portion of the plurality of portions of time, and the selection includes the at least one driving incident; (Collopy paragraph 0055)

wherein the remote data-logging server is configured to log the derived driving information received from the mobile telecommunications device and comprises:

a database for storing a plurality of accounts, at least one of the plurality of accounts having a unique identifier, and the database being configured to store the selection of the derived driving information, associated by the unique identifier to the vehicle and the driver, to the at least one account; (Collopy paragraph 0036 discloses, "Data can also be obtained from a database 160 which stores information pertaining to the vehicle operator 110, e.g., previous driving history, along with other data as required. Furthermore, the aggregation component 148 can obtain information as required from the insurance provider as well as any third party entities such as other insurance companies, parents of the vehicle operator, and the like." and Collopy paragraph 0061 discloses, "During start up of the on-board monitoring system 125, which can include associating the mobile device 105 with the on-board monitoring system 125, various methods can be employed to identify and authenticate the user associated with mobile device 105. In one embodiment, user identification information can be retrieved from the mobile device 105 and forwarded to the identification component 320." And Collopy paragraph 0049 , "It is to be appreciated that the mobile device 105 employed by the driver as part of the system 100 can comprise of any combination of components that allow gathering, processing, transmission, presentation, evaluation, determination of insurance rates and any pertinent information, and any components to assist and enable the identification of the driver to the insurance provider system 135.") and

a communications interface configured to communicate with the mobile telecommunications device, and receive therefrom:

the unique identifier for association of the mobile telecommunications device with the at least one of the plurality of accounts; (Collopy paragraph 0061 , "Such user identification information can comprise of an IMSI number retrieved from a SIM (not shown) located on the

mobile device 105, e.g., in device ID 160. The identification component 320 can access storage device 350, retrieve any user account information contained therein that is associated with the IMSI number, and, using the retrieved information, identify the user associated with the mobile device 105 and accordingly the prospective driver of vehicle 130 (ref. FIG. 1).") and

the selection of the derived driving information to be logged to the at least one of the plurality of accounts, and wherein the remote data-logging server is further configured to process the derived driving information logged to the at least one of the plurality of accounts to determine a risk profile for at least one of the vehicle and driver. (Collopy paragraph 0038, "The gathering of data by the on-board monitoring system 125 can be in real-time thereby allowing the driving analysis component 150 to analyze the received data in real-time/near real-time and, accordingly, a dynamic rate determination component 155 to dynamically determine an insurance rate(s) based upon the gathered data and data analysis." And Collopy paragraph 0035, "Data received at the insurance provider system 135 can be collected by an aggregation component 148. The aggregation component can compile received data to facilitate processing by the data analysis component 150. The insurance provider 135 employs various analytical methods (by utilizing driving analysis component 150) to facilitate determination of an appropriate insurance rate and any other pertinent information concerning the driving habits of the driver.")

17. As per claim 39, The data-logging system of Claim 38, wherein the risk profile is used to define an insurance premium associated with the at least one of the plurality of accounts, and the data-logging system is further configured to communicate to the mobile telecommunications device an insurance offer generated in response to the derived driving information received from the mobile telecommunications device. (Collopy paragraph 0055)

18. As per claim 40, The data-logging system of Claim 38, wherein the at least one driving incident is defined by an occurrence of the sensor data exceeding a predetermined value during the driving period. (Collopy paragraph 0055)

19. As per claim 41, The data-logging system of Claim 40, wherein the at least one driving incident comprises one or more of harsh breaking, harsh acceleration, harsh swerving, or an accident. (Collopy paragraphs 0035 and 0075)

20. As per claim 42, The data-logging system of Claim 40, wherein execution of the computer- executable instructions by the processor further causes the mobile telecommunications device to:

store the sensor data relating to the at least one driving incident; (Collopy paragraphs 0035 and 0075) and

transmit the stored sensor data to the remote data-logging server. (Collopy paragraph 0036 discloses, "Data can also be obtained from a database 160 which stores information pertaining to the vehicle operator 110, e.g., previous driving history, along with other data as required. Furthermore, the aggregation component 148 can obtain information as required from the insurance provider as well as any third party entities such as other insurance companies, parents of the vehicle operator, and the like.")

21. As per claim 43, The data-logging system of Claim 42, wherein execution of the computer- executable instructions by the processor further causes the mobile telecommunications device to store the sensor data generated before, during, and after the at least one driving incident. (Collopy paragraph 0055 discloses, "One or more video cameras 240 can be located on a vehicle 130 to record visual information. In an embodiment comprising of a single camera 240 the camera could be placed in the vehicle 130 to be forward facing to the direction of travel and

captures visual information regarding the journey. Alternatively, a plurality of cameras 240 can be located on the vehicle 130 allowing video to be acquired from a variety of viewpoints from the vehicle 130, e.g., a second camera can be recording information in a rearward viewpoint gathering information for use in accident analysis such as when the vehicle is reversing or has been involved in an accident, e.g., rear-ended. The visual data acquired by the camera can be streamed to the insurance provider system 135 via the on-board monitoring system 125 and/or mobile device 105 for data analysis. Alternatively the acquired visual data can be stored local to the vehicle 130, before sending to the insurance provider system 135, in memory 260 associated with the on-board monitoring system and/or in memory (not shown) located with the video camera 240. The various memory buffers can be programmed to retain a specific amount of data, e.g., the last X minutes, or until the memory capacity is exceeded, whereupon the first stored video is replaced by most recently acquired video. The acquired video data can be used for a variety of purposes regarding collection of contextual data and/or analysis. Examples of such purposes include the video stream can be analyzed to assist in the determination of the current weather conditions (e.g., it is snowing, windscreen wipers are operating, etc.), during post-collision review the gathered video can be reviewed to determine cause of collision, blame, etc., and the like.")

22. As per claim 44, The data-logging system of Claim 38, wherein execution of the computer- executable instructions by the processor further causes the mobile telecommunications device to determine the at least one driving incident as a marked variation in a change of the sensor data over at least a portion of the plurality of portions of time during the driving period indicative of a difference in a state of motion of the vehicle occurring over the at least a portion of the plurality of portions. (Collopy paragraphs 0035 and 0075)

23. As per claim 45, The data-logging system of Claim 44, wherein the at least one driving incident comprises one or more of harsh breaking, harsh acceleration, harsh swerving or an accident. (Collopy paragraphs 0035 and 0075)

24. As per claim 46, The data-logging system of Claim 44, wherein execution of the computer- executable instructions by the processor further causes the mobile telecommunications device to select, prior to transmitting the selection of the derived driving information, the sensor data relating to the at least one driving incident. (Collopy paragraph 0055 discloses, "One or more video cameras 240 can be located on a vehicle 130 to record visual information. In an embodiment comprising of a single camera 240 the camera could be placed in the vehicle 130 to be forward facing to the direction of travel and captures visual information regarding the journey. Alternatively, a plurality of cameras 240 can be located on the vehicle 130 allowing video to be acquired from a variety of viewpoints from the vehicle 130, e.g., a second camera can be recording information in a rearward viewpoint gathering information for use in accident analysis such as when the vehicle is reversing or has been involved in an accident, e.g., rear-ended. The visual data acquired by the camera can be streamed to the insurance provider system 135 via the on-board monitoring system 125 and/or mobile device 105 for data analysis. Alternatively the acquired visual data can be stored local to the vehicle 130, before sending to the insurance provider system 135, in memory 260 associated with the on-board monitoring system and/or in memory (not shown) located with the video camera 240. The various memory buffers can be programmed to retain a specific amount of data, e.g., the last X minutes, or until the memory capacity is exceeded, whereupon the first stored video is replaced by most recently acquired video. The acquired video data can be used for a variety of purposes regarding collection of contextual data and/or analysis. Examples of such purposes include the video

stream can be analyzed to assist in the determination of the current weather conditions (e.g., it is snowing, windscreen wipers are operating, etc.), during post-collision review the gathered video can be reviewed to determine cause of collision, blame, etc., and the like.")

25. As per claim 47, The data-logging system of Claim 46, wherein to select the sensor data relating to the at least one driving incident, execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to select the sensor data generated before, during, and after the at least one driving incident. (Collopy paragraph 0055 discloses, "One or more video cameras 240 can be located on a vehicle 130 to record visual information. In an embodiment comprising of a single camera 240 the camera could be placed in the vehicle 130 to be forward facing to the direction of travel and captures visual information regarding the journey. Alternatively, a plurality of cameras 240 can be located on the vehicle 130 allowing video to be acquired from a variety of viewpoints from the vehicle 130, e.g., a second camera can be recording information in a rearward viewpoint gathering information for use in accident analysis such as when the vehicle is reversing or has been involved in an accident, e.g., rear-ended. The visual data acquired by the camera can be streamed to the insurance provider system 135 via the on-board monitoring system 125 and/or mobile device 105 for data analysis. Alternatively the acquired visual data can be stored local to the vehicle 130, before sending to the insurance provider system 135, in memory 260 associated with the on-board monitoring system and/or in memory (not shown) located with the video camera 240. The various memory buffers can be programmed to retain a specific amount of data, e.g., the last X minutes, or until the memory capacity is exceeded, whereupon the first stored video is replaced by most recently acquired video. The acquired video data can be used for a variety of purposes regarding collection of contextual data and/or analysis. Examples of such purposes include the video

stream can be analyzed to assist in the determination of the current weather conditions (e.g., it is snowing, windscreen wipers are operating, etc.), during post-collision review the gathered video can be reviewed to determine cause of collision, blame, etc., and the like.")

26. As per claim 48, The data-logging system of Claim 47, wherein execution of the computer- executable instructions by the processor further causes the mobile telecommunications device to transmit the selected sensor data to the remote data-logging server. (Collopy paragraph 0101 discloses, "The system 800 also includes one or more server(s) 804. The server(s) 804 can also be hardware and/or software (e.g., threads, processes, computing devices). The servers 804 can house threads to perform transformations by employing the specification, for example. One possible communication between a client 802 and a server 804 can be in the form of a data packet adapted to be transmitted between two or more computer processes.")

27. As per claim 49, The data-logging system of Claim 38, wherein the sensor set further comprises an image sensor. (Collopy paragraph 0055 discloses, "One or more video cameras 240 can be located on a vehicle 130 to record visual information. In an embodiment comprising of a single camera 240 the camera could be placed in the vehicle 130 to be forward facing to the direction of travel and captures visual information regarding the journey. Alternatively, a plurality of cameras 240 can be located on the vehicle 130 allowing video to be acquired from a variety of viewpoints from the vehicle 130, e.g., a second camera can be recording information in a rearward viewpoint gathering information for use in accident analysis such as when the vehicle is reversing or has been involved in an accident, e.g., rear-ended. The visual data acquired by the camera can be streamed to the insurance provider system 135 via the on-board monitoring system 125 and/or mobile device 105 for data analysis. Alternatively the acquired visual data can be stored local to the vehicle 130, before sending to the insurance provider

system 135, in memory 260 associated with the on-board monitoring system and/or in memory (not shown) located with the video camera 240. The various memory buffers can be programmed to retain a specific amount of data, e.g., the last X minutes, or until the memory capacity is exceeded, whereupon the first stored video is replaced by most recently acquired video. The acquired video data can be used for a variety of purposes regarding collection of contextual data and/or analysis. Examples of such purposes include the video stream can be analyzed to assist in the determination of the current weather conditions (e.g., it is snowing, windscreen wipers are operating, etc.), during post-collision review the gathered video can be reviewed to determine cause of collision, blame, etc., and the like.")

28. As per claim 50, The data-logging system of Claim 38, wherein the driving information comprises one or more of velocity, direction of travel, an indication of exceeding a velocity limit, or data representing jerky steering. (Collopy paragraph 0073 discloses, "The on-board monitoring system 125 can receive speed limit data transmitted from the intelligent road sign and, if the vehicle is determined to be speeding, the driver can be informed of the fact that they are speeding,")

29. As per claim 51, The data-logging system of Claim 38, wherein execution of the computer- executable instructions by the processor further causes the mobile telecommunications device to register the start of the driving period in response to an initialization input generated automatically in response to the sensor data having predetermined values. (Collopy paragraph 0063 and 0090)

30. As per claim 52, A data-logging system configured to monitor how a vehicle is being driven by a driver during a driving period and to log driving information representing behaviour

of the vehicle whilst the vehicle is being driven by the driver during the driving period, the data-logging system comprising:

a remote data-logging server; (Collopy paragraph 0101 discloses, "The system 800 also includes one or more server(s) 804. The server(s) 804 can also be hardware and/or software (e.g., threads, processes, computing devices). The servers 804 can house threads to perform transformations by employing the specification, for example. One possible communication between a client 802 and a server 804 can be in the form of a data packet adapted to be transmitted between two or more computer processes.")

a mobile telecommunications device including a user interface, a processor, a memory, and a sensor set comprising at least an accelerometer and a positioning module; (Collopy paragraph 0035 discloses, "System 100 includes an insurance policy holder, operator 110, utilizing a mobile device 105 to associate the operator 110 with an on-board monitoring system 125 and a vehicle 130. By employing wireless communications, the mobile device 105 is in communication with an insurance provider system 135 via a transceiver 140 and a communication component 145. As vehicle 130 is being driven by operator 110 the driver's driving habits, skills, route of travel, activity, etc., can be monitored by the on-board monitoring system 125 in conjunction with the mobile device 105." And Collopy paragraph 0044 discloses, "Any suitable device to assist in identifying a driver can be employed in conjunction with the on-board monitoring system 125. The suitable device can comprise of, but not limited to, any combination of an interface to locate with the on-board monitoring system 125, a memory for storing device/user identification, one or more applications employed as part of the monitoring process, a processor to implement the application(s), process any data, store new data, etc., a transceiver to transmit or receive data as required in performing the monitoring process,

display/communication device(s) to convey information to the driver, and input device(s) to allow the user to interact with presented information and provide feedback, e.g., such feedback could be acceptance of a new insurance rate or entering of a password for authentication purposes.")

an application comprising computer-executable instructions downloaded onto the memory, wherein the computer-executable instructions, when executed by the processor, cause the mobile telecommunications device to: (Collopy paragraph 0104)

process sensor data from the sensor set to generate derived driving information representing how the vehicle is being driven by the driver during the driving period, wherein the driving period is defined by a duration comprising a plurality of portions of time, and wherein the driving information includes at least one driving incident, the at least one driving incident being defined by an occurrence of the sensor data exceeding a predetermined value during the driving period; (Collopy paragraph 0055)

generate the derived driving information without data from vehicle sensors during the driving period in which the mobile telecommunications device is within the vehicle and the vehicle is being driven by the driver; (Collopy paragraph 0055)

store the sensor data relating to the at least one driving incident; and transmit a selection of the derived driving information and the stored sensor data corresponding to the selected derived driving information to the remote data-logging server, wherein the selection is determined by identifying a portion of the plurality of portions of time, and the selection includes the at least one driving incident; (Collopy paragraph 0036 discloses, "Data can also be obtained from a database 160 which stores information pertaining to the vehicle operator 110, e.g., previous driving history, along with other data as required. Furthermore, the aggregation

component 148 can obtain information as required from the insurance provider as well as any third party entities such as other insurance companies, parents of the vehicle operator, and the like." and Collopy paragraph 0061 discloses, "During start up of the on-board monitoring system 125, which can include associating the mobile device 105 with the on-board monitoring system 125, various methods can be employed to identify and authenticate the user associated with mobile device 105. In one embodiment, user identification information can be retrieved from the mobile device 105 and forwarded to the identification component 320." And Collopy paragraph 0049 , "It is to be appreciated that the mobile device 105 employed by the driver as part of the system 100 can comprise of any combination of components that allow gathering, processing, transmission, presentation, evaluation, determination of insurance rates and any pertinent information, and any components to assist and enable the identification of the driver to the insurance provider system 135.")

wherein the remote data-logging server is configured to log the derived driving information and the sensor data received from the mobile telecommunications device and comprises:

a database for storing a plurality of accounts, at least one of the plurality of accounts having a unique identifier and the database being configured to store the selection of the derived driving information associated by the unique identifier to the vehicle and the driver, and the sensor data, to the at least one of the plurality of accounts; (Collopy paragraph 0036 discloses, "Data can also be obtained from a database 160 which stores information pertaining to the vehicle operator 110, e.g., previous driving history, along with other data as required. Furthermore, the aggregation component 148 can obtain information as required from the insurance provider as well as any third party entities such as other insurance companies, parents

of the vehicle operator, and the like." and Collopy paragraph 0061 discloses, "During start up of the on-board monitoring system 125, which can include associating the mobile device 105 with the on-board monitoring system 125, various methods can be employed to identify and authenticate the user associated with mobile device 105. In one embodiment, user identification information can be retrieved from the mobile device 105 and forwarded to the identification component 320." And Collopy paragraph 0049 , "It is to be appreciated that the mobile device 105 employed by the driver as part of the system 100 can comprise of any combination of components that allow gathering, processing, transmission, presentation, evaluation, determination of insurance rates and any pertinent information, and any components to assist and enable the identification of the driver to the insurance provider system 135.")

a communications interface configured to communicate with the mobile telecommunications device, and receive therefrom: the unique identifier for association of the mobile telecommunications device with the at least one of the plurality of accounts; (Collopy paragraph 0061 , "Such user identification information can comprise of an IMSI number retrieved from a SIM (not shown) located on the mobile device 105, e.g., in device ID 160. The identification component 320 can access storage device 350, retrieve any user account information contained therein that is associated with the IMSI number, and, using the retrieved information, identify the user associated with the mobile device 105 and accordingly the prospective driver of vehicle 130 (ref. FIG. 1).") and

the selection of the derived driving information and the sensor data to be logged to the at least one of the plurality of accounts, wherein the remote data-logging server is further configured to process the derived driving information and the sensor data logged to the at least one of the plurality of accounts to determine a risk profile for at least one of the vehicle and

driver. (Collopy paragraph 0038 discloses, "The gathering of data by the on-board monitoring system 125 can be in real-time thereby allowing the driving analysis component 150 to analyze the received data in real-time/near real-time and, accordingly, a dynamic rate determination component 155 to dynamically determine an insurance rate(s) based upon the gathered data and data analysis." And Collopy paragraph 0035 , "Data received at the insurance provider system 135 can be collected by an aggregation component 148. The aggregation component can compile received data to facilitate processing by the data analysis component 150. The insurance provider 135 employs various analytical methods (by utilizing driving analysis component 150) to facilitate determination of an appropriate insurance rate and any other pertinent information concerning the driving habits of the driver.")

31. As per claim 53, A mobile telecommunications device configured to log driving information associated with a vehicle, the mobile telecommunications device comprising:

a sensor set comprising at least an accelerometer and a positioning module; (Collopy paragraph 0013 discloses, "A global positioning system GPS can be included in the system allowing the location of the driver and vehicle to be determined which can be forwarded to the insurance provider to allow rates based on location to be provided. An accelerometer can also be included to provide feedback regarding whether the driver is accelerating or braking excessively.")

a processor; (Collopy paragraph 0042 discloses, "Also, it is understood that while not shown, the on-board monitoring system 125 can include any equipment required to facilitate communication of data, where the equipment can include processor(s), memory, communication components and associated applications and protocols, etc., as necessary.")

a memory; (Collopy paragraph 0042 discloses, "Also, it is understood that while not shown, the on-board monitoring system 125 can include any equipment required to facilitate communication of data, where the equipment can include processor(s), memory, communication components and associated applications and protocols, etc., as necessary.") and

an application comprising computer-executable instructions downloaded onto the memory, wherein the computer-executable instructions, when executed by the processor, cause the mobile telecommunications device to: (Collopy paragraph 0104)

determine, based on the sensor data from the sensor set, a start of a driving period at which the mobile telecommunications device is within the vehicle and the vehicle is in use, wherein the driving period is defined by a duration from the start to an end and the duration is comprised of a plurality of portions of time; (Collopy paragraph 0036 discloses, "Data can also be obtained from a database 160 which stores information pertaining to the vehicle operator 110, e.g., previous driving history, along with other data as required. Furthermore, the aggregation component 148 can obtain information as required from the insurance provider as well as any third party entities such as other insurance companies, parents of the vehicle operator, and the like." and Collopy paragraph 0061 discloses, "During start up of the on-board monitoring system 125, which can include associating the mobile device 105 with the on-board monitoring system 125, various methods can be employed to identify and authenticate the user associated with mobile device 105. In one embodiment, user identification information can be retrieved from the mobile device 105 and forwarded to the identification component 320." And Collopy paragraph 0049 , "It is to be appreciated that the mobile device 105 employed by the driver as part of the system 100 can comprise of any combination of components that allow gathering, processing, transmission, presentation, evaluation, determination of insurance rates and any

pertinent information, and any components to assist and enable the identification of the driver to the insurance provider system 135.")

process the sensor data from the sensor set during the driving period to derive driving information associated with how the vehicle is driven, including vehicle behaviour and user behaviour; (Collopy paragraph 0038 , "The gathering of data by the on-board monitoring system 125 can be in real-time thereby allowing the driving analysis component 150 to analyze the received data in real-time/near real-time and, accordingly, a dynamic rate determination component 155 to dynamically determine an insurance rate(s) based upon the gathered data and data analysis." And Collopy paragraph 0035 , "Data received at the insurance provider system 135 can be collected by an aggregation component 148. The aggregation component can compile received data to facilitate processing by the data analysis component 150. The insurance provider 135 employs various analytical methods (by utilizing driving analysis component 150) to facilitate determination of an appropriate insurance rate and any other pertinent information concerning the driving habits of the driver.")

store a selection of the driving information to the memory, wherein the driving information is derived without data from vehicle sensors, and wherein the selection is determined by identifying a portion of the plurality of portions of time; (Collopy paragraph 0055)

transmit the selection of the derived driving information to a remote data-logging server; (Collopy pargraph 0055) and

wherein the mobile telecommunications device is controlled by a downloaded application to register the start of the driving period in response to an initialization input generated automatically in response to the sensor data having a predetermined value. (Collopy paragraph 0055)

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TYLER D PAIGE whose telephone number is (571)270-5425. The examiner can normally be reached M-F 7:00am - 6:00pm (mst).

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Black can be reached on 571-272-6956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/TYLER D PAIGE/
Primary Examiner, Art Unit 3666

Notice of References Cited	Application/Control No. 18/676,284	Applicant(s)/Patent Under Reexamination Wright, Andrew William	
	Examiner TYLER D PAIGE	Art Unit 3666	Page 1 of 1

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*		Document Number Country Code-Number-Kind Code	Date YYYY-MM-DD	Name	CPC Classification	US Classification
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	B					
	C					
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	M					

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*		Document Number Country Code-Number-Kind Code	Date YYYY-MM-DD	Country	Name	CPC Classification
	N					
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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	October 2019 Subject Matter Eligibility Guidance
	V	
	W	
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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in YYYY-MM-DD format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/676,284	Wright, Andrew William
	Examiner	Art Unit
	TYLER D PAIGE	3666

CPC - Searched*		
Symbol	Date	Examiner

CPC Combination Sets - Searched*		
Symbol	Date	Examiner
G07C5/02 or G06F17/00 or G06Q40/08 or G07C5/008 or G07C5/0858 or G07C5/0866 or G09B5/02 or G09B19/14 or H04M1/6041 or H04M1/6075 or H04M1/72406 or H04M1/724098 or H04M1/72454 or H04M1/72412 or H04M2201/36 or H04M2250/12 or H04M2250/74	07/26/2024	tdp

US Classification - Searched*			
Class	Subclass	Date	Examiner
701	33.4	07/26/2024	tdp

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Inventor Search	07/26/2024	tdp
NPL Search	07/26/2024	tdp
PE2E Search	07/26/2024	tdp

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/TYLER D PAIGE/ Examiner, Art Unit 3666	

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/676,284	Wright, Andrew William
	Examiner	**Art Unit**
	TYLER D PAIGE	3666

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS										
☐ Claims renumbered in the same order as presented by applicant					☐ CPA		☐ T.D.		☐ R.1.47	
CLAIM		**DATE**								
Final	Original	07/26/2024								
	24	✓								
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	26	✓								
	27	✓								
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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.D.P/
Examiner's Signature/Date 8/5/2024

Substitute for Form SB08a/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*	***Complete if Known***	
	Application Number	17/729,962
	Filing Date	April 26, 2022
	First Named Inventor	Wright, Andrew William
	Art Unit	3666
	Examiner Name	Central Docket
	Attorney Docket Number	044228.111206

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.D.P/
Tuesday, August 20, 2024

Substitute for Form SB08a/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*	***Complete if Known***	
	Application Number	17/729,962
	Filing Date	April 26, 2022
	First Named Inventor	Wright, Andrew William
	Art Unit	3666
	Examiner Name	Central Docket
	Attorney Docket Number	044228.111206

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Examiner Initials	Cite No.	Document Number Number – Kind Code (if known)	Publication or Grant Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document
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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.D.P/
Examiner, /Tamara D. Peko/ 08/22/2024

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	78	EP 1615178 A2	01-11-2006	EAS Surveillance GmbH		

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Examiner Initials Date 8/5/2024

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Applicant is to place a check mark here if English Language Translation is attached

NON PATENT LITERATURE DOCUMENTS

Examiner Initials	Cite No.	Include name of the author, title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), Volume-issue Number(s), publisher, city and/or country where published.	T
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Tyler D Paige 07/23/2024

Substitute for Form SB08a/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*	***Complete if Known***	
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	Examiner Name	Central Docket
	Attorney Docket Number	044228.111206

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Examiner Signature	/TYLER D PAIGE/ (07/23/2024)	**Date Considered**	07/23/2024

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See CFR 1.97(e)(1)

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement. See CFR 1.97(e)(2)

CONTENT OF IDS

☒ Copies of reference numbers **1 - 96** are not being submitted because they were previously cited by or submitted to the U.S. Patent and Trademark Office in patent application number **16/665,746**, filed **October 28, 2019 now patent number 11,321,970** in patent application number **16/222,893**, filed **December 17, 2018 now patent number 10,950,068** in patent application number **15/454,944**, filed **March 9, 2017 now patent number 10,198,878** in patent application number **15/061,910**, filed **March 4, 2016 now patent number 9,633,487** in patent application number **13/994,455**, filed **July 24, 2013 now patent number 9,311,271** for which a claim for priority under 35 U.S.C. § 120 has been made in the instant application.

☐ The month of publication for reference numbers is not available. However, the year of publication for these references is sufficiently earlier than the effective US filing date and any foreign priority date so that the particular month of publication is not in issue pursuant to 37 CFR § 1.98(b).

STATEMENT UNDER 37 C.F.R. § 1.704(d)(1)

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Tanesha Pendleton 5/28/2024

Substitute for Form SB08a/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*	***Complete if Known***	
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	Filing Date	April 26, 2022
	First Named Inventor	Wright, Andrew William
	Art Unit	3666
	Examiner Name	Central Docket
	Attorney Docket Number	044228.111206

☐ This information disclosure statement is in compliance with §§ 1.97 and 1.98 and will not be considered a failure to engage in reasonable efforts to conclude prosecution (processing or examination) of the application under paragraphs 37 C.F.R. § 1.704(c)(6), (c)(8), (c)(9), or (c)(10) because each item of information contained in the information disclosure statement:

☐ Was first cited in any communication from a patent office in a counterpart foreign or international application or from the Office, and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of the information disclosure statement; or

☐ Is a communication that was issued by a patent office in a counterpart foreign or international application or by the Office, and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of the information disclosure statement.

☐ See attached certification statement.

☐ The fee set forth in § 1.17(p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

Please charge any deficiency or credit any overpayment to Deposit Account No. 23-3050.

SIGNATURE

/Mark H. Krietzman/

Mark H. Krietzman
Registration No. 41128

Date: May 28, 2024

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Suite 3300
Philadelphia, PA 19103-7501
Telephone: (215) 568-3100
Facsimile: (215) 568-3439

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	906	((("WRIGHT") near3 ("Andrew"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/23 01:06 PM
L2	2566	701/33.4.ccls.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/23 01:06 PM
L3	393384	(G07C5/02 or G06F17/00 or G06Q40/08 or G07C5/008 or G07C5/0858 or G07C5/0866 or G09B5/02 or G09B19/14 or H04M1/6041 or H04M1/6075 or H04M1/72406 or H04M1/724098 or H04M1/72454 or H04M1/72412 or H04M2201/36 or H04M2250/12 or H04M2250/74).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:07 PM
L4	159731	(smartphone OR mobile ADJ device) SAME (windshield OR front window)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:17 PM
L5	159731	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:17 PM
L6	159754	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:17 PM
L7	1613	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen) AND (blackbox OR black ADJ box) AND (time OR period)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:19 PM
L8	144	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:20 PM

		AND (blackbox OR black ADJ box) AND (time OR period) AND insurance ADJ premium AND offer					
L9	144	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen) AND (blackbox OR black ADJ box) AND insurance ADJ premium AND offer	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:21 PM
L10	1613	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen) AND (blackbox OR black ADJ box) AND (time OR period)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:21 PM
L11	1469	L10 NOT L9	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:21 PM
L12	1613	L10	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:21 PM
L13	1304	L10 AND application AND (start OR initiate)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:22 PM
L14	1304	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen) AND (blackbox OR black ADJ box) AND (time OR period) AND application AND (start OR initiate)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:22 PM
L15	641	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen) AND (blackbox OR black ADJ box) AND (time OR period) AND application AND (start OR initiate) AND (collision OR accident	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:23 PM

		OR aggressive OR wreckless OR dangerous)					
L16	172	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen) AND (blackbox OR black ADJ box) AND (time OR period) AND download SAME application AND (start OR initiate) AND (collision OR accident OR aggressive OR wreckless OR dangerous)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:23 PM
L17	641	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen) AND (blackbox OR black ADJ box) AND (time OR period) AND (start OR initiate) AND (collision OR accident OR aggressive OR wreckless OR dangerous)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:24 PM
L18	494	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen) AND (blackbox OR black ADJ box) AND (time OR period) SAME (start OR initiate) AND (collision OR accident OR aggressive OR wreckless OR dangerous)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:24 PM
L19	51	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen) AND (blackbox OR black ADJ box) AND (time OR period) SAME (start OR initiate) SAME (collision OR accident OR aggressive OR wreckless OR	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:24 PM

		dangerous)					
L20	81	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen) SAME (time OR period) SAME (start OR initiate) SAME (collision OR accident OR aggressive OR wreckless OR dangerous)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:24 PM
L21	3	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen) SAME (time OR period) SAME (start OR initiate) SAME (collision OR accident OR aggressive OR wreckless OR dangerous) AND camera SAME (forward near2 facing OR forward ADJ fac$3)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:25 PM
L22	64	(smartphone OR mobile ADJ device) SAME (windshield OR front window OR windscreen OR wind ADJ screen) SAME (collision OR accident OR aggressive OR wreckless OR dangerous) AND camera SAME (forward near2 facing OR forward ADJ fac$3)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/23 01:26 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

Substitute for Form SB08a/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Complete if Known	
Application Number	18/676,284
Filing Date	May 28, 2024
First Named Inventor	Wright, Andrew William
Art Unit	TBD
Examiner Name	TBD
Attorney Docket Number	044228.111208

U. S. PUBLICATION AND PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number Number – Kind Code (if known)	Publication or Grant Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document
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	2	5,638,273 A	06-10-1997	Coiner et al.
	3	6,724,920 B1	04-20-2004	Berenz et al.
	4	6,073,004 A	06-06-2000	Balachandran
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	12	8,554,468 B1	10-08-2013	Bullock
	13	8,781,442 B1	07-15-2014	Link, II
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	36	2008/0255722 A1	10-16-2008	McClellan et al.
	37	2009/0109037 A1	04-30-2009	Farmer
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	49	2011/0117856 A1	05-19-2011	Veluppillai et al.
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	52	2011/0212717 A1	09-01-2011	Rhoads et al.
	53	2012/0072244 A1	03-22-2012	Collins et al.
	54	2012/0083960 A1	04-05-2012	Zhu et al.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.D.P/

Substitute for Form SB08a/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Complete if Known	
Application Number	18/676,284
Filing Date	May 28, 2024
First Named Inventor	Wright, Andrew William
Art Unit	TBD
Examiner Name	TBD
Attorney Docket Number	044228.111208

U. S. PUBLICATION AND PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number Number – Kind Code (if known)	Publication or Grant Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document
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Examiner Initials	Cite No.	Foreign Patent Document Country Code- Number -Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T*
	77	DE 202008013951 U1	01-08-2009	CSB System AG		
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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.D.P/

Substitute for Form SB08a/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Complete if Known	
Application Number	18/676,284
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FOREIGN PATENT DOCUMENTS

Examiner Initials	Cite No.	Foreign Patent Document Country Code- Number -Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T*
	79	EP 1764749 A2	03-21-2007	Suzuki et al.		
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Applicant is to place a check mark here if English Language Translation is attached

NON PATENT LITERATURE DOCUMENTS

Examiner Initials	Cite No.	Include name of the author, title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), Volume-issue Number(s), publisher, city and/or country where published.	T
	88	Barbeau et al.; "TRAC-IT--A Software Architecture Supporting Simutaneous Travel Behavior Data Collection & Real-time Location-Based Services for GPS-Enabled Mobile Phones"; Proceedings of the Nat'l Academy of Sciences Transportation Research Board 88.sup.th Annual Meeting; Paper #09-3175; Jan. 2009; 20 pages.	
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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.D.P/

Substitute for Form SB08a/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*	***Complete if Known***	
	Application Number	18/676,284
	Filing Date	May 28, 2024
	First Named Inventor	Wright, Andrew William
	Art Unit	TBD
	Examiner Name	TBD
	Attorney Docket Number	044228.111208

NON PATENT LITERATURE DOCUMENTS			
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Examiner Signature	/TYLER D PAIGE/ (07/23/2024)	**Date Considered**	07/23/2024

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See CFR 1.97(e)(1)

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement. See CFR 1.97(e)(2)

CONTENT OF IDS

☒ Copies of reference numbers **1 - 96** are not being submitted because they were previously cited by or submitted to the U.S. Patent and Trademark Office in patent application number **16/665,746**, filed **October 28, 2019 now patent number 11,321,970** in patent application number **16/222,893**, filed **December 17, 2018 now patent number 10,950,068** in patent application number **15/454,944**, filed **March 9, 2017 now patent number 10,198,878** in patent application number **15/061,910**, filed **March 4, 2016 now patent number 9,633,487** in patent application number **13/994,455**, filed **July 24, 2013 now patent number 9,311,271** for which a claim for priority under 35 U.S.C. § 120 has been made in the instant application.

☐ The month of publication for reference numbers is not available. However, the year of publication for these references is sufficiently earlier than the effective US filing date and any foreign priority date so that the particular month of publication is not in issue pursuant to 37 CFR § 1.98(b).

STATEMENT UNDER 37 C.F.R. § 1.704(d)(1)

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.D.P/

Substitute for Form SB08a/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*	***Complete if Known***	
	Application Number	18/676,284
	Filing Date	May 28, 2024
	First Named Inventor	Wright, Andrew William
	Art Unit	TBD
	Examiner Name	TBD
	Attorney Docket Number	044228.111208

☐ This information disclosure statement is in compliance with §§ 1.97 and 1.98 and will not be considered a failure to engage in reasonable efforts to conclude prosecution (processing or examination) of the application under paragraphs 37 C.F.R. § 1.704(c)(6), (c)(8), (c)(9), or (c)(10) because each item of information contained in the information disclosure statement:

☐ Was first cited in any communication from a patent office in a counterpart foreign or international application or from the Office, and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of the information disclosure statement; or

☐ Is a communication that was issued by a patent office in a counterpart foreign or international application or by the Office, and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of the information disclosure statement.

☐ See attached certification statement.

☐ The fee set forth in § 1.17(p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

Please charge any deficiency or credit any overpayment to Deposit Account No. 23-3050.

SIGNATURE

/Mark H. Krietzman/

Mark H. Krietzman
Registration No. 41128

Date: May 28, 2024

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Facsimile: (215) 568-3439

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.D.P/

Bibliographic Data

Application No: 18/676,284

Foreign Priority claimed: ◉ Yes ○ No

35 USC 119 (a-d) conditions met: ☑ Yes ☐ No ☐ Met After Allowance

Verified and Acknowledged: /TYLER D PAIGE/ (Examiner's Signature) | (Initials)

Title: Method and System for Logging Vehicle Behaviour

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
05/28/2024	701	3666	044228.111208
RULE			

APPLICANTS

INVENTORS

Andrew William Wright, Virginia Water, UNITED KINGDOM

CONTINUING DATA

This application is a CON of 17729962 04/26/2022 PAT 12002301

17729962 is a CON of 16665746 10/28/2019 PAT 11321970

16665746 is a CON of 16222893 12/17/2018 PAT 10950068

16222893 is a CON of 15454944 03/09/2017 PAT 10198878

15454944 is a CON of 15061910 03/04/2016 PAT 9633487

15061910 is a CON of 13994455 07/24/2013 PAT 9311271

13994455 is a 371 of PCT/GB2011/052491 12/15/2011

FOREIGN APPLICATIONS

UNITED KINGDOM GB1021292.6 12/15/2010

UNITED KINGDOM GB1101259.8 01/25/2011

UNITED KINGDOM GB1109759.9 06/10/2011

UNITED KINGDOM GB1118777.0 10/31/2011

IF REQUIRED, FOREIGN LICENSE GRANTED**

06/12/2024

** SMALL ENTITY **

STATE OR COUNTRY

UNITED KINGDOM

ADDRESS

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Washington Square, Suite 1100

1050 Connecticut Ave. N.W.
Washington, DC 20036-5304
UNITED STATES

FILING FEE RECEIVED

$2,656

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/676,284	05/28/2024	Andrew William Wright	044228.111208	7645

30734 7590 07/10/2024

BakerHostetler
Washington Square, Suite 1100
1050 Connecticut Ave. N.W.
Washington, DC 20036-5304

EXAMINER	
CENTRAL, DOCKET	

ART UNIT	PAPER NUMBER
OPAP	

NOTIFICATION DATE	DELIVERY MODE
07/10/2024	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

edervis@bakerlaw.com
eofficemonitor@bakerlaw.com
patents@bakerlaw.com

Decision Granting Request for Prioritized Examination (Track I)	**Application No.** 18/676,284	**Applicant(s)** Wright, Andrew William	
	Examiner CHERYL P GIBSON BAYLOR	**Art Unit** OPET	**AIA (FITF) Status** No

1. THE REQUEST FILED 28 May 2024 IS **GRANTED** .

The above-identified application has met the requirements for prioritized examination

A. ☑ for an original nonprovisional application (Track I).
B. ☐ for an application undergoing continued examination (RCE).

2. **The above-identified application will undergo prioritized examination**. The application will be accorded special status throughout its entire course of prosecution until one of the following occurs:

A. filing a **petition for extension of time** to extend the time period for filing a reply;

B. filing an **amendment to amend the application to contain more than four independent claims, more than thirty total claims** , or a multiple dependent claim;

C. filing a **request for continued examination** ;

D. filing a notice of appeal;

E. filing a request for suspension of action;

F. mailing of a notice of allowance;

G. mailing of a final Office action;

H. completion of examination as defined in 37 CFR 41.102; or

I. abandonment of the application.

Telephone inquiries with regard to this decision should be directed to CHERYL GIBSON BAYLOR at (571)272-3213. In his/her absence, calls may be directed to Petition Help Desk at (571) 272-3282.

/CHERYL GIBSON BAYLOR/ Paralegal Specialist, OPET	

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/676,284	**07/09/2024 08:57:51 PM Z ET**	**044228.111208**

Title of Invention

Method and System for Logging Vehicle Behaviour

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7645	FILED BY	Mara Rodriguez
PATENT CENTER #	66297610	FILING DATE	05/28/2024
CUSTOMER #	30734	FIRST NAMED INVENTOR	Andrew William Wright
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Mark Krietzman

Documents

TOTAL DOCUMENTS: 0

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C.

371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/676,284	07/09/2024 08:57:51 PM Z ET	044228.111208

Title of Invention

Method and System for Logging Vehicle Behaviour

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7645	FILED BY	Mara Rodriguez
PATENT CENTER #	66297610	AUTHORIZED BY	Mark Krietzman
CUSTOMER #	30734	FILING DATE	05/28/2024
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Andrew William Wright

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
DA / 502036	E202479K58288112	Mara Rodriguez

PRE-AUTHORIZED ACCOUNT

502036

PRE-AUTHORIZED CATEGORY

37 CFR 1.16 (National application filing, search, and examination fees); 37 CFR 1.17 (Patent application and reexamination processing fees); 37 CFR 1.19 (Document supply fees); 37 CFR 1.20 (Post Issuance fees); 37 CFR 1.21 (Miscellaneous fees and charges)

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
2202	EACH CLAIM IN EXCESS OF 20	40.00	7	280.00
			TOTAL AMOUNT:	$280.00

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/676,284	**07/09/2024 08:53:06 PM Z ET**	**044228.111208**

Title of Invention

Method and System for Logging Vehicle Behaviour

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7645	FILED BY	Mara Rodriguez
PATENT CENTER #	66297558	FILING DATE	05/28/2024
CUSTOMER #	30734	FIRST NAMED INVENTOR	Andrew William Wright
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Mark Krietzman

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
044228_111208_Preliminary_Amendment_dtd_2024-07-09.pdf	12	Preliminary Amendment	107 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
044228_111208_Preliminary_Amendment_dtd_2024-07-09.pdf	0DEDBC68297B2AC17EA162C6295F83DD50CF81680EE530E244D7E6ADF449C60CFD65238E9D57133EACE259DCE5FE25275AF6BCE94E1F4D92CF37F2639DBC9037

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If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **Andrew William Wright**	**Confirmation No.: 7645**
Application No.: 18/676,284	**Group Art Unit: OPAP**
Filing Date: May 28, 2024	**Examiner: Not Yet Assigned**
For: Method and System for Logging Vehicle Behaviour	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

PRELIMINARY AMENDMENT

Preliminary to examination of the above-captioned patent application, please amend the application as follows:

☐ **Amendments to the Specification** begin on page of this paper.

☐ **Amendments to the Abstract** begin on page of this paper.

☒ **Amendments to the Claims** are reflected in the listing of the claims which begins on page 2 of this paper.

☐ **Amendments to the Drawings** begin on page of this paper and include an attached replacement sheet.

☒ **Remarks** begin on page 2 of this paper.

☒ The Commissioner is hereby authorized to charge any fee deficiency, charge any additional fees, or credit any overpayment of fees, associated with this application in connection with this filing, or any future filing, submitted to the U.S. Patent and Trademark Office during the pendency of this application, to Deposit Account No. 50-2036.

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1-23. (Canceled)

24. (New) A data-logging system configured to monitor how a vehicle is being driven by a driver during a driving period and to log driving information representing behavior of the vehicle whilst the vehicle is being driven by the driver during the driving period, the data-logging system comprising:

a remote data-logging server;

a mobile telecommunications device including a user interface, a processor, a memory, and a sensor set comprising at least an accelerometer and a positioning module; and

an application comprising computer-executable instructions downloaded onto the memory, wherein the computer-executable instructions, when executed by the processor, cause the mobile telecommunications device to:

process sensor data from the sensor set to generate derived driving information representing how the vehicle is being driven by the driver during the driving period, wherein the driving period is defined by a duration comprising a plurality of portions of time, and wherein the derived driving information includes a driving score;

generate the derived driving information without data from vehicle sensors during the driving period in which the mobile telecommunications device is within the vehicle and the vehicle is being driven by the driver; and

transmit a selection of the derived driving information to the remote data-logging server, wherein the selection is determined by identifying a portion of the plurality of portions of time, and the selection includes the driving score,

wherein the remote data-logging server is configured to log the derived driving information received from the mobile telecommunications device and comprises:

a database for storing a plurality of accounts, at least one of the plurality of accounts having a unique identifier, and the database being configured to store the

selection of the derived driving information to the at least one account, the selection associated by the unique identifier to the vehicle and the driver; and

a communications interface configured to communicate with the mobile telecommunications device and receive therefrom:

the unique identifier for association of the mobile telecommunications device with the at least one of the plurality of accounts; and

the selection of the derived driving information to be logged to the at least one of the plurality of accounts, and

wherein the remote data-logging server is further configured to process the derived driving information logged to the at least one of the plurality of accounts over a plurality of driving periods including the driving period to generate an aggregated driving score used to determine a risk profile for at least one of the vehicle and the driver.

25. (New) The data-logging system of Claim 24, wherein the aggregated driving score is used to define an insurance premium associated with the at least one of the plurality of accounts, and the data-logging system is further configured to communicate to the mobile telecommunications device an insurance offer generated in response to the derived driving information received from the mobile telecommunications device.

26. (New) The data-logging system of Claim 25, wherein the application is provided from an insurance company and the application links the driver to an insurance policy associated with the at least one of the plurality of accounts.

27. (New) The data-logging system of Claim 24, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to determine a driving incident as part of the derived driving information, the driving incident being defined by an occurrence of the sensor data exceeding a predetermined value during the driving period.

28. (New) The data-logging system of Claim 27, wherein the driving incident comprises one or more of harsh breaking, harsh acceleration, harsh swerving, or an accident.

29. (New) The data-logging system of Claim 27, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to:

store the sensor data relating to the driving incident; and

transmit the stored sensor data to the remote data-logging server.

30. (New) The data-logging system of Claim 29, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to store the sensor data generated before, during, and after the driving incident that is continuously collected, associated with the driving incident, and included within at least a portion of the plurality of portions of time.

31. (New) The data-logging system of Claim 24, wherein execution of the computer-executable instructions by the processor to generate the derived driving information further causes the mobile telecommunications device to determine a driving incident as part of the derived driving information, the driving incident defined by a marked variation in a change of the sensor data over at least a portion of the plurality of portions of time during the driving period indicative of a difference in a state of motion of the vehicle occurring over the at least a portion of the plurality of portions.

32. (New) The data-logging system of Claim 31, wherein the driving incident comprises one or more of harsh breaking, harsh acceleration, harsh swerving, or an accident.

33. (New) The data-logging system of Claim 31, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to select, prior to transmitting the selection of the derived driving information, the sensor data relating to the driving incident.

34. (New) The data-logging system of Claim 33, wherein, to select the sensor data relating to the driving incident, execution of the computer-executable instructions by the processor further cause the mobile telecommunications device to select the sensor data generated before, during, and after the driving incident.

35. (New) The data-logging system of Claim 34, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to transmit the selected sensor data to the remote data-logging server.

36. (New) The data-logging system of Claim 31, wherein the at least a portion of the plurality of portions comprises a five-minute time period.

37. (New) The data-logging system of Claim 24, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to register a start of the driving period in response to an initialization input generated automatically in response to the sensor data having predetermined values.

38. (New) A data-logging system configured to monitor how a vehicle is being driven by a driver during a driving period and to log driving information representing behaviour of the vehicle whilst the vehicle is being driven by the driver during the driving period, the data-logging system comprising:

a remote data-logging server;

a mobile telecommunications device including a user interface, a processor, a memory, and a sensor set comprising at least an accelerometer and a positioning module; and

an application comprising computer-executable instructions downloaded onto the memory, wherein the computer-executable instructions, when executed by the processor, cause the mobile telecommunications device to:

process sensor data from the sensor set to generate derived driving information representing how the vehicle is being driven by the driver during the driving period, wherein the driving period is defined by a duration comprising a plurality of portions of time, and wherein the derived driving information includes at least one driving incident;

generate the derived driving information without data from vehicle sensors during the driving period in which the mobile telecommunications device is within the vehicle and the vehicle is being driven by the driver; and

transmit a selection of the derived driving information to the remote data-logging server, wherein the selection is determined by identifying a portion of the plurality of portions of time, and the selection includes the at least one driving incident;

wherein the remote data-logging server is configured to log the derived driving information received from the mobile telecommunications device and comprises:

a database for storing a plurality of accounts, at least one of the plurality of accounts having a unique identifier, and the database being configured to store the selection of the derived driving information, associated by the unique identifier to the vehicle and the driver, to the at least one account; and

a communications interface configured to communicate with the mobile telecommunications device, and receive therefrom:

the unique identifier for association of the mobile telecommunications device with the at least one of the plurality of accounts; and

the selection of the derived driving information to be logged to the at least one of the plurality of accounts, and

wherein the remote data-logging server is further configured to process the derived driving information logged to the at least one of the plurality of accounts to determine a risk profile for at least one of the vehicle and driver.

39. (New) The data-logging system of Claim 38, wherein the risk profile is used to define an insurance premium associated with the at least one of the plurality of accounts, and the data-logging system is further configured to communicate to the mobile telecommunications device an

insurance offer generated in response to the derived driving information received from the mobile telecommunications device.

40. (New) The data-logging system of Claim 38, wherein the at least one driving incident is defined by an occurrence of the sensor data exceeding a predetermined value during the driving period.

41. (New) The data-logging system of Claim 40, wherein the at least one driving incident comprises one or more of harsh breaking, harsh acceleration, harsh swerving, or an accident.

42. (New) The data-logging system of Claim 40, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to:

store the sensor data relating to the at least one driving incident; and

transmit the stored sensor data to the remote data-logging server.

43. (New) The data-logging system of Claim 42, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to store the sensor data generated before, during, and after the at least one driving incident.

44. (New) The data-logging system of Claim 38, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to determine the at least one driving incident as a marked variation in a change of the sensor data over at least a portion of the plurality of portions of time during the driving period indicative of a difference in a state of motion of the vehicle occurring over the at least a portion of the plurality of portions.

45. (New) The data-logging system of Claim 44, wherein the at least one driving incident comprises one or more of harsh breaking, harsh acceleration, harsh swerving or an accident.

46. (New) The data-logging system of Claim 44, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to select, prior to transmitting the selection of the derived driving information, the sensor data relating to the at least one driving incident.

47. (New) The data-logging system of Claim 46, wherein to select the sensor data relating to the at least one driving incident, execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to select the sensor data generated before, during, and after the at least one driving incident.

48. (New) The data-logging system of Claim 47, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to transmit the selected sensor data to the remote data-logging server.

49. (New) The data-logging system of Claim 38, wherein the sensor set further comprises an image sensor.

50. (New) The data-logging system of Claim 38, wherein the driving information comprises one or more of velocity, direction of travel, an indication of exceeding a velocity limit, or data representing jerky steering.

51. (New) The data-logging system of Claim 38, wherein execution of the computer-executable instructions by the processor further causes the mobile telecommunications device to register the start of the driving period in response to an initialization input generated automatically in response to the sensor data having predetermined values.

52. (New) A data-logging system configured to monitor how a vehicle is being driven by a driver during a driving period and to log driving information representing behaviour of the

vehicle whilst the vehicle is being driven by the driver during the driving period, the data-logging system comprising:

a remote data-logging server;

a mobile telecommunications device including a user interface, a processor, a memory, and a sensor set comprising at least an accelerometer and a positioning module;

an application comprising computer-executable instructions downloaded onto the memory, wherein the computer-executable instructions, when executed by the processor, cause the mobile telecommunications device to:

process sensor data from the sensor set to generate derived driving information representing how the vehicle is being driven by the driver during the driving period, wherein the driving period is defined by a duration comprising a plurality of portions of time, and wherein the driving information includes at least one driving incident, the at least one driving incident being defined by an occurrence of the sensor data exceeding a predetermined value during the driving period;

generate the derived driving information without data from vehicle sensors during the driving period in which the mobile telecommunications device is within the vehicle and the vehicle is being driven by the driver;

store the sensor data relating to the at least one driving incident; and

transmit a selection of the derived driving information and the stored sensor data corresponding to the selected derived driving information to the remote data-logging server, wherein the selection is determined by identifying a portion of the plurality of portions of time, and the selection includes the at least one driving incident;

wherein the remote data-logging server is configured to log the derived driving information and the sensor data received from the mobile telecommunications device and comprises:

a database for storing a plurality of accounts, at least one of the plurality of accounts having a unique identifier and the database being configured to store the selection of the derived driving information associated by the unique identifier to the vehicle and the driver, and the sensor data, to the at least one of the plurality of accounts;

a communications interface configured to communicate with the mobile telecommunications device, and receive therefrom:

the unique identifier for association of the mobile telecommunications device with the at least one of the plurality of accounts; and

the selection of the derived driving information and the sensor data to be logged to the at least one of the plurality of accounts,

wherein the remote data-logging server is further configured to process the derived driving information and the sensor data logged to the at least one of the plurality of accounts to determine a risk profile for at least one of the vehicle and driver.

53. (New) A mobile telecommunications device configured to log driving information associated with a vehicle, the mobile telecommunications device comprising:

a sensor set comprising at least an accelerometer and a positioning module;

a processor;

a memory; and

an application comprising computer-executable instructions downloaded onto the memory, wherein the computer-executable instructions, when executed by the processor, cause the mobile telecommunications device to:

determine, based on the sensor data from the sensor set, a start of a driving period at which the mobile telecommunications device is within the vehicle and the vehicle is in use, wherein the driving period is defined by a duration from the start to an end and the duration is comprised of a plurality of portions of time;

process the sensor data from the sensor set during the driving period to derive driving information associated with how the vehicle is driven, including vehicle behaviour and user behaviour;

store a selection of the driving information to the memory, wherein the driving information is derived without data from vehicle sensors, and wherein the selection is determined by identifying a portion of the plurality of portions of time;

transmit the selection of the derived driving information to a remote data-logging server; and

wherein the mobile telecommunications device is controlled by a downloaded application to register the start of the driving period in response to an initialization input generated automatically in response to the sensor data having a predetermined value.

REMARKS

No action has occurred in this case since it was filed. As such, Applicants are submitting a preliminary amendment to cancel claims 1-23, and to submit new claims 24-53 prior to the first office action being issued. Applicants respectfully request that the foregoing amendments to the claims be made prior to the first office action being issued. No new matter has been added. An early and favorable action on the merits is respectfully requested.

No fee is due in connection with the submission of this amendment. Please charge any fee deficiencies or credit any overpayments to Deposit Account No. 50-2036 with reference to Docket. No.: 044228.111208.

Date: July 9, 2024

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PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 18/676,284	Filing Date 05/28/2024	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $40 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $ 192 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	07/08/2024	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 30	Minus	** 23	= 7		x $40 =	280
	Independent (37 CFR 1.16(h))	* 4	Minus	*** 4	= 0		x $ 192 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	280

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
18/676,284	05/28/2024		976	044228.111208	23	4

CONFIRMATION NO. 7645

30734
BakerHostetler
Washington Square, Suite 1100
1050 Connecticut Ave. N.W.
Washington, DC 20036-5304

FILING RECEIPT



Date Mailed: 06/14/2024

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

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Inventor(s)

Andrew William Wright, Virginia Water, UNITED KINGDOM;

Applicant(s)

Andrew William Wright, Virginia Water, UNITED KINGDOM;

Assignment For Published Patent Application

AUTO TELEMATICS LTD., YORK, UNITED KINGDOM

Power of Attorney: The patent practitioners associated with Customer Number 30734

Domestic Priority data as claimed by applicant

This application is a CON of 17/729,962 04/26/2022 PAT 12,002,301
which is a CON of 16/665,746 10/28/2019 PAT 11,321,970
which is a CON of 16/222,893 12/17/2018 PAT 10,950,068
which is a CON of 15/454,944 03/09/2017 PAT 10,198,878
which is a CON of 15/061,910 03/04/2016 PAT 9,633,487
which is a CON of 13/994,455 07/24/2013 PAT 9,311,271
which is a 371 of PCT/GB2011/052491 12/15/2011

Foreign Applications (You may be eligible to benefit from the Patent Prosecution Highway program at the USPTO. Please see http://www.uspto.gov for more information.)
UNITED KINGDOM 1021292.6 12/15/2010 No Access Code Provided
UNITED KINGDOM 1101259.8 01/25/2011 No Access Code Provided
UNITED KINGDOM 1109759.9 06/10/2011 No Access Code Provided
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The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 18/676,284**

Projected Publication Date: 09/19/2024

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

Method and System for Logging Vehicle Behaviour

Preliminary Class

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 18/676,284

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	64		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	280		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	320		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	23 minus 20 =	* 3	x 40 =	120	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	4 minus 3 =	* 1	x 192 =	192			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	976		TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

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Sale Item Reference Number	Effective Date
18676284	05/28/2024

Document Number	Fee Code	Fee Code Description	Amount Paid	Payment Method
I20246D135355800	2830	PROCESSING FEE, EXCEPT PROV. APPLS.	$56.00	Deposit Account

Substitute for Form SB08a/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*	***Complete if Known***	
	Application Number	18/676,284
	Filing Date	May 28, 2024
	First Named Inventor	Wright, Andrew William
	Art Unit	TBD
	Examiner Name	TBD
	Attorney Docket Number	044228.111208

U. S. PUBLICATION AND PATENT DOCUMENTS				
Examiner Initials	Cite No.	Document Number Number – Kind Code (if known)	Publication or Grant Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document
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Substitute for Form SB08a/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*	***Complete if Known***	
	Application Number	18/676,284
	Filing Date	May 28, 2024
	First Named Inventor	Wright, Andrew William
	Art Unit	TBD
	Examiner Name	TBD
	Attorney Docket Number	044228.111208

U. S. PUBLICATION AND PATENT DOCUMENTS				
Examiner Initials	Cite No.	Document Number Number – Kind Code (if known)	Publication or Grant Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document
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Substitute for Form SB08a/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*	***Complete if Known***	
	Application Number	18/676,284
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	First Named Inventor	Wright, Andrew William
	Art Unit	TBD
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	Attorney Docket Number	044228.111208

U. S. PUBLICATION AND PATENT DOCUMENTS				
Examiner Initials	Cite No.	Document Number Number – Kind Code (if known)	Publication or Grant Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document
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	74	6,073,004 A	06-06-2000	Balachandran
	75	7,821,421 B2	10-26-2010	Tamir et al.
	76	8,682,399 B2	03-25-2014	Rabu

FOREIGN PATENT DOCUMENTS						
Examiner Initials	Cite No.	Foreign Patent Document Country Code- Number -Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T*
	77	DE 202008013951 U1	01-08-2009	CSB System AG		
	78	EP 1615178 A2	01-11-2006	EAS Surveillance GmbH		

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	First Named Inventor	Wright, Andrew William
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	Attorney Docket Number	044228.111208

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Examiner Initials	Cite No.	Foreign Patent Document Country Code- Number -Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T*
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Applicant is to place a check mark here if English Language Translation is attached

NON PATENT LITERATURE DOCUMENTS

Examiner Initials	Cite No.	Include name of the author, title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), Volume-issue Number(s), publisher, city and/or country where published.	T
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Substitute for Form SB08a/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*	***Complete if Known***	
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	Filing Date	May 28, 2024
	First Named Inventor	Wright, Andrew William
	Art Unit	TBD
	Examiner Name	TBD
	Attorney Docket Number	044228.111208

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Examiner Signature		**Date Considered**	

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See CFR 1.97(e)(1)

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement. See CFR 1.97(e)(2)

CONTENT OF IDS

☒ Copies of reference numbers **1 - 96** are not being submitted because they were previously cited by or submitted to the U.S. Patent and Trademark Office in patent application number **16/665,746**, filed **October 28, 2019 now patent number 11,321,970** in patent application number **16/222,893**, filed **December 17, 2018 now patent number 10,950,068** in patent application number **15/454,944**, filed **March 9, 2017 now patent number 10,198,878** in patent application number **15/061,910**, filed **March 4, 2016 now patent number 9,633,487** in patent application number **13/994,455**, filed **July 24, 2013 now patent number 9,311,271** for which a claim for priority under 35 U.S.C. § 120 has been made in the instant application.

☐ The month of publication for reference numbers is not available. However, the year of publication for these references is sufficiently earlier than the effective US filing date and any foreign priority date so that the particular month of publication is not in issue pursuant to 37 CFR § 1.98(b).

STATEMENT UNDER 37 C.F.R. § 1.704(d)(1)

Substitute for Form SB08a/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*	***Complete if Known***	
	Application Number	18/676,284
	Filing Date	May 28, 2024
	First Named Inventor	Wright, Andrew William
	Art Unit	TBD
	Examiner Name	TBD
	Attorney Docket Number	044228.111208

☐ This information disclosure statement is in compliance with §§ 1.97 and 1.98 and will not be considered a failure to engage in reasonable efforts to conclude prosecution (processing or examination) of the application under paragraphs 37 C.F.R. § 1.704(c)(6), (c)(8), (c)(9), or (c)(10) because each item of information contained in the information disclosure statement:

☐ Was first cited in any communication from a patent office in a counterpart foreign or international application or from the Office, and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of the information disclosure statement; or

☐ Is a communication that was issued by a patent office in a counterpart foreign or international application or by the Office, and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of the information disclosure statement.

☐ See attached certification statement.

☐ The fee set forth in § 1.17(p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

Please charge any deficiency or credit any overpayment to Deposit Account No. 23-3050.

SIGNATURE

/Mark H. Krietzman/

Mark H. Krietzman
Registration No. 41128

Date: May 28, 2024

BakerHostetler LLP
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Telephone: (215) 568-3100
Facsimile: (215) 568-3439

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PATENT AND TRADEMARK OFFICE

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/676,284	**05/29/2024 01:15:33 PM Z ET**	**044228.111208**

Title of Invention

Method and System for Logging Vehicle Behaviour

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7645	FILED BY	Mara Rodriguez
PATENT CENTER #	65715107	FILING DATE	-
CUSTOMER #	30734	FIRST NAMED INVENTOR	Andrew William Wright
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Mark Krietzman

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
02-044228.111208_IDS_1449.pdf	6	Information Disclosure Statement (IDS) Form (SB08)	173 KB

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DOCUMENT	MESSAGE DIGEST(SHA-512)
02-	8CF7BB70946085827A7126B41606E34605674D1D897EE00EAF

044228.111208_IDS_1449.pdf E9AEFB94D83A2602FFDAB16D9890CDD14D6095DAA77B9651DF9DB6E2C03E7E797D220B5F1D74CA

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

Assignment ID: PATI262248

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

CONVEYING PARTY DATA

Name	Execution Date
Andrew William Wright	04/29/2022

RECEIVING PARTY DATA

Company Name:	Auto Telematics Ltd.
Street Address:	5 Driffield Terrace, York
Internal Address:	York
City:	Yorkshire
State/Country:	UNITED KINGDOM
Postal Code:	Y0241EJ

PROPERTY NUMBERS Total: 1

Property Type	Number
Application Number:	18676284

CORRESPONDENCE DATA

Fax Number: 7149668827

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Phone: 7149668827
Email: MRODRIGUEZ@BAKERLAW.COM
Correspondent Name: Mark H. Krietzman
Address Line 1: 600 ANTON BOULEVARD
Address Line 2: SUITE 900
Address Line 4: COSTA MESA, CALIFORNIA 92606

ATTORNEY DOCKET NUMBER:	044228.111208
NAME OF SUBMITTER:	Mara Rodriguez
SIGNATURE:	Mara Rodriguez
DATE SIGNED:	05/29/2024
	This document serves as an Oath/Declaration (37 CFR 1.63).

Total Attachments: 2
source=044228_111208_Assignment#page1.tif
source=044228_111208_Assignment#page2.tif

ASSIGNMENT

WHEREAS, I, Andrew William Wright, citizen of Great Britain, ("Assignor"), has made a certain new and useful invention entitled "METHOD AND SYSTEM FOR LOGGING VEHICLE BEHAVIOUR" ("the invention") for which US Patent Application 18/676,284 was filed May 28, 2024.

AND WHEREAS, Auto Telematics Ltd., ASSIGNEE, having a place of business at 5 Driffield Terrace, York, Yorkshire, United Kingdom YO24 1EJ ("Assignee"), is desirous of acquiring the entire right, title and interest in and to said invention, and in and to any and all Letters Patent of the United States and all foreign countries which may be obtained therefor;

NOW, THEREFORE, for good and valuable consideration, the receipt for and sufficiency of which is hereby acknowledged, Assignors do hereby sell, assign, transfer and set over unto Assignee, its legal representatives, successors, and assign, the entire right, title and interest in and to said invention, including the right to claim priority under 35 U.S.C. § 119 and/or § 120 and the right to sue for past infringement, as set forth in the above-mentioned application, including said application and any continuations, continuations-in-part, divisions, reissues, re-examinations or extensions thereof, and in and to any and all patents of the United States and all foreign countries which may be issued for said invention;

UPON SAID CONSIDERATION, Assignors hereby agree not to execute any writing or do any act whatsoever conflicting with these presents, and that Assignors will, at any time upon request, without further or additional consideration but at the expense of Assignee, execute such additional assignments and other writings and do such additional acts as Assignee may deem necessary or desirable to perfect Assignee's enjoyment of this grant, and render all necessary assistance in making application for and obtaining original, divisional, continuations, continuations-in-part, reexamined, reissued, or extended Letters Patent of the United States and all foreign countries on said invention, and in enforcing any rights or choses in action accruing as a result of such applications or patents, by giving testimony in any proceedings or transactions involving such applications or patents, and by executing preliminary statements and other affidavits, it being understood that the foregoing covenant and agreement shall bind, and inure to the benefit of the assigns and legal representatives of Assignors and Assignee;

AWW

AND, Assignors request the Commissioner of Patents and Trademarks to issue any Letters Patent of the United States which may be issued for said invention to Assignee, its legal representatives, successors or assigns, as the sole owner of the entire right, title and interest in and to said patent and the invention covered thereby.

29th April 2022
Date

A. Wright
(Andrew William Wright)

Doc Code: PA.
Document Description: Power of Attorney

PTO/AIA/82B (07-13)
Approved for use through 03/31/2021. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date
18/676,284	05/28/2024

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

☑ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 30734

OR

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

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OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

☑ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☐ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature		Date (Optional)	
Name	Andrew William Wright		
Title	Joint Assignee		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☑ Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/676,284	**05/28/2024 07:37:37 PM Z ET**	**044228.111208**

Title of Invention

Method and System for Logging Vehicle Behaviour

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7645	FILED BY	Mara Rodriguez
PATENT CENTER #	65704815	FILING DATE	-
CUSTOMER #	30734	FIRST NAMED INVENTOR	Andrew William Wright
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Mark Krietzman

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
044228_111208_POA.pdf	1	Power of Attorney	1156 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
044228_111208_POA.pdf	8112DF593052C3DF0D1F63DBF2FE1F03E8A79D5E10024757F 238280C52C305E51D57877E15E729F9525252A8F36EED35032 7FB14C9C63A8E510ECF049C2A8D73

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18/676,284	**05/28/2024 07:27:07 PM Z ET**	**044228.111208**

Title of Invention

Method and System for Logging Vehicle Behaviour

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7645	FILED BY	Mara Rodriguez
PATENT CENTER #	65704655	FILING DATE	-
CUSTOMER #	30734	FIRST NAMED INVENTOR	Andrew William Wright
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Mark Krietzman

Documents

TOTAL DOCUMENTS: 0

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)

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371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/676,284	05/28/2024 07:27:07 PM Z ET	044228.111208

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Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
DA / 502036	E20245RJ27415500	Mara Rodriguez

PRE-AUTHORIZED ACCOUNT	PRE-AUTHORIZED CATEGORY
502036	37 CFR 1.16 (National application filing, search, and examination fees); 37 CFR 1.17 (Patent application and reexamination processing fees); 37 CFR 1.19 (Document supply fees); 37 CFR 1.20 (Post Issuance fees); 37 CFR 1.21 (Miscellaneous fees and charges)

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
2817	REQUEST FOR PRIORITIZED EXAMINATION	1680.00	1	1680.00
2111	UTILITY PATENT APPL. SEARCH FEE	280.00	1	280.00
4011	BASIC FILING FEE- UTILITY	64.00	1	64.00
2311	EXAMINATION OF ORIGINAL PATENT APPLICATION	320.00	1	320.00

2202	EACH CLAIM IN EXCESS OF 20	40.00	3	120.00
2201	EACH INDEPENDENT CLAIM IN EXCESS OF THREE	192.00	1	192.00
			TOTAL AMOUNT:	**$2,656.00**

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PTO/SB/01 (08-12)
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DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	METHOD AND SYSTEM FOR LOGGING VEHICLE BEHAVIOR

As the below named inventor, I hereby declare that:

This declaration is directed to: [X] The attached application, or

United States application or PCT international application number _____

filed on _____

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Andrew William Wright Date (Optional): 23/7/2013

Signature: _____

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. This information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc Code: TRACK1.REQ
Document Description: TrackOne Request

PTO/AIA/424 (04-14)

CERTIFICATION AND REQUEST FOR PRIORITIZED EXAMINATION UNDER 37 CFR 1.102(e) (Page 1 of 1)

First Named Inventor:	Andrew William Wright	Nonprovisional Application Number (if known):	
Title of Invention:	Method and System for Logging Vehicle Behaviour		

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS PRIORITIZED EXAMINATION FOR THE ABOVE-IDENTIFIED APPLICATION.

1. The processing fee set forth in 37 CFR 1.17(i)(1) and the prioritized examination fee set forth in 37 CFR 1.17(c) have been filed with the request. The publication fee requirement is met because that fee, set forth in 37 CFR 1.18(d), is currently $0. The basic filing fee, search fee, and examination fee are filed with the request or have been already been paid. I understand that any required excess claims fees or application size fee must be paid for the application.

2. I understand that the application may not contain, or be amended to contain, more than four independent claims, more than thirty total claims, or any multiple dependent claims, and that any request for an extension of time will cause an outstanding Track I request to be dismissed.

3. The applicable box is checked below:

I. ☑ Original Application (Track One) - Prioritized Examination under § 1.102(e)(1)

i. (a) The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a). This certification and request is being filed with the utility application via EFS-Web.

---OR---

(b) The application is an original nonprovisional plant application filed under 35 U.S.C. 111(a). This certification and request is being filed with the plant application in paper.

ii. An executed inventor's oath or declaration under 37 CFR 1.63 or 37 CFR 1.64 for each inventor, **or** the application data sheet meeting the conditions specified in 37 CFR 1.53(f)(3)(i) is filed with the application.

II. ☐ Request for Continued Examination - Prioritized Examination under § 1.102(e)(2)

i. A request for continued examination has been filed with, or prior to, this form.
ii. If the application is a utility application, this certification and request is being filed via EFS-Web.
iii. The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a), or is a national stage entry under 35 U.S.C. 371.
iv. This certification and request is being filed prior to the mailing of a first Office action responsive to the request for continued examination.
v. No prior request for continued examination has been granted prioritized examination status under 37 CFR 1.102(e)(2).

Signature /Mark H. Krietzman/	Date May 28, 2024
Name (Print/Typed) Mark H. Krietzman	Practitioner Registration Number 41128

Note: *This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required.**

☑ *Total of 1 forms are submitted.

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The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

METHOD AND SYSTEM FOR LOGGING VEHICLE BEHAVIOUR

Cross-Reference to Related Applications

[0001] This application is a continuation of U.S. patent application no. 17/729,962, filed April 26, 2022, which is a continuation of U.S. patent application no. 16/665,746, filed October 28, 2019, which is a continuation of U.S. patent application no. 16/222,893 filed December 17, 2018, which is a continuation of U.S. patent application no. 15/454,944 filed March 9, 2017, which is a continuation of U.S. Patent Application no. 15/061,910 filed March 4, 2016 and now issued as U.S. 9,633,487, which is a continuation of U.S. patent application no. 13/994,455 filed July 24, 2013 and now issued as U.S. 9,311,271, which is a 371 of international patent application PCT/GB2011/052491 filed December 15, 2011, which claims foreign priority to GB patent application no. 1118777.0 filed October 31, 2011, GB patent application no. 1109759.9 filed June 10, 2011, GB patent application no. 1101259.8 filed January 25, 2011, and GB patent application no. 1021292.6 filed December 15, 2010, the contents of which are incorporated in their entirety as if fully presented herein.

Field of the invention

[0002] The present invention relates to methods and systems for logging driving information associated with vehicle behaviour. Moreover, the present invention relates to a mobile device adapted for installation to a vehicle and configured to log such driving information, for example, video footage associated with how the vehicle is driven. Such driving information may subsequently be utilised to determine the cause of an event such as an accident, to modify driver behaviour and/or to determine insurance premiums.

Background

[0003] Data logging devices are commonly installed on aircraft that log data about events associated with the behaviour of the aircraft and also the crew controlling the aircraft. Such data logging devices are commonly termed "black boxes" and are very useful for determining the cause of problems that have affected the aircraft, especially when no other record of a significant event such as a crash exists.

[0004] Similar data logging devices exist for road vehicles, and can be used to realise similar advantages. Vehicle users as well as authorities can use such devices to determine the cause of traffic accidents or other vehicle-related events, whether these stem from vehicle malfunction or driver negligence. For example, the data logged by these devices

can be used as evidence for insurance claims and so potentially to determine insurance premiums.

[0005] Some of these data logging devices can be integrated with the car data network, and so may take inputs from sensors integrated with the vehicle, such as those measuring the speed of the vehicle. However, these can be difficult and costly to install. Others having their own internal sensor set are more readily retrofitted to a vehicle. Nonetheless, such data logging devices for road vehicles are less prevalent perhaps due to their unjustifiable expense. Accordingly, the uptake of data logging devices that can be retrofitted to road vehicles, as are known in the art, has been minimal.

[0006] It is an object of the present invention to alleviate the above-mentioned problems, at least in part.

Summary of the invention

[0007] According to a first aspect of the present invention there is provided a mobile telecommunications device configured to log driving information associated with a vehicle is described. The mobile telecommunications device comprises: a sensor set comprising an image sensor and at least one of an audio sensor, an accelerometer or a positioning module, or a combination thereof; a user interface; a processor; and a memory. The mobile telecommunications device is configured to: determine, based on the inputs received by the user interface and sensor data from the device's sensor set, a start of a driving period during which the mobile device is removably affixed to the vehicle and the vehicle is in use, wherein the start of the driving period is determined without data from sensors of the vehicle; process the sensor data from the sensor set during the driving period to derive driving information associated with how the vehicle is driven; and store a selection of the driving information to the memory. The driving information comprises images captured by the image sensor and the mobile telecommunications device is controlled by a downloaded application to process the captured images to make a safety determination for the vehicle and in response to making an unsafe determination for the vehicle, to issue an alert signal.

[0008] Advantageously, the use of a mobile telecommunication device enables a data logging device to be conveniently and inexpensively retrofitted to a vehicle. Mobile telecommunication devices such as "smart-phones" are becoming increasingly widespread, and these devices tend to have the requisite sensor sets to capture data concerning vehicle behaviour. Thus, a generic mobile telecommunication device already owned by a driver of

the vehicle can be loaded with the application to provide such data logging functionality that would otherwise necessitate a dedicated black-box. Thus, the functionality of a black-box can be realised without additional expense.

[0009] Following on from this, it will be appreciated that the mobile device is ideally a portable mobile telecommunication device. Ideally, the mobile device is a hand-portable mobile device. Advantageously, the portability permits the mobile device to be conveniently fitted to and removed from the vehicle.

[0010] Furthermore, such a mobile telecommunication device presents additional advantages over known dedicated black-box systems as the data logging functionality of the mobile telecommunication device can be continually refined. This can be achieved without physically upgrading the hardware of the device, and also without significant user intervention. Specifically, the application may be arranged to determine whether a software update exists and if so, control the mobile device to download at least portions of an improved version of the application. Conveniently, downloading may be via the wireless telecommunication module. Said downloading may be automatic, or may be user-confirmed. For the avoidance of doubt, the application will typically be stored on a portion of the memory of the mobile device and executed therefrom, as is known in the art. Also, it will be appreciated that the application, or portion thereof, may be downloaded via the wireless telecommunication module and/or via an intermediary device. For example, the application may be side loaded to the mobile device from an intermediary computing device.

[0011] The application may be sourced from an application store and/or content provider. For example, the content provider may comprise the Apple® Appstore®. The content provider may comprise a cloud computing provider.

[0012] It will be appreciated that the use of such a generic mobile device in this context may be counter-intuitive to a person skilled in the art - such generic devices are not designed to withstand events such as catastrophic crashes. Furthermore, such generic devices are usually not necessarily configured to appropriately detect conditions that may need to be recorded. Such devices are usually kept in a user's pocket or bag, and so are not best placed to generate sensor data associated with the behaviour of a vehicle. However, the inventor of the present invention has realised that such a mobile device that is adapted for installation to the vehicle can overcome such drawbacks and fulfil a role similar to a black box. To this end,

the mobile telecommunication device may comprise an adapter arranged to hold the device securely to the vehicle.

[0013] Advantageously, as well as protecting the device from damage, the adapter improves the suitability and reliability of the sensor data and so the driving information associated with when and/or how the vehicle is being driven. For example, if the sensor set comprises an accelerometer, the acceleration of the vehicle can be more accurately measured due to the mobile device being firmly attached to the vehicle. Similarly, if the sensor set comprises an image sensor, for example, for capturing video footage of the road ahead, better footage can be obtained as the mobile device can be held in the correct position and orientation relative to the vehicle. In particular, the mobile device may be positioned by the adapter so that its image sensor views the road ahead through a windshield of the vehicle.

[0014] As mentioned, the device is arranged to log driving information associated with the vehicle, when that vehicle is being driven. This is realised by registering the start of the driving period during which the mobile device is installed to the vehicle and the vehicle is being driven by the driver. Advantageously, this prevents driving information from being needlessly recorded. As will be appreciated the mobile device has only a finite storage capacity and so registering the start of the driving period is useful for minimising the unnecessary usage of memory. In particular, where the mobile device comprises an image sensor, and the sensor data comprises a sequence of images (e.g., a video) the storage space can be very quickly filled by the memory.

[0015] To this end, it is preferred that when the application is executed, it controls the mobile device to register the start of a driving period in response to an initialisation input. The initialisation input may comprise a user input - for example, the user manually executing the application on the mobile device. The initialisation input is also generated automatically in response to the mobile device being installed to the vehicle and/or the vehicle being driven. The initialisation input may be generated automatically in response to the sensor data having predetermined values. For example, if the sensor data reflects a detected speed above a predetermined threshold – for example, 20 kilometres per hour – then this can be used to trigger the start of the driving period. Similarly, if the sensor data reflects that the mobile device is held securely to the vehicle in a predetermined position (for example, via the adapter) this can also be used to trigger the start of the driving period. To this end, the adapter and/or the mobile device may comprise a registration module configured to register

the installation of the mobile device to the vehicle and/or the adapter. The registration module may comprise a proximity sensor to detect the proximity of the mobile device to the vehicle. The registration module may comprise a NFC (near field communication) device. The registration module may be arranged to determine a match between the location of the mobile device and the location of the vehicle. The match may be performed by receiving and comparing a first positioning input associated with the position of the vehicle and a second positioning input associated with the position of the mobile device. The registration module and/or adapter may be a smart holster.

[0016] Preferably, the executed application controls the mobile device to manage voice-calls incoming to the mobile device during a driving period. For example, said voice-call management may comprise temporarily disabling and/or diverting voice-calls incoming to the mobile device during a driving period. Advantageously, this safety feature discourages users from making or receiving phone calls whilst driving. It will be appreciated that a driver is less able to control a vehicle effectively whilst also manipulating a mobile device, and in many countries doing so is illegal. However, the provision of a 'hands-free' mode or accessory – as are well known in the art - may obviate the need for a user to manipulate the mobile device. Accordingly, the executed application may be arranged to control the mobile device to selectively disable and/or divert voice-calls incoming to the mobile device during a driving period, in dependence on the detection of a hands-free accessory or hands-free mode enabled on the mobile device.

[0017] Furthermore, the executed application may be arranged to control the mobile device to enable a hands-free mode of operation on detection of a driving period. For example, the enabled hands-free mode of operation may comprise enabling voice-activated commands. In light of this, it is preferred that the adapter is configured to hold the mobile device in a way that facilitates reception of voice commands from the user. In particular, the mobile device may be held in a position relative to the user to permit clear reception of the user's voice. Typically, this position is about the dashboard in a vehicle such as car or van. Furthermore, the adapter is configured with an opening through which an audio sensor of the mobile device is able to receive the user's voice.

[0018] Also, even though a driver's control of a vehicle may be affected by manipulating the mobile device, under certain circumstances, this may not be objectionable – for example, when the vehicle is stationary. Accordingly, the executed application may be

arranged to control the mobile device to selectively disable and/or divert voice-calls incoming to the mobile device during a driving period, in dependence on the driving information – for example, the speed and location of the vehicle.

[0019] Furthermore, it will be appreciated that the driver may not be the only user within the vehicle, and so disabling functions of the mobile device may not be appropriate under all circumstances, as a passenger of the vehicle may want to use the mobile device whilst the driver is driving. Under these circumstances, the executed application is arranged to control the mobile device to register the presence of a non-driver (for example, via image recognition, or entry of an unlock code) and unlock, or retain the original functionality of the mobile device. Furthermore, the executed application may be arranged to run in the background. Accordingly, the mobile device may be used for other purposes, such as making or receiving a telephone call.

[0020] It is advantageous to store only selected driving information for the purpose of logging how a vehicle is being driven during the driving period. Whilst it may be possible to sample and process sensor data at a relatively high rate (i.e. many times a second), continually storing driving information derived from that sensor data at such a high rate can use up a lot of storage space on the mobile device, the majority of which is likely to be redundant. Therefore, by being selective about the driving information that is stored, storage utilisation can be made more efficient.

[0021] In particular, the executed application may control the mobile device to store a summary of the driving period. The summary may comprise compressed and/or summarised driving information. For example, the sensor data can be processed at a first sampling rate and then down-sampled to a fraction of the first sampling rate for storage as driving information. Put another way, the mobile device can be controlled by the executed application to down-sample sensor data from a first sampling rate to a second sampling and store the sensor data as driving information at said second sampling rate. Advantageously, this retains a snapshot of when and/or how the vehicle is being driven, but with fewer data points, and so requiring less storage space.

[0022] Nonetheless, under certain circumstances, it is more useful to retain information at higher or the highest possible sampling rates. In particular, it is more important to have detailed information associated with the behaviour of a vehicle during a crash than when the vehicle is being driven normally.

[0023] Accordingly, the executed application may be arranged to control the mobile device to detect the occurrence of a predetermined event of significance (such as a crash) and in response store driving information associated with that event to the memory. Preferably, said driving information associated with that event comprises driving information in the lead up to and immediately following the event. In particular, detailed driving information in the lead up to, and immediately following a predetermined event of significance is preferably stored. It will be understood that the driving information associated with the detected event may be transmitted via the wireless telecommunication module in addition to, or instead of storing said data. Said transmitted driving information may be transmitted to a remote data logging system.

[0024] To this end the mobile device may comprise an event detector for detecting the occurrence of an event.

[0025] Preferably, the event detector is arranged to detect the occurrence of a predetermined event by correlating data, such as sensor data, against an event indication model. The application may comprise the event indication model.

[0026] Preferably, the event indication model comprises a set of predetermined data values corresponding to a predetermined event. Accordingly, the event detector is arranged to compare the set of predetermined data values against corresponding sensor data to determine whether the predetermined event has occurred.

[0027] For example, the event indication model may indicate that a serious crash has occurred if values returned by an accelerometer sensor exceed predetermined data values of the event indication model, thereby representing a sustained vehicle deceleration beyond a threshold level. Following on from this, it will be appreciated that detection of an event may be dependent on matching a sequence of data values that have occurred over time. Moreover, the event indication model may comprise a sequence of predetermined data values, the sequence being associated by a function of time. Thus, the event detector may be arranged to compare the sequence of predetermined data values against corresponding sensor data that have been generated over a given time period. Put another way, the event detector and event indication model are arranged to indicate the occurrence of an event in dependence on the correlation between a set of predetermined data values occurring over time. Thus, a set of values returned from sensor data over a period of time are compared against a corresponding

sequence of predetermined data values of the event indication model. Typically, this is to determine a rate of change of variables associated with a sensor set.

[0028] It will be understood that an event indication model may comprise a plurality of sets of predetermined data values, each set corresponding to different sensor data. For example, an event indication model associated with a serious accident event may contain data values corresponding to both the deceleration of the vehicle, and the orientation of the vehicle. Thus, if a vehicle is involved in a serious impact, and overturns, this is represented by the model, and so can be detected by the event detector.

[0029] Preferably, the event indication model comprises a pattern of predetermined data values. Preferably, the event detector is arranged to detect the occurrence of an event by carrying out pattern recognition by matching sensor data values to the pattern of predetermined data values of the event indication model. Preferably, there is a plurality of event indication models. Each event indication model may be associated with a separate predetermined event.

[0030] Preferably, the executed application may be arranged to control the mobile device to process sensor data from the sensor set during a plurality of driving periods to derive driving information associated with when and/or how the vehicle is driven for each of the driving periods. Preferably, sensor data processed during a first set of driving periods define a benchmark against which sensor data is compared during subsequent sets of driving periods. In particular, the executed application may be arranged to control the mobile to modify one or more event indication models in response to the benchmark. Advantageously, such a benchmark ensures that the event indication models may be tailored to the standard behaviour of a particular vehicle. As will be appreciated, different sensor types, mobile devices, mounting positions, vehicles, drivers and road conditions may generate different sets of sensor data for driving behaviour that is considered standard or safe. Accordingly, the benchmark allows the mobile device to account for variable driving conditions.

[0031] Preferably, a plurality of benchmarks may be defined. A benchmark may be defined for each driver. A benchmark may be defined for each vehicle to which the mobile device is to be installed. Ideally, a benchmark is defined for each driver-vehicle pair. To this end, the mobile device may be arranged to receive an input to specify a driver, a vehicle or a driver-vehicle pair. Advantageously, this ensures that different drivers and vehicles do not disrupt the accurate event detecting capabilities of the event detector.

[0032] Once a predetermined event has been detected by the event detector, it is desirable to take an appropriate action in response to that detected event. Accordingly, the executed application may be arranged to control the mobile device to take at least one predetermined action in response to a detected event. The action taken may comprise transmitting driving information and/or sensor data, via the wireless telecommunication module of the mobile device, to a remote system. Advantageously, this enables a remote system to be notified of the occurrence of a particular event, and the details associated with that event. For example, the remote system may be arranged to deploy emergency services based on a transmitted notification concerning the occurrence of a crash, and also the location of the mobile device (and so the vehicle) are also included in the transmitted information. A further advantage of transmitting driving information and/or sensor data to a remote system is that such data then does not need to be stored on or processed by the mobile device. Thus, this can free the storage space on the mobile device, and also allow the processor of the mobile device to carry out other tasks. A remote system may comprise or be interfaced with an insurance company database.

[0033] A further advantage associated with sending driving information to a remote system is that the driving information can be assessed remotely. This assessment can be performed automatically or manually - either way it advantageously removes the processing burden from the mobile device. Alternatively, if transmission bandwidths are small, the processing can be executed automatically on the processing device. In this case, the use of virtual neural networks can be used to determine whether the driving information represents acceptable or unacceptable driving patterns.

[0034] The action taken may comprise storing data captured at a higher (or the highest possible) sampling rate than when an event is not detected. Thus, as described above, this may involve preventing the down-sampling of sensor data. Furthermore, the action taken may comprise protecting said driving information from being overwritten.

[0035] The action taken may comprise providing feedback to a user to indicate that an event has been detected. Preferably, the mobile device is configured to receive a user interaction to confirm or deny whether the detected event has actually occurred following said feedback. Advantageously, such user feedback can be used to modify event indication models thereby to refine the effectiveness of the event detector. The mobile device may comprise a speaker. Accordingly, such feedback may be provided via an audio prompt. The

mobile device may comprise a display screen. Accordingly, such feedback may be provided via a visual prompt. The feedback may comprise notifying a user that a further action has been scheduled, and will be taken within a predetermined period. For example, the feedback may indicate to a user that an event such as a serious crash has been detected, and so the next action to be taken will be to contact emergency services within 10 seconds. Preferably, the feedback includes a prompt to receive a user input. For example, the prompt may be arranged to receive a user input to cancel a subsequently scheduled action. Advantageously, this prevents actions being taken needlessly as a result of an incorrect determination of an event.

[0036] The feedback may provide reassurance and/or guidance to a user. For example, a user may be provided with an important checklist of things to do following an accident or incident. For example, the user may be guided to use a camera (image sensor) on the mobile device to take photographs of the vehicles involved in the incident, including the number plates of those vehicles. The user may be guided to use a text input device on the mobile device to note the name, address, insurance details etc of third parties involved in incident.

[0037] The action taken may comprise communicating to a remote system associated with an insurance company that an incident has been detected (e.g. via a low bandwidth data connection or via text message). If appropriate – or in response to a request from a communication to the mobile device from the remote system – the action taken may comprise transmitting all or selected portions of the driving information associated with the detected event.

[0038] Preferably, the executed application is arranged to control the mobile device to prioritise essential communications, such as calls to the emergency services.

[0039] Preferably, the memory comprises a long term memory for persistently storing driving information and/or sensor data. Preferably the memory comprises a buffer. The buffer may comprise a short term memory for transiently storing driving information and/or sensor data. Preferably, the short term memory is arranged to receive driving information and/or sensor data at a higher update rate than the long term memory. Preferably, the long term memory has a larger capacity than the short term memory.

[0040] Preferably, the executed application controls the mobile device to write driving information and/or sensor data to the short term memory at a predetermined update rate during the driving period. Ideally, the driving information and/or sensor data is written to

the short term memory in a predetermined sequence, ideally a chronological sequence. Preferably, the executed application controls the mobile device to overwrite driving information and/or sensor data previously written to the short term memory. Advantageously, this ensures that recording of sensor data and/or driving information, especially data that is recorded at a relatively high update rate, is not prevented during the driving period due to the short term memory becoming full.

[0041] Preferably, the driving information and/or sensor data is overwritten in accordance with the predetermined sequence. Advantageously, this can ensure that the most relevant, up-to-date data is retained in the short-term memory.

[0042] Preferably, the action taken in response to a detected event comprises transferring data from the short-term memory to the long-term memory. Advantageously, this can ensure that the most recent information associated with an event is persistently stored in the long term memory, and is not overwritten.

[0043] Preferably, the sensor set comprises an accelerometer for detecting the acceleration of the mobile device. Accordingly, the corresponding sensor data may comprise acceleration data generated by the accelerometer. The accelerometer may be a single axis or dual axis accelerometer. However, it is preferable that the accelerometer is a three-axis accelerometer so that movement of the vehicle may be determined in three-dimensional space. Furthermore, as the mobile device may be mounted by a user in one of a number of different orientations relative to the vehicle, a three-axis accelerometer ensures that acceleration along the axis aligned with the general forward movement of the vehicle may be effectively detected. This is particularly important to determine an event such as heavy braking of the vehicle and/or a crash.

[0044] Preferably, the sensor set comprises an image sensor such as a camera. Accordingly, the corresponding sensor data may comprise images and/or a sequence of images generated from the image sensor. Said sequence of images may be processed and/or stored in the form of a video. Advantageously, this can improve the space utilisation of the sequence of images. Preferably, the mobile device is arranged to receive a user input to store a user-selected image or sequence of images to the memory. The image sensor data may be processed to determine safety information and feedback said safety information to the driver. For example, the mobile device may be controlled to determine the proximity of the mobile device to other vehicles. Said determination may be via comparing the apparent size of the

number plate of other vehicles in an image with a known size of a standard number-plate, and from that the distance to those other vehicles. Thus, the mobile device can make a determination that another vehicle is too close, and issue a warning to the driver to slow down to avoid a collision. Similarly, images of the road ahead may be processed to determine whether a vehicle is drifting out of lane (e.g. because the driver is falling asleep). In response to such a determination, an alert can be issued. Similarly, images of road signs may be processed to assess driver behaviour.

[0045] It will be appreciated that the mobile device may comprise a plurality of image sensors. For example, the mobile device may have a forward-facing camera and a rear-facing camera. Accordingly, it may be possible to view images of the road ahead, external to the vehicle, and also from inside the vehicle. In particular, the mobile device may be arranged to capture images or a sequence of images of the driver. Images of the driver according to the present aspect of the present invention processed to make a safety determination. For example, the images may be processed to detect whether the driver is falling asleep. In particular, a blink rate of the driver may be detected by processing the image data. Similarly, a determination may be made whether the driver has their eyes closed. In response to such a determination that a driver is falling asleep, the mobile device may be arranged to issue an alert so as to wake the driver.

[0046] Preferably, the sensor set comprises an audio sensor such as a microphone. Accordingly, the corresponding sensor data may comprise audio data.

[0047] Advantageously, an image sensor and/or an audio sensor can provide an important record of an event such as a crash.

[0048] Preferably, the sensor set comprises a positioning module arranged to determine the position of the mobile device. The positioning module may comprise a GPS module. The positioning module may be arranged to utilise the wireless telecommunication module to self-localise, for example by determining a position relative to one or more mobile telecommunication cell towers. Advantageously, the positioning module can allow the mobile device to determine its position (and so the position of the vehicle) over time. Accordingly, the positioning module can thus determine the speed of the mobile device and vehicle. Thus, the corresponding sensor data may comprise latitude, longitude, elevation, speed and other data obtainable from positioning modules such as GPS modules as is known in the art.

[0049] Preferably, the sensor set comprises an orientation sensor for determining the orientation of the mobile device. Said orientation sensor may comprise an electronic compass for determining a bearing, and so the direction in which the mobile device is facing. Accordingly, the corresponding sensor data may comprise orientation and bearing data. Advantageously, such data can be used to augment the data of the positioning module. Furthermore, the executed application may be arranged to use the data from the orientation sensor to determine whether the mobile device has been fitted to vehicle, and whether the mobile device has been fitted in the correct orientation. Advantageously, the data from the orientation sensor may also be used to determine whether a significant event has occurred, such as the vehicle overturning.

[0050] Preferably, the sensor set comprises a user-input device arranged to receive an input from a user. The user input device may comprise at least one of buttons and a touch-sensitive display screen. Advantageously, this allows a user to input data to the mobile device.

[0051] Preferably, the mobile device comprises a timer. Preferably, the executed application is arranged to control the mobile device to record sensor data and/or driving information against time as determined by the timer. Accordingly, the timer can be used to time-synchronise sensor data and/or driving information.

[0052] Preferably, the executed application is arranged to encrypt the driving information stored on the memory. Advantageously, this reduces the possibility of said driving information being modified without authorisation. This is an important consideration when such driving data may be used as evidence, for example, when determining the cause of an accident.

[0053] Preferably, the mobile device is arranged to interface with an external device to receive external driving information from said external device. It will be appreciated that the sensor set onboard the mobile device may be supplemented by a sensor set external to the mobile device. For example, the external device may be an engine management system of the vehicle and/or the external device may be arranged to connect to the on-car data network of the vehicle. Thus, the external device may have access to information associated with the behaviour of the vehicle (for example, the speed of the vehicle, how much the brake pedal is being pressed, etc). Such driving information can be processed and/or stored by the mobile

device under control of the executed application in a manner similar to driving information derived from sensor data internal to the mobile device.

[0054] Preferably, the mobile device is arranged to interface with an external device wirelessly, for example via a Bluetooth® connection. Advantageously, this removes the need for the mobile device to be physically connected to the external device. As will be appreciated, following a driving period, a user may want to leave the vehicle and so take a personal mobile telecommunication device with them, and so a wireless interface with such an external device obviates the inconvenience of physically detaching and then subsequently re-attaching the mobile device.

[0055] Preferably, the mobile device is further controlled by the application to determine a unique identifier associated with the mobile device and retrieve from the memory and transmit via the wireless telecommunication module to a remote system said driving information paired with said unique identifier.

[0056] Advantageously, by pairing an identifier uniquely associated with the mobile device enables the remote system to unambiguously determine the source of the driving information. Accordingly, said driving information can be matched to a particular driver and/or vehicle. This is particularly useful when assessing a risk profile of said driver.

[0057] Preferably, the mobile device is controlled by the executed application to process the driving information to generate a driving score. The driving information may comprise the driving score.

[0058] Preferably, the mobile device comprises a display screen. Preferably, the display screen is touch-sensitive. Advantageously, the display screen may thereby be user-interactable. Preferably, the mobile device comprises a graphical user interface (GUI). The graphical user interface comprises user-interactable artefacts such as buttons. Preferably, the user-interactable artefacts may be displayed on the screen and receive a user input for selection or control of those artefacts. The mobile device may be controlled to selectively hide those artefacts in dependence on the state of the mobile device.

[0059] Preferably, the mobile device is controlled by the application to provide feedback about the driving information and/or values of the sensor data. Ideally, such feedback is via the display screen. For example, a detected speed may be displayed, a time elapsed may be displayed, a bearing/heading may be displayed, a detected position may be

displayed and/or a detected image or sequence of images may be displayed (e.g. via a video feed).

[0060] In some embodiments there is provided a mobile telecommunications device adapted for installation to a vehicle and configured to log driving information associated with the vehicle when driven, the mobile device comprising: a sensor set comprising at least one of an image sensor, an audio sensor, an accelerometer and a positioning module; a processor for processing sensor data from at least the sensor set to derive said driving information; a memory for storing said derived driving information; a wireless telecommunications module operable to download a controlling application; and a registration means for registering the start of a driving period during which the mobile device is installed to the vehicle and the vehicle is being driven by a driver; wherein, the processor is arranged to process sensor data from the sensor set during the driving period to derive driving information associated with when and/or how the vehicle is driven and store a selection of the driving information to the memory.

[0061] In another embodiment there is provided a mobile telecommunications device adapted for installation to a vehicle and configured to log driving information associated with the vehicle when driven, the mobile device comprising: a sensor interface arranged to receive sensor data from a sensor set; a processor for processing the sensor data to derive said driving information; a memory for storing said derived driving information; a wireless telecommunications module operable to download a controlling application; and a registration means for registering the start of a driving period during which the mobile device is installed to the vehicle and the vehicle is being driven by a driver; wherein, the processor is arranged to process sensor data from the sensor set during the driving period to derive driving information associated with when and/or how the vehicle is driven and store a selection of the driving information to the memory.

[0062] Preferably, the sensor interface is arranged to receive sensor data from a sensor set external to the mobile device. Preferably, the sensor interface is arranged to interface with an external device as described in relation to the first aspect of the present invention. Advantageously, this enables a mobile device to utilise a richer or better equipped sensor set than that local to the mobile device.

[0063] In another embodiment there is provided a mobile device adapted for installation to a vehicle and configured to log driving information associated with the vehicle

when driven. Preferably, the mobile device comprises a sensor interface arranged to receive sensor data from an external sensor set. The mobile device may comprise an internal sensor set. Preferably, the mobile device comprises a processor for processing the sensor data to derive said driving information. Preferably, the mobile device comprises a memory for storing said derived driving information. Preferably, the mobile device is a mobile telecommunication device, comprising a wireless telecommunications module. Preferably, the wireless telecommunications module is operable to download an application. Preferably, the mobile device comprises a registration means for registering the start of a driving period during which the mobile device is installed to the vehicle and the vehicle is being driven by a driver. Preferably, the processor is arranged to process sensor data from the sensor set during the driving period to derive driving information associated with when and/or how the vehicle is driven. Preferably, the mobile device is arranged to store a selection of the driving information to the memory. Preferably, the mobile device is arranged to transmit a selection of the driving information via the wireless telecommunication module. The mobile device may be arranged to transmit a selection of the driving information via the wireless telecommunication module to a remote system such as a remote data-logging system. Advantageously, transmitting (rather than storing) selected driving information prevents storage space local to the mobile device being used up.

[0064] In another embodiment there is provided a method of logging driving information associated with a vehicle when driven, the method comprising: adapting and installing a mobile device to the vehicle, the mobile device comprising a memory; registering the start of a driving period during which the mobile device is installed to the vehicle and the vehicle is being driven by a driver; processing sensor data from a sensor set during the driving period to derive driving information associated with when and/or how the vehicle is driven; and storing a selection of the driving information to the memory of the mobile device.

[0065] In another embodiment there is provided a data-logging system for logging driving information comprising: a database for storing a plurality of accounts, each account having a unique identifier and the database being arranged to store driving information associated with at least one of a vehicle and a driver; a communications interface arranged to communicate with a remote mobile device, and receive therefrom: a unique identifier for association of the mobile device with a corresponding one of the plurality of accounts; and driving information to be logged to that corresponding account.

[0066] The remote mobile device may be a mobile device in accordance with one of the first to fourth aspects of the present invention.

[0067] Preferably, the driving information comprises a driving score. Preferably, the driving information comprises sensor data captured and processed by the mobile device during a driving period during which the mobile device is installed to a vehicle being driven by a driver.

[0068] Preferably, the system is arranged to process the driving information logged to the corresponding account to generate a driving score. The driving score may be used to determine a risk profile for at least one of the vehicle and driver. The driving score may be used to define an insurance premium associated with the account.

[0069] Preferably, the system is further arranged to communicate to a mobile device an insurance offer generated in response to the driving information received from the mobile device. The data logging system may be further arranged to receive from the mobile device a user-acceptance of the insurance offer.

[0070] The mobile device may be arranged to generate an insurance offer in response to a predetermined set of conditions being met. For example, driving information over a plurality of driving period adhering to predetermined models. Such models may comprise safe driving parameters and/or thresholds.

[0071] According to a second aspect of the present invention there is provided a method of using a mobile telecommunications device to make a safety determination for a vehicle when in use, the method comprising: downloading a software program to the mobile telecommunications device, the software program in use configuring a processor of the mobile telecommunications device when the mobile telecommunications device is removably affixed to the vehicle, to: register the start of a driving period during which the mobile telecommunications device is removably affixed to the vehicle and the vehicle is being driven by a driver; the start of the driving period being determined based on the inputs received by a user interface of the mobile telecommunications device and sensor data from a sensor set of the device, the sensor set comprising a plurality of sensors selected from a group of sensors including an image sensor, and at least one of an audio sensor, an accelerometer and a positioning module, the start of the driving period also being determined without data from sensors of the vehicle; process, at the mobile telecommunications device, sensor data from the sensor set during the driving period to derive driving information associated with

how the vehicle is driven; the driving information including images captured by the image sensor; and store a selection of the driving information to a memory of the mobile telecommunications device; processing the captured images to make a safety determination for the vehicle; and issuing an alert signal in response to making an unsafe determination for the vehicle from the processing step.

[0072] According to a third aspect of the present invention there is provided a non-transitory computer-readable medium having instructions comprising a software application stored thereon, wherein the instructions are configured to be executed on a processor of a mobile telecommunications device to enable the mobile telecommunications device to log driving information associated with a driver of a vehicle, the mobile telecommunications device including a display; a sensor set comprising a plurality of sensors selected from a group of sensors including an image sensor, and at least one of an audio sensor, an accelerometer and a positioning module; the processor; a user interface and a memory, wherein the instructions, upon execution by the processor, enable the mobile telecommunications device to:register the start of a driving period during which the mobile telecommunications device is removably affixed to the vehicle and the vehicle is being driven by a driver; the start of the driving period being determined based on the inputs received by the user interface of the mobile telecommunications device and sensor data from the sensor set, the start of the driving period also being determined without data from sensors of the vehicle; process, at the mobile telecommunications device, sensor data from the sensor set during the driving period to derive driving information associated with how the vehicle is driven; the driving information including images captured by the image sensor; store a selection of the driving information to the memory of the mobile telecommunications device; process the captured images to make a safety determination for the vehicle; and issue an alert signal in response to making an unsafe determination for the vehicle from the processing step.

[0073] For brevity, it will be understood that features, functions and advantages of different aspects of the present invention may be combined or substituted where context allows. For example, features, functions or advantages of the mobile device described in relation to the first to fourth aspects of the present invention may be provided as method steps in the method of logging driving information according to the fifth aspect of the present invention.

Brief Description of the Drawings

[0074] In order that the invention may be more readily understood, reference will now be made, by way of example, to the accompanying drawings in which:

[0075] Figure 1 is a schematic illustration of a system within which the mobile device of various embodiments of the present invention may be used;

[0076] Figure 2 is an illustration of the automobile of Figure 1 configured with a mobile device in accordance various embodiments of the present invention;

[0077] Figure 3 is a schematic illustration of the functional components of the mobile device of Figure 2;

[0078] Figure 4a is a process flow chart, illustrating method steps executable by the mobile device of Figures 2 and 3;

[0079] Figure 4b is a more detailed process flow chart, providing an example of how a driving incident or event may be detected in accordance with embodiments of the present invention; and

[0080] Figures 5 to 24 illustrate a graphical user interface of the mobile device according to Figures 1 to 4b.

Detailed Description of the Embodiments

[0081] Specific embodiments are now described with reference to the appended figures.

[0082] A preferred embodiment of the present invention relates to a mobile telecommunications device for recording events associated with a vehicle, such as a car. In particular, the mobile telecommunications device is loaded with an application – a 'mobile app' – which is arranged to record and document the events surrounding an incident involving the vehicle (a 'driving incident'), such as a vehicle collision. The mobile application may be referred to as the 'Witness' application in the ensuing description.

[0083] Figure 1 illustrates a system 1 within which a vehicle, such as an automobile 3 configured with a mobile telecommunications device executing the Witness application, may communicate with one or more remotely located devices or systems. Such devices may relate to one or more servers, such as an insurance server 5, an emergency services server 7, a content provider server 9, and a personal computer 11. Communication between the

automobile 3 and the one or more remotely located devices 5, 7, 9, 11 may be effected via a shared communication network 13. The shared communication network may relate to a wide area network (WAN) such as the Internet, and may also comprise telecommunications networks. For example, the mobile telecommunications device of the present embodiments may be arranged to communicate with any one of the remotely located devices 5, 7, 9, 11 via a mobile telecommunications base station 15, which is coupled to the shared mobile telecommunications network 13.

[0084] A main purpose of the mobile telecommunications device, when arranged within a vehicle in motion, such as the illustrated automobile 3, is to monitor and process sensor data captured by the mobile device, to derive driving information associated with the moving automobile 3. As mentioned previously, this driving information is subsequently used by the mobile device to determine if a driving incident or event has occurred. The term "driving incident" as used within the present context may relate to an event such as a collision, a near-miss, dangerous driving, erratic driving or similar. Similarly, the driving information may be used as a means for monitoring a driver's driving performance, and determining a driving characteristic, or user profile for the subject driver. In other words, the sensor data and/or the driving information may be used to determine for example, if the driver is a cautious driver, or a reckless driver. This information may be used, for example by an insurance provider, to conduct a risk assessment and to tailor an insurance premium to the subject driver on the basis of a determined driving characteristic. Further details of this alternative embodiment are described below.

[0085] The mobile telecommunication device's functionality is provided by the Witness application, which is installed in the device's local non-volatile storage, and which is executed by the device's native processor. The application may be downloaded to the mobile device via the shared communications network 13 and telephone base station 15, from the content provider server 9.

[0086] In use (once the application has been configured for execution on the mobile telecommunications device), when a driving incident has been detected by the mobile telecommunications device, data, comprising one or more of mobile device sensor data, derived driving information, and captured image data may be automatically forwarded to one or more of the remotely located devices 5, 7, 9, 11. For example, the mobile device may be configured such that when a driving incident is detected, such as a collision involving an

automobile 3, driving information (including image data captured by the mobile device) derived from the sensor data is automatically forwarded to the insurance server 5, via the base station 15 and shared communications network 13. In this way, data relating to the driving incident (a collision in this example), is automatically forwarded to the automobile user's insurance provider, for use in claim settlement, and/or to determine culpability.

[0087] Similarly, once a driving incident has been detected, data may also be automatically forwarded to the emergency services server 7. For example, such data may comprise the position information of the automobile 3, along with an automated S.O.S. message requesting assistance from the emergency services. Forwarded data may also comprise sensor data, and any relevant derived driving information, such as speed of impact, the g-forces the vehicle was subjected to during the collision, or any other information wherefrom the severity of the collision may be determined, and which may be used to assist the emergency services in coordinating the appropriate level of response.

[0088] Optionally, an electronic message may be sent to a personal contact preselected by the user. For example, an automated message, such as an e-mail, may be forwarded to the PC 11 of the user nominated personal contact, informing the personal contact that the user of the vehicle 3 has been involved in a driving incident. Similarly, and due to the mobile device's telecommunications functionality, an electronic text message, such as an SMS (Short Message Service) may be forwarded to the telephone of the user selected personal contact, informing the contact of the driving incident. The mobile device may be equally be arranged to communicate with a personal contact via any known electronic messaging service and/or instant messaging service too. For example, via Apple's® iMessage, or RIM's® BlackBerry Messenger (BBM) service.

[0089] This functionality of forwarding a message to a nominated contact, may also be of particular benefit for managing large fleets of vehicles. For example, a car hire service. In this way, if any of the vehicles comprised in the fleet are involved in a driving incident, the car hire service may be automatically notified of the identity of the specific vehicle involved in the driving incident. In such embodiments, the nominated personal contact would be preselected by the vehicle fleet manager. The option of providing a second user selected personal contact is also envisaged. In this way, a message may be forwarded to both the car hire service for example, and to the driver's selected personal contact.

[0090] In preferred embodiments the mobile telecommunications device relates to a mobile telephone having native processing functionality, and preferably relates to a smartphone. Preferably, the mobile telephone comprises a camera arranged to enable image capture, and preferably arranged to enable a sequence of images to be captured taken in temporal succession. In other words, in preferred embodiments the mobile telephone comprises a camera configured to enable video footage of a sequence of events to be captured.

[0091] Alternatively, the mobile telecommunications device may relate to a PDA, a notepad such as an iPad®, or any other mobile device comprising local processing means and means for communicating with a telecommunications network.

[0092] Figure 2 provides a more detailed view of the automobile 3 of Figure 1, and illustrates a preferred arrangement of the mobile telecommunications device 17 within the automobile 3. In the illustrated embodiment, the mobile telecommunications device 17 relates to a smartphone configured with an image capture device, such as a camera. Preferably, the device 17 is arranged within the vehicle, such that the camera has a clear line of sight of the road in the principle direction of travel of the automobile 3. For example, the device 17 may be attached to the windshield 19 of the automobile 3 in an adapter 21. The adapter 21 may comprise a flexible telescopic arm, configured with a suction cup at one end for affixing the adapter to the windshield 19, and a dock arranged at the opposite end for securely holding the telecommunications device 17 in place. The telescopic arm enables the position of the device 17 to be varied, such that a clear line of sight in the direction of travel may be obtained.

[0093] The details of the adapter 21 are irrelevant for present purposes, with the exception that it must enable a clear line of sight in the principle direction of travel of the vehicle to be obtained, and it must firmly affix the mobile to the vehicle. Affixing the mobile telecommunications device 17 to the automobile 3, ensures that the mobile device 17 is able to accurately capture the automobile's state of motion. By principle direction of travel is intended the main direction of travel of the vehicle when operated in a conventional way, indicated by the arrow A in Figure 2. In other words, the forward direction of travel. The skilled reader will appreciate that whilst most vehicles, such as an automobile, may have more than one direction of travel (e.g. travelling backwards when in reverse gear), the majority of vehicles have a primary direction of travel, which is the intended direction of

travel for any transit of substantial length and/or distance. Arranging the telecommunications device 17 relative to the direction of principal travel, ensures that the camera (not shown) of the telecommunications device 17 is well placed to capture any image data which may be pertinent to a subsequently detected driving incident, such as a collision.

[0094] Figure 3 is a schematic of the modular components of the mobile telecommunications device 17 of Figure 2. Preferably the mobile telecommunications device 17 comprises: an image capture module 21, an accelerometer 23, a GPS receiver 25, an audio capture module 27, a communications module 29, a processor module 31 and a storage module 33. The image capture module 21, accelerometer 23, GPS receiver 25, and audio capture module 27 form a sensor set and are generically referred to as data capture modules in the ensuing description, and are differentiated from the communications module 29, processor module 31 and storage module 33, in that they comprise sensors for sampling physical data.

[0095] This sampled physical data, which is also referred to as sensor data, is subsequently processed by the processor module 31 and stored in the storage module 33.

[0096] The image capture module 21 may relate to any image capture device, such as an integrated camera commonly found in smartphones or similar mobile devices. As mentioned previously, the image capture module 21 is preferably configured to capture a plurality of images taken in temporal succession, such as provided by a video camera.

[0097] The accelerometer 23 is arranged to provide information regarding the motion of the automobile 3 along all three dimensional axes. For example, the accelerometer 23 provides information regarding the pitch, yaw and roll of the automobile 3. Sensor data captured from the accelerometer 23 may be used to determine the g-forces the automobile has been subjected to. This is particularly useful in determining the severity of a collision. In general, the greater the g-forces experienced in a collision, the greater the risk of serious injury to the passengers of the vehicle. This information may assist the emergency services in forming an initial assessment of the severity of a collision. Furthermore, this type of data may also assist the emergency services and/or insurance provider to obtain a better understanding of the driving incident. For example, in the event of a collision, this data may assist the emergency services and/or insurance provider to obtain a better understanding of how the collision occurred. This information may subsequently be used for dispute resolution, and/or for determining culpability.

[0098] The GPS receiver 25 is arranged to provide location information, such as positional coordinates, and can also provide velocity information. When combined with the accelerometer sensor data, the GPS receiver data can be used to provide a very accurate model of a driving incident, such as a collision. In particular, the GPS sensor data provides velocity data, such as the velocity of impact. The velocity data enables one to determine if a vehicle was being driven at speeds greater than the legally permitted maximum speeds.

[0099] The audio capture module 27 provides means, such as a microphone, for recording audio data, which might be generated by a driving incident. This includes any sounds generated externally to the vehicle, for example the sound of an impact, or the sound of the crumple zone being crushed. Additionally, sounds generated internally to the vehicle are also recorded. Such audio data may also help to recreate a driving incident, and understanding the causes of the incident.

[00100] The communication module 29 provides the mobile telecommunications device 17 with functionality for communicating with the remotely located devices 5, 7, 9, 11 of Figure 1. The communication module 29 comprises a wireless telecommunications sub-module 31 enabling communication over a telecommunications network. An optional wi-fi communication sub-module is also envisaged. Similarly, the presence of wired communication modules are also envisaged, such as a USB port and/or an IEEE 1394 interface (more commonly known as FireWire™) to support wired communication with a remote device, such as a personal computer or similar. Such a connection may be useful for the purposes of side-loading the application to the mobile device.

[00101] As mentioned previously, sensor data captured from any one of the aforementioned data capture modules 21, 23, 25, 27 is processed by the processor module 33, to generate driving information. By driving information is intended any data which may be derived from raw sensor data captured by any one of the aforementioned modules 21, 23, 25, 27. For example, g-force data is driving information which is derived from the sensor data sampled by the accelerometer 23. The skilled reader will be familiar with the plurality of types of driving information that may be derived from sensor data sampled by the aforementioned modules, and accordingly a complete list of the different types of driving information that may be derived from sampled sensor data is omitted for brevity.

[00102] The processor module 33 is also configured to analyse sampled sensor data and generated driving information to determine if a driving incident has occurred (described in more detail below).

[00103] Sampled sensor data is stored in storage 34, which is operatively coupled to the processor module 33, along with any generated driving information. The storage 34 is preferably configured with a FIFO (First In First Out) storage buffer 34a, and a permanent storage component 34b. In preferred embodiments, the data capture modules are configured to sample data at periodic intervals. Preferably, these intervals are sufficiently small, of the order of milliseconds, such that for practical purposes the data capture modules may be considered to sample data continuously. The sampled data, along with any derived driving information is preferably stored in the storage buffer 34a, unless a driving incident has been identified, in which case the associated sensor data and driving information is stored in the permanent storage component 34b to avoid undesirable overwriting.

[00104] In preferred embodiments, the FIFO storage buffer 34a is provided with a finite amount of storage space. Nonetheless, said storage space may be predefined by the user as will be described below. In any case, once this storage space has been exhausted, the oldest recorded data is overwritten by newly sampled data, and this cycle of overwriting older data with newly sampled data is continuously carried out during operation of the telecommunications device 17, unless a driving incident has been detected, in which case, and as mentioned previously, all data related to the driving incident is stored in a long term protected storage 34b to safeguard it from being overwritten by newer data.

[00105] In preferred embodiments, the mobile telecommunications device 17 may be configured with a data recording strategy by the user. This might define the frequency with which sensor data is sampled. In other words, how many measurements are made per unit of time. Furthermore, the recording strategy also defines how data is recorded. In preferred embodiments, sampled sensor data is stored in data files in the buffer 34a. Each data file represents a plurality of sequentially sampled sensor data, captured over a defined period of time, which will be referred to as a 'data file period'. This is best illustrated by considering captured image data, such as video footage. A video period may be defined, which period defines the unit of physical time covered by captured video footage comprised in a single video data file – this is the data file period for image data. The video data file is subsequently stored in the buffer 34a. For example, a five minute video period setting,

instructs the processor 33 to store all sequentially captured image data captured by the image capture module 21 over a period of five minutes, in a separate video data file. It is to be understood that whilst the image capture module 21 is continuously sampling image data (in other words, it is continuously capturing image data), this plurality of captured image data is grouped together for storage in video data files, each data file representing a five minute data file period.

[00106] Sampled sensor data and derived driving information is also continuously analysed by the processor module 33 for the purposes of detecting a driving incident. As soon as a driving incident is identified, the associated sensor data and derived driving information is stored in a data file in accordance with the data recording strategy. Returning to the example described in the preceding paragraph, this entails combining the video footage captured within a temporal window of five minutes leading up to the detected driving incident, in a single video file, and storing this data file in protected storage 34b. Whilst each different type of sensor data may be recorded in separate data files, in preferred embodiments all the different types of sensor data sampled by the mobile telecommunications device 17 are stored together in a single data file in accordance with the user selected data recording strategy. This means that the five minute data file referred to above, preferably also comprises GPS data, accelerometer data, and audio data sampled over the five minute time period.

[00107] Data files are stored in the buffer 34a, unless they are associated with a driving incident, in which case they are then stored in protected storage 34b, which cannot be overwritten. Once the storage space comprised in the buffer 34a has been exhausted, the oldest data file is overwritten by a newer data file.

[00108] Data compression methods may also be used in conjunction with the present invention to improve the use of storage. For example, data comprised in data files which have not been associated with a driving incident may be compressed using compression techniques, which techniques will be known to the skilled reader. Similarly, within a data file associated with a driving incident, sensor data captured at time coordinates which are distant from the determined driving incident may be compressed. In this way, the resolution of sensor data which is directly pertinent to a driving incident is maintained, whilst sensor data which may be less relevant to the driving incident is maintained at a lower resolution.

[00109] Since the sensors of the mobile telecommunications device 17 are continuously recording sensor data, even when a driving incident is detected, the device 17 may be configured to comprise sensor data and/or driving information recorded/derived shortly after the driving incident in the same data file, since this data may also be relevant for understanding a driving incident. Furthermore, this also enables the mobile telecommunications device to record multiple driving incidents. For example, a multiple collision.

[00110] The processor module 33 may be configured with encryption means, enabling stored data files to be encrypted to prevent data tampering. Envisaged encryption means may comprise both software solutions and hardware solutions. For example, the processor module may comprise a cryptoprocessor, or the processor may be configured with code to carry out a cryptographic process.

[00111] Figure 4a is a flow chart outlining the method carried out by the mobile telecommunications device 17, to determine if a driving incident has occurred, in accordance with a preferred embodiment. An application is downloaded from the content provider server 9 of Figure 1, onto the mobile telecommunications device 17, at step 36, as previously described. This may be done over a telecommunications network. The application provides the mobile telecommunications device 17 with the previously described functionality, when executed on the device. The mobile telecommunications device is configured within the vehicle, at step 38. This may comprise affixing the mobile telecommunications device 17 to the vehicle via an adapter, as described previously.

[00112] The recording strategy is specified at step 40. As mentioned previously, this comprises setting the period of time that each recorded data file represents. Furthermore, it may also comprise defining the size of the buffer 34a and/or the number of data files that are to be stored within the buffer. Preferably, the recording strategy is specified only once, upon first use of the mobile telecommunications device 17. Where the recording strategy has already been defined, method step 40 is skipped, and the method continues with step 42.

[00113] The start of a driving period is registered, at step 42. The start of the driving period determines when the recording of sampled sensor data begins. The start of a driving period may be manually entered by the user via the application's graphical user interface (GUI). Alternatively, the start of the driving period may be automated. For example, the mobile device 17 may be configured to initiate the driving period once sensor data above

a minimum threshold value is recorded, indicative of the vehicle being in motion. For example, once a velocity greater than 20 kilometres per hour is detected.

[00114] Alternatively, the start of the driving period may be initiated once the application determines that the mobile telecommunications device 17 has been affixed to the vehicle. For example, the adapter 21 may comprise a registration module (not shown) arranged to register the installation and fixation of the mobile device to the vehicle and/or adapter. The registration module may comprise an NFC device. When the mobile device is brought into close proximity with the registration module, a driving period is initiated.

[00115] Once the driving period has been initiated, sensor data is sampled and recorded in storage 34, at step 44. Additionally, the sampled sensor data is used to generate driving information by the processor module 33. The sampled sensor data and the driving information is continuously analysed by the processor module 33, at step 46.

[00116] The processor module 33 determines if a driving incident has been detected, at step 48. This is determined on the basis of the analysis carried out at step 46. If a driving incident has been detected, all the sensor data and driving information associated with the data file period, is stored in a data file in protected storage 34b, at step 50.

[00117] There are several ways in which a driving incident may be detected. Preferably, this is an automated process, wherein the processor module 33 determines a driving incident has occurred on the basis of an observed marked variation in sensor data and/or driving information. The term 'marked variation' is to be understood to relate to a significant change in sensor data and/or driving information occurring over a very short time period. In other words, a detected impulse in recorded sensor data and/or driving information, indicative of a significant change in the state of motion of the vehicle occurring over a short time period. For example, a sudden increase in the g-forces the vehicle is subjected to, may be indicative of a collision and if observed, result in a driving incident being determined to have occurred by the processor module 33.

[00118] Predefined threshold values may also be used to automate the detection of a driving incident. For example, each data type and/or derived driving information (e.g. acceleration, velocity, g-force, pitch, roll, yaw etc.) may be associated with a threshold value. When any one of these threshold values is exceeded, the processor module 33 may be configured to determine that a driving incident has occurred. Similarly, the automated detection of a driving incident may require that a threshold condition associated with a

combination of predefined threshold values, each threshold value being associated with a different data type and/or type of driving information, must be exceeded, in order for the processor module 33 to automatically determine that a driving incident has occurred. For example, in the event of a collision, it is reasonable to expect to observe a marked variation in g-force, accompanied by a marked variation in velocity. Accordingly, the threshold condition may require that in order for a collision to be automatically detected, both a marked variation in g-force and a marked variation in speed, in excess of predefined threshold values must be observed.

[00119] Similarly, the occurrence of a driving incident may also be recorded manually by the user via the application GUI. This may be beneficial for the purposes of documenting data associated with a low velocity collision - colloquially referred to as a 'fender-bender' - which may not result in any marked variations in sampled sensor data, and therefore may not be automatically detected.

[00120] Once a driving incident, such as a collision, has been detected, and the data file comprising the associated sensor data and driving information has been securely stored in protected storage 34b, the data file is transmitted to the insurance server 5 of Figure 1, at step 52. The data file informs the insurance provider that a driving incident has occurred and provides the insurance provider with the sensor data and derived driving information. This data assists the insurance provider in better understanding the collision, in addition to assisting with determining culpability, where more than one vehicle are involved.

[00121] Similarly, once a driving incident has been detected, an S.O.S. message may be automatically forwarded from the mobile telecommunications device 17 to the emergency services server 7, at step 54. The S.O.S. message may also comprise sensor data and derived driving information, which may assist the emergency services in coordinating their response.

[00122] As mentioned previously, the mobile telecommunications device 17 will continue to sample and record sensor data even once a driving incident has been detected, unless the mobile telecommunications device 17 detects that the driving period has terminated, at step 56. If the driving period has terminated, the present method is terminated and the device stops recording sensor data. The end of a driving period may be automatically detected by the processor module 33, if certain conditions are met. For example, if the measured velocity of the vehicle remains zero for a predetermined period of time, the

processor module 33 may infer that the vehicle is stationary and no longer being driven, and accordingly ceases recording sensor data, and the method is terminated. If instead the processor determines that the driving period has not yet terminated, a new data file period is initiated, at step 58, and steps 44 through 62 are repeated.

[00123] Where a driving incident is not detected at step 48, the processor module 33 will determine if the data file period has expired, at step 60. If the data file period has expired, then the sensor data and the derived driving information generated during the data file period is combined and stored in a single data file, for storage in the buffer 34b, at step 62. The processor 3 then determines, at step 56, if the driving period has terminated. If the driving period has not terminated, a new data file period is initiated, at step 58. The mobile telecommunications device 17 continues to sample sensor data, to derive driving information, and steps 44 through 62 are repeated, until the driving period is determined to have terminated.

[00124] Figure 4b provides more detail regarding how a driving incident may be automatically detected (i.e. steps 46 and 48 of Figure 4a) in a preferred embodiment, where the mobile telecommunications device 17 is configured to sample audio data, accelerometer data, and GPS data only. Each one of these types of data is analysed in turn, at steps 64, 66 and 68. The analysis may comprise comparing measured sensor data and/or derived driving information with a data model. The model may comprise defined threshold values for different data types. Sampled sensor data and/or driving information may be compared with the data model to determine if a driving incident has occurred.

[00125] For example, the analysis of sampled audio data, at step 64, may comprise comparing the recorded audio data with predetermined audio data models representing specific sounds. Such sounds may relate to the sound of tyre squeals, the sound of deforming metal, the sound of breaking glass, passenger screaming and/or shouting, the sound of airbag deployment, and any other sound which may be associated with a driving incident. Effectively, this may be considered audio fingerprinting, which serves to identify specific sounds associated with a driving incident by carrying out a signal profile analyses of the audio signal captured by the audio capture module 27. To achieve this, the storage device 34 may comprise a database of prestored audio sound files. The audio sound files represent sounds associated with a driving incident. The captured audio signal is compared with the sound files comprised in the database, to identify matches between the captured audio signal

and the database of sound files. This facilitates the audio fingerprinting of specific sounds, indicative of a driving incident, present within the captured audio data signal captured by the audio capture module 27.

[00126] Similarly, the analysis of sampled accelerometer data, at step 66, may comprise comparing the sampled data with predetermined accelerometer data models. The data models represent specific states of motion of the vehicle. For example, this might comprise defining threshold values for yaw, pitch and roll, which if exceeded, indicate a state of motion of the vehicle indicative of a driving incident. For example, a measured yaw value above a predetermined threshold value may be indicative of the vehicle having lost traction and is fishtailing and/or skidding. Similarly, a roll and/or pitch value above a predetermined threshold value may be indicative of the vehicle having overturned.

[00127] Accelerometer sensor data is also used for deriving driving information such as g-forces. Analysis of g-force data is also used to determine if a driving incident has occurred. For example, approximate g-force values for detecting certain driving incidents are as follows:

[00128] Harsh braking – a deceleration of greater than 2.5 m/s^2 or forward G-force of greater than 0.7G for more than 400msec.

[00129] Harsh acceleration – from stationary, an acceleration greater than 2.5 m/s^2 or backward G-force of greater than 0.7G for more than 800msec.

[00130] Harsh swerving - lateral G-forces greater than 0.7G for more than 400msec.

[00131] The data models are preferably preconfigured and are comprised within the application executed on the mobile telecommunications device. Different data models are used depending on the type of vehicle the telecommunications device is being used with. Different vehicle types will experience different states of motion during regular operation, which must be considered in determining if a driving incident has occurred. For example, a motorcycle will display more roll and/or pitch than an automobile during regular operation. Accordingly, different data models and/or threshold values must be used to automate the identification of a driving incident for different vehicle types. The specific data models used may be selected during an initial configuration of the mobile telecommunications device, by indicating the type of vehicle the device is being used with.

[00132] On the basis of the audio data analysis and the accelerometer data analysis, the mobile telecommunications device determines, at step 72, if a driving incident has occurred. If it is determined that a driving incident has occurred, then the telecommunications device proceeds with step 50 of Figure 4a. If instead a driving incident is not detected, the telecommunications device proceeds with step 60 of Figure 4a.

[00133] The GPS data analysis, at step 68, comprises analysing positional data and velocity data for any anomalous readings. For example, a sudden deceleration followed by a zero-velocity reading lasting a predetermined period of time, may be indicative of a collision. If such a zero-velocity reading is observed at step 70, in conjunction with anomalous audio and/or accelerometer sensor at step 72, then a driving incident is determined and the mobile telecommunications device proceeds with step 50 of Figure 4a. This is a further example of a threshold condition, discussed previously.

[00134] The previously described mobile telecommunications device and method may also be used to monitor and generate a driver profile. The driver profile may be indicative of the type of driver a user is. For example, this may comprise determining if a user is a calm and patient driver, or an aggressive driver. Also, this may comprise determining whether a user regularly flouts speed limits, and/or ignores safety distances. This type of information may be used by an insurance provider to conduct a personalised risk assessment for individual users. Insurance premium rates may then be tailored to the specific user on the basis of the personalised risk assessment.

[00135] For example, analysis of captured image data, such as video footage, may be used to determine if a user regularly flouts safety distances. In preferred embodiments, the mobile telecommunications device is arranged within the subject vehicle to have a clear line of sight of the road in the direction of principle motion. Accordingly, the number plate of any vehicle preceding the subject vehicle will be captured by the image capture module. Since the physical dimensions of number plates are standardised and known in each country, they may be used as a metric to scale the captured image. When combined with the known optical characteristics of the image capture module, this enables the distance of the image capture module from the image object (i.e. the preceding vehicle) to be determined at the time of image capture. This information may then be used to see if a user adheres to recommended safety distances. A user that is observed to regularly flout recommended safety distances,

may be considered to represent a greater risk, and accordingly may be required to pay a greater insurance premium than a user who regularly respects recommended safety distances.

[00136] Image analysis can also be used to determine driving conditions and the driving environments. For example, image processing can detect road signs, such as stop signs or traffic lights. Furthermore, driving conditions, as affected by the weather can be determined. For example, if the windscreen wipers are detected to be in motion, it can be inferred to be raining. Once the driving conditions are so determined, an assessment of the driving performance of a user can be made by determining whether the user reacts or behaves appropriately to the driving conditions. For example, if the driver is seen to be jumping red lights, or driving dangerously in rain or snow, then a higher risk profile may be assigned to that driver.

[00137] Similarly, accelerometer and g-force data may be used to determine if a user has an erratic driving style. For example, a user that generates sharp variations in g-force data and accelerometer data during regular operation of a vehicle, may be considered to drive erratically, and therefore at greater risk of being involved in an accident, and insurance premium rates for the user may be tailored accordingly.

[00138] The mobile telecommunications device may also be configured to interface and communicate directly with a vehicles native telemetry systems. For example, the majority of modern cars have inbuilt electronic control systems or engine management systems, arranged to collect data regarding vehicle system performance. This data may be communicated to the mobile telecommunications device either via a wired physical connection, such as USB (Universal Serial Bus), or via a wireless communication protocol such as Bluetooth®. This data may subsequently be used by the mobile telecommunications device to complement sensor data captured directly by the telecommunications device. In this way a more accurate model of a driving incident, and/or of a user profile may be generated. For example, native vehicle telemetric systems may comprise electronic tyre pressure sensors, and are able to detect if a tyre is under and/or over-inflated. This information may be communicated to the mobile telecommunications device and may help to explain the causes for a driving incident, such as a sudden loss of traction resulting from a burst tyre.

[00139] Further features of the Witness application, are set out below.

Benchmarking

[00140] It will be appreciated that different sensor types, phones, mounting positions, vehicles, drivers and road conditions may generate differing outputs for driving behaviour that is 'safe'. To account for this, the Witness application may have the following functionality:

[00141] During a 'training mode' (e.g. first week of enabling the Witness application) the input from the sensors are used to build up a 'benchmark' for a particular driver's typical driving conditions.

[00142] Assuming an accident does not occur during this training mode, the benchmark data can be subsequently used to assess the occurrence of driving incident.

[00143] There is preferably an option to notify the Witness application of a change in parameters (e.g. different driver, driving off-road etc). Thus a number of 'profiles' may be set up. Each profile may require an independent training mode period.

[00144] If the Witness application incorrectly detects that a driving incident has occurred, it can receive feedback from the user to modify its sensitivities. E.g. a more aggressive driver is actually driving.

Crash/Collision Management

[00145] On detection of a crash (or other driving incident) the Witness application is arranged to take one or more of the following actions:

[00146] Announce that it has detected an accident (audio/screen prompt)

[00147] Call the emergency services (with option to cancel) – e.g: Audio/screen prompt: 'Witness has detected that you have been involved in a (serious) accident and will call the emergency services. If this is not the case, please cancel within 10 seconds.'

[00148] Provide reassurance

[00149] Provide the user with a checklist of things to do:

[00150] Take photographs of vehicles involved in the incident (inc number plates)

[00151] Take down name, address, insurance details etc of 3rd parties involved in incident

[00152] Communicate to the insurance company that an incident has been detected (e.g. low bandwidth data or text message)

[00153] Protect the high quality recorded data so it is not overwritten

[00154] If appropriate – or in response to a request from a communication to the phone from the insurance company – transmit all or selected portions of the recorded data associated with the incident.

[00155] N.B. Use of the communication channels is controlled by the Witness application to prioritise essential communications such as calls to the emergency services.

[00156] Note that data transmission from the mobile telephone to the insurance company may be automatic (for example, triggered by a detected incident) or manual (for example, in response to a request from the insurance company). In the latter case, the Witness application may include functionality to allow the insurance company to browse through the data files available on the mobile telephone so as to select one or more for transmission to the insurance company.

Data processing for generating a user profile

[00157] Further features of the user profile generation embodiment are summarised:

[00158] If the Witness application incorrectly detects an event or incident of significance, and receives feedback that the vehicle was not involved in an accident (but was in a near miss) – this could alter the risk profile of the driver. For example – if this happens frequently, but no accident occurs over a given period, this could be an indicator that the driver is good at reacting to potential hazards.

[00159] Erratic driving (e.g. jerky steering or braking detected by G-force sensor).

[00160] Driving faster than the speed limit allocated to a given road (detected by GPS).

[00161] Further details regarding the features and functionality of the Witness application, in particular the graphical user interface of the Witness application, are now described.

[00162] Referring to Figure 5, a first page 80 of the Witness application user manual is shown in which an image of the Main Menu (the top-level menu) 82 is displayed. The Main Menu is displayed when a user first runs the application on a smart-phone, such as the iPhone® 4. The main menu includes the following user-selectable buttons:

[00163] Recording Screen 84

[00164] File Management 86

[00165] Settings 88

[00166] Accident Management 90

[00167] Information 92 (displays up a manual, as shown in Figures 5 to 14).

[00168] Selecting the Recording Screen button 84 opens the Recording Screen 94 – the second image shown in Figure 5. The Recording Screen 94 contains a video feed 96 from the camera of the smart-phone, which occupies the majority of the visible screen area. Overlaid on to the video feed is the detected speed of the vehicle 98 (e.g. 0 mph), heading 100 (e.g. south by south-west) and the elapsed recorded time 102 (e.g. 00:00). Displayed in a left column of the Recording Screen are additional user selectable buttons:

[00169] Keep current video 104 (pressing this button will automatically copy the current video - and the previous video segment - to the protected storage 34b, and prevents that information from being overwritten. The user is advised to press this button in the event of a driving incident that needs to be recorded).

[00170] Take photo 106 (captures a still photograph).

[00171] Exit Recorder 108 (returns to main screen).

[00172] Start / Stop Recording 110 (starts recording video footage - and other data).

[00173] Referring to Figure 6, a second page 112 of the Witness application user manual is shown, in which an image of the Recording Screen 114 is shown and described operating in a map-displaying mode rather than a video-feed mode.

[00174] During recording, (i.e. when the 'Start / Stop Recording' button 110 is pressed) the Exit Recorder button in the Recording Screen is substituted with a Map Display button 116. Pressing it will toggle between the modes showing the video feed and a map of the current location.

[00175] Referring to Figure 7, a third page 118 of the Witness application user manual is shown, in which the File Management Screen 120 is shown and described. The File Management Screen 120 can be accessed by pressing the File Management Button 86 in the Main Menu.

[00176] The File Management Screen 120 displays video and associated data (e.g. telemetry data) that has been previously recorded. The stored data is contained in either a protected area of storage or in a "Recording Stack". Data files in the protected area are saved and so not overwritten as part of a Recording Strategy. In contrast, data files in the Recording Stack may be overwritten as part of the Recording Strategy.

[00177] As illustrated in Figure 7, the bottom section of the list represents the "Kept" data files 122, whereas the top section of the list represents the "Recording Stack" 124. "Kept" data files 122 can be edited and deleted from the File Management Screen 120, whereas "Recording Stack" data files cannot. Editing "Kept" data files can involve renaming them.

[00178] The recorded data files are listed on screen along with the time and date of the recording and the electronic size of the data file. Accordingly, the user is provided with feedback about how big the data files are, and so if the smart-phone is low in storage, the user can elect to delete certain "Kept" data files. "Recording Stack" data files will be automatically overridden by the Recording Strategy.

[00179] The controls on the toolbar at the bottom of the recordings screen allow a user to change the selection mode of the video stack and includes:

[00180] Video 126 (when highlighted, if a data file is selected, a video recording playback screen will be displayed).

[00181] Map 128 (when highlighted, if a data file is selected, then a map will be displayed showing the area over which the recording was made).

[00182] Export 130 (when highlighted, a selected data file will be passed to an Export Screen where export options will be provided).

[00183] Keep 132 (when highlighted, if a "Recording Stack" data file is selected, then a user will be prompted to name it, and then it will be stored as a "Kept" data file).

[00184] The icons in the File Management Screen change in dependence on the selected mode. For example, Figure 20 shows the icons 134 displayed when the Video selection mode is highlighted; Figure 21 shows the icons 136 displayed when the Map selection mode is highlighted; Figure 22 shows the icons 138 displayed when the Export selection mode is highlighted and Figure 23 shows the icons 140 displayed when the Keep selection mode is highlighted. Advantageously, this provides improved feedback to a user

about what selection mode is highlighted and so what action is likely from the selection of a data file.

[00185] Referring to Figure 8, a fourth page 142 of the Witness application user manual is shown, in which an image of a Recording Playback screen 144 is shown and described. The Recording Playback screen is invoked by highlighting the Video Mode 126 in the File Management Screen 120 and selecting an appropriate data file.

[00186] In the Recording Playback screen 144 it is possible to play back a pre-recorded video feed associated with a chosen data file. As well as playing back the recorded video feed, the Recording Playback screen also displays other associated data such as telemetry data 146. For example, date, time, speed, forward/backward G-forces, latitude, longitude and heading information is overlaid onto the video feed. As the video is played back, these values will typically change depending on the behaviour of the vehicle, as recorded by the mobile device.

[00187] Forward and backward G-forces are those that correspond to the forward and backward movement of the vehicle and are the primary metric for determining an event such as a crash. However, other G-forces (e.g. up/down and side-to-side) may also be measured by the device – even if they are not necessarily displayed on the mobile screen.

[00188] As recited in Figure 8, the Recording Playback screen provides further user controls in the form of:

[00189] Playback Position Scrub Bar 148 (horizontal bar at bottom of screen)

[00190] Playback Speed Bar 150 (vertical bar at left side of screen)

[00191] Pause 152 (pauses playback)

[00192] Eject 154 (return to previous screen)

[00193] Loop 156 (plays the data file continuously)

[00194] The Playback Position Scrub Bar 148 allows a user to jump to different positions within the recording without necessarily needing to watch all of the recorded footage. Advantageously, this allows a user to more quickly locate a desired item of footage within a given data file. Also, the Playback Speed Bar 150 can be used to speed up or slow down the playback of the data file. This allows a desired item of footage to be found more quickly through sped-up playback, and also allows an item of footage to be more carefully analysed through slowed-down playback. Furthermore, it is possible to zoom in and out of a

region of the video file using a 'pinch and zoom' movement as is standard with most multi-touch touch-screen devices.

[00195] Referring to Figure 9, a fifth page 158 of the Witness application user manual is shown, in which a different type of Recording Playback screen 160 is shown and described. Specifically, the image represents playback of a pre-recorded data file as can be invoked by highlighting the Map Mode 128 in the File Management Screen 120 and selecting an appropriate data file.

[00196] In contrast with the Video Mode playback, this Map Mode playback shows a map of the area 162 where the recording took place. A blue breadcrumb trail 164 is overlaid on to the map showing the extent of movement of the vehicle during the recorded period. A scrub slider 166 is shown, which is user-operable to adjust the time within the recorded period. As the slider is adjusted, a pin 168 moves along the blue breadcrumb 164 to show the position of the vehicle at the time as specified by the slider 166. Tapping the pin 168 displays associated telemetry data 170 at that position and time.

[00197] Referring to Figure 10, a sixth page 172 of the Witness application user manual is shown, in which an image of a Video Export Screen 174 is described. The Video Export Screen 174 may be invoked by highlighting the Export button 130 in the File Management Screen 120 and selecting an appropriate data file.

[00198] The Video Export Screen 174 allows the quality of the video associated with the selected data file to be adjusted, before that video is exported. Advantageously, this can allow the user to control the size of the data to be exported. Telemetry data (i.e. sensor data) is also exported, embedded within the video file. Video data can be exported with or without sound, depending on the permissions of the user. Export typically involves copying data files from the mobile device to a local computer (e.g. via a data cable) or a remote server (e.g. via a wireless connection).

[00199] Referring to Figure 11, a seventh page 176 of the Witness application user manual is shown, in which an image of the Settings Screen 178 is displayed and described. The Settings Screen 178 allows the operation of the Recording Strategy to be controlled. Specifically, the Settings Screen allows a user to select the number of video segments that the application should store, and the size of those segments (i.e. a data file period). Accordingly, the user is able to set a limit to the storage usage of the Recording Stack (i.e. the size of the

buffer 34a) part of the program. The user can also control the storage usage of the Recording Stack through the use of the video quality buttons.

[00200] Note that the Witness application may be arranged to calculate the remaining memory available on the smart-phone and suggest the appropriate settings automatically.

[00201] The Recording Strategy involves maintaining a user-controlled number of video segments. When a new video recording is initialised – instantiating a new segment – this is written over the oldest video segment. Thus only the most recently recorded videos are maintained in the Recording Stack.

[00202] Another setting that can be controlled in the Settings Screen 178 is the G-force threshold at which the Witness application will assume that a crash has taken place. It is expected that different vehicles and driving styles will need different G-force thresholds to be set to ensure a reasonable sensitivity to crash forces whilst also prevent crash detection false positives. It should be noted that although the manual recites "*Raise the sensitivity if you find that crash detection is triggered during normal driving...*" it is the sensitivity *threshold* that is to be raised, and not the sensitivity itself. A slider 180 allows the sensitivity threshold to be set via the touch-sensitive screen.

[00203] The Settings Screen 178 also has a button 182 to allow a user to define more settings via a More Settings Screen.

[00204] Referring to Figure 12, an eighth page 184 of the Witness application user manual is shown, in which an image of the More Settings Screen 186 is displayed and described. Here, it is possible for the user to select speed units 188 and also select whether the map should be displayed during recording 190, and at which speed it should be displayed in favour of the video feed. This is a safety feature of the Witness application that hides the video feed during recording when the vehicle is detected as travelling above a predetermined speed. The video feed is replaced by a map of the location of the vehicle – as is typical with in-vehicle GPS devices. Note that although the on-screen video feed is replaced with a map, video recording continues in the background.

[00205] In alternatives, the application may be arranged to detect the vehicle speed, and at a particular speed, switch off the screen entirely. It should be understood that the device will continue to record video, telemetry and other information even when the screen is

switched off. Entirely switching off the screen of the device is advantageous as it significantly reduces the drain on the battery of the mobile device.

[00206] Note that the Witness application is also arranged to interface with the phone to detect low-light conditions and in response change the brightness of the screen to prevent the user/driver being dazzled. This can also save battery life.

[00207] The More Settings Screen 186 also includes a Personal Details button 192 which, when pressed invokes a Personal Details Screen.

[00208] Referring to Figure 13, a ninth page 194 of the Witness application user manual is shown, in which an image of the Personal Details Screen 196 is displayed and described.

[00209] Here, the name 198, vehicle registration number 200, mobile number 202 and email address 204 to be used in an emergency, can be specified by the user. In the event of a detected incident, these details, along with information regarding the detected incident (e.g. time of incident, location and optionally telemetry data) will be emailed to the specified email address automatically. This can ensure that the chosen recipient of that email will be informed immediately about the occurrence and nature of the detected incident.

[00210] This Personal Details Screen 196 also allows the user to set whether it is possible for the video stack to be deleted 206. A security PIN protects the changing of this option so that if a first user having the PIN (for example, a parent) can review the driving style and behaviour of a second user not having the PIN (for example, their son or daughter) by reviewing the Recording Stack – as the Recording Stack cannot be deleted by that second user. As shown in Figure 24, the PIN can be set for the first time by entering it twice into the appropriate PIN fields 208.

[00211] Referring to Figure 14, a tenth page 210 of the Witness application user manual is shown, in which images of an Accident Management Screen 212 and Witness Details Screen 214 are displayed and described.

[00212] The Accident Management Screen 212 can be invoked by the user selecting the accident management button 90 on the Main Menu , or can be automatically switched to after the Witness application has detected that there has been an incident (e.g. via G-forces exceeding a threshold level). Similarly, data can automatically be permanently stored as "Kept" and/or sent if high G-forces are detected.

[00213] As can be seen on the Accident Management Screen 212, there are the following user selectable buttons:

[00214] Accident Advice / What to do 214

This option provides guidance as to what to do during an accident – see Figures 15 and 16 for the displayed Accident Advice Screens.

[00215] Witnesses 216

This option invokes functionality to allow the collection of information from or about witnesses to an incident. An image of the Witnesses Detail information summary screen 214 is shown in Figure 14. Figure 17 shows the Witness Detail information collection screen 218. Voice notes can also be taken via the microphone of the smart-phone.

[00216] Photos 220

This option enables the camera to allow a user to capture images associated with an incident.

[00217] Drivers 222

This option invokes functionality to allow collection about the other drivers involved in an incident, such as their vehicle and insurance details. The Drivers Detail information collection screen 224 is shown in Figure 18.

[00218] Your Details 226

This option provides a readily available store of the details of the user - as to be provided to other drivers – and can contain name, address and insurance details. The 'Your Details' screen 228 is shown in Figure 19.

[00219] Details recorded via the Accident Management Screen 212 are electronically authenticated and feature a time-stamp. In alternatives, this data may be encrypted to ensure the integrity of the stored data.

[00220] Furthermore, in alternatives, the exchange of the details of the drivers and witnesses can be conducted, at least in part, via Bluetooth® (for example, between mobile devices) – and/or via email. Relevant information associated with the driver is pre-stored on the Witness application in a format that can be sent readily, via a communication channel such as Bluetooth® or email.

[00221] Finally, note that in each Screen or Menu, there is a button 230 provided to go back to the previous menu. Also, when certain actions are performed or selected by a user, the Witness application is arranged to provide an audible feedback signal (for example, a

beep). For example, this could be in response to starting a recording, keeping a video segment and/or a stopped recording.

Alternatives and extensions

[00222] The Witness application can be extended to interface with remote users to allow them to control the operation of the application as well as view information logged by the application.

[00223] In particular, the present application can be extended to a scenario where the Witness application is under the control of an insurance company. Such an insurance company may provide insurance to the user, and so may have an interest in the behaviour of that user, and moreover, a vehicle under the control of that user, as described previously.

[00224] In such a scenario, the insurance company will maintain a device monitoring system that can interface with a mobile device running the Witness application. In fact, the device monitoring system may interface with a large number of mobile devices, each running an individual copy of the Witness application, logging respective user/vehicle behaviours. This could the insurance provider server 5 of Figure 1.

[00225] With such a monitoring system, it is unpractical to actively monitor each and every mobile device and receiving and handling the sheer quantity of data from each and every device would also be very difficult.

[00226] Consequently, the device monitoring system and the mobile devices are advantageously arranged to automatically and intelligently interface with one another in a way that minimises the computational and bandwidth burden on the device monitoring system.

[00227] In particular, each mobile device running the Witness application is arranged to make a determination as to whether there is a need to transfer data to the device monitoring system. For example, the Witness application may be arranged to automatically send data to the device monitoring system that only has high G-force activity associated with it, as this may be indicative of a crash or another driving incident. Alternatively, the Witness application may be arranged to send detailed or high-bandwidth information if a user indicates that an accident has occurred.

[00228] In either case, the video segments and associated sensor and/or derived driving information data associated with the relevant event will be sent. However, no other data (for example, from another date) will be sent.

[00229] Alternatively, less computationally or bandwidth intensive information may be sent on a periodic basis – for example, every day, week or month. Such general information may be sent to establish a profile of a particular user. For example, many high G-force related activities may indicate that the driver is driving aggressively. A determination about the profile can be made automatically by requesting and automatically analysing further data. For example, the location and speed information can be used to determine whether a vehicle is found to frequently break the speed limit. If this is the case, then the profile of the user can be set accordingly.

[00230] Such general and periodically obtained information can also be used to remotely adjust the settings of the application. For example, many high G-force related activities may instead indicate that the set up of the car is such that the mobile device is subjected to high G forces (rather than the driver driving aggressively). If the driving is determined to be safe, but the mobile device is setting off many false positives, then the device monitoring system can automatically adjust the settings of the application. For example, the G-force sensitivity threshold may be increased remotely.

[00231] Thus, the initial data that is automatically transmitted from the mobile device to the vehicle monitoring system is limited in bandwidth so as not to overload the vehicle monitoring system as a whole. However, after processing or analysis is performed on the initial data, further information may be requested. For example, further information may be requested automatically by the system or manually by a controller acting for the insurance company. Such further information may include high resolution video logs and sensor data and derived driving information such as G-force measurements.

[00232] It will be understood that the mobile device may also automatically keep certain data at random. Furthermore, the reason for keeping certain data may also be logged (e.g. logged as a result of a manual request by the user, or in response to a high G-force event).

[00233] The mobile device and device monitoring system may also be arranged to highlight detected transgressions. For example, driving during curfew hours, or driving at locations where insurance is not valid (e.g. other countries, off-road, race tracks etc).

[00234] As will be appreciated, the interaction of the mobile device and the device monitoring system has the advantage of actively improving user driving behaviour. That is, if the user knows that their logged driving behaviour may adversely effect their insurance policy, then it is likely that the user will be dissuaded from driving recklessly. In view of this, an insurance company may be able to incentivise users through lower insurance premiums.

[00235] However, so that users do not wrongfully benefit from such incentives, it is necessary to enforce the correct and consistent use of the Witness application.

[00236] It would not be beneficial from the perspective of the insurance company if the user could choose when to enable the application. For example, if a user could choose to disable the application when speeding then the effectiveness of the application would be reduced.

[00237] Accordingly, the application may include measures to guarantee that the application is enabled whenever a given insured vehicle is being driven.

[00238] Such measures may involve matching data recorded by the Witness application with that recorded independently by the vehicle. For example, the Witness application records the distance travelled during every journey. To ensure the summed distances of all journeys tracked by the Witness application tally with the total travelled distance of the vehicle, the user may be prompted to enter the odometer mileage periodically.

[00239] If the distance recorded by the Witness application does not correlate with the difference between odometer readings, then the discrepancy will be flagged to the user and/or the insurance company. A substantial discrepancy will typically indicate that the Witness application has not been monitoring all vehicle journeys and the appropriate action can be taken (e.g. the user can be warned, insurance premium may be raised etc).

[00240] It will be appreciated that such a tallying exercise depends on the Witness application being used every time one particular vehicle is driven. However, in alternatives, if the Witness application is used with different vehicles, the Witness application may be arranged to register the different vehicles so that their respective odometer readings can be tallied with distance recordings associated with each respective vehicle.

[00241] Other measures can be implemented in conjunction with the Witness application to guarantee that the application is enabled whenever a given vehicle is being driven. For example, the mobile device on which the Witness application is installed may comprise an NFC device, such as an RFID tag. The NFC device may be compatible with a

complementary device on a so-called 'smart-holster' into which the mobile device may be fitted during operation.

[00242] The smart-holster interacts with the NFC device on the smart-phone to determine whether or not the smart-phone is inserted into the smart-holster. The smart-holster can then be interfaced with the engine management system of the vehicle so that the vehicle may be activated and driven only when the mobile device is in place within the smart-holster.

[00243] It will be appreciated that the mobile device has so far been described in the context of a smart-phone. However, it will be appreciated by a person skilled in the art that other devices may also be suitable for performing the functions described in relation to the Witness application. For example, the Witness application may be adapted to run on a general purpose tablet-style computing device, such as an iPad®.

[00244] Furthermore, it will be understood that features, advantages and functionality of the different embodiments described herein may be combined where context allows. In addition, a skilled person will appreciated that the functionality described above may be implemented using the mobile device suitably programmed.

[00245] Having described several exemplary embodiments of the present invention and the implementation of different functions of the device in detail, it is to be appreciated that the skilled addressee will readily be able to adapt the basic configuration of the device to carry out described functionality without requiring detailed explanation of how this would be achieved. Therefore, in the present specification several functions of the device have been described in different places without an explanation of the required detailed implementation as this not necessary given the abilities of the skilled addressee to code functionality into the device.

CLAIMS:

1. A portable mobile telecommunications device configured to log driving information associated with a vehicle, the portable mobile telecommunications device comprising:

a sensor set comprising at least one of an image sensor, an audio sensor, an accelerometer and a positioning module, or a combination thereof;

a processor;

and a memory;

the portable mobile telecommunications device being configured to:

determine, based at least in part on sensor data from the device's sensor set, a start of a driving period during which the mobile device is present in the vehicle and the vehicle is in use,

process the sensor data from the sensor set during the driving period to derive driving information associated with how the vehicle is driven, mobile telecommunications device being configured to process the sensor data automatically, using a neural network provided in the mobile device, to determine whether the driving information satisfies one or more safe driving thresholds;

store at least some of the driving information to the memory; and,

wherein the portable mobile telecommunications device is configured to have a training period during which sensor data from the device's sensor set is used to determine a benchmark for a particular driver and to use the benchmark during the driving period.

2. A portable mobile telecommunications device of Claim 1, wherein the driving information is derived without data from the vehicle sensors.

3. A portable mobile telecommunications device of Claim 1, wherein the telecommunications device is configured to detect the occurrence of a predetermined event and in response to take at least one predetermined action.

4. A portable mobile telecommunications device of Claim 1, wherein the telecommunications device is configured to process the driving information to generate a driving score associated with a particular driver of the vehicle.

5. A portable mobile telecommunications device of Claim 4, wherein the telecommunications device is configured to use the driving score associated with the particular driver of the vehicle to define an insurance premium for the particular driver of the vehicle.

6. A portable mobile telecommunications device of Claim 1, further comprising a user interface and wherein the telecommunications device is configured to determine, based at least in part on the inputs received by the user interface, the start of the driving period.

7. A portable mobile telecommunications device of Claim 1, wherein the telecommunications device is a smartphone.

8. A portable mobile telecommunications device of Claim 7, wherein the telecommunications device is controlled by a downloaded application to use the neural network to determine whether the driving information satisfies the one or more safe driving thresholds.

9. A portable mobile telecommunications device of Claim 5, wherein the telecommunications device is removably affixed to the vehicle during the driving period.

10. A portable mobile telecommunications device according to Claim 1, wherein the telecommunications device is configured to detect predetermined driving events, the predetermined driving events comprising at least one of a vehicle acceleration event, a vehicle braking event, a vehicle cornering event, a vehicle orientation event and a vehicle swerving event.

11. A portable mobile telecommunications device according to Claim 1, wherein the telecommunications device comprises an event detector, configured to detect the occurrence of a predetermined driving event using an event indication model provided in the mobile telecommunications device.

12. A portable mobile telecommunications device according to Claim 11, wherein the event indication model comprises a pattern of predetermined data values and the event detector is configured to detect the occurrence of an event by carrying out pattern recognition by matching sensor data values to the pattern of predetermined data values of the event indication model.

13. A portable mobile telecommunications device of Claim 1, wherein the telecommunications device comprises an event detector, configured to detect the occurrence of a predetermined driving event using an event indication model provided in the telecommunications device and wherein ~~mobile~~ telecommunications device is configured to modify the event indication model in response to determining the benchmark.

14. A mobile telecommunications device configured to log driving information associated with a vehicle, the mobile telecommunications device comprising:

a sensor set comprising at least one of an image sensor, an audio sensor, an accelerometer and a positioning module, or a combination thereof;

a processor;

and a memory;

the portable mobile telecommunications device being configured to:

determine, based at least in part on sensor data from the device's sensor set, a start of a driving period during which the mobile device is present in the vehicle and the vehicle is in use,

process the sensor data from the sensor set during the driving period to derive driving information associated with how the vehicle is driven, portable mobile telecommunications device being configured to process the sensor data automatically, using a neural network provided in the mobile device, to determine whether the driving information satisfies one or more safe driving thresholds;

store at least some of the driving information to the memory; and,

wherein the portable mobile telecommunications device is configured to control the mobile device to selectively disable functions of the portable mobile telecommunications device during the driving period in dependence on the driving information.

15. The mobile telecommunications device of Claim 14, wherein the portable mobile telecommunications device is configured to selectively disable and/or divert incoming voice calls during the driving period.

16. The mobile telecommunications device of Claim 1, wherein the portable mobile telecommunications device comprises a wireless telecommunications module operable to download a controlling application and the processor is configurable by the controlling application.

17. A data-logging system for logging driving information comprising:

a database for storing a plurality of accounts, each account having a unique identifier and the database being arranged to store driving information associated with at least one of a vehicle and a driver;

a communications interface arranged to communicate with a remote mobile telecommunications device in combination with an adapter according to Claim 1, and receive therefrom:

a unique identifier for association of the portable mobile device with a corresponding one of the plurality of accounts; and

driving information to be logged to that corresponding account.

18. A mobile telecommunications device configured to process driving information associated with a vehicle, the mobile telecommunications device comprising:

a sensor set comprising at least one of an image sensor, an audio sensor, an accelerometer and a positioning module, or a combination thereof; and

a processor, the processor being configurable as a neural network;

the portable mobile telecommunications device being configured to process sensor data from the sensor set during a driving period, during which the mobile device is present in the vehicle and the vehicle is in use, to derive driving information associated with how the vehicle is driven, the mobile telecommunications device being configured to process the sensor data automatically, using the neural network, to determine whether the driving information satisfies the one or more safe driving thresholds; and, wherein the mobile

telecommunications device is configured to determine, based at least in part on the sensor data from the device's sensor set, a start of the driving period.

19. A mobile telecommunications device of Claim 18, further comprising a user interface and wherein the portable mobile telecommunications device is configured to determine, based at least in part on the inputs received by the user interface, the start of the driving period.

20. The mobile telecommunications device of Claim 18, wherein the portable mobile telecommunications device is configured to detect the occurrence of a predetermined event and in response to take at least one predetermined action.

21. The mobile telecommunications device of Claim 18, wherein the portable mobile telecommunications device is configured to control the mobile device to selectively disable functions of the mobile telecommunications device during the driving period in dependence on the driving information.

22. The mobile telecommunications device of Claim 21, wherein the portable mobile telecommunications device is configured to control the mobile device to selectively disable and/or divert incoming voice calls during the driving period.

23. The mobile telecommunications device of Claim 18, wherein the portable mobile telecommunications device comprises a wireless telecommunications module operable to download a controlling application and the processor is configurable by the controlling application.

ABSTRACT

METHOD AND SYSTEM FOR LOGGING VEHICLE BEHAVIOUR

A mobile telecommunications device configured to log driving information associated with a vehicle is described. The mobile telecommunications device comprises: a sensor set comprising at least one of an image sensor, an audio sensor, an accelerometer and a positioning module, or a combination thereof; a processor; and a memory; the mobile telecommunications device being configured to: determine, based at least in part on sensor data from the device's sensor set, a start of a driving period during which the mobile device is present in the vehicle and the vehicle is in use, process the sensor data from the sensor set during the driving period to derive driving information associated with how the vehicle is driven, mobile telecommunications device being configured to process the sensor data automatically, using a neural network provided in the mobile device, to determine whether the driving information represents an acceptable or unacceptable driving pattern; and store at least some of the driving information to the memory.

Substitute for Form SB08a/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*	***Complete if Known***	
	Application Number	17/729,962
	Filing Date	April 26, 2022
	First Named Inventor	Wright, Andrew William
	Art Unit	3666
	Examiner Name	Central Docket
	Attorney Docket Number	044228.111206

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	90	Meyer, Stefan; "Fahrtenbuch--iPhone Apps Plus"; https://web.archive.org/web/20091210215707/http://www.iphoneappsplus.com/- -business/fahrtenbuch/index.htm; retrieved Jan. 19, 2016; 2 pages (XP055242544).	
	91	"iPhone & iPad iOS Entwicklung"; NeuMedienFraktion; http://www.neuemedienfraktion.de/iPhone/iPhone.html; retrieved Jan. 19, 2016; 2 pages (XP055242566).	
	92	Kanjo et al.; "MobGeoSen: facilitating personal geosensor data collection and visualization using mobile phones"; Personal and Ubiquitous Computing; vol. 12 No. 8; 2008; p. 599-607.	
	93	European Patent Application No. 11813683.7; Office Action Article 94(3); dated Jan. 26, 2016; 6 pages.	
	94	European Patent Application No. 17165104.5; Extended Search Report; dated Oct. 16, 2017; 12 pages.	

Substitute for Form SB08a/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*	***Complete if Known***	
	Application Number	17/729,962
	Filing Date	April 26, 2022
	First Named Inventor	Wright, Andrew William
	Art Unit	3666
	Examiner Name	Central Docket
	Attorney Docket Number	044228.111206

NON PATENT LITERATURE DOCUMENTS			
	95	Thompson et al.; "Using Smartphones to Detect Car Accidents and Provide Situational Awareness to Emergency Responders"; Mobile Wireless Middleware, Operating Systems, and Applications; 2010; p. 29-42	
	96	Langle et al.; "Are You a Safe Driver"; Int'l Conf. on Computational Science and Engineering; 2009; p. 502-507	

Examiner Signature		**Date Considered**	

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See CFR 1.97(e)(1)

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement. See CFR 1.97(e)(2)

CONTENT OF IDS

☒ Copies of reference numbers **1 - 96** are not being submitted because they were previously cited by or submitted to the U.S. Patent and Trademark Office in patent application number **16/665,746**, filed **October 28, 2019 now patent number 11,321,970** in patent application number **16/222,893**, filed **December 17, 2018 now patent number 10,950,068** in patent application number **15/454,944**, filed **March 9, 2017 now patent number 10,198,878** in patent application number **15/061,910**, filed **March 4, 2016 now patent number 9,633,487** in patent application number **13/994,455**, filed **July 24, 2013 now patent number 9,311,271** for which a claim for priority under 35 U.S.C. § 120 has been made in the instant application.

☐ The month of publication for reference numbers is not available. However, the year of publication for these references is sufficiently earlier than the effective US filing date and any foreign priority date so that the particular month of publication is not in issue pursuant to 37 CFR § 1.98(b).

STATEMENT UNDER 37 C.F.R. § 1.704(d)(1)

Substitute for Form SB08a/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*	***Complete if Known***	
	Application Number	17/729,962
	Filing Date	April 26, 2022
	First Named Inventor	Wright, Andrew William
	Art Unit	3666
	Examiner Name	Central Docket
	Attorney Docket Number	044228.111206

☐ This information disclosure statement is in compliance with §§ 1.97 and 1.98 and will not be considered a failure to engage in reasonable efforts to conclude prosecution (processing or examination) of the application under paragraphs 37 C.F.R. § 1.704(c)(6), (c)(8), (c)(9), or (c)(10) because each item of information contained in the information disclosure statement:

☐ Was first cited in any communication from a patent office in a counterpart foreign or international application or from the Office, and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of the information disclosure statement; or

☐ Is a communication that was issued by a patent office in a counterpart foreign or international application or by the Office, and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of the information disclosure statement.

☐ See attached certification statement.

☐ The fee set forth in § 1.17(p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

Please charge any deficiency or credit any overpayment to Deposit Account No. 23-3050.

SIGNATURE

/Mark H. Krietzman/

Mark H. Krietzman
Registration No. 41128

Date: May 28, 2024

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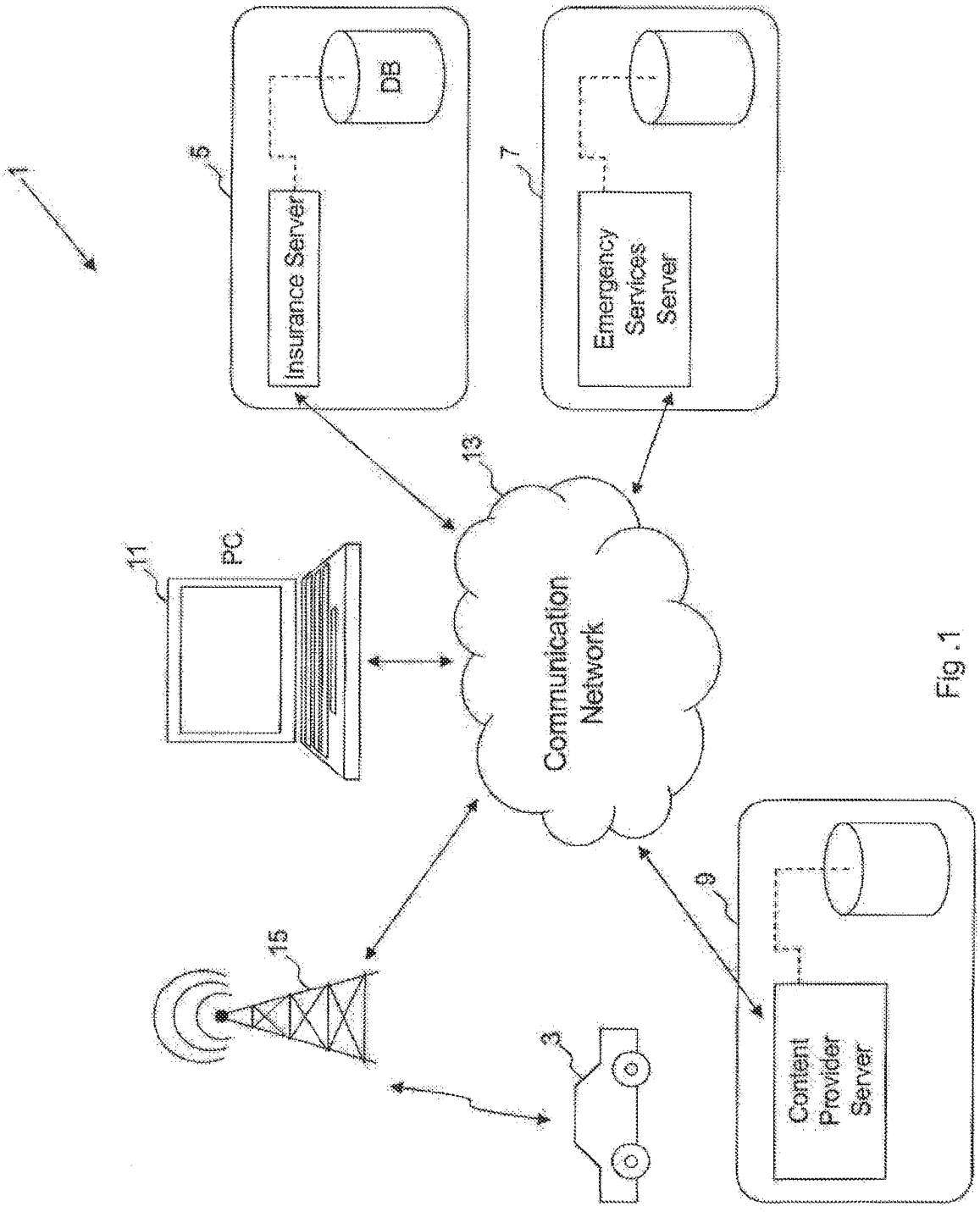

1
5
DB
Insurance Server
7
Emergency Services Server
13
Communication Network
11
PC
9
Content Provider Server
15
3

Fig .1

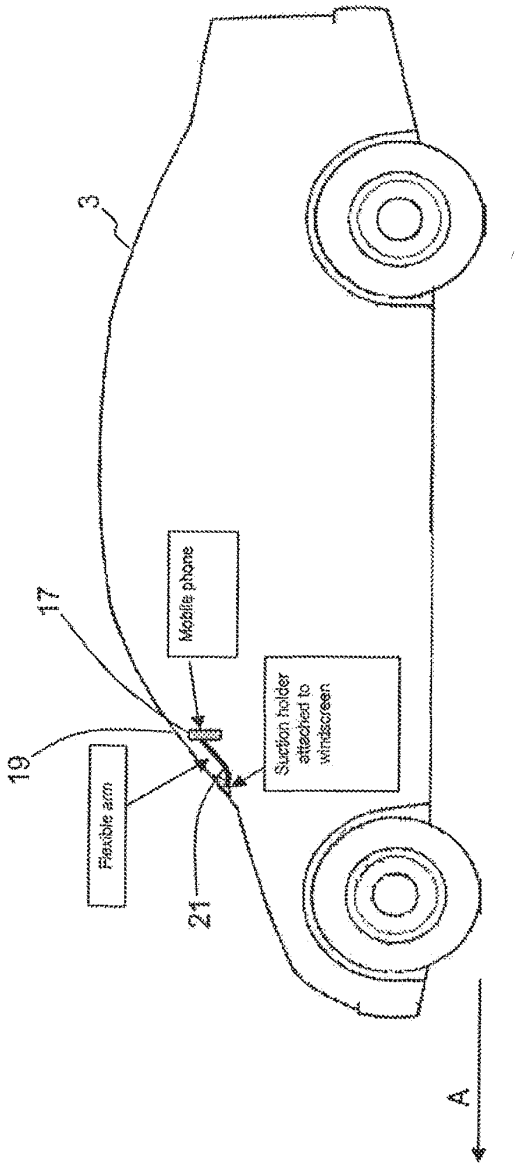

3
17
19
21
Mobile phone
Suction holder attached to windscreen
Flexible arm
A

Fig.2

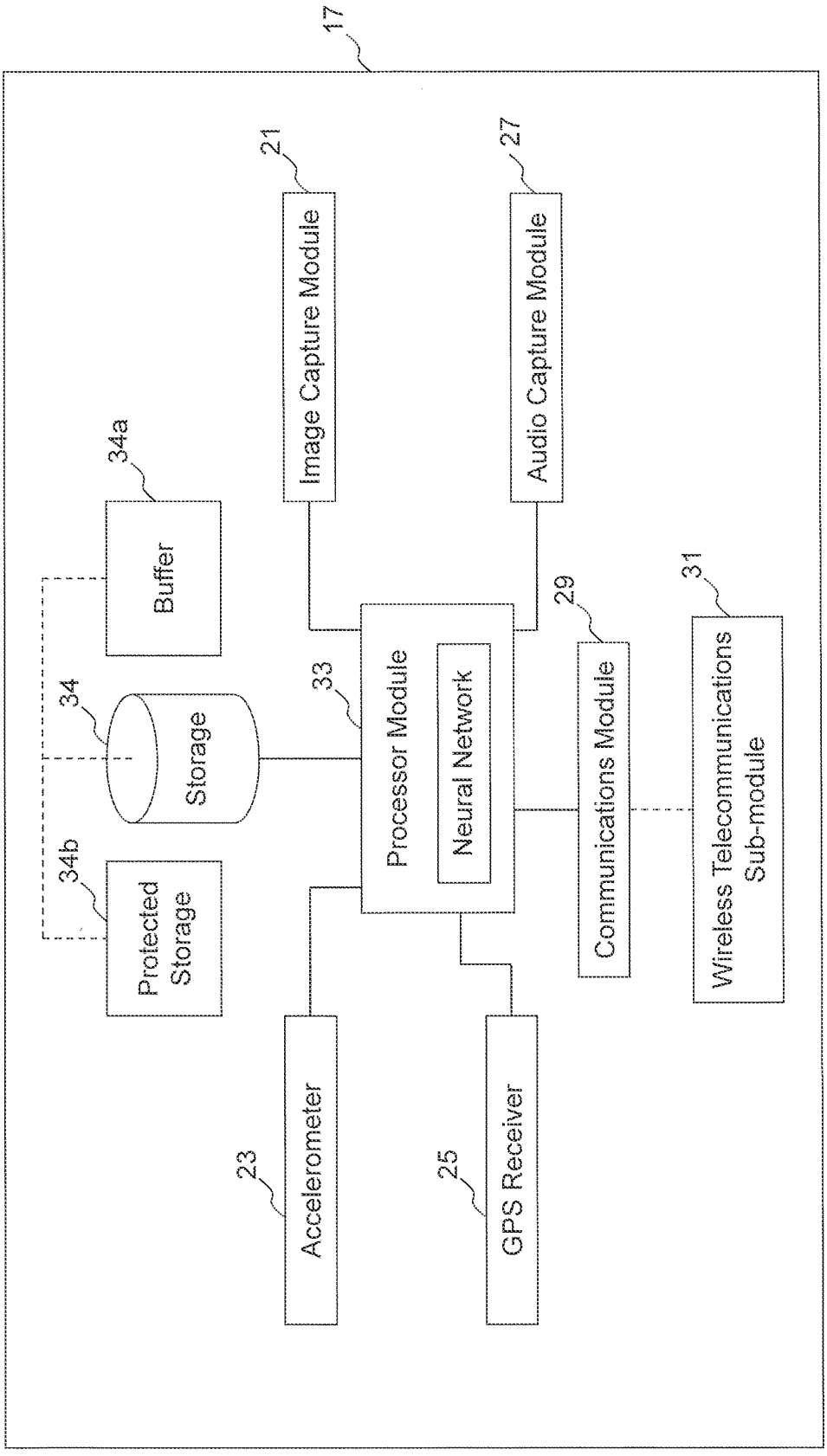

17
21
Image Capture Module
27
Audio Capture Module
34a
Buffer
34
Storage
33
Processor Module
Neural Network
29
Communications Module
31
Wireless Telecommunications Sub-module
34b
Protected Storage
23
Accelerometer
25
GPS Receiver

Fig .3

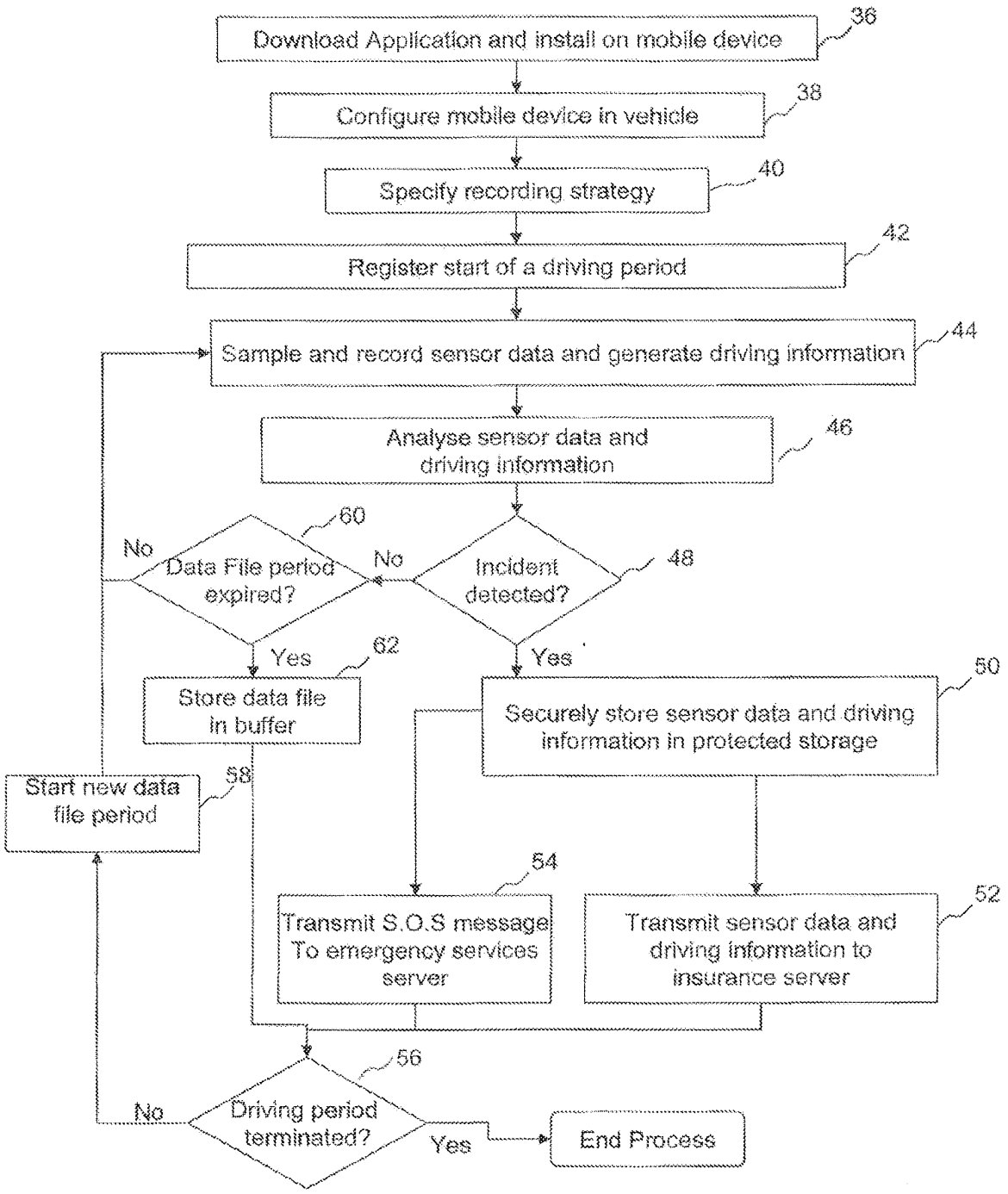

Download Application and install on mobile device
36
Configure mobile device in vehicle
38
Specify recording strategy
40
Register start of a driving period
42
Sample and record sensor data and generate driving information
44
Analyse sensor data and driving information
46
60
No
Data File period expired?
No
Incident detected?
48
Yes
62
Yes
Store data file in buffer
Securely store sensor data and driving information in protected storage
50
Start new data file period
58
54
Transmit S.O.S message To emergency services server
Transmit sensor data and driving information to insurance server
52
56
No
Driving period terminated?
Yes
End Process

Fig. 4a

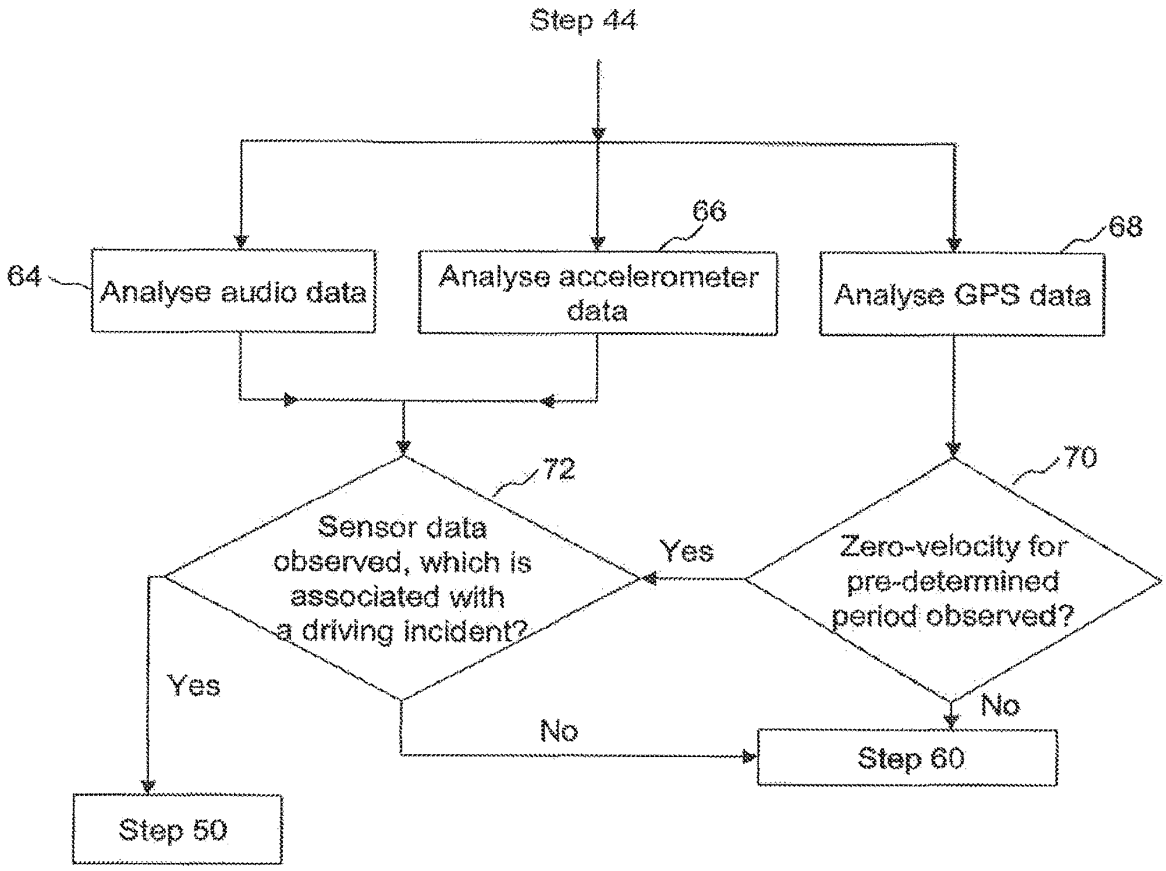

Step 44
64
Analyse audio data
66
Analyse accelerometer data
68
Analyse GPS data
72
Sensor data observed, which is associated with a driving incident?
70
Zero-velocity for pre-determined period observed?
Yes
Yes
No
No
Step 50
Step 60

Fig. 4b

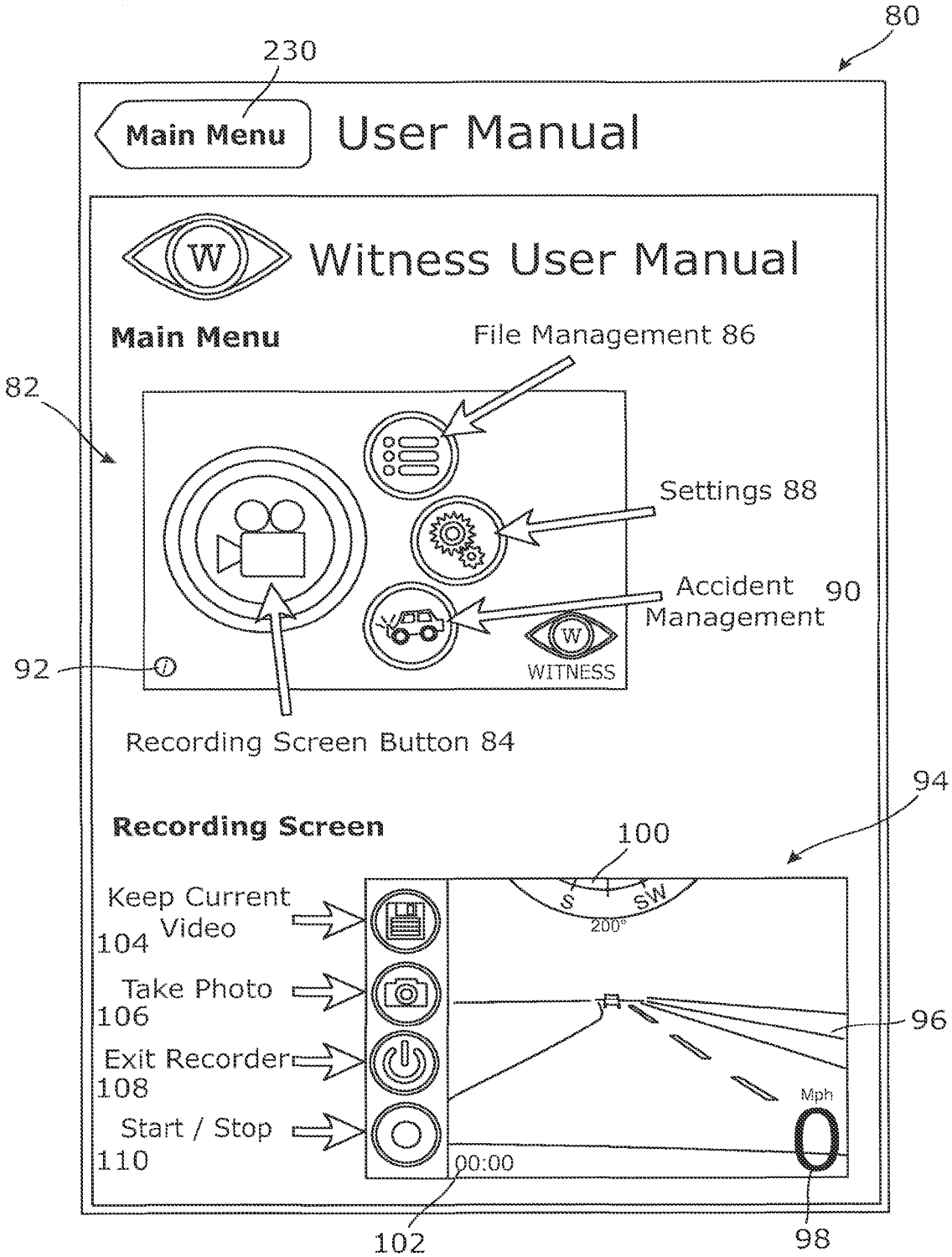

80
230
Main Menu
User Manual
Witness User Manual
Main Menu
File Management 86
82
Settings 88
Accident Management 90
92
WITNESS
Recording Screen Button 84
94
Recording Screen
100
Keep Current Video
104
Take Photo
106
Exit Recorder
108
Start / Stop
110
S
SW
200°
96
Mph
0
00:00
102
98

Fig. 5

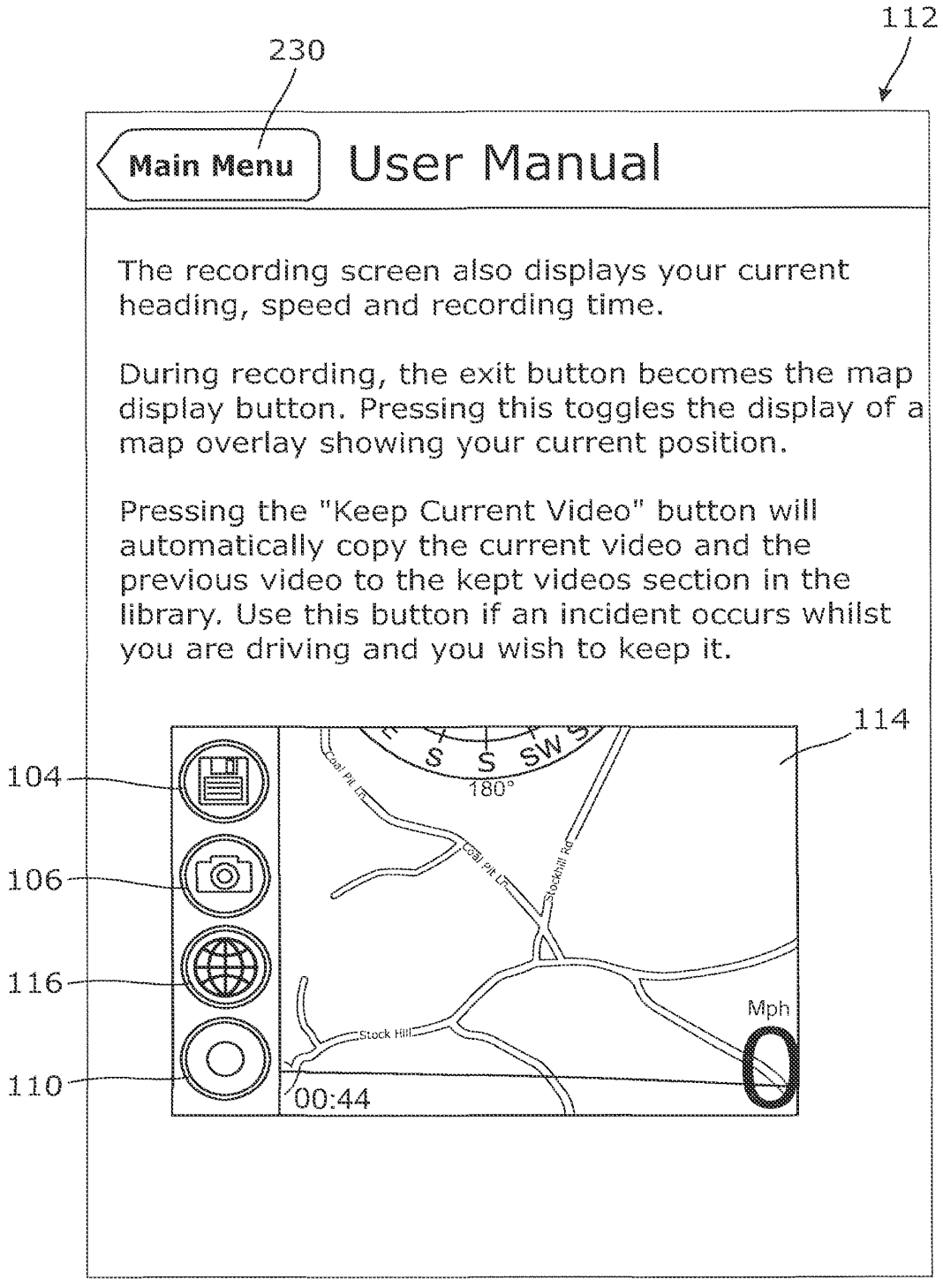

112
230
Main Menu
User Manual
The recording screen also displays your current heading, speed and recording time.
During recording, the exit button becomes the map display button. Pressing this toggles the display of a map overlay showing your current position.
Pressing the "Keep Current Video" button will automatically copy the current video and the previous video to the kept videos section in the library. Use this button if an incident occurs whilst you are driving and you wish to keep it.
114
104
106
116
110
S
S
SW
180°
Coal Pit Ln
Coal Pit Ln
Stockhill Rd
Stock Hill
Mph
0
00:44

Fig. 6

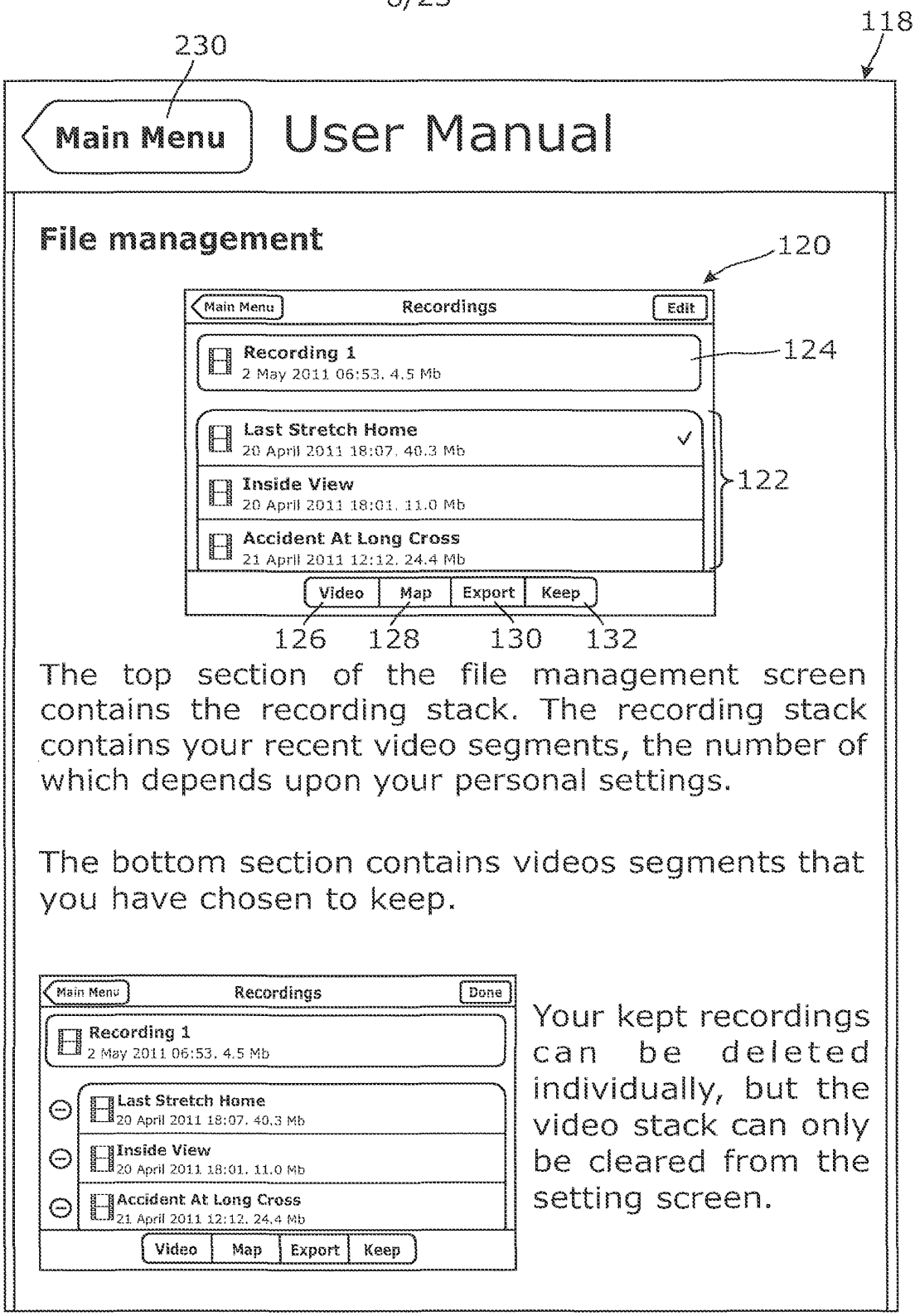

118
230
Main Menu
User Manual
File management
120
Main Menu
Recordings
Edit
Recording 1
2 May 2011 06:53, 4.5 Mb
124
Last Stretch Home
20 April 2011 18:07, 40.3 Mb
Inside View
20 April 2011 18:01, 11.0 Mb
Accident At Long Cross
21 April 2011 12:12, 24.4 Mb
122
Video
Map
Export
Keep
126
128
130
132
The top section of the file management screen contains the recording stack. The recording stack contains your recent video segments, the number of which depends upon your personal settings.
The bottom section contains videos segments that you have chosen to keep.
Main Menu
Recordings
Done
Recording 1
2 May 2011 06:53, 4.5 Mb
Last Stretch Home
20 April 2011 18:07, 40.3 Mb
Inside View
20 April 2011 18:01, 11.0 Mb
Accident At Long Cross
21 April 2011 12:12, 24.4 Mb
Video
Map
Export
Keep
Your kept recordings can be deleted individually, but the video stack can only be cleared from the setting screen.

Fig. 7

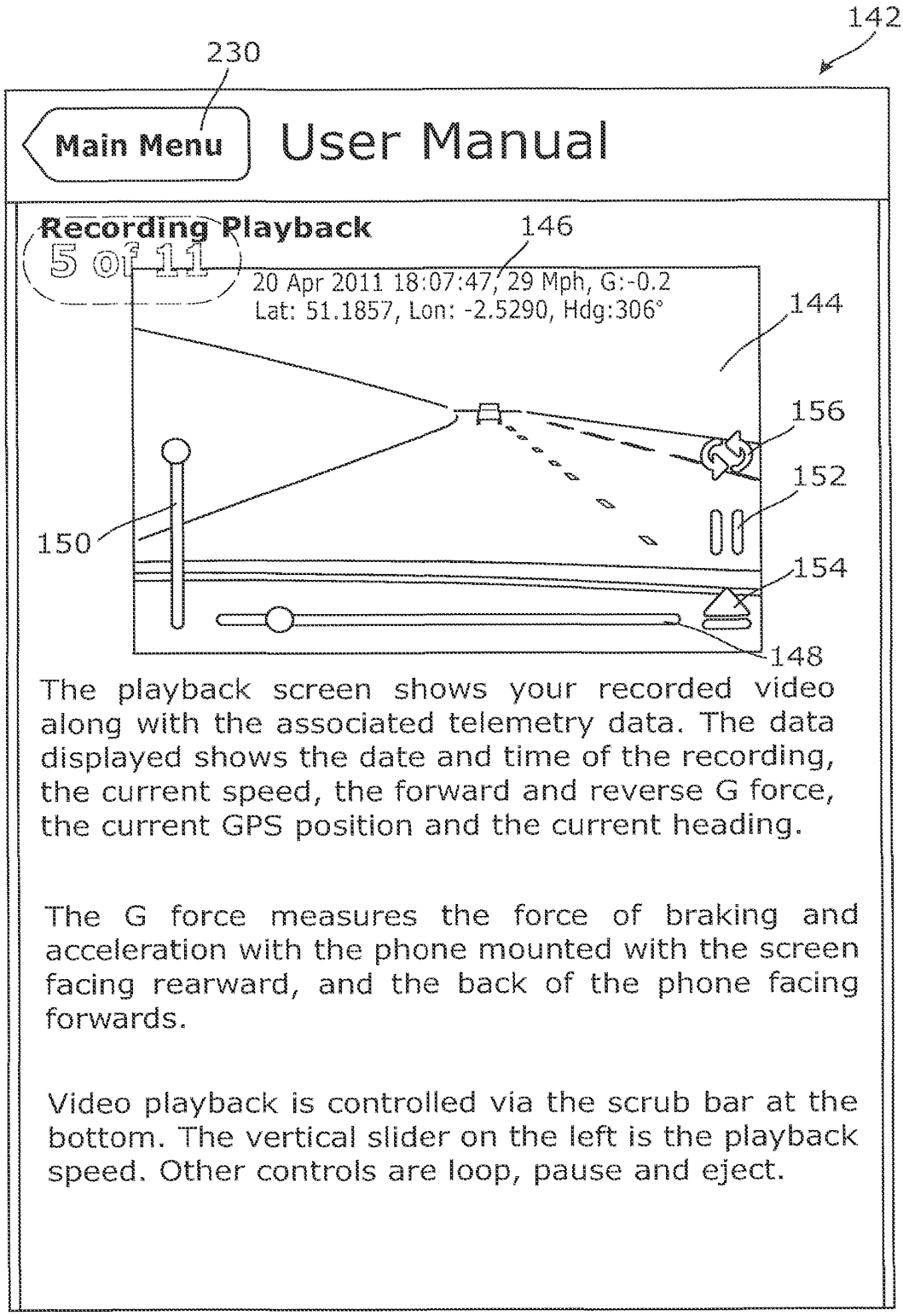

142
230
Main Menu
User Manual
Recording Playback
5 of 11
146
20 Apr 2011 18:07:47, 29 Mph, G:-0.2
Lat: 51.1857, Lon: -2.5290, Hdg:306°
144
156
152
150
154
148
The playback screen shows your recorded video along with the associated telemetry data. The data displayed shows the date and time of the recording, the current speed, the forward and reverse G force, the current GPS position and the current heading.
The G force measures the force of braking and acceleration with the phone mounted with the screen facing rearward, and the back of the phone facing forwards.
Video playback is controlled via the scrub bar at the bottom. The vertical slider on the left is the playback speed. Other controls are loop, pause and eject.

Fig. 8

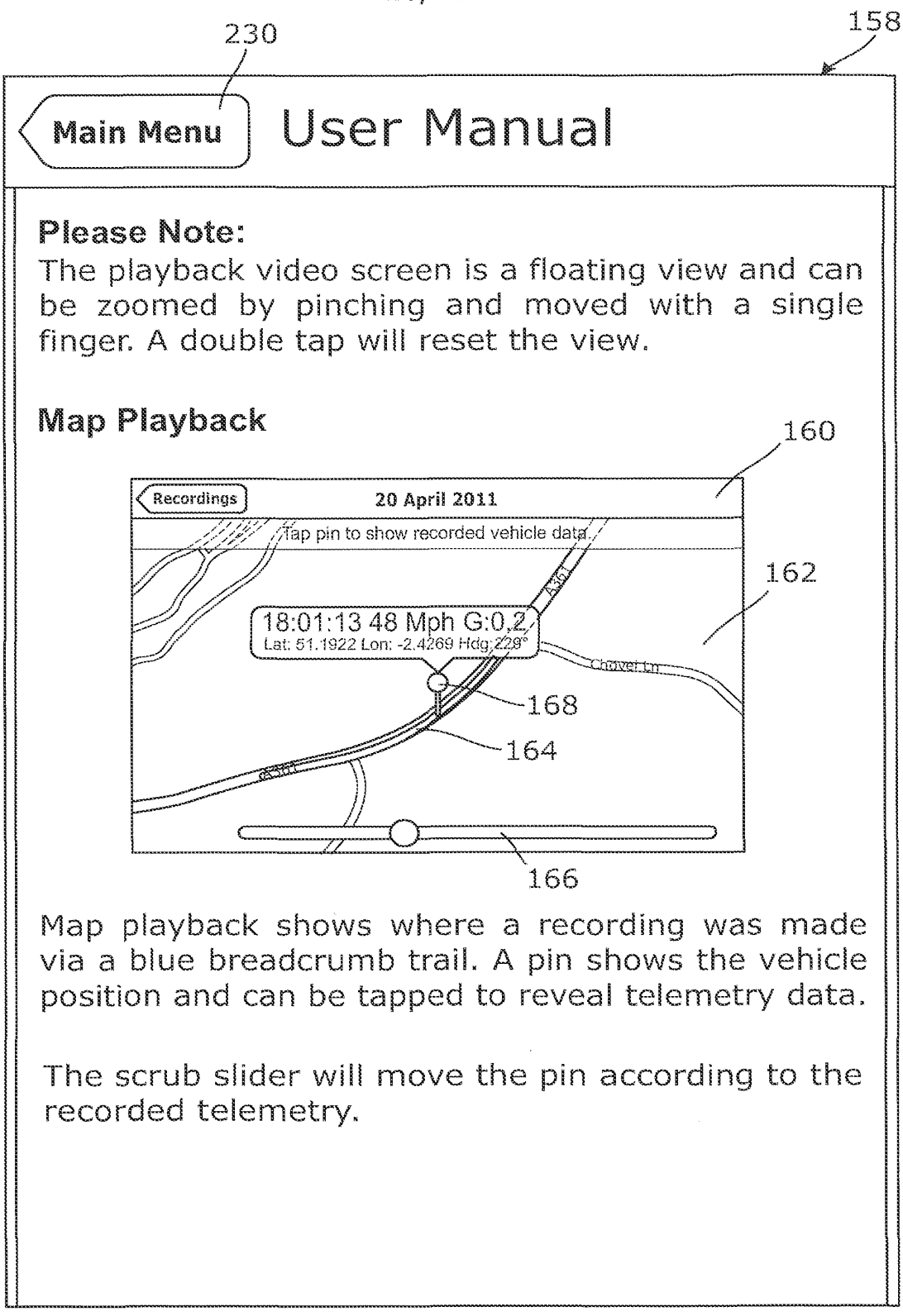

230
158
Main Menu
User Manual
Please Note:
The playback video screen is a floating view and can be zoomed by pinching and moved with a single finger. A double tap will reset the view.
Map Playback
160
Recordings
20 April 2011
Tap pin to show recorded vehicle data.
162
18:01:13 48 Mph G:0.2
Lat: 51.1922 Lon: -2.4269 Hdg: 228°
A361
Chovel Ln
168
164
A361
166
Map playback shows where a recording was made via a blue breadcrumb trail. A pin shows the vehicle position and can be tapped to reveal telemetry data.
The scrub slider will move the pin according to the recorded telemetry.

Fig. 9

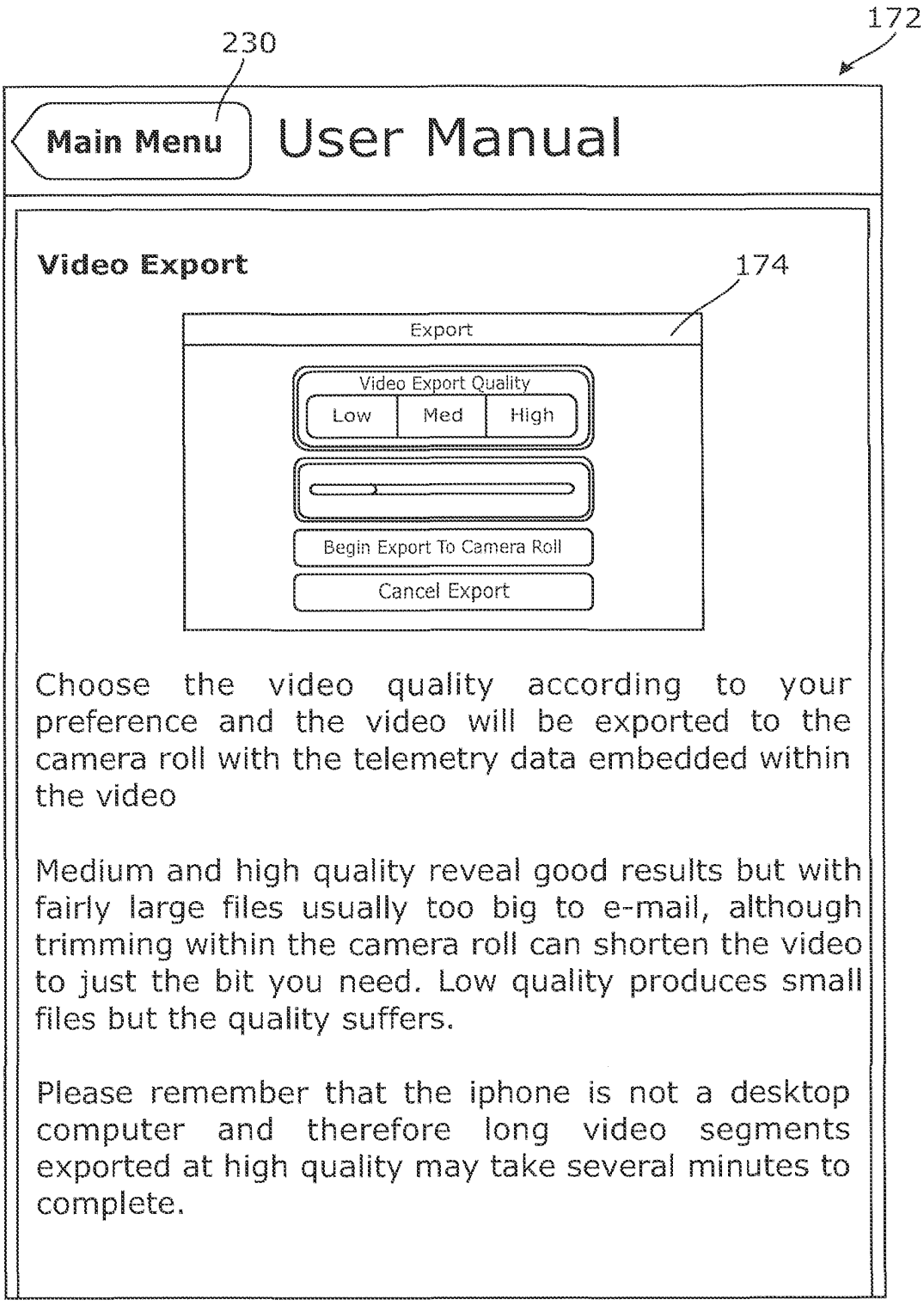
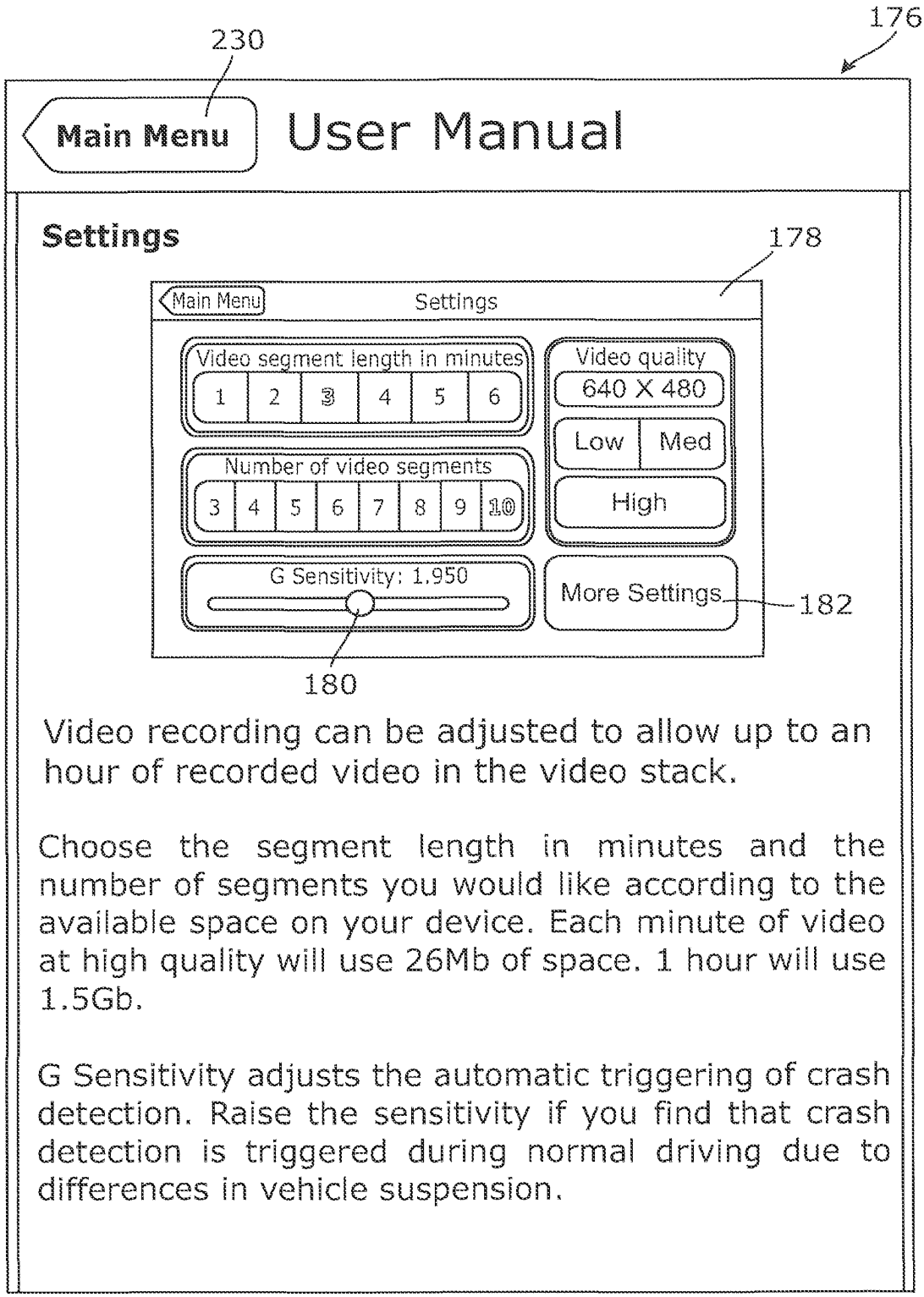

172
230
Main Menu
User Manual
Video Export
174
Export
Video Export Quality
Low
Med
High
Begin Export To Camera Roll
Cancel Export
Choose the video quality according to your preference and the video will be exported to the camera roll with the telemetry data embedded within the video
Medium and high quality reveal good results but with fairly large files usually too big to e-mail, although trimming within the camera roll can shorten the video to just the bit you need. Low quality produces small files but the quality suffers.
Please remember that the iphone is not a desktop computer and therefore long video segments exported at high quality may take several minutes to complete.

Fig. 10

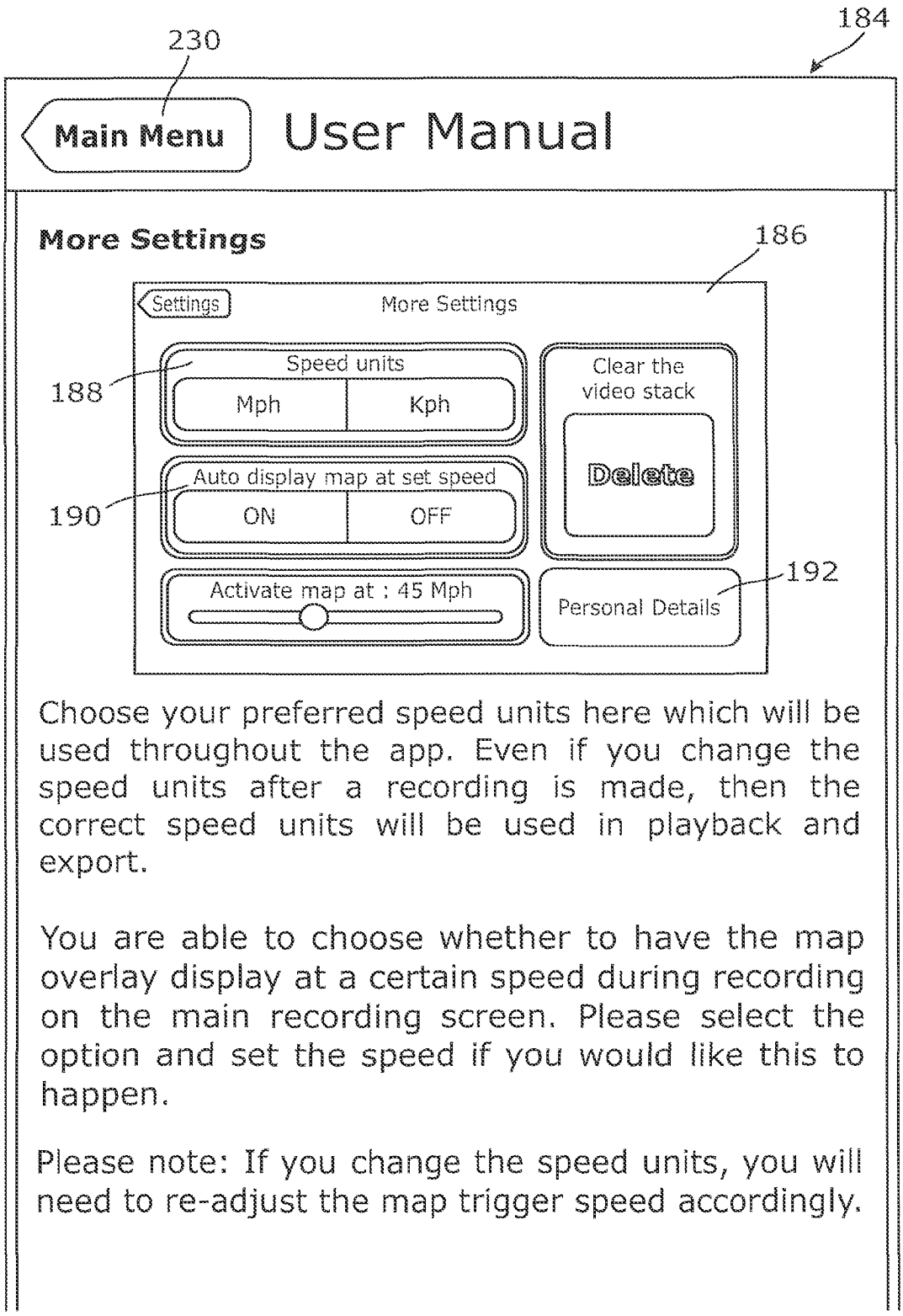


Video recording can be adjusted to allow up to an hour of recorded video in the video stack.

Choose the segment length in minutes and the number of segments you would like according to the available space on your device. Each minute of video at high quality will use 26Mb of space. 1 hour will use 1.5Gb.

G Sensitivity adjusts the automatic triggering of crash detection. Raise the sensitivity if you find that crash detection is triggered during normal driving due to differences in vehicle suspension.

Fig. 11



Choose your preferred speed units here which will be used throughout the app. Even if you change the speed units after a recording is made, then the correct speed units will be used in playback and export.

You are able to choose whether to have the map overlay display at a certain speed during recording on the main recording screen. Please select the option and set the speed if you would like this to happen.

Please note: If you change the speed units, you will need to re-adjust the map trigger speed accordingly.

Fig. 12

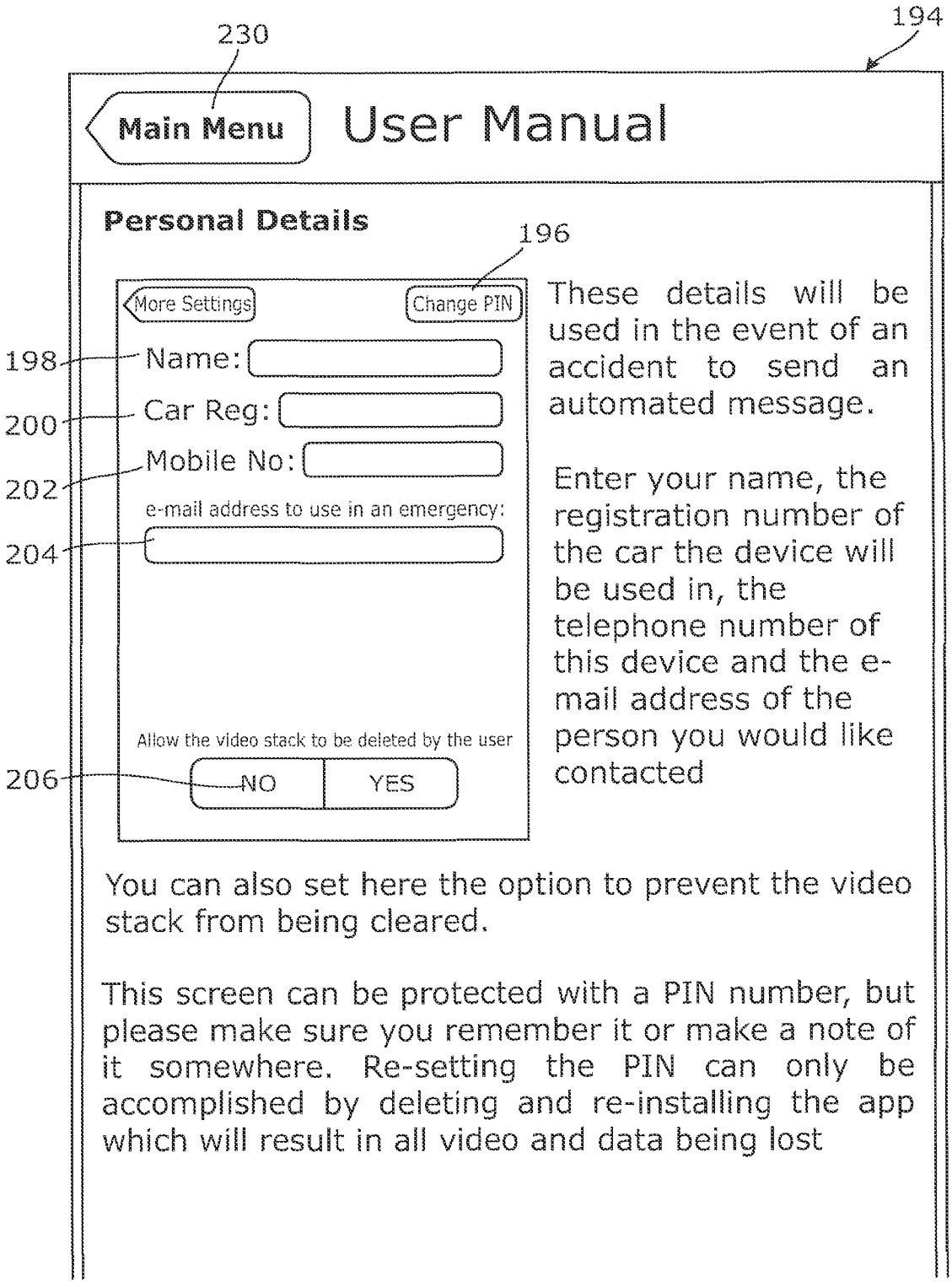

194
230
Main Menu
User Manual
Personal Details
196
More Settings
Change PIN
198
Name:
200
Car Reg:
202
Mobile No:
e-mail address to use in an emergency:
204
Allow the video stack to be deleted by the user
206
NO
YES
These details will be used in the event of an accident to send an automated message.
Enter your name, the registration number of the car the device will be used in, the telephone number of this device and the e-mail address of the person you would like contacted
You can also set here the option to prevent the video stack from being cleared.
This screen can be protected with a PIN number, but please make sure you remember it or make a note of it somewhere. Re-setting the PIN can only be accomplished by deleting and re-installing the app which will result in all video and data being lost

Fig. 13

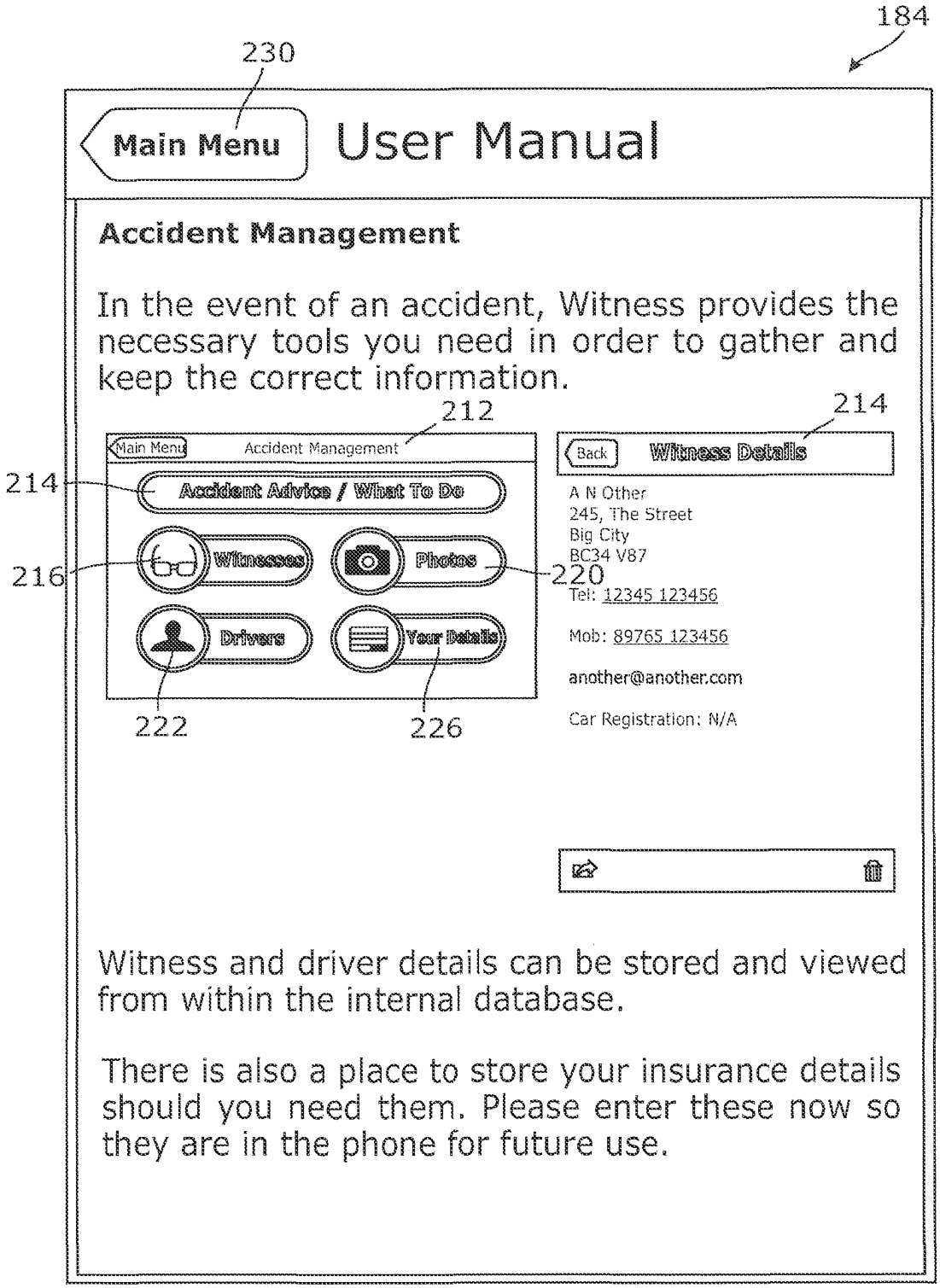

184
230
Main Menu
User Manual
Accident Management
In the event of an accident, Witness provides the necessary tools you need in order to gather and keep the correct information.
212
214
Main Menu
Accident Management
Back
Witness Details
214
Accident Advice / What To Do
A N Other
245, The Street
Big City
BC34 V87
216
Witnesses
Photos
220
Tel: 12345 123456
Drivers
Your Details
Mob: 89765 123456
another@another.com
Car Registration: N/A
222
226
Witness and driver details can be stored and viewed from within the internal database.
There is also a place to store your insurance details should you need them. Please enter these now so they are in the phone for future use.

Fig. 14


230
Accident Management
What should you do?
Make sure you and others are safe
* Is anyone injured?
* Is the accident causing a hazard?
* Has someone left the scene?
If yes to any of these, then call the emergency services
1. Witnesses - Collect the names and addresses of any witnesses.
2. Photographs - Take pictures of the scene of the accident, damage to cars and other property, and the occupants of the other vehicle.
3. Drivers - Collect names, addresses, registration numbers and insurance details of all other drivers involved.

Fig. 15

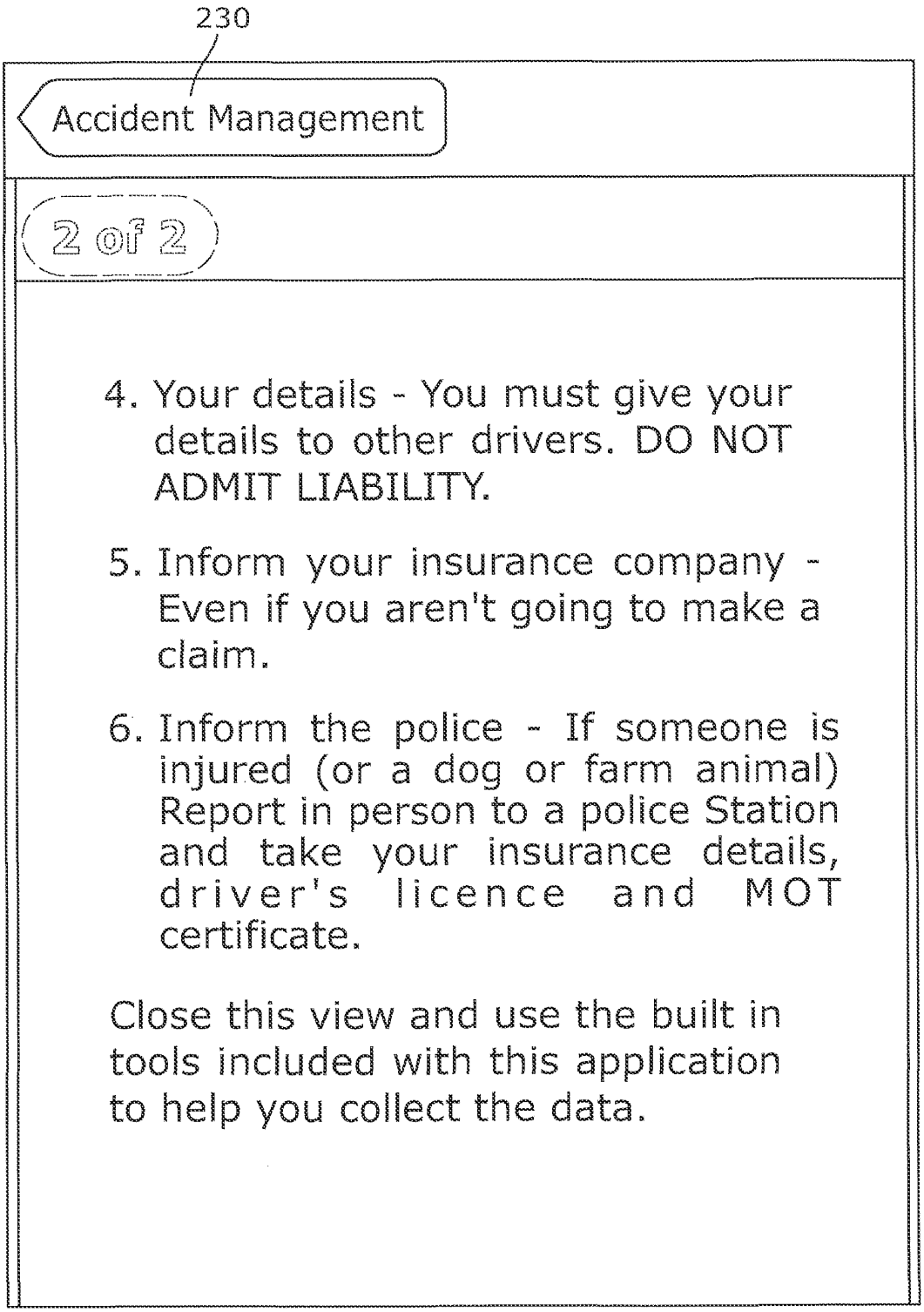

230
Accident Management
2 of 2
4. Your details - You must give your details to other drivers. DO NOT ADMIT LIABILITY.
5. Inform your insurance company - Even if you aren't going to make a claim.
6. Inform the police - If someone is injured (or a dog or farm animal) Report in person to a police Station and take your insurance details, driver's licence and MOT certificate.
Close this view and use the built in tools included with this application to help you collect the data.

Fig. 16

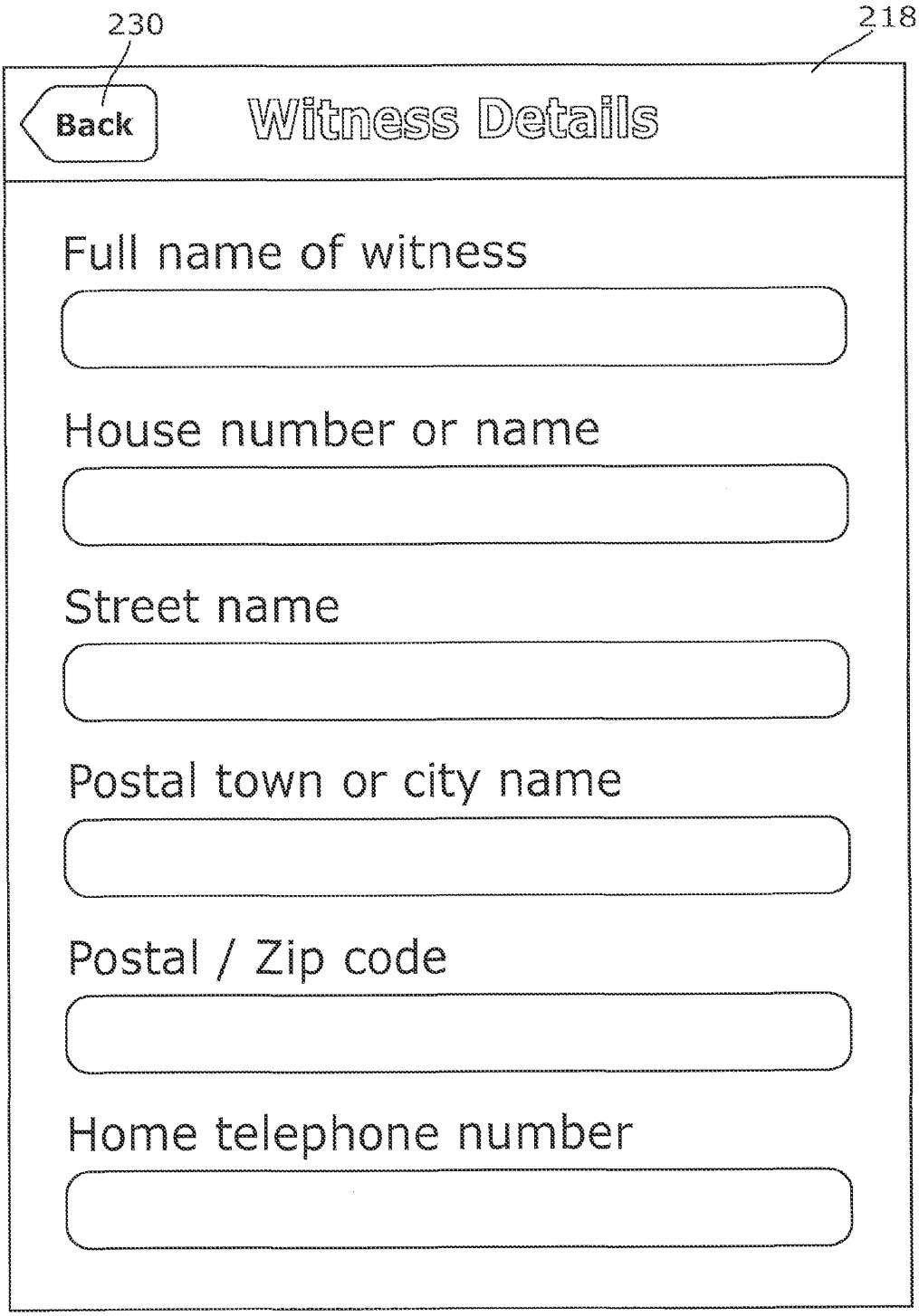

230
218
Back
Witness Details
Full name of witness
House number or name
Street name
Postal town or city name
Postal / Zip code
Home telephone number

Fig. 17

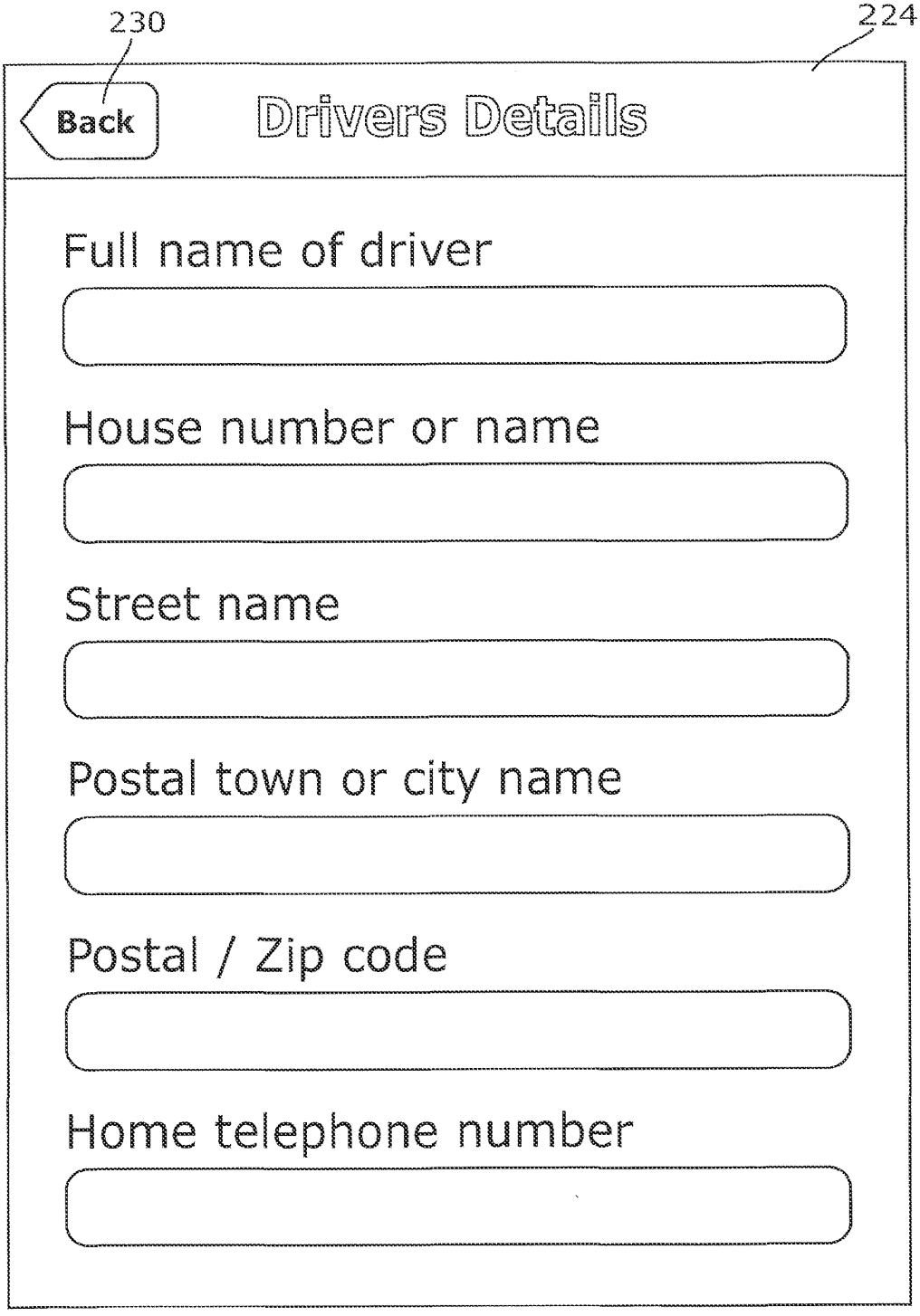

230
224
Back
Drivers Details
Full name of driver
House number or name
Street name
Postal town or city name
Postal / Zip code
Home telephone number

Fig. 18

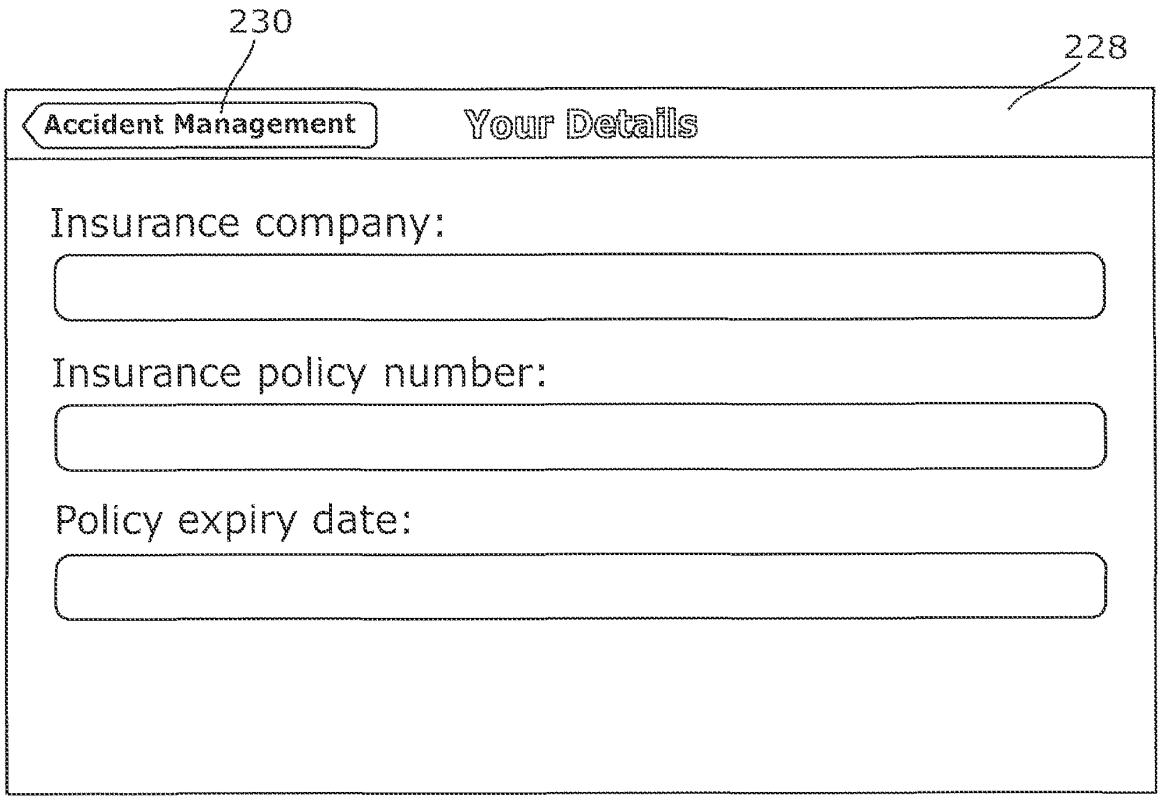

230
228
Accident Management
Your Details
Insurance company:
Insurance policy number:
Policy expiry date:

Fig. 19

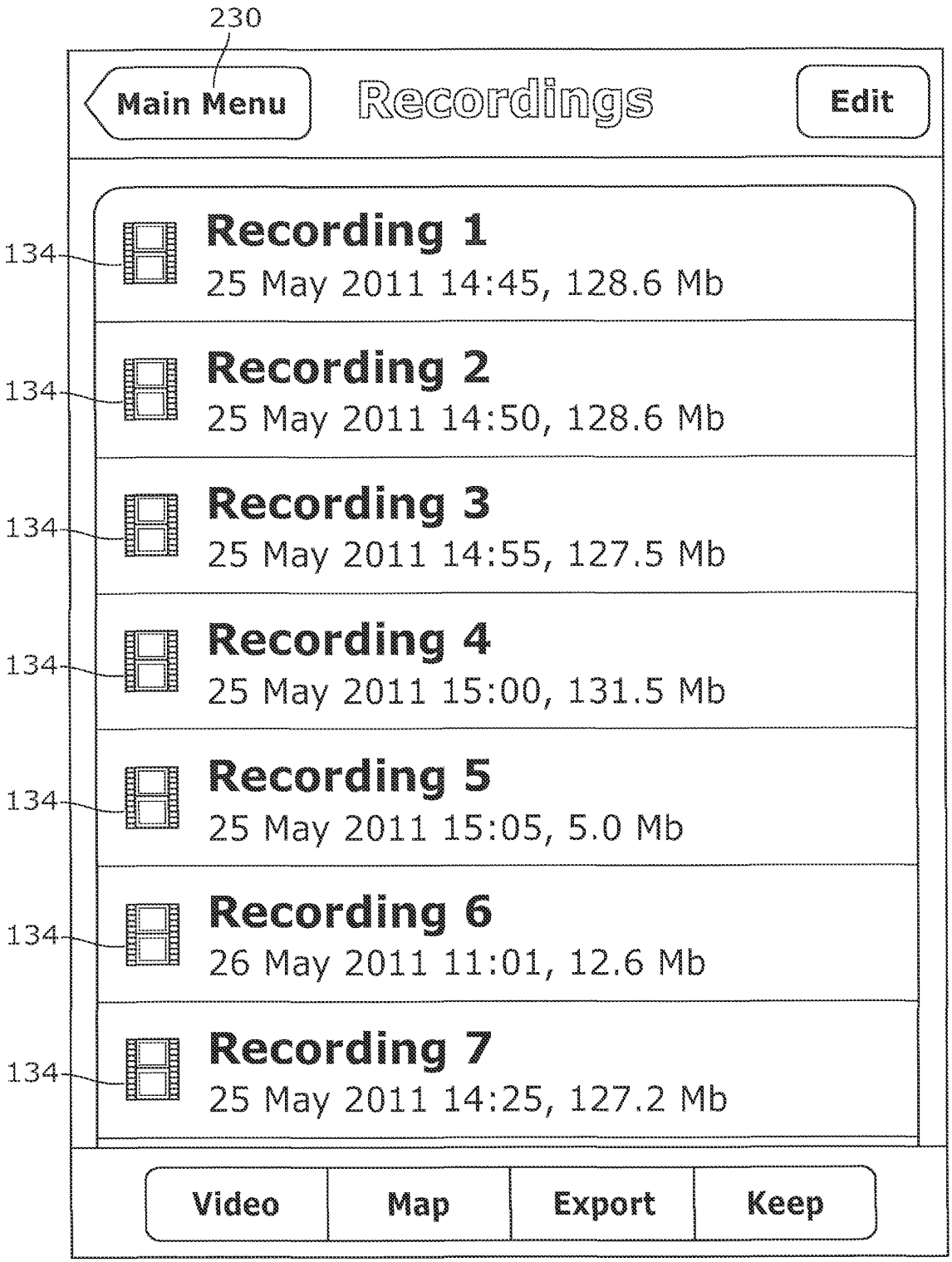

230
Main Menu
Recordings
Edit
134
Recording 1
25 May 2011 14:45, 128.6 Mb
134
Recording 2
25 May 2011 14:50, 128.6 Mb
134
Recording 3
25 May 2011 14:55, 127.5 Mb
134
Recording 4
25 May 2011 15:00, 131.5 Mb
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Recording 5
25 May 2011 15:05, 5.0 Mb
134
Recording 6
26 May 2011 11:01, 12.6 Mb
134
Recording 7
25 May 2011 14:25, 127.2 Mb
Video
Map
Export
Keep

Fig. 20

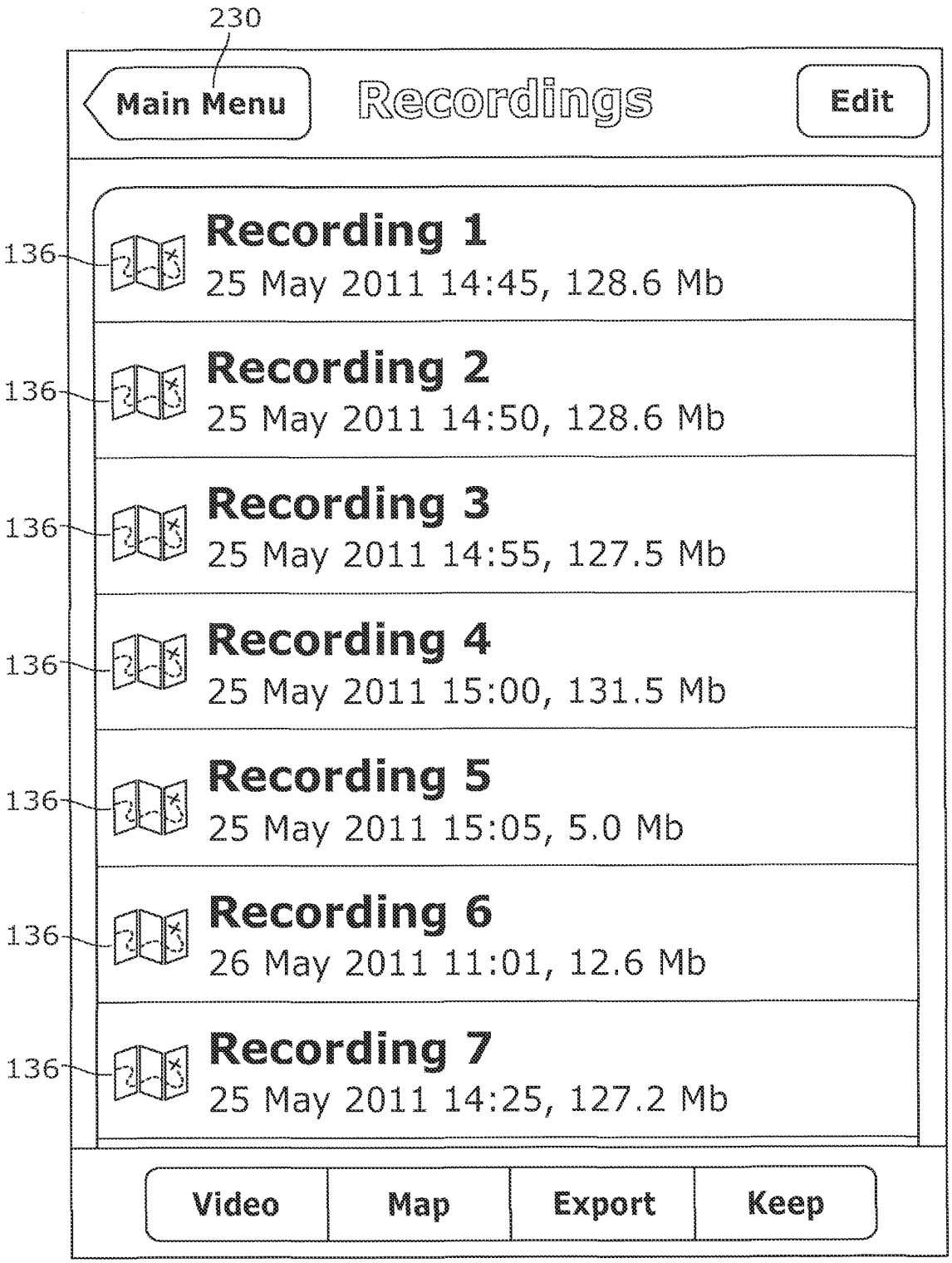

230
Main Menu
Recordings
Edit
136
Recording 1
25 May 2011 14:45, 128.6 Mb
136
Recording 2
25 May 2011 14:50, 128.6 Mb
136
Recording 3
25 May 2011 14:55, 127.5 Mb
136
Recording 4
25 May 2011 15:00, 131.5 Mb
136
Recording 5
25 May 2011 15:05, 5.0 Mb
136
Recording 6
26 May 2011 11:01, 12.6 Mb
136
Recording 7
25 May 2011 14:25, 127.2 Mb
Video
Map
Export
Keep

Fig. 21

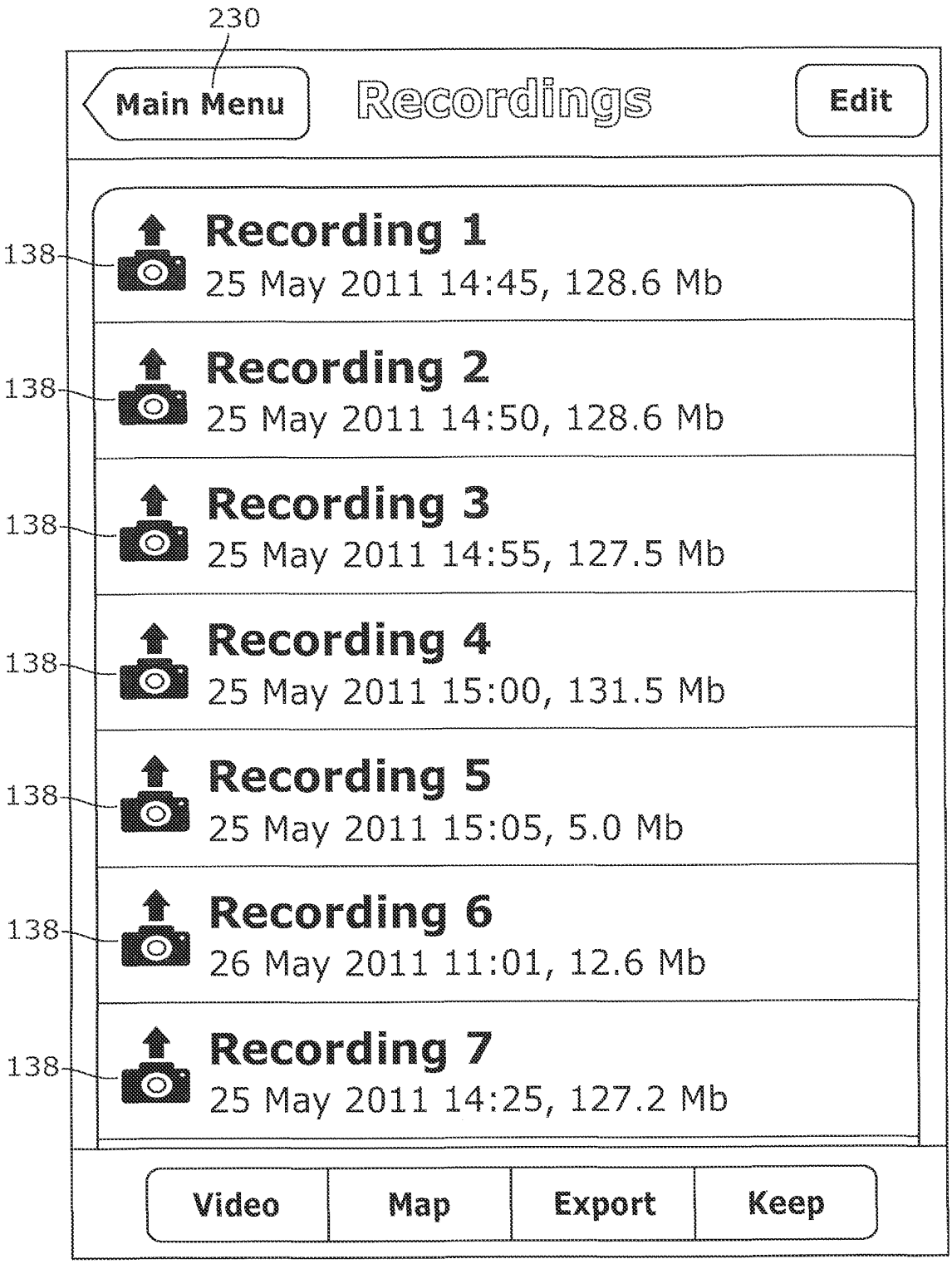

230
Main Menu
Recordings
Edit
138
Recording 1
25 May 2011 14:45, 128.6 Mb
138
Recording 2
25 May 2011 14:50, 128.6 Mb
138
Recording 3
25 May 2011 14:55, 127.5 Mb
138
Recording 4
25 May 2011 15:00, 131.5 Mb
138
Recording 5
25 May 2011 15:05, 5.0 Mb
138
Recording 6
26 May 2011 11:01, 12.6 Mb
138
Recording 7
25 May 2011 14:25, 127.2 Mb
Video
Map
Export
Keep

Fig. 22

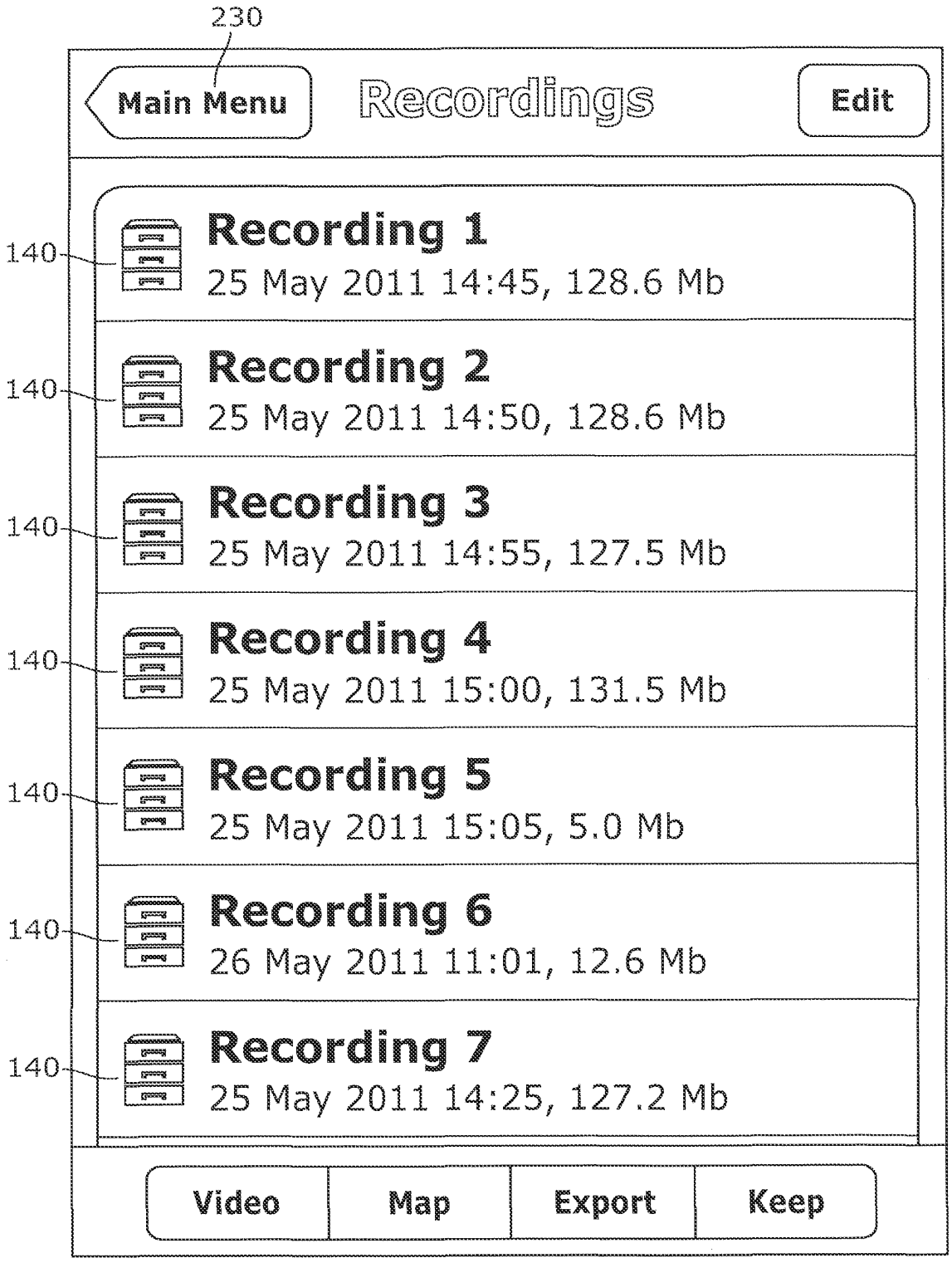

230
Main Menu
Recordings
Edit
140
Recording 1
25 May 2011 14:45, 128.6 Mb
140
Recording 2
25 May 2011 14:50, 128.6 Mb
140
Recording 3
25 May 2011 14:55, 127.5 Mb
140
Recording 4
25 May 2011 15:00, 131.5 Mb
140
Recording 5
25 May 2011 15:05, 5.0 Mb
140
Recording 6
26 May 2011 11:01, 12.6 Mb
140
Recording 7
25 May 2011 14:25, 127.2 Mb
Video
Map
Export
Keep

Fig. 23

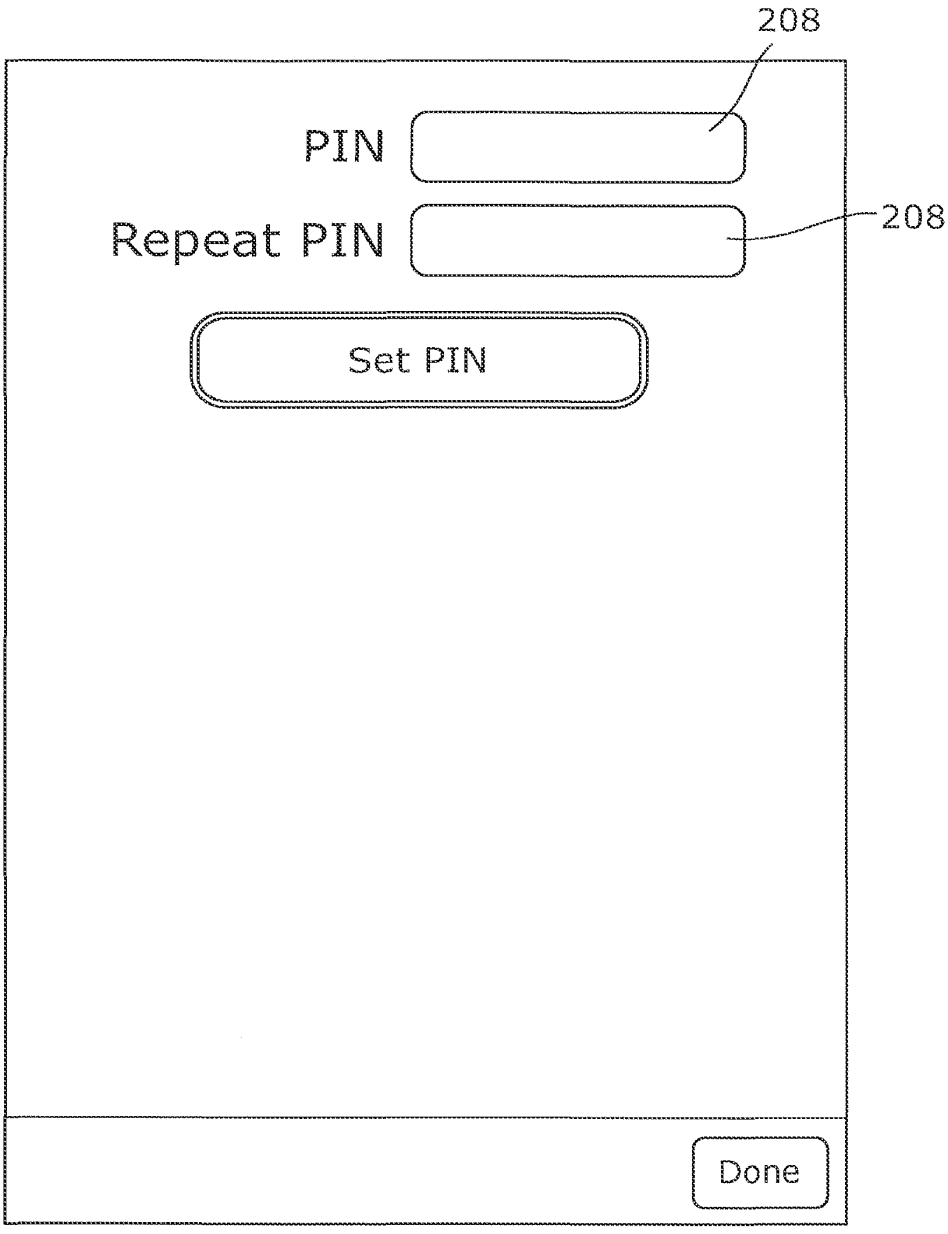


Fig. 24

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	044228.111208
	Application Number	
Title of Invention	Method and System for Logging Vehicle Behaviour	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Andrew	William	Wright	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Virginia Water	Country of Residence [i]	GB

Mailing Address of Inventor:

Address 1	Cedar Springs		
Address 2	Waverly Drive		
City	Virginia Water, Surrey	**State/Province**	
Postal Code	GU25 4PZ	**Country** [i]	GB

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	30734		
Email Address	patents@bakerlaw.com	Add Email	Remove Email

Application Information:

Title of the Invention	Method and System for Logging Vehicle Behaviour		
Attorney Docket Number	044228.111208	**Small Entity Status Claimed**	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	25	**Suggested Figure for Publication (if any)**	

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	044228.111208
	Application Number	
Title of Invention	Method and System for Logging Vehicle Behaviour	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	30734		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	17729962	2022-04-26

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	044228.111208
	Application Number	
Title of Invention	Method and System for Logging Vehicle Behaviour	

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
17729962	Continuation of	16665746	2019-10-28

Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16665746	Continuation of	16222893	2018-12-17	10950068	2021-03-16

Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16222893	Continuation of	15454944	2017-03-09	10198878	2019-02-05

Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15454944	Continuation of	15061910	2016-03-04	9633487	2017-04-25

Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15061910	Continuation of	13994455	2013-07-24	9311271	2016-04-12

Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
13994455	a 371 of international	PCT/GB2011/052491	2011-12-15

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
1021292.6	GB	2010-12-15	

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	044228.111208
	Application Number	
Title of Invention	Method and System for Logging Vehicle Behaviour	

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Remove / Access Code[i] (if applicable)
1101259.8	GB	2011-01-25	
Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Remove / Access Code[i] (if applicable)
1109759.9	GB	2011-06-10	
Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Remove / Access Code[i] (if applicable)
1118777.0	GB	2011-10-31	

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	044228.111208
	Application Number	
Title of Invention	Method and System for Logging Vehicle Behaviour	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	044228.111208
	Application Number	
Title of Invention	Method and System for Logging Vehicle Behaviour	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

◯ Assignee	◯ Legal Representative under 35 U.S.C. 117	◯ Joint Inventor
◯ Person to whom the inventor is obligated to assign.	◯ Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Applicant:

Address 1			
Address 2			
City		**State/Province**	
Country		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	044228.111208
	Application Number	
Title of Invention	Method and System for Logging Vehicle Behaviour	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☒

Organization Name	AUTO TELEMATICS LTD.

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1	5 DRIFFIEL TERRACE		
Address 2			
City	YORK	**State/Province**	
Country i	UK	Postal Code	YO24 1EJ
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Mark H. Krietzman/			Date (YYYY-MM-DD)	2024-05-28
First Name	Mark H.	Last Name	Krietzman	Registration Number	41,128

Additional Signature may be generated within this form by selecting the Add button. Add

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	044228.111208
	Application Number	
Title of Invention	Method and System for Logging Vehicle Behaviour	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/676,284	**05/28/2024 07:22:43 PM Z ET**	**044228.111208**

Title of Invention

Method and System for Logging Vehicle Behaviour

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7645	FILED BY	Mara Rodriguez
PATENT CENTER #	65703726	FILING DATE	-
CUSTOMER #	30734	FIRST NAMED INVENTOR	Andrew William Wright
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Mark Krietzman

Documents

TOTAL DOCUMENTS: 6

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
044228_111208_ADS.pdf	9	Application Data Sheet	1780 KB
Warning: The attached version of the AIA/14 form is not the current version and data may not fully load to USPTO systems.			
044228_111208_Track_1_Transmittal.pdf	2	Miscellaneous Incoming Letter	112 KB
044228_111208_Declaration.pdf	1	Oath or Declaration filed	236 KB
044228_111208_Track_One_Drawing_Figs.pdf	25	Drawings-only black and white line drawings	2204 KB

1-044228_111208_Track_One_CON_Application_Specification_2024-05-24-APP.TEXT.docx	52	Application body structured text document	68 KB

Warning: Bookmarks were found and have been removed. Word count in abstract section is over 150 words.

00-044228_111208_IDS_1449.pdf	6	Information Disclosure Statement (IDS) Form (SB08)	174 KB

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Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
044228_111208_ADS.pdf	BF87E3D1B0C86AC4A7CC8466C15BCE4006EBA02107F8DAFDF08DECBEEBF13D695C734D5B8FF22C0DE21C94B8B64C7E1AEE87BA5E8F6CB97C8DE59E903D4333FA
044228_111208_Track_1_Transmittal.pdf	C9A9319BDBA45F8F92BAD7D1F4300EA254808707724EC178F84E24B888BC848BB28F6DAD3DA30C8117DF46E928F1BE58FA77017E36E870EC30F371C3D2F86080
044228_111208_Declaration.pdf	4A918259E6AC776D4CBDD2D800BDFB5349E0450DB05646FF73E89E468B005D14761EB58D00CFAC247B67E4399CEE7DE20C6A1EE992724538E66109C056AE9975
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ON_Application_Specification_2024-05-24-APP.TEXT.docx	E654DCB70C1ACE5F10668075A014A52
00-044228_111208_IDS_1449.pdf	176F945B552B353109902AEA4DF53C33D576410CAE887658CF5344E418A2346EDFB643EF17B732EEDB6C0E995154D064D52574CE6183A477011A2DF03CF79C8F

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

DocCode - SCORE

Placeholder Sheet for Supplemental Content

Application Number: 18676284 Document Date: 05/28/2024

The presence of this form indicates that the following document type was received in electronic format on the date identified above. This document is stored separately from the typical case contents which are stored in image format.

Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded and no paper documents or physical media exist.

- Drawing

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Form Revision Date: March 1, 2024