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Collopy et al.(10) **Pub. No.: US 2010/0131304 A1**(43) **Pub. Date: May 27, 2010**(54) **REAL TIME INSURANCE GENERATION**

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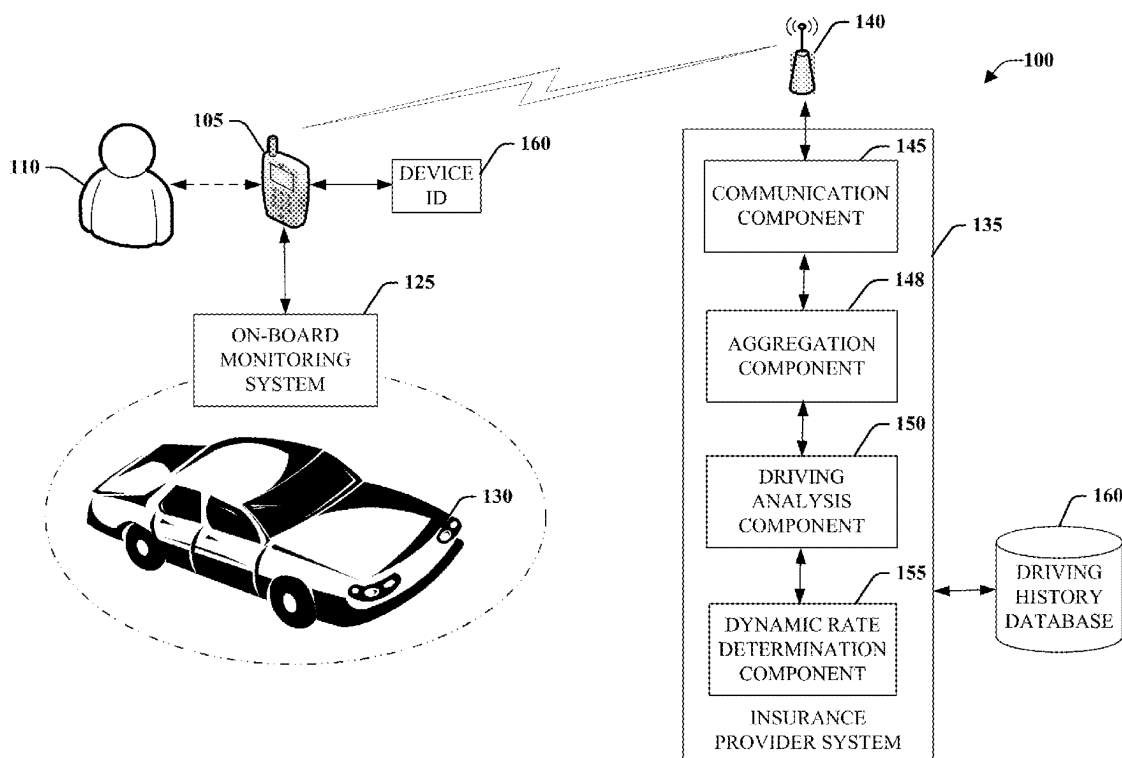
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G06Q 40/00 (2006.01)(52) **U.S. Cl.** **705/4**(57) **ABSTRACT**

An on-board monitoring system in conjunction with a mobile device can be employed to gather real-time information regarding how a vehicle is being operated by the owner of the mobile device. The mobile device has information stored thereon that allows the user to be identified by the on-board monitoring system. The real-time information is forwarded to a remote insurance provider system that, based upon the gathered real-time information, determines an insurance rate. The determined insurance rate can be transmitted to the owner allowing them to see how their driving style is affecting their insurance rate and can adjust their driving style accordingly.



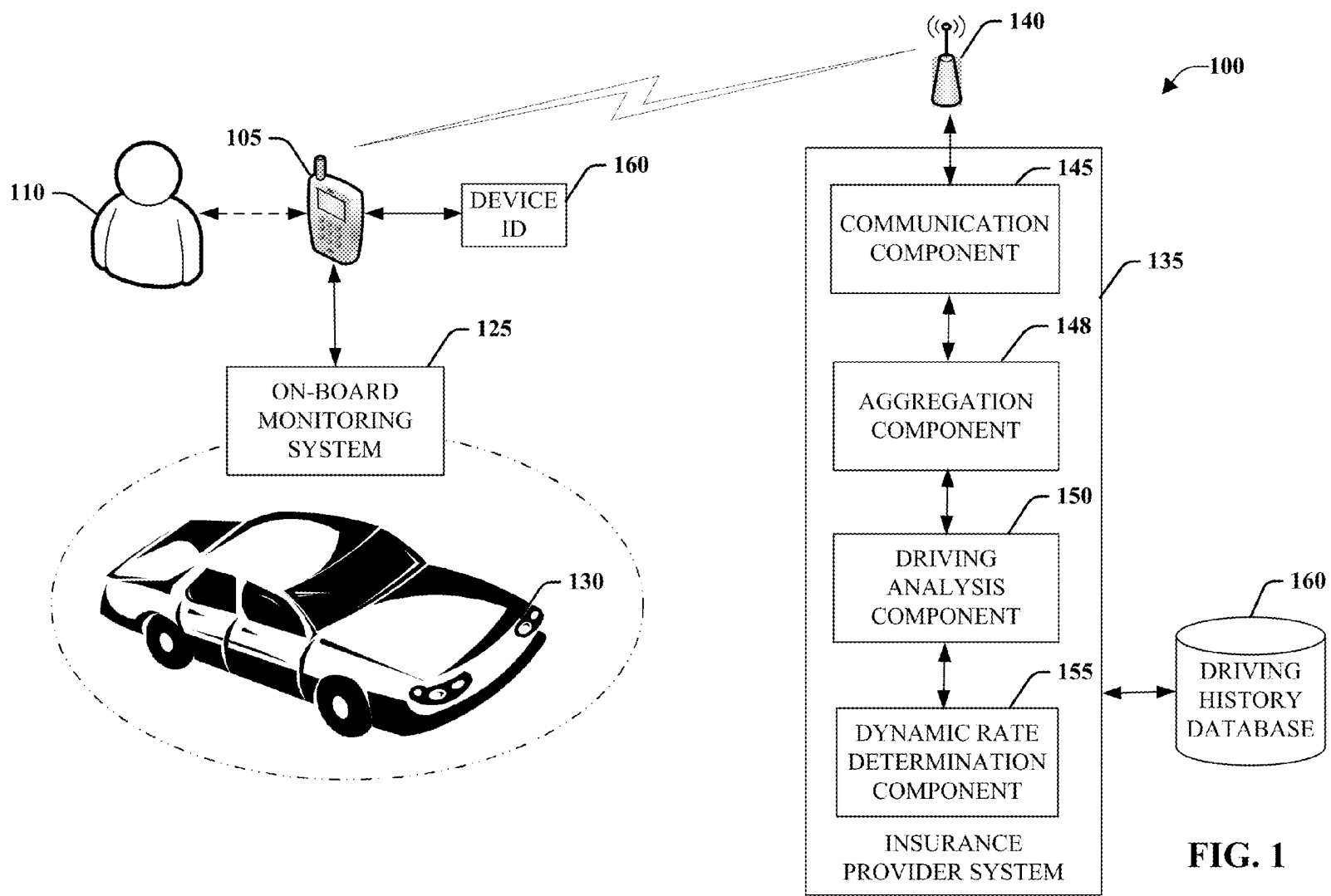


FIG. 1

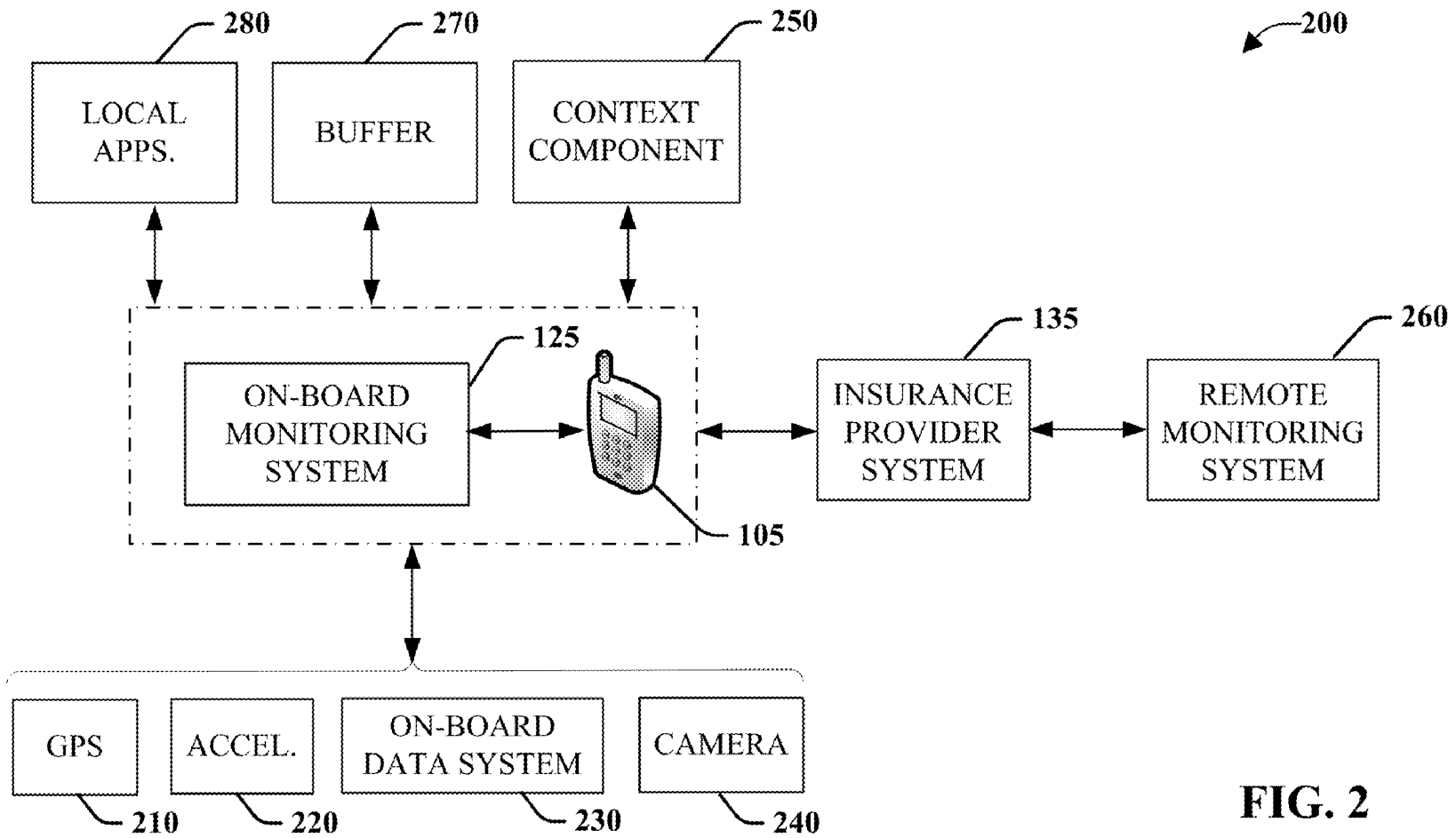


FIG. 2

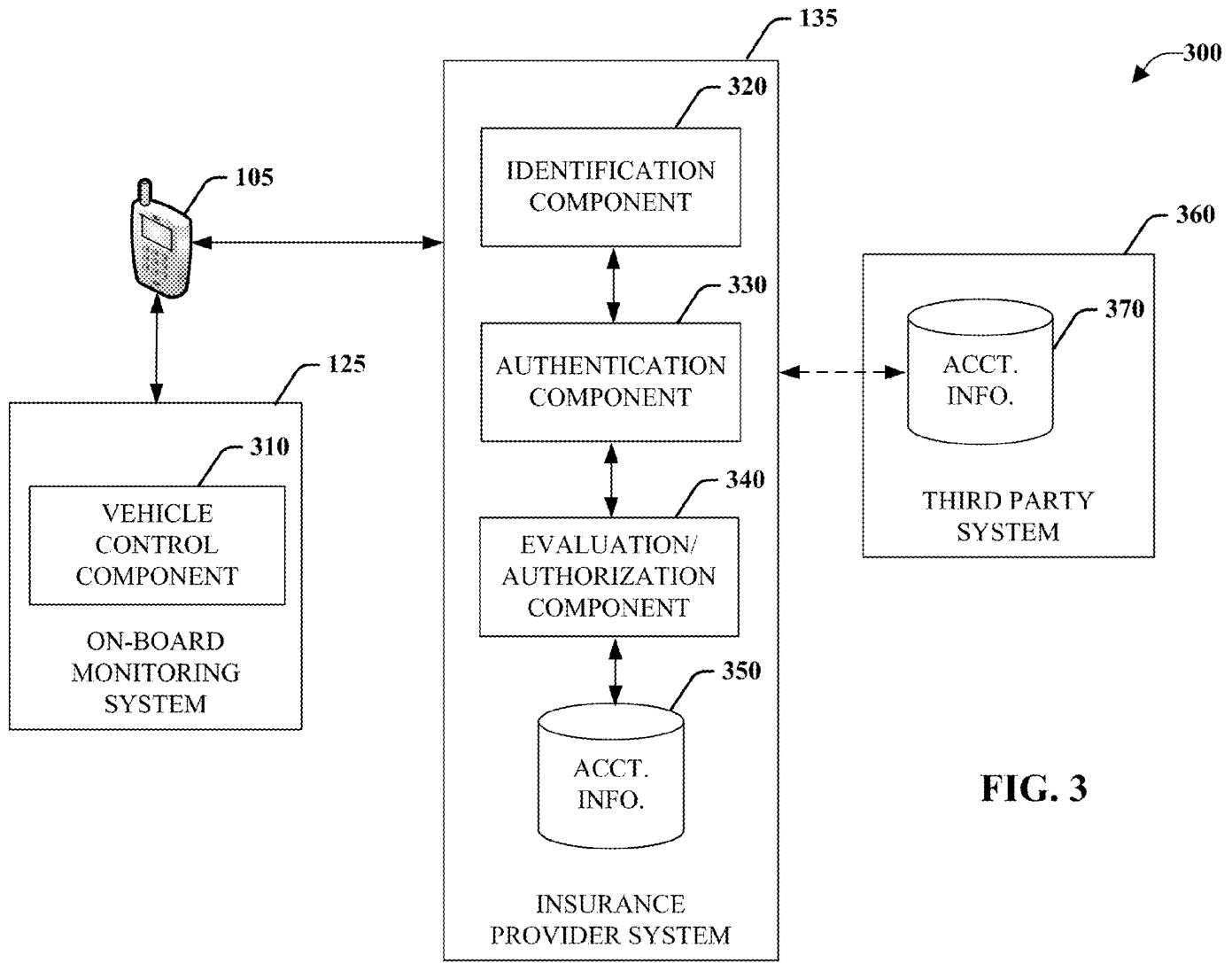


FIG. 3

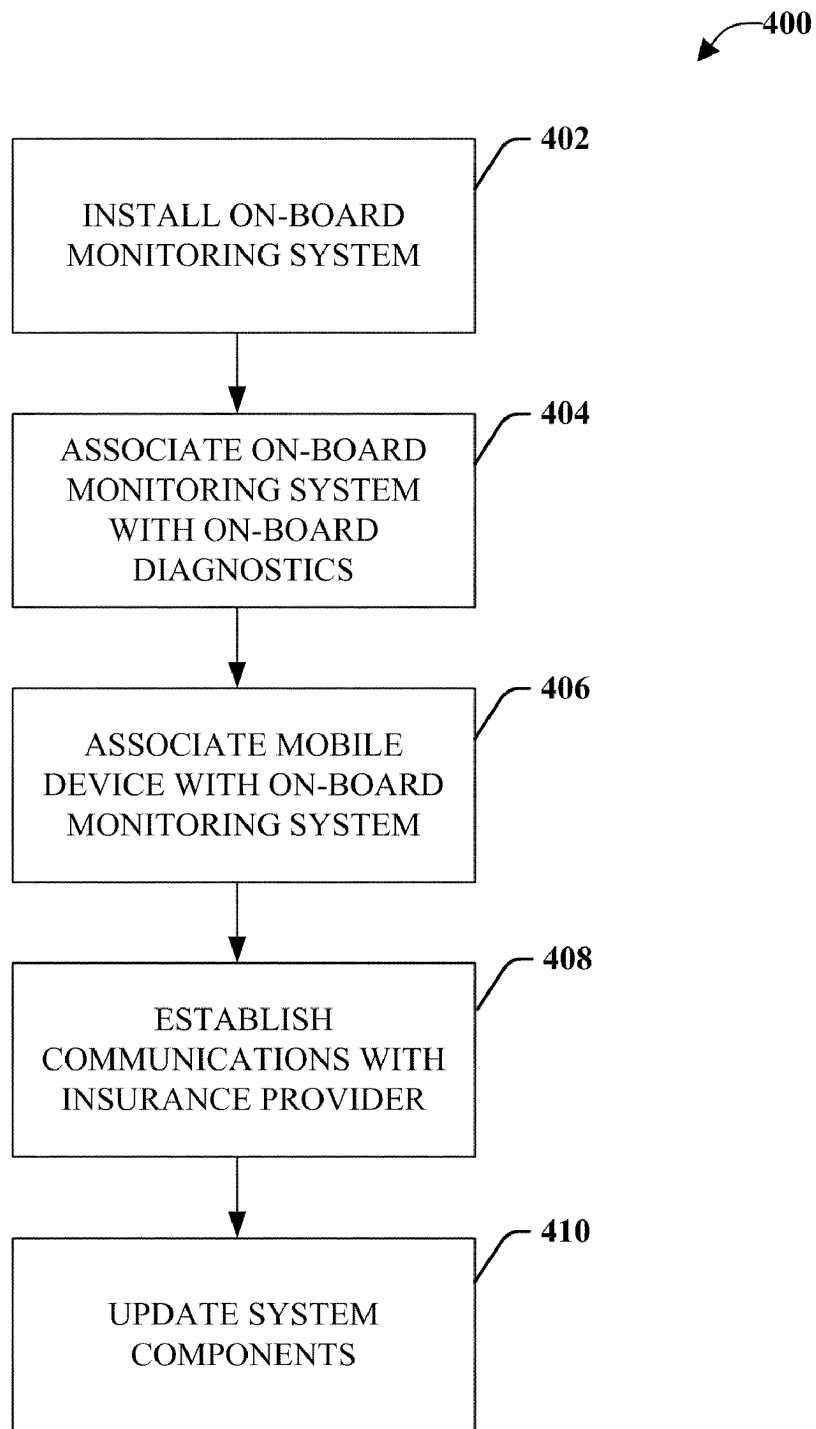


FIG. 4

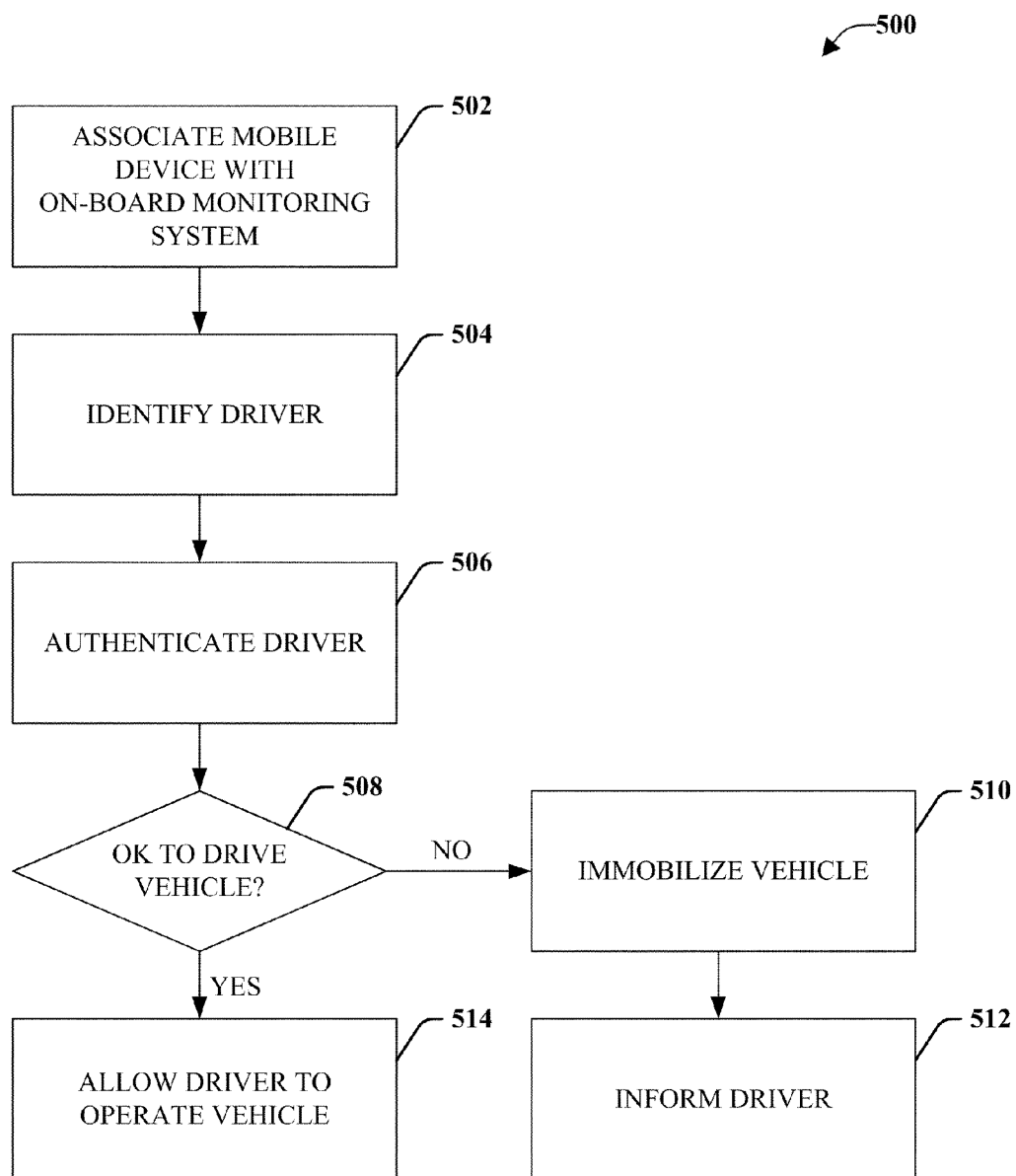


FIG. 5

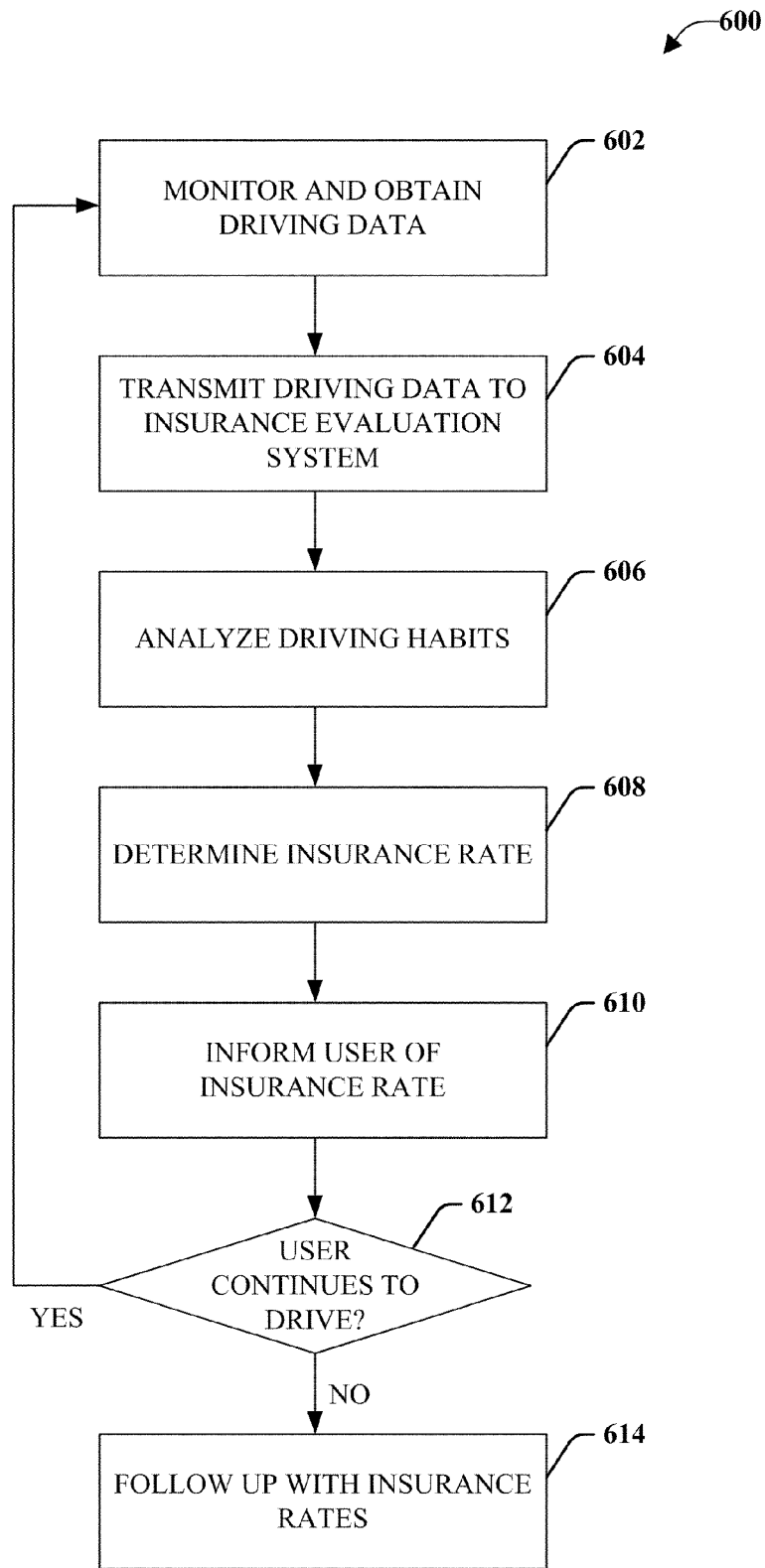


FIG. 6

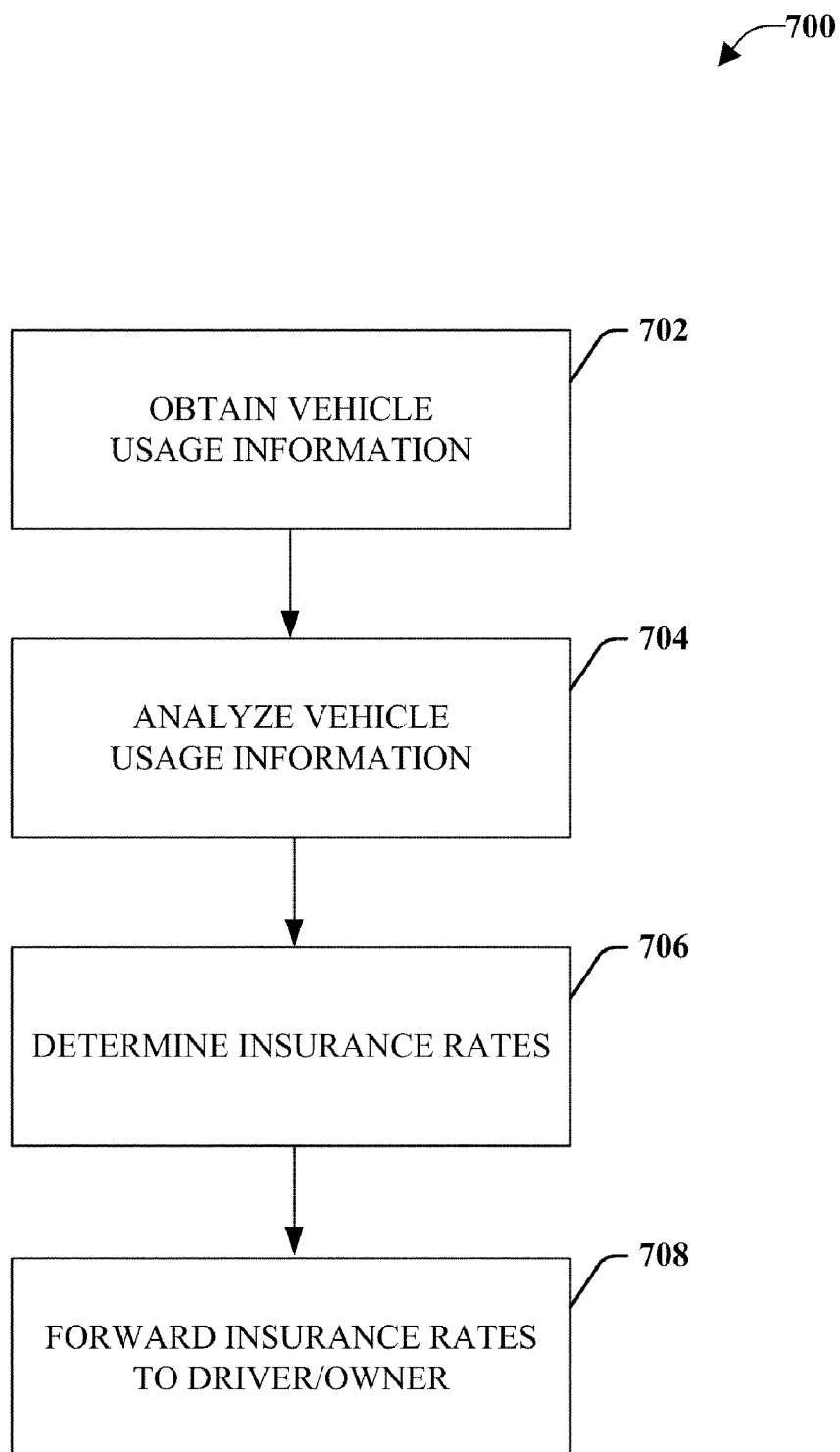


FIG. 7

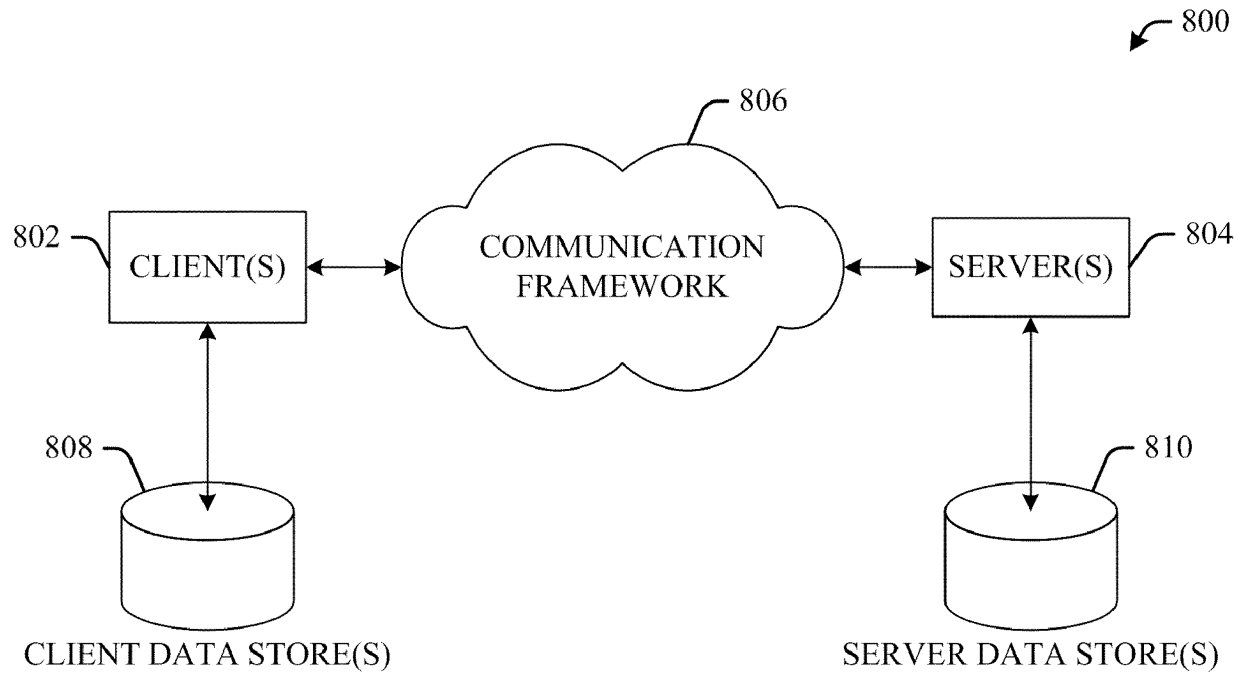


FIG. 8

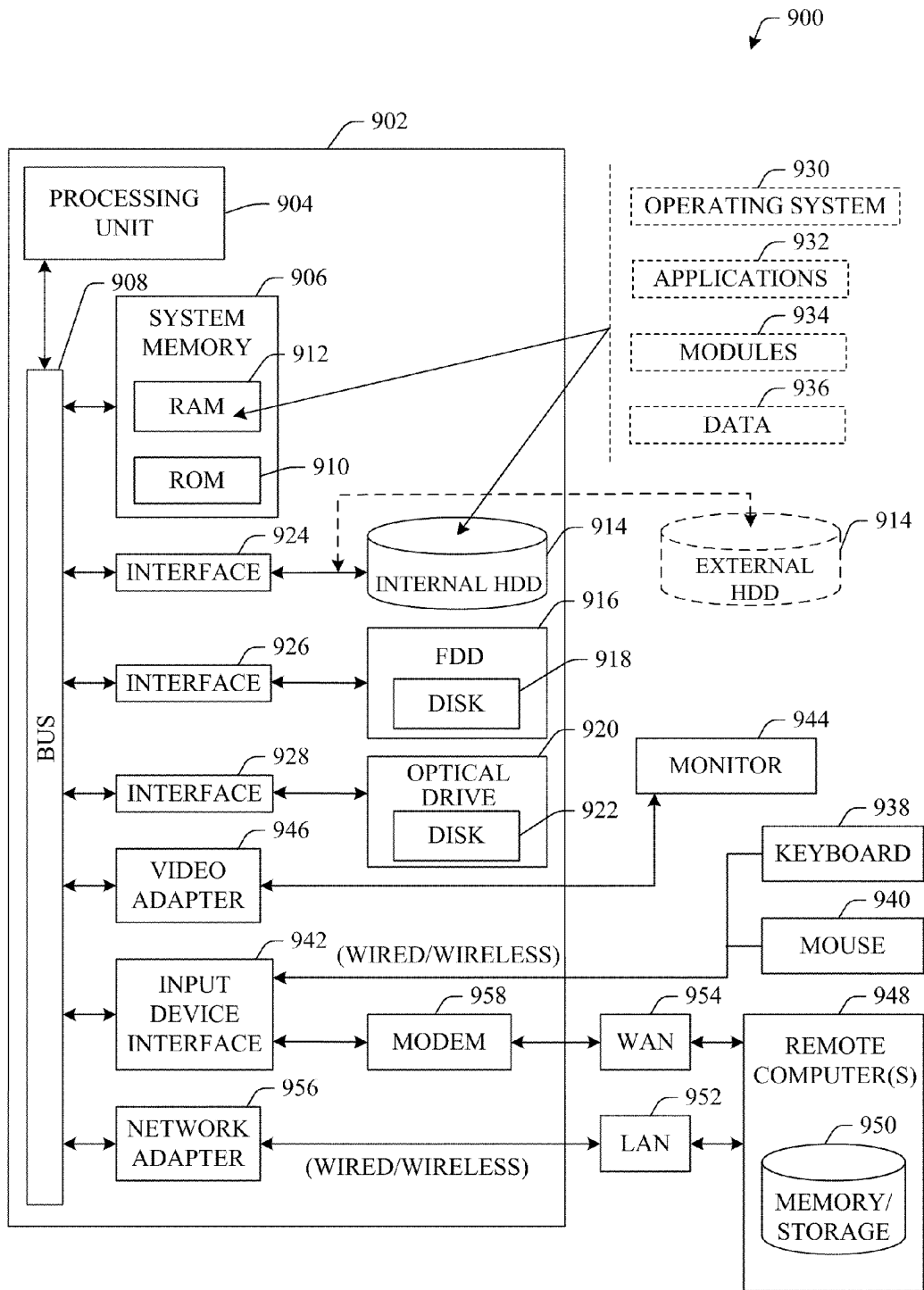


FIG. 9

REAL TIME INSURANCE GENERATION

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Patent Application Ser. No. 61/118,400, filed on Nov. 26, 2008, entitled "INSURANCE OPTIMIZER AND REAL TIME ANALYTICS", the entirety of which is incorporated herein by reference.

TECHNICAL FIELD

[0002] The subject specification relates generally to insurance rates and in particular to disclosing real-time insurance rates to a vehicle operator.

BACKGROUND

[0003] Insurance coverage is a commodity that many people purchase for peace of mind and/or because local laws require such coverage. Thus, most people might consider insurance as something that is necessary and, at times, undesirable due to high cost of insurance premiums. A person can pay an insurance premium at one instance for coverage over a block of time, such as making a payment semi-annually for six months of coverage. Once the premium is paid, the driver commonly does not think about insurance until the next payment is due or an incident occurs that brings the premium to the driver's consciousness (e.g., being in an automobile accident). With limited and infrequent thought to insurance premiums, drivers can be less likely to perform actions that are beneficial to lowering their premiums as well as their risk factor.

[0004] Insurance companies calculate premiums for coverage through complex models based upon a variety of factors. The goal of these models is to determine a risk level associated with a driver or vehicle—based upon the risk level, an amount for the premium can be ascertained. Age, driver citation history, and other factors can be used in determining the risk level and thus ascertaining the amount for a premium.

SUMMARY

[0005] The following discloses a simplified summary of the specification in order to provide a basic understanding of some aspects of the specification. This summary is not an extensive overview of the specification. It is intended to neither identify key or critical elements of the specification nor delineate the scope of the specification. Its sole purpose is to disclose some concepts of the specification in a simplified form as a prelude to the more detailed description that is disclosed later.

[0006] With the disclosed innovation, data regarding a driver's driving skills and habits can be obtained in real time. The data can be subsequently analyzed and an appropriate insurance rate determined. The insurance rate or other information pertaining to the driver's driving style can be forwarded to the driver in real time while they are still driving the vehicle thereby allowing the driver to adjust their driving technique, where such an adjustment can result in lower insurance rates being determined. Alternatively, the new insurance rates and associated data can be forwarded to the driver at a later time, e.g., upon completion of a journey.

[0007] The driver is identified to an on-board monitoring system using a device that has unique identification information stored thereon to allow the driver to be uniquely identified.

Such a device can be a cell phone, where the IMSI information stored on the cell phone SIM can be employed to identify the driver. Alternative embodiments, for example, can include a RFID device, cards with information stored in a magnetic strip, etc.

[0008] The on-board monitoring system is in communication with an insurance provider system. Data gathered by the on-board monitoring system can be forwarded to the insurance provider, the data analyzed and an insurance rate determined. The determined rate can then be forwarded to the on-board monitoring system allowing the driver to see immediately what effect their driving style is having upon their insurance rate.

[0009] An authentication process can be performed to ensure that the driver is who they say they are. In one embodiment, authentication can involve comparing shared digital keys between an identification device and the on-board monitoring system. In an alternative embodiment, an external database can be accessed and a shared digital key can be obtained to compare with one stored on a cell phone SIM.

[0010] Authorization of the driver can be carried out, whereby once the driver has been identified, information is obtained as to whether the driver is allowed to drive a particular vehicle, for example, in a fleet of company vehicles. Alternatively, the driver may be deemed to be unsuitable for driving certain passengers in a vehicle and is thus prevented from driving them. The authorization process can include immobilization of a particular vehicle, and/or informing the driver that they are not able to drive that particular vehicle or certain passengers.

[0011] A third party system and database can be accessed to facilitate identification of the driver. In one embodiment a database operated by the cell phone system provider can be queried and information identifying the owner of the cell phone accessed.

[0012] A contextual system can be included that interacts with other applications such as a calendar on a cell phone. The contextual system can prompt the driver of an upcoming trip, e.g., to the airport, and allow them sufficient time to make the trip in a safe manner.

[0013] 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.

[0014] Further, the on-board monitoring system can be connected to any on-board diagnostic system(s) available on the vehicle. Data received from the on-board diagnostic system can be employed to help determine how the vehicle is being driven, whether the driver and passengers are wearing their seatbelts, road worthiness of the vehicle, etc.

[0015] Insurance rate determination applications can be installed and operating on the insurance provider system. Applications providing similar functionality, either in a comprehensive or limited manner, can be installed and operating local to the on-board monitoring system. The applications can be employed in conjunction with buffer memory such that in the event of communication failure between the on-board monitoring system and the insurance provider system any gathered/processed data can be stored in the buffer until communications are re-established and the data is downloaded to the respective device.

[0016] The real-time insurance rate determination system can be incorporated into a “mesh” comprising of other drivers, GPS based location information, traffic systems, etc. The mesh allows the driver to interface with the transport infrastructure and have their attention drawn to speed limits, other vehicles, illegal maneuvers, etc.

[0017] Data gathered by the on-board monitoring system, GPS, on-board diagnostic systems, etc., can be employed in the reconstruction of accidents, and if required, provided to legal entities for legal proceedings.

[0018] Also, the real-time insurance determination system addresses the issue of drivers owning multiple vehicles and having to insure them all even though only one vehicle is driven at any given time. As the system is focused on the driver it is possible to determine an insurance coverage based upon the frequency with which each vehicle is driven.

[0019] A cell phone can be used to identify a driver and provide a means for communication between the on-board monitoring system and the remote insurance provider system. Hence it is possible to determine whether the driver uses their cell phone while driving, e.g., they talk or send text with the cell phone while driving. Appropriate insurance rates can be charged based on cell phone usage.

[0020] The driver can also opt to allow third party companies to have access to their data, allowing the third party companies to forward advertisements etc. that the third party company determines pertains to the driver based on their data.

[0021] The insurance provider system can be available to a plurality of insurance companies allowing the driver to benefit from quotes the companies, where the driver can switch from one insurance coverage to another in real time.

[0022] The following description and the annexed drawings set forth certain illustrative aspects of the specification. These aspects are indicative, however, of but a few of the various ways in which the principles of the specification can be employed. Other advantages and novel features of the specification will become apparent from the following detailed description of the specification when considered in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] FIG. 1 illustrates a system for real-time monitoring of a driver to facilitate determination of insurance rate(s) in accordance with an aspect.

[0024] FIG. 2 illustrates a system for real-time monitoring of a driver to enable determination of rate(s) of insurance in accordance with an aspect.

[0025] FIG. 3 depicts a monitoring system in communication with an insurance provider system to facilitate operation of a vehicle in accordance with an aspect.

[0026] FIG. 4 presents an example methodology for the installation of a real-time insurance system in accordance with an aspect.

[0027] FIG. 5 illustrates a representative methodology for initializing on-board monitoring for a real-time insurance system and authenticating/authorizing a driver in accordance with an aspect.

[0028] FIG. 6 illustrates an example methodology for gathering information from an on-board monitoring system employed in a real-time insurance system in accordance with an aspect.

[0029] FIG. 7 illustrates an example methodology 700 for determining insurance rates based upon vehicle usage in accordance with an aspect.

[0030] FIG. 8 illustrates an example of a schematic block diagram of a computing environment in accordance with an aspect.

[0031] FIG. 9 illustrates an example of a block diagram of a computer operable to execute the disclosed architecture.

DETAILED DESCRIPTION

[0032] The claimed subject matter is now described with reference to the drawings, wherein like reference numerals are used to refer to like elements throughout. In the following description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the claimed subject matter. It can be evident, however, that the claimed subject matter can be practiced without these specific details. In other instances, well-known structures and devices are shown in block diagram form in order to facilitate describing the claimed subject matter.

[0033] As used in this application, the terms “component,” “module,” “system,” “interface,” or the like are generally intended to refer to a computer-related entity, either hardware, a combination of hardware and software, software, or software in execution. For example, a component can be, but is not limited to being, a process running on a processor, a processor, an object, an executable, a thread of execution, a program, and/or a computer. By way of illustration, both an application running on a controller and the controller can be a component. One or more components can reside within a process and/or thread of execution and a component can be localized on one computer and/or distributed between two or more computers. As another example, an interface can include I/O components as well as associated processor, application, and/or API components.

[0034] Traditional methods of determining an insurance rate for a driver involves reviewing the driver's driving history (e.g., traffic violations in a particular period, age, location, and the like), the vehicle to be driven, location of the vehicle, etc., and generating an insurance rate based thereon. Rather than insuring each vehicle, the focus of insurance is placed upon the individual and real-time information generated reflecting the driver's driving habits/skills. The issue is how to identify a particular driver and associate them with the vehicle that they are driving? An individual may not only drive their vehicle but can also have access to and drive a family member's vehicle, friend's vehicle, corporate fleet vehicle, rental vehicle, etc. Therefore, it is of interest to be able to track and monitor the individual driver regardless of the vehicle they are driving. By gathering real-time data, insurance rates can be determined that are more representative of a driver's driving habits and skills than the conventional system of insurance rate determination based on such factors as number of traffic violations, e.g., speeding tickets, etc.

[0035] FIG. 1 illustrates a system 100 for real-time monitoring of a driver to facilitate determination of insurance rate(s) based on various aspects as disclosed infra. 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 con-

junction 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. The communication component 145 can provide communication protocols, data conversion, etc., as necessary, to allow transmission of data and information between the on-board monitoring system 125, the mobile device 105 and the insurance provider system 135. 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.

[0036] Further, 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. 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. The aggregation component 148 gathers information from as many sources as required to facilitate generation and presentation of insurance rate(s). Data gathered by the aggregation component 148 can also be forwarded from the insurance provider system 135 to the mobile device 105, on-board monitoring system 125, and any other components associated with system 100 to facilitate presentation of any pertinent data, e.g., insurance rates, to an operator 110 or other interested party.

[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. The database 160 can be incorporated into the insurance provider system 135, or reside in a third party system (not shown). It is to be appreciated that a wealth of data and information can be generated by the various components of system 100, and database/memory components (not shown) can be distributed as required across the system 100 to facilitate collection, transmission, generation, evaluation, and determination of a variety of data to facilitate operation of the system.

[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. The determined insurance rate(s) and any other pertinent information can be transmitted to the mobile device 105 and/or

on-board monitoring system 125 for presentation to the driver. The pertinent information and insurance rate(s) can be presented employing various communication devices incorporated into the mobile device 105, the on-board monitoring system 125, or other system (not shown) located in vehicle 130, where such communication devices include audio presentation, visual display such as a graphical interface, light emitting diode(s), head up display (HUD), or other suitable communication means. By employing such real-time/near real-time gathering, analysis, and rate determination, an insurance premium can be generated that reflects the driver's driving habits more closely than a traditional method such as determining a rate based upon a number of speeding tickets received by a driver in a given time period.

[0039] In an alternative embodiment any feedback information, e.g., determined insurance rate(s) or other pertinent information, can be presented via a remote system such as a personal computer (e.g., connected to the insurance system) (not shown) for viewing by the driver or other interested party. The insurance rate(s) can be calculated in real-time and as such can more accurately reflect appropriate coverage for a driver. A variety of different factors can influence a likelihood of the driver being involved in an accident, having a vehicle stolen, and the like. For example, if the driver is travelling through bad weather, then risk of accident can be higher and an insurance rate can be increased in real-time as weather conditions change—conversely, if there is relatively little traffic surrounding the driver's vehicle, then the rate can be lowered.

[0040] It is to be appreciated that the terms “real-time” and “near real-time” are being utilized to convey the time taken to monitor, gather, transmit, process, present, etc., any data and information that facilitates determination of an insurance rate and driver feedback. The terms “real-time” and “near real-time” can be interposed to reflect the virtually instantaneous data collection and insurance rate determination in comparison with traditional methods of insurance rate determination and provision of the rate information to a customer via letter, phone, email, etc. The traditional methods of letter, phone, email, etc. can be employed to present insurance rates and information determined by the methods disclosed herein to the customer at a later time, e.g., upon completion of the journey.

[0041] It is also to be appreciated that while the discussion relates to real time insurance determination in conjunction with an automobile, the innovation is not so limited and can be applied to any system involving a data gathering system employed to acquire information in real time and from the information insurance rates, financial coverage, and the like, can be determined in real time. Examples of other areas of application insurance of other transportation systems including boats, ships, motorbikes, trains, farm machinery, industrial machinery, trucks, and the like. Machinery can also be a suitable application with gathered information being employed to determine if the machinery has been operated in an appropriate manner (e.g., a safe manner) in accordance with the safe operation of the machine, operations manuals, and the like.

[0042] It is to further be appreciated that while the preceding discussion relates to the on-board monitoring system 125 communicating with the insurance provider 135 via mobile device 105, transceiver 140, and communication component 145, the disclosed system is not so limited. In an alternative embodiment, the on-board monitoring system 125 can

include a wireless communication system (not shown) facilitating direct communications between the on-board monitoring system **125** and the insurance provider **135**, via transceiver **140**. Any suitable combination and location of communication means can be employed to facilitate communications between the various system components. 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. Further, it is to be appreciated that by employing a transceiver **140** to communicate between the on-board monitoring system **125** and the insurance provider system **135**, the variety of communication protocols and techniques employed by the system **100** can be extended beyond those supported by the mobile device **105**. Such communication techniques can, for example, include wireless, wired, cellular, WiFi, WiMax, WiLAN, satellite, etc.

[0043] The mobile device **105** can be any suitable device that can have information stored thereon or can be associated with information that uniquely identifies an individual. Such devices include mobile phones, cellphones, personal digital assistant (PDA), laptops, portable computer devices, and the like.

[0044] 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.

[0045] A range of methods and systems can be utilized to allow a driver to be associated with a vehicle. In one embodiment, as shown in FIG. 1, a device ID component **160** associated with the mobile device **105** can be employed to identify mobile device **105** and, accordingly, the owner or user of mobile device **105**. In one embodiment, the device ID component **160** can be a Subscriber Identity Module (SIM) card in a driver's cell phone and the information stored thereon can be utilized to identify the driver. A SIM card can store a variety of identification information such as an International Mobile Subscriber Identity (IMSI) or an integrated circuit card ID (ICC-ID), for example. Other identifiers for other network and communication systems can be employed to identify a device, such as the International Mobile Equipment Identity (IMEI) number associated with a cell phone. Alternatively, a Willcom-SIM (W-SIM) device or the like could be employed, where the SIM card effectively has its own transceiver located thereon.

[0046] In an alternative embodiment a device employing RFID technology can be employed to allow the on-board monitoring system **125** to identify a driver. The driver can place the RFID enabled device within transmission range of the on-board monitoring device **125**, whereupon identification and authentication information can be read from the

RFID and employed by the on-board monitoring system **125** to identify and, if required, authenticate the driver. Such an RFID device can be carried by the driver as a smart-card or as a key-fob, for example. A similar approach can be employed with mobile devices **105** utilizing other ranged wireless systems such as Bluetooth, IEEE 802.11 (a, b, g, etc.), and the like.

[0047] In another embodiment, the driver identification information could be stored on a card incorporating magnetic strip technology whereupon the driver swipes the card through a card reader associated with the on-board monitoring system to facilitate identification and authentication of the driver. Alternatively, information could be stored and represented as a barcode which is presented to a barcode scanner (not shown) associated with the on-board monitoring system **125** and the information stored in the barcode is read.

[0048] The mobile device **105** and the on-board monitoring system **125** can be updated via hardware e.g., connecting the mobile device **105** or on-board monitoring system **125** to a computer etc. to install/upgrade software which can be downloaded from the internet. Alternatively, the upgrade can be transmitted to the mobile device **105** or the on-board monitoring system **125** by wireless means. As a further alternative, while the on-board monitoring system **125** is shown as a separate system, the on-board monitoring system **125** could be incorporated into the mobile device **105**, for example, as a plug-in module.

[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**.

[0050] FIG. 2 illustrates a system **200** for real-time monitoring of a driver to facilitate determination of rate(s) of insurance. System **200** illustrates communications between an on-board monitoring system **125** and an external system such as the insurance provider system **135** being conducted via the mobile device **105**. System **200** also comprises a GPS **210** providing location information, an accelerometer **220**, and an on-board diagnostics system **230** which can provide information regarding how a vehicle is being driven and the current condition of the vehicle. One or more camera's **240** can be located onboard the vehicle to gather visual data throughout the vehicle journey. Further, system **200** includes a context component **250** providing scheduling information to a user and a buffer **270** for storing data. Along with information and communication being exchanged between the on-board monitoring system **125**/mobile device **105** and the insurance provider **135**, a remote monitoring system **260** can be employed to interact with the insurance provider system **135**, the on-board monitoring system **125** and/or the mobile device **105**. The remote monitoring system **260** can comprise of any device suitable to facilitate presentation of information and means for allowing a user to interact with the information and the various components of systems **100** and **200**, suitable devices include a personal computer, laptop, personal digital assistant, cell phone, etc. The remote monitoring system **260** can be communicatively coupled to the insurance provider system **135**, with the insurance provider system **135** forwarding information to the remote monitoring system **260** as it is received from the on-board monitoring system **125**, the mobile device **105**, or after it has been processed by the

insurance provider system **135**. Alternatively, the remote monitoring system **260** can be in direct communication with the mobile device **105** and/or the on-board monitoring system **125** and receives information directly therefrom, and provides feedback and/or instructions thereto.

[0051] The GPS **210** and the accelerometer **220** can be located in the mobile device **105**, the on-board monitoring system **125**, or external to, but in communication with the mobile device **105** and/or the on-board monitoring system **125**. The GPS **210** provides information regarding the location of the respective device to which it is communicatively coupled. The GPS **210** could be located in the mobile device **105** thereby allowing the location of the user (e.g., a driver) of mobile device **105** to be determined when the mobile device **105** is local to the user, and accordingly, when the mobile device **105** is associated with the on-board monitoring system **125** the location of vehicle **130** (not shown) to be determined. For example, in a situation where someone drives a vehicle belonging to someone else, e.g., a child drives a vehicle belonging to their parent the parent can employ the GPS **210** either via the mobile device **105** or in conjunction with the on-board monitoring system **125** to keep track of the location of their child as the child conducts their journey. Location information can be forwarded to the insurance provider system **135** for processing as part of an insurance rate determination, and also presented to the parent, via the remote monitoring system **260**. The GPS **210** can provide feedback regarding the current location of the driver, which can be employed to monitor the past/present/future location of a driver. Continuing with the example above, the location of the child can be monitored by a parent, via the remote monitoring system **260**, to ensure they are going where they said they were going, the neighborhood currently being driven through, etc. Information provided by the GPS **210** can be processed and employed to assist in directing a driver to go via a safer route, avoid congestion, etc. The information provided by the GPS **210** can be presented to a remote user via the remote monitoring system **260**, and instructions can be entered into the remote monitoring system **260** by a remote user and provided to the driver via the mobile device **105**, on-board monitoring system **125**, or other suitable device available to the driver and/or installed in the vehicle.

[0052] Accelerometer **220** can be employed to monitor the rate of acceleration/deceleration of the vehicle being driven, with the captured data being employed by the insurance provider system **135** as part of a determination of insurance rate. Alerts can be generated if a driver is/has been driving in a dangerous manner, e.g., accelerating or braking excessively, and presented to a person monitoring the driver via the monitoring system **260**. For example, if a child is overly accelerating a parent's vehicle, the parent can be informed via the remote monitoring system **260**, of the child's driving style and appropriate action taken, such as calling the child to tell them to not accelerate excessively. Alternatively, the parent can be informed that the child is speeding or that they are going through a "bad" neighborhood and corrective action is required.

[0053] The on-board monitoring system **125** can be associated with, and obtain information from, an on-board data system **230**. The on-board data system **230** can include an engine control unit/module (ECU/ECM) located on vehicle **130** (see FIG. 1) that monitors various sensors located throughout the engine, fuel, and exhaust systems to control various aspects of the vehicles internal combustion engine

operation. The on-board data system **230** can also include a transmission control unit (TCU), powertrain control module (PCM, which can be a combined ECU/TCU), and other control units/on board diagnostic systems located in an automobile monitoring sensors associated with the transmission system, braking system, windows, doors, windscreen wipers, climate control, etc., and information obtained therefrom can allow the on-board monitoring system **125** to build an accurate picture of how the vehicle is being operated. In one example, the on-board monitoring system **125** can retrieve information from the on-board data system **230** regarding whether the driver and any other occupants of the vehicle are wearing their seatbelts, and if seatbelts are not worn appropriate feedback can be provided indicating a reduction in insurance premium if the seatbelts were worn. The on-board monitoring system **125** can be hardwired to the on-board data system **230** via, in the context of one example, an on-board diagnostics (OBD) connector (e.g., an OBD-II connector) or similar connector/device. Alternatively, the on-board monitoring system **125** can be coupled to the on-board data system **230** using wireless technologies, such as Bluetooth, IEEE 802.11 (a, b, g, etc.), for example.

[0054] Further, the on-board data system **230** can obtain information regarding the condition of the vehicle **130**. In one example, if tire pressure is low, an inference can be made that there is a higher likelihood of an accident and thus the insurance rate should be increased.

[0055] 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.

[0056] A context component **250** can also comprise part of the mobile device **105** and/or the on-board monitoring system **125**, and interacts with other applications (not shown) such as a calendar application operating on the mobile device **105**. The context component **250** can review the calendar entries and prompt the driver of an upcoming trip, e.g., to an airport. The context component **250**, in conjunction with a trip plan-

ner/geographic location application 280, can determine the amount of time required to complete the journey and prompt the driver sufficiently ahead of commencing the journey to allow the driver to make the trip in a safe manner.

[0057] A memory buffer 270 can also be utilized by the on-board monitoring system 125 and/or the mobile device 105. Owing to the possibility of lost wireless communications during a journey there may be occasions where the on-board monitoring system 125 and/or mobile device 105 are not able to communicate with the insurance provider system 135. During such occasions, which can be of indeterminate duration, any data gathered by the on-board monitoring system 125 or the mobile device 105 can be temporarily stored in the buffer 270. Upon re-establishment of communications between the insurance provider system 135, the on-board monitoring system 125 and/or the mobile device 105, the data stored in the buffer can be downloaded to the insurance provider system 135 for analysis and insurance rate determination. Employing the buffer 270 allows data to be gathered and stored even though communications cannot be conducted between the various components of the real time data gathering system. Conversely, the insurance provider system 135 can also include a buffer (not shown) which can be employed to store information generated by the various components of the insurance provider system 135 during the communications outage and, upon re-establishment of communications, the information generated by the insurance provider system 135 can be forwarded to the on-board monitoring system 125 and/or the mobile device 105. The buffer on the insurance provider system 135 can also be employed to store data to be transmitted to the remote monitoring system 260 in the event of communication outage therebetween, e.g., a network failure.

[0058] 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. Also, the local applications 280 can be employed to control what data is stored in the buffer 270. To prevent data overflow of the buffer 270, the local applications 280 can process the data as it is gathered thereby allowing the processed data to be stored as opposed to the raw data, where it is envisioned that the processed data occupies less memory than the raw data.

[0059] A particular application 280 could be a digital road map which in conjunction with the GPS 210 and the on-board data system 230 can be used to assist in the determination of whether a vehicle is speeding. The position of a vehicle can be ascertained by the GPS 210 and in accordance with the digital road map the speed restrictions of the road being navigated can be determined. By comparing the designated speed limit of the road in comparison with the speed of the vehicle (e.g., obtained from the on-board data system 230) a real time determination can be made regarding the velocity of the vehicle and whether it is breaking the posted speed limit, with an according effect on insurance rate. Alternatively, a digital road map (not shown) can be stored at the insurance provider system 135 and data provided by the GPS 210 can be ana-

lyzed by the insurance provider system 135, vehicle velocity determined and the insurance rate affected accordingly.

[0060] Turning to FIG. 3, system 300 comprises a mobile device 105 and on-board monitoring system 125 in communication with an insurance provider system 135. The on-board monitoring system 125 further comprises a vehicle control component 310 which can be employed to ensure the vehicle is being operated in a safe manner. The insurance provider system 135 further comprises an identification component 320, an authentication component 330, an evaluation/authorization component 340, along with a storage device 350 containing driver account information database(s) to identify a driver and control their operation of a vehicle as required. Further, system 300 can include a third party system 360 which includes account information database 370.

[0061] 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. 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).

[0062] To 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. The respective account information can be stored in the database 350 and retrieved during the initialization of the on-board monitoring system 125, such as when the mobile device 105 is being communicatively associated with the on-board monitoring system 125.

[0063] Alternatively, the identification component 320 can be incorporated into the on-board monitoring system 125 to provision user identification (not shown). Including the identification component in the on-board monitoring system 125 allows the identification process to be conducted local to the vehicle where the on-board monitoring system 125 identifies the driver and then conducts authentication, evaluation and authorization in conjunction with the insurance provider system 135, as described supra. In an alternative embodiment, the identification, authentication, evaluation and authorization processes, as described supra, could be performed by various components located on the on-board monitoring system 125.

[0064] In an alternative embodiment, the driver information can be stored locally on the on-board monitoring system 125 and during association of mobile device 105 with the on-board monitoring system 125 the on-board monitoring system 125 confirms the identity of the driver and informs the insurance provider system 135 that driver having identity X is

about to operate the vehicle associated with the on-board monitoring system **125**. For example, the mobile device **105** could include a connector (not shown), the connector is inserted into a receptacle (not shown) located on the on-board monitoring system. The connector can comprise of a unique arrangement of connectors (e.g., copper strips) which can be used to uniquely identify the mobile device **105** and the driver associated therewith. Alternatively, the on-board monitoring system **125** can include a bar-code reader or magnetic strip reader, and when a card employing the appropriate technology is swiped through the reader the driver is identified. In an alternative embodiment, the on-board monitoring device **125** can include a bio-metric device that allows a driver to be identified by their voice signature, iris-scan, fingerprint, or other bio-metric method suitable to identify the driver.

[0065] In another embodiment the driver identification information can be compared with identification information stored in a database **370** of a third party system **360** associated with the mobile device **105**, e.g., a cell phone service provider database, and the driver information is compared with a list(s) of phone customers/subscribers or other pertinent information stored by the cell phone system provider. Alternatively, the third party system **360** and database **370** can be any suitable information provider which can be used to identify a driver.

[0066] To ensure the identity of the driver an authentication process can be performed. In one embodiment this may involve an authentication process of comparing shared digital key information between a digital key stored on the mobile device **105** with a digital key stored in the on-board monitoring system **125**. Alternatively, a digital key stored on the mobile device **105** can be compared with a second digital key stored in a database **350** associated with the insurance system or, alternatively, a database **370** associated with the service provider of the mobile device **105**, e.g., in the case where the mobile device **105** is a cell phone, the second digital key could be provided by the cell phone service provider. The digital keys can be part of a symmetric shared key system (public key) or the digital keys can be part of an asymmetric shared key system (public-private keys). In an alternative embodiment the driver may have to enter authentication information, e.g., type a password, say a password, etc., on an input device associated with the on-board monitoring system **125**, where such an input device could be the mobile device **105** keypad/touchscreen or a keypad/touchscreen attached to the on-board monitoring system **125**. The authentication process can be performed by an authentication component **330** located at the insurance provider, e.g., the authentication component **330** compares the private key employed by a mobile device **105** and a public key stored for the user of mobile device **105** in the account information database **350**. Alternatively, an authentication component (not shown) can be located in the on-board monitoring system **125**, in the mobile device **105**, or other suitable location within the system to provision user authentication. Authentication can be in any form including digital key comparison, password entry, bio-metric data, etc.

[0067] At any time during or after the identification and authentication processes (as required) are being performed, the status of the driver can be evaluated and their ability to drive the vehicle authorized. The evaluation and authorization process can be performed by the evaluation/authorization component **340** located in the insurance provider system **135**. Such an evaluation can include generating evaluation queries such as "Is the driver deemed safe to drive the vehicle?", "Is

the driver deemed safe to drive the other passengers in the vehicle?", "Is the driver authorized to drive the vehicle?". A particular evaluation query could be determining whether a particular driver is authorized to drive a vehicle in a company fleet, and more particularly, whether the driver is authorized to drive a particular vehicle from the fleet of company vehicles? Another query could be to determine whether a driver is allowed to drive with a particular passenger in the vehicle, e.g., parents do not want their child in a vehicle being driven by a driver whom they deem to be a dangerous driver. Another example could be to evaluate whether the driver has sufficient insurance to drive a particular vehicle, where, in the event that they do not have sufficient coverage, the driver is informed that they must obtain suitable insurance coverage to drive the vehicle.

[0068] In response to a negative evaluation being returned by the evaluation/authorization component **340**, to prevent the vehicle being driven by a negatively evaluated driver, a vehicle control component **310** can be employed to immobilize the vehicle associated with the on-board monitoring system **125**. Also, the prospective driver can be informed of their negative evaluation status with the status information being conveyed to them via an output device (not shown) located on their mobile device **105**, the on-board monitoring system **125**, or other suitable means available to the user and/or installed in the vehicle. In one embodiment, the vehicle control component **310** can be in communication with the vehicle ECU (not shown) and forwards signals/data/information to the ECU instructing the ECU to prevent operation of the vehicle engine. For example, the ECU controls the ignition circuit preventing ignition, or the signal received by the ECU when the automatic gearshift is in park could be overridden by the vehicle control component **310** thereby preventing the associated circuitry from allowing ignition of the engine to occur, etc.

[0069] In another embodiment a device (not shown) can be installed in a vehicle to measure the blood alcohol content (BAC) of a driver, such a device can be a breathalyzer or other ignition interlock device, for example. Each time a driver wishes to drive the vehicle they have to pass a BAC test administered by the device. The on-board monitoring system **125** in conjunction with the evaluation/authorization component **340** can be communicatively associated with a breathalyzer and monitor how often a driver fails the breath test with gathered data being utilized by components of the insurance provider system **135** (e.g., the dynamic rate determination component **155**) as part of the insurance rate determination process. In another aspect the vehicle control component **310** in conjunction with the vehicle ECU, in response to a BAC being too high, could immobilize the vehicle.

[0070] After the driver has been identified, authenticated (as required) and favorably evaluated (as required) the driver can proceed to drive the vehicle and monitoring of their driving is conducted.

[0071] The on-board monitoring system **125** can also be part of a wider ranging system that includes positional feedback to the vehicle and allowed actions based thereon. For example, the position of the vehicle can be determined using the GPS **210** (see FIG. 2) which can be entered into a "mesh" system where the "mesh" comprises other vehicles, information of the various roads, streets, highways, etc., in terms of speed limits, etc., as well as the operation of any traffic signals. If a traffic signal is on red and the junction has a "No Right Turn On Red" limitation, if the driver attempts to make

the right turn while the light is on red, an interface associated with the on-board monitoring system **125** can inform the driver that they are attempting to make an illegal turn, with the vehicle control component **310** being employed to apply the brakes to the vehicle so preventing the driver from making the prohibited turn. By employing the on-board monitoring system **125** and the vehicle control component **310** in such a manner the likelihood of a driver making an erroneous/potentially dangerous maneuver can be reduced thereby reducing the likelihood of an accident and accordingly minimizing insurance premiums.

[0072] The on-board monitoring system **125**, the GPS **210** and the vehicle control component **310** can be employed to control the speed of the vehicle. An on-board digital map (not shown) could be included in the on-board monitoring system **125**, which in conjunction with the location of the vehicle being pinpointed by GPS **210** the speed limit restriction of the road being navigated can be determined and the speed of the vehicle controlled accordingly by the vehicle control component **310** to comply with the speed limit. Alternatively, the vehicle control component **310** can be disabled, but the speed of the vehicle versus the posted speed limit can be analyzed to determine whether the driver is speeding and insurance rates can be dynamically generated.

[0073] The on-board monitoring system **125** can receive input from "intelligent" road signs. The intelligent road signs could transmit the speed limit which they have been placed to enforce. 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, the resulting effect on their insurance premium, and/or the vehicle control component **310** can be employed to reduce the speed of the vehicle to the respective speed limit by, for example, reducing the engine revolutions per minute, dropping a gear, applying the brakes, etc. By employing the real-time monitoring system the driver/vehicle can be incorporated into a mesh network of other drivers to allow awareness of other drivers and conditions, e.g., indication of how fast an oncoming vehicle is approaching, whether the vehicle is in the drivers blind spot, etc.

[0074] Information associated with the GPS **210** in association with the "mesh" system can be employed to assist other drivers. For example, if a vehicle has stopped or is driving below the speed limit the driver can be prompted to indicate what might be the reason for their slow/impaired progress. Via an interface associated with the on-board monitoring system **125**, or the mobile device **105**, the user can respond by selecting the appropriate reason from a list of reasons, e.g., "stuck in traffic jam". Such feedback can be gathered and any other drivers who might be heading in the direction of the traffic jam can be prompted about the traffic jam, and if required, find an alternative route.

[0075] 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. The savings realized by the insurance company could be employed to offset the costs of implementing the real time monitoring system **100** to the insurance customer.

[0076] A common complaint from owners of multiple vehicles is that they are paying to insure all the vehicles they own and yet they can only drive one vehicle at any given time. By monitoring vehicle usage of driver in real-time a proportional insurance rate system can be implemented based upon which vehicle(s) they drove in a given time period. For example, a person owns a sports car and a family van. Typically, a sports car has a higher insurance rate than a family van, but the owner drives the family van on weekdays and the sports car on weekends. Employing a ratio based system to determine the insurance premium could result in a 5:2 ratio of family van usage versus sports car usage, however this system is effectively based on the vehicle owner accurately identifying when they use the respective vehicles. Alternatively, with the subject invention, the insurance coverage can be adjusted in real-time depending upon which vehicle is being driven, where it is being driven, applying insurance rates for city, highway, unsafe neighborhood, etc., all being applied in real-time. By monitoring actual usage of each vehicle, an insurance premium that more accurately reflects the vehicle usage can be generated. Also, insurance rates can be based on vehicle usage, if a vehicle sits idle for an extended period the coverage could be adjusted to reflect that. For example, a vehicle sits in a garage during the winter months, only fire and theft insurance coverage need be paid during that time period.

[0077] Another concern is the attention of a driver while driving a vehicle. Usage of a mobile device **105** can be a major source of distraction for a driver, with accounts being commonplace of accidents resulting from the driver not paying attention to the road while using mobile device **105** (for example, texting/talking on a cell phone, entering information into a PDA, laptop, or the like). In one embodiment, where the mobile device **105** is a cell phone, by monitoring real-time usage of the cell phone while driving, a knowledge base can be built on the driver's attention during driving and appropriate insurance rate determined and charged. For example, limited or no cell phone usage during driving has a lower insurance premium than a driver who frequently talks on a cell phone while driving. A log of cell phone usage can be compiled at the on-board monitoring system **125** and/or at the insurance provider system **135**.

[0078] It is to be appreciated that while systems **100**, **200** and **300**, present the on-board monitoring system **125** and mobile device **105** interacting with a single insurance provider system **135**, the proposed embodiments are not so limited. It is envisioned that information gathered by the on-board monitoring system **125** in conjunction with the mobile device **105** can be shared amongst a plurality of insurance provider systems **135**. Such an approach allows the plurality of insurance providers to analyze the gathered information, determine an insurance rate(s) based upon the gathered information and present the determined rates to the driver to which the gathered information pertains thereby allowing the driver to select one insurance provider over another based upon the particulars of the insurance prospectus and quotes. The insurance provider can present their insurance prospectus and quotes to the driver in real-time by employing a display

device associated with mobile device **105** or the on-board monitoring system **125**. Such a real-time system can allow a driver to use more than one insurance firm throughout the course of a journey. For example, if the driver is partaking in a transcontinental journey they can take advantage of rates offered by a plurality of insurance companies during the journey, while driving through the U.S. Mid-West the driver could use insurance from company X, and while driving in the Central U.S. company Y may offer better insurance rates. 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. Further, an insurance company can send information to the user for review at a later date either by traditional means such as by regular mail or electronically for presentation by the remote monitoring system **260**.

[0079] The driver can agree to having all or part of the information gathered by the real-time insurance systems **100**, **200**, and **300**, be passed on to third party vendors. By agreeing to the dissemination of their information a corresponding reduction in their insurance rates can be realized or other benefit could be conferred to the driver. For example, the travel destination(s) and route(s) therebetween can be forwarded to an advertising/marketing company which can forward information regarding businesses in the vicinity of the destination(s) and route(s) to the driver, where, for example, such a business could be a restaurant located at or near the destination.

[0080] The various aspects (e.g., in connection with insurance) can employ various machine learning and reasoning techniques (e.g., Artificial Intelligence based schemes, rules based schemes, and so forth) for carrying out various aspects thereof. For example, a process for determining a reduction (or increase) in insurance premiums can be facilitated through an automatic classifier system and process. The identification component **320**, the authentication component **330**, and the evaluation/authorization component **340** can, either individually or in combination, employ artificial intelligence (AI) techniques as part of the process of identifying and authorizing a driver of a vehicle. The on-board monitoring system **125** can use AI to infer such information as proposed route, real-time selection of insurance coverage, driving habits of the driver, operating condition of a vehicle, etc.

[0081] A classifier is a function that maps an input attribute vector, $x=(x_1, x_2, x_3, x_4, x_n)$, to a confidence that the input belongs to a class, that is, $f(x)=\text{confidence}(\text{class})$. Such classification can employ a probabilistic and/or statistical-based analysis (e.g., factoring into the analysis utilities and costs) to prognose or infer an action that a user desires to be automatically performed.

[0082] A support vector machine (SVM) is an example of a classifier that can be employed. The SVM operates by finding a hypersurface in the space of possible inputs, which hypersurface attempts to split the triggering criteria from the non-triggering events. Intuitively, this makes the classification correct for testing data that is near, but not identical to training data. Other directed and undirected model classification approaches include, e.g., naïve Bayes, Bayesian networks, decision trees, neural networks, fuzzy logic models, and probabilistic classification models providing different pat-

terns of independence can be employed. Classification as used herein also is inclusive of statistical regression that is utilized to develop models of priority.

[0083] As will be readily appreciated from the subject specification, the one or more aspects can employ classifiers that are explicitly trained (e.g., through a generic training data) as well as implicitly trained (e.g., by observing user behavior, receiving extrinsic information). For example, SVM's are configured through a learning or training phase within a classifier constructor and feature selection module. Thus, the classifier(s) can be used to automatically learn and perform a number of functions, including but not limited to determining according to a predetermined criteria when to grant access, which stored procedure to execute, etc. The criteria can include, but is not limited to, the amount of data or resources to access through a call, the type of data, the importance of the data, etc.

[0084] In accordance with an alternate aspect, an implementation scheme (e.g., rule) can be applied to control and/or regulate insurance premiums, real time monitoring, and associated aspects. It will be appreciated that the rules-based implementation can automatically and/or dynamically gather and process information based upon a predefined criterion.

[0085] By way of example, a user can establish a rule that can require a trustworthy flag and/or certificate to allow automatic monitoring of information in certain situations whereas, other resources in accordance with some aspects may not require such security credentials. It is to be appreciated that any preference can be facilitated through pre-defined or pre-programmed in the form of a rule. It is to be appreciated that the rules-based logic described can be employed in addition to or in place of the artificial intelligence based components described.

[0086] FIG. 4, presents an example methodology **400** for the installation of a real-time insurance system. At **402** an on-board monitoring system is installed in a vehicle to facilitate the collection of real-time data from the vehicle and forwarding of the real-time data to an insurance provider. At **404** the on-board monitoring system can be associated with the on-board data/diagnostic control units and system(s) incorporated into the vehicle. The on-board data/diagnostic control units and system(s) can include the vehicles engine control unit/module (ECU/ECM), transmission control unit (TCU), powertrain control unit (PCU), on-board diagnostics (OBD), sensors and processors associated with the transmission system, and other aspects of the vehicle allowing the on-board monitoring system to gather sufficient data from the vehicle for a determination of how the vehicle is being driven to be made. The on-board monitoring system can be communicatively coupled by hard wiring to the on-board diagnostic system(s) or the systems can be communicatively associated using wireless technologies.

[0087] At **406** a mobile device, e.g., a cell phone, can be associated with the on-board monitoring system where the mobile device can facilitate communication between the on-board monitoring system with a remote insurance provider system. The mobile device provides identification information to the on-board monitoring system to be processed by the on-board monitoring system or forwarded an insurance provider system to enable identification of the driver.

[0088] At **408** communications are established between the on-board monitoring system and the mobile device with the remote insurance provider system. In one embodiment it is envisaged that the on-board monitoring system and the insur-

ance provider system are owned and operated by the same insurance company. However, the system could be less restricted whereby the insurance provider system is accessible by a plurality of insurance companies with the operator of the on-board monitoring system, e.g., the driver of the vehicle to which the on-board monitoring system is attached, choosing from the plurality of insurance providers available for their particular base coverage. In such an embodiment, upon startup of the system the insurance provider system can default to the insurance company providing the base coverage and the operator can select from other insurance companies as they require.

[0089] Over time, as usage of the on-board monitoring system continues, at **410**, there is a likelihood that various aspects of the system might need to be updated or replaced, e.g., software update, hardware updates, etc., where the updates might be required for an individual insurance company system or to allow the on-board monitoring system to function with one or more other insurance company systems. Hardware updates may involve replacement of a piece of hardware with another, while software updates can be conducted by connecting the mobile device and/or the on-board monitoring system to the internet and downloading the software from a company website hosted thereon. Alternatively, the software upgrade can be transmitted to the mobile device or the on-board monitoring system by wireless means. As a further alternative the updates can be conferred to the mobile device or the on-board monitoring system by means of a plug-in module or the like, which can be left attached to the respective device or the software can be downloaded there from.

[0090] Turning to FIG. 5, an example methodology **500** is shown for initializing on-board monitoring for a real-time insurance system and authenticating/authorizing a driver. At **502** mobile device, e.g., a cell phone, is associated with an on-board monitoring system. It is to be appreciated that even while the method relates to the mobile device being a cell phone any device that facilitates storing, processing, and communication of information to allow a driver to be identified can be employed by the method.

[0091] At **504** information is retrieved from the mobile device to allow identification of the driver. The information can be retrieved by an on-board monitoring system and compared with driver information stored therein. In an alternative embodiment the information can be transmitted to an external system where the identification information is compared with driver information stored therein. For example, the information could be forwarded to a system associated with an insurance company and compared with a list of registered/known drivers. In an alternative embodiment the identification information could be forwarded to a database associated with the cell phone system provider and compared with the list of subscribers or similar information stored therein.

[0092] At **506**, as required, the driver can be authenticated to confirm the identity of the driver. In one embodiment this may involve an authentication process of comparing shared digital key information between a digital key on the cell phone with a digital key stored in the on-board monitoring system. Alternatively a cell phone digital key can be compared with a key stored in a database associated with the insurance system or, alternatively, a database associated with the cell phone service provider. In an alternative embodiment the driver may have to enter authentication information, e.g., a password, on an input device associated with the on-board

monitoring system, where such an input device could be the cell phone keypad/touchscreen or a keypad/touchscreen attached to the on-board monitoring system.

[0093] At **508**, as required, the status of the driver can be evaluated through the use of a query/evaluation process. The query can be of any grammatical form to generate a suitable response thereto. Such a query could be one of the following or the like . . . "Is the driver deemed safe to drive the vehicle?", "Is the driver deemed safe to drive the other passengers?", "Is the driver authorized to drive the vehicle?", "Is the driver authorized to drive that particular vehicle from the fleet of company vehicles?" At **510**, in response to negative feedback to the query/evaluation of the driver, the vehicle can be immobilized to prevent usage of the vehicle by the negatively evaluated driver. At **512** the driver can be informed that they are not allowed to drive the vehicle, where the information is forwarded by any suitable means. For example, the driver can be informed by a message displayed on the cell phone, via a display component associated with the on-board monitoring system, or a remote device suitable to display the evaluation information. At **514**, in response to a favorable outcome to the "OK to drive vehicle?" of **508**, a favorably evaluated driver is allowed to drive the vehicle.

[0094] FIG. 6, illustrates an example methodology **600** for gathering information from an on-board monitoring system employed in a real-time insurance system. At **602**, monitoring of the driver and the vehicle they are operating is commenced. Monitoring can employ components of an on-board monitoring system, mobile device components, e.g., cell phone system, or any other system components associated with monitoring the vehicle as it is being driven. Such components can include a global positioning system (GPS) to determine the location of the vehicle at any given time, such a GPS can be located in a cell phone, as part of the on-board monitoring system, or an external system coupled to the monitoring system/cell phone—such an external system being an OEM or after sales GPS associated with the vehicle to be/being driven. A video data stream can be gathered from a video camera coupled to the on-board monitoring system recording the road conditions, etc. throughout the journey. Information can also be gathered from monitoring/control system(s) that are integral to the vehicle, e.g., the vehicle's engine control unit/module (ECU/ECM) that monitors various sensors located throughout the engine, fuel and exhaust systems, etc.

[0095] At **604**, the dynamically gathered data is transmitted to an insurance evaluation system. At **606**, the gathered data is analyzed. Such analysis can involve identifying the route taken by the driver, the speed driven, time of day the journey was undertaken, weather conditions during the journey, other road traffic, did the user use their cell phone during the journey?, and the like. At **608**, the gathered data is assessed from which an insurance rate(s) can be determined. For example, if the driver drove above the speed limit then an appropriate determination could be to increase the insurance premium. At **610**, the driver can be informed of the newly determined insurance rate. Any suitable device can be employed such as informing the user by cell phone, a display device associated with the on-board monitoring system, or another device associated with the vehicle. The information can be conveyed in a variety of ways, including a text message, a verbal message, graphical presentation, change of light emitting diodes (LED's) on a display unit, a HUD, etc.

[0096] At **612**, the driver can continue to drive the vehicle whereby the method can return to **602** where the data gather-

ing is commenced once more. Alternatively, at **612**, the driver may complete their journey and data gathering and analysis is completed. At **614** the driver can be presented with new insurance rates based upon the data gathered while they were driving the vehicle. The new insurance rates can be delivered and presented to the driver by any suitable means, for example the new insurance rates and any pertinent information can be forwarded and presented to the driver via a HUD employed as part of the real time data gathering system. By employing a HUD instantaneous notifications regarding a change in the driver's insurance policy can be presented while mitigating driver distractions (e.g., line of sight remains substantially unchanged). Alternatively, the on-board monitoring system can be used, or a remote computer/presentation device coupled to the real time data gathering system where the information is forwarded to the driver via, e.g., email. In another embodiment, the driver can access a website, hosted by a respective insurance company, where the driver can view their respective rates/gathered information/analysis system, etc. Further, traditional means of communication such as a letter can be used to forward the insurance information to the driver.

[0097] FIG. 7 illustrates an example methodology **700** for determining insurance rates based upon vehicle usage. At **702**, vehicle usage information is obtained for a driver. In one example scenario the driver owns a plurality of vehicles and wants to have their insurance rates to be based upon the how much they drive each respective vehicle. Traditionally an owner who owns a number of vehicles has to pay a substantially higher insurance premium than someone who only owns a single vehicle. However, the multiple vehicle owner feels aggrieved that they are paying a seemingly disproportionate amount. By employing the real time insurance system it is possible to gather information based upon when the driver was driving each particular vehicle and determine an insurance rate based thereon. At **704**, the usage for each vehicle is assessed and, accordingly, at **706**, based upon the assessed usage an insurance rate for the multiple vehicles can be determined. For example, it is determined that the driver only drives the vehicle (vehicle A) with the highest insurance premium approx 10% of the time, while the vehicle (vehicle B) with the lower insurance premium is driven the remaining 90%. Based on such information an insurance rate can be determined comprising of $0.1(\text{vehicle A insurance premium}) + 0.9(\text{vehicle B insurance premium})$. At **708**, the determined insurance premium based upon actual vehicle usage is forwarded to the driver/owner of the vehicles.

[0098] In another embodiment of methodology **700** the vehicle usage at **702** can indicate how much a particular vehicle is driven and for how long it is in a garage. For example, in the Great Lakes region of the continental USA an owner of a vintage vehicle may choose to place the vehicle in storage during the winter months and hence only wants to have insurance to cover when the vehicle is being driven in the summer.

[0099] For purposes of simplicity of explanation, methodologies that can be implemented in accordance with the disclosed subject matter were shown and described as a series of blocks. However, it is to be understood and appreciated that the claimed subject matter is not limited by the order of the blocks, as some blocks can occur in different orders and/or concurrently with other blocks from what is depicted and described herein. Moreover, not all illustrated blocks can be required to implement the methodologies described herein-

after. Additionally, it should be further appreciated that the methodologies disclosed throughout this specification are capable of being stored on an article of manufacture to facilitate transporting and transferring such methodologies to computers. The term article of manufacture, as used, is intended to encompass a computer program accessible from any computer-readable device, carrier, or media.

[0100] Referring now to FIG. 8, there is illustrated a schematic block diagram of a computing environment **800** in accordance with the subject specification. The system **800** includes one or more client(s) **802**. The client(s) **802** can be hardware and/or software (e.g., threads, processes, computing devices). The client(s) **802** can house cookie(s) and/or associated contextual information by employing the specification, for example.

[0101] 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. The data packet can include a cookie and/or associated contextual information, for example. The system **800** includes a communication framework **806** (e.g., a global communication network such as the Internet) that can be employed to facilitate communications between the client(s) **802** and the server(s) **804**.

[0102] Communications can be facilitated via a wired (including optical fiber) and/or wireless technology. The client(s) **802** are operatively connected to one or more client data store(s) **808** that can be employed to store information local to the client(s) **802** (e.g., cookie(s) and/or associated contextual information). Similarly, the server(s) **804** are operatively connected to one or more server data store(s) **810** that can be employed to store information local to the servers **804**.

[0103] Referring now to FIG. 9, there is illustrated a block diagram of a computer operable to execute the disclosed architecture. In order to provide additional context for various aspects of the subject specification, FIG. 9 and the following discussion are intended to provide a brief, general description of a suitable computing environment **900** in which the various aspects of the specification can be implemented. While the specification has been described above in the general context of computer-executable instructions that can run on one or more computers, those skilled in the art will recognize that the specification also can be implemented in combination with other program modules and/or as a combination of hardware and software.

[0104] Generally, program modules include routines, programs, components, data structures, etc., that perform particular tasks or implement particular abstract data types. Moreover, those skilled in the art will appreciate that the inventive methods can be practiced with other computer system configurations, including single-processor or multiprocessor computer systems, minicomputers, mainframe computers, as well as personal computers, hand-held computing devices, microprocessor-based or programmable consumer electronics, and the like, each of which can be operatively coupled to one or more associated devices.

[0105] The illustrated aspects of the specification can also be practiced in distributed computing environments where certain tasks are performed by remote processing devices that are linked through a communications network. In a distrib-

uted computing environment, program modules can be located in both local and remote memory storage devices.

[0106] A computer typically includes a variety of computer-readable media. Computer-readable media can be any available media that can be accessed by the computer and includes both volatile and nonvolatile media, removable and non-removable media. By way of example, and not limitation, computer-readable media can comprise computer storage media and communication media. Computer storage media includes volatile and nonvolatile, removable and non-removable media implemented in any method or technology for storage of information such as computer-readable instructions, data structures, program modules or other data. Computer storage media includes, but is not limited to, RAM, ROM, EEPROM, flash memory or other memory technology, CD-ROM, digital versatile disk (DVD) or other optical disk storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or any other medium which can be used to store the desired information and which can be accessed by the computer.

[0107] Communication media typically embody computer-readable instructions, data structures, program modules or other data in a modulated data signal such as a carrier wave or other transport mechanism, and includes any information delivery media. The term “modulated data signal” means a signal that has one or more of its characteristics set or changed in such a manner as to encode information in the signal. By way of example, and not limitation, communication media include wired media such as a wired network or direct-wired connection, and wireless media such as acoustic, RF, infrared and other wireless media. Combinations of the any of the above should also be included within the scope of computer-readable media.

[0108] With reference again to FIG. 9, the example environment 900 for implementing various aspects of the specification includes a computer 902, the computer 902 including a processing unit 904, a system memory 906 and a system bus 908. The system bus 908 couples system components including, but not limited to, the system memory 906 to the processing unit 904. The processing unit 904 can be any of various commercially available processors or proprietary specific configured processors. Dual microprocessors and other multi-processor architectures can also be employed as the processing unit 904.

[0109] The system bus 908 can be any of several types of bus structure that can further interconnect to a memory bus (with or without a memory controller), a peripheral bus, and a local bus using any of a variety of commercially available bus architectures. The system memory 906 includes read-only memory (ROM) 910 and random access memory (RAM) 912. A basic input/output system (BIOS) is stored in a non-volatile memory 910 such as ROM, EPROM, EEPROM, which BIOS contains the basic routines that help to transfer information between elements within the computer 902, such as during start-up. The RAM 912 can also include a high-speed RAM such as static RAM for caching data.

[0110] The computer 902 further includes an internal hard disk drive (HDD) 914 (e.g., EIDE, SATA), which internal hard disk drive 914 can also be configured for external use in a suitable chassis (not shown), a magnetic floppy disk drive (FDD) 916, (e.g., to read from or write to a removable diskette 918) and an optical disk drive 920, (e.g., reading a CD-ROM disk 922 or, to read from or write to other high capacity optical

media such as the DVD). The hard disk drive 914, magnetic disk drive 916 and optical disk drive 920 can be connected to the system bus 908 by a hard disk drive interface 924, a magnetic disk drive interface 926 and an optical drive interface 928, respectively. The interface 924 for external drive implementations includes at least one or both of Universal Serial Bus (USB) and IEEE 1394 interface technologies. Other external drive connection technologies are within contemplation of the subject specification.

[0111] The drives and their associated computer-readable media provide nonvolatile storage of data, data structures, computer-executable instructions, and so forth. For the computer 902, the drives and media accommodate the storage of any data in a suitable digital format. Although the description of computer-readable media above refers to a HDD, a removable magnetic diskette, and a removable optical media such as a CD or DVD, it should be appreciated by those skilled in the art that other types of media which are readable by a computer, such as zip drives, magnetic cassettes, flash memory cards, cartridges, and the like, can also be used in the example operating environment, and further, that any such media can contain computer-executable instructions for performing the methods of the specification.

[0112] A number of program modules can be stored in the drives and RAM 912, including an operating system 930, one or more application programs 932, other program modules 934 and program data 936. All or portions of the operating system, applications, modules, and/or data can also be cached in the RAM 912. It is appreciated that the specification can be implemented with various proprietary or commercially available operating systems or combinations of operating systems.

[0113] A user can enter commands and information into the computer 902 through one or more wired/wireless input devices, e.g., a keyboard 938 and a pointing device, such as a mouse 940. Other input devices (not shown) can include a microphone, an IR remote control, a joystick, a game pad, a stylus pen, touch screen, or the like. These and other input devices are often connected to the processing unit 904 through an input device interface 942 that is coupled to the system bus 908, but can be connected by other interfaces, such as a parallel port, an IEEE 1394 serial port, a game port, a USB port, an IR interface, etc.

[0114] A monitor 944 or other type of display device is also connected to the system bus 908 via an interface, such as a video adapter 946. In addition to the monitor 944, a computer typically includes other peripheral output devices (not shown), such as speakers, printers, etc.

[0115] The computer 902 can operate in a networked environment using logical connections via wired and/or wireless communications to one or more remote computers, such as a remote computer(s) 948. The remote computer(s) 948 can be a workstation, a server computer, a router, a personal computer, portable computer, microprocessor-based entertainment appliance, a peer device or other common network node, and typically includes many or all of the elements described relative to the computer 902, although, for purposes of brevity, only a memory/storage device 950 is illustrated. The logical connections depicted include wired/wireless connectivity to a local area network (LAN) 952 and/or larger networks, e.g., a wide area network (WAN) 954. Such LAN and WAN networking environments are commonplace in offices and companies, and facilitate enterprise-wide computer networks, such as intranets, all of which can connect to a global communications network, e.g., the Internet.

[0116] When used in a LAN networking environment, the computer 902 is connected to the local network 952 through a wired and/or wireless communication network interface or adapter 956. The adapter 956 can facilitate wired or wireless communication to the LAN 952, which can also include a wireless access point disposed thereon for communicating with the wireless adapter 956.

[0117] When used in a WAN networking environment, the computer 902 can include a modem 958, or is connected to a communications server on the WAN 954, or has other means for establishing communications over the WAN 954, such as by way of the Internet. The modem 958, which can be internal or external and a wired or wireless device, is connected to the system bus 908 via the input device interface 942. In a networked environment, program modules depicted relative to the computer 902, or portions thereof, can be stored in the remote memory/storage device 950. It will be appreciated that the network connections shown are example and other means of establishing a communications link between the computers can be used.

[0118] The computer 902 is operable to communicate with any wireless devices or entities operatively disposed in wireless communication, e.g., a printer, scanner, desktop and/or portable computer, portable data assistant, communications satellite, any piece of equipment or location associated with a wirelessly detectable tag (e.g., a kiosk, news stand, restroom), and telephone. This includes at least Wi-Fi and Bluetooth™ wireless technologies. Thus, the communication can be a predefined structure as with a conventional network or simply an ad hoc communication between at least two devices.

[0119] Wi-Fi, or Wireless Fidelity, allows connection to the Internet from a couch at home, a bed in a hotel room, or a conference room at work, without wires. Wi-Fi is a wireless technology similar to that used in a cell phone that enables such devices, e.g., computers, to send and receive data indoors and out; anywhere within the range of a base station. Wi-Fi networks use radio technologies called IEEE 802.11 (a, b, g, etc.) to provide secure, reliable, fast wireless connectivity. A Wi-Fi network can be used to connect computers to each other, to the Internet, and to wired networks (which use IEEE 802.3 or Ethernet). Wi-Fi networks operate in the unlicensed 2.4 and 5 GHz radio bands, at an 11 Mbps (802.11a) or 54 Mbps (802.11b) data rate, for example, or with products that contain both bands (dual band), so the networks can provide real-world performance similar to the basic 10 BaseT wired Ethernet networks used in many offices.

[0120] The aforementioned systems have been described with respect to interaction among several components. It should be appreciated that such systems and components can include those components or sub-components specified therein, some of the specified components or sub-components, and/or additional components. Sub-components can also be implemented as components communicatively coupled to other components rather than included within parent components. Additionally, it should be noted that one or more components could be combined into a single component providing aggregate functionality. The components could also interact with one or more other components not specifically described herein but known by those of skill in the art.

[0121] As used herein, the terms to “infer” or “inference” refer generally to the process of reasoning about or deducing states of the system, environment, and/or user from a set of observations as captured via events and/or data. Inference can

be employed to identify a specific context or action, or can generate a probability distribution over states, for example. The inference can be probabilistic—that is, the computation of a probability distribution over states of interest based on a consideration of data and events. Inference can also refer to techniques employed for composing higher-level events from a set of events and/or data. Such inference results in the construction of new events or actions from a set of observed events and/or stored event data, whether or not the events are correlated in close temporal proximity, and whether the events and data come from one or several event and data sources.

[0122] Furthermore, the claimed subject matter can be implemented as a method, apparatus, or article of manufacture using standard programming and/or engineering techniques to produce software, firmware, hardware, or any combination thereof to control a computer to implement the disclosed subject matter. The term “article of manufacture” as used herein is intended to encompass a computer program accessible from any computer-readable device, carrier, or media. For example, computer readable media can include but are not limited to magnetic storage devices (e.g., hard disk, floppy disk, magnetic strips . . .), optical disks (e.g., compact disk (CD), digital versatile disk (DVD) . . .), smart cards, and flash memory devices (e.g., card, stick, key drive . . .). Additionally it should be appreciated that a carrier wave can be employed to carry computer-readable electronic data such as those used in transmitting and receiving electronic mail or in accessing a network such as the Internet or a local area network (LAN). Of course, those skilled in the art will recognize many modifications can be made to this configuration without departing from the scope or spirit of the claimed subject matter.

[0123] Moreover, the word “exemplary” is used herein to mean serving as an example, instance, or illustration. Any aspect or design described herein as “exemplary” is not necessarily to be construed as preferred or advantageous over other aspects or designs. Rather, use of the word exemplary is intended to disclose concepts in a concrete fashion. As used in this application, the term “or” is intended to mean an inclusive “or” rather than an exclusive “or”. That is, unless specified otherwise, or clear from context, “X employs A or B” is intended to mean any of the natural inclusive permutations. That is, if X employs A; X employs B; or X employs both A and B, then “X employs A or B” is satisfied under any of the foregoing instances. In addition, the articles “a” and “an” as used in this application and the appended claims should generally be construed to mean “one or more” unless specified otherwise or clear from context to be directed to a singular form.

[0124] What has been described above includes examples of the subject specification. It is, of course, not possible to describe every conceivable combination of components or methodologies for purposes of describing the subject specification, but one of ordinary skill in the art can recognize that many further combinations and permutations of the subject specification are possible. Accordingly, the subject specification is intended to embrace all such alterations, modifications and variations that fall within the spirit and scope of the appended claims. Furthermore, to the extent that the term “includes” is used in either the detailed description or the claims, such term is intended to be inclusive in a manner similar to the term “comprising” as “comprising” is interpreted when employed as a transitional word in a claim.

What is claimed is:

1. A computer implemented system for real-time gathering insurance information, comprising:

a collection component that gathers operation data from a vehicle, the operation data is gathered in real-time;
an identification component that obtains information from which an identity of an operator of the vehicle is established; and

an analysis component that determines an insurance rate based upon the operation data and operator identity.

2. The system of claim **1**, the operation data is gathered from a monitoring system where the monitoring system is located on the vehicle.

3. The system of claim **1**, the operator identity is obtained from a mobile device associated with the operator.

4. The system of claim **1**, further comprising an authentication component that authenticates the operator based at least in part on information provided by the mobile device.

5. The system of claim **4**, the authentication component compares the information provided by the mobile device with operator account information stored in a database.

6. The system of claim **1**, further comprising an authorization component that based upon at least feedback provided by the operator determines whether the operator is allowed to operate the vehicle.

7. The system of claim **1**, further comprising a driving analysis component that receives the operation data, the operation data indicates how the vehicle is being driven.

8. The system of claim **7**, further comprising a dynamic rate determination component that calculates insurance rates based upon the results received from the data analysis component.

9. A method for gathering real-time data for determination of insurance rates, comprising:

employing a processor executing computer executable instructions stored on a computer readable storage medium to implement the following acts:

identifying a potential driver of a vehicle based upon identification information stored on a device associated with the driver; and

gathering real-time data from the vehicle being driven by the driver.

10. The method of claim **9**, further comprising forwarding the real-time data to an external insurance rate determination system.

11. The method of claim **10**, further comprising receiving from the external insurance rate determination system an insurance rate determined at least in part on the real-time data.

12. The method of claim **11**, further comprising presenting the determined insurance rate to the driver.

13. The method of claim **9**, the device is a cell phone belonging to the driver.

14. The method of claim **13**, further comprising monitoring usage of the cell phone by the driver.

15. The method of claim **9**, the real-time data is employed to facilitate reconstruction of an accident.

16. A computer implemented system for determining insurance rates in real-time, comprising:

means for identifying a driver from information stored on a device associated with the driver; and

means for gathering real-time data regarding how the driver is driving a vehicle.

17. The system of claim **16**, further comprising means for transmitting the real-time data to a remote computer system that determines an insurance rate based at least in part on the real-time data.

18. The system of claim **17**, further comprising means for receiving an insurance rate from a remote computer system.

19. The system of claim **18**, further comprising means for presenting the insurance rate to the driver.

20. The system of claim **16**, means for determining usage of the device while the vehicle is being operated by the driver.

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