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Phelan

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(54) **DRIVER AUTHENTICATION SYSTEM AND METHOD FOR MONITORING AND CONTROLLING VEHICLE USAGE**

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G06F 19/00 (2011.01)
B60R 25/00 (2013.01)

(52) **U.S. Cl.**
CPC ***B60R 25/00*** (2013.01)

(58) **Field of Classification Search**
None
See application file for complete search history.

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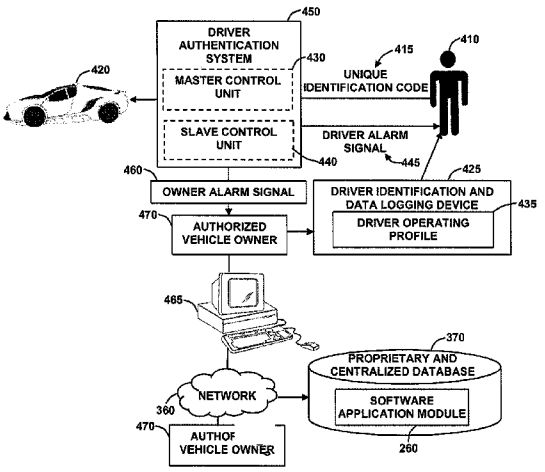
(57) **ABSTRACT**

A driver authentication and safety system and method for monitoring and controlling vehicle usage by high-risk drivers. A centralized database comprising a software application can be accessed by an authorized user via a data communications network utilizing a remote computer in order to configure a desired operating profile that matches requirements of the high-risk driver. The operating profile can be loaded to a driver identification and data logging device in conjunction with the remote computer. A master control unit receives a unique identification code from the data logging device to authenticate the high-risk driver and to operate the vehicle within the desired operating profile. A slave control unit receives commands from the master control unit and generates a real time alarm signal if the driver violates the preprogrammed operating profile unique to the driver.

20 Claims, 8 Drawing Sheets



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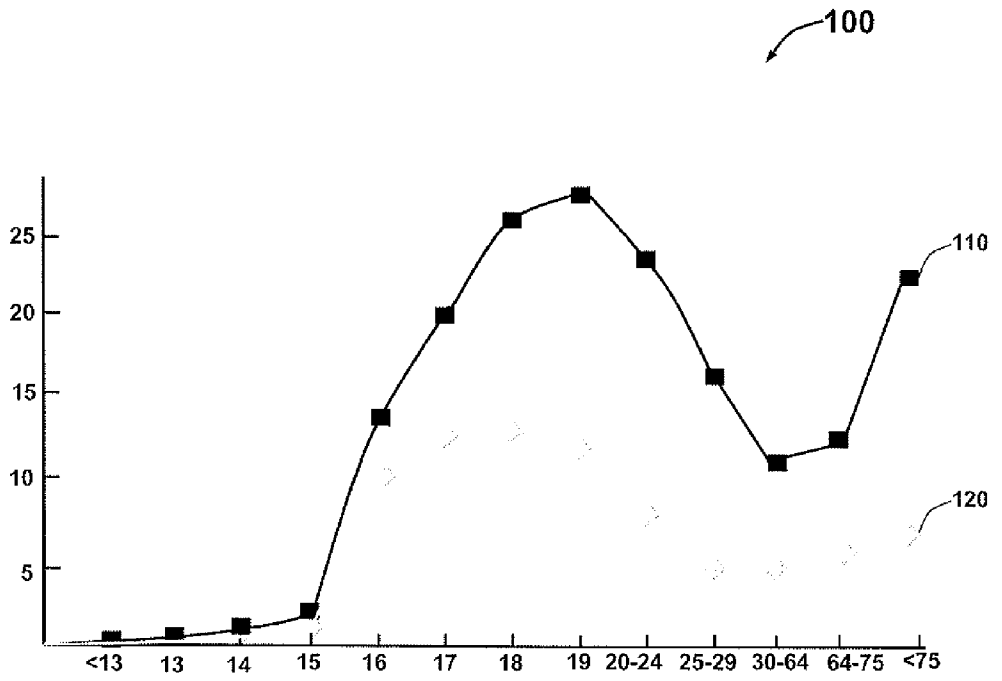
100
110
120
25
20
15
10
5
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13
14
15
16
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18
19
20-24
25-29
30-64
64-75
<75

FIG. 1

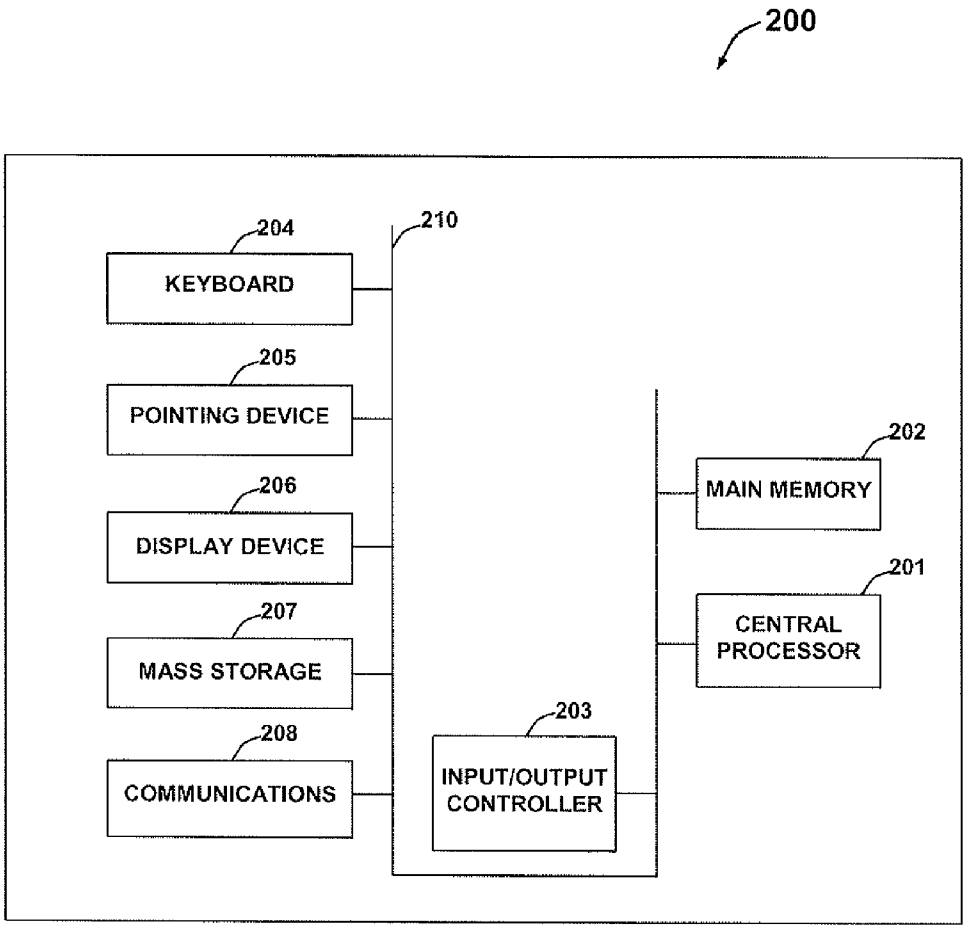
200
204
KEYBOARD
210
205
POINTING DEVICE
202
MAIN MEMORY
206
DISPLAY DEVICE
201
CENTRAL PROCESSOR
207
MASS STORAGE
203
INPUT/OUTPUT CONTROLLER
208
COMMUNICATIONS

FIG. 2

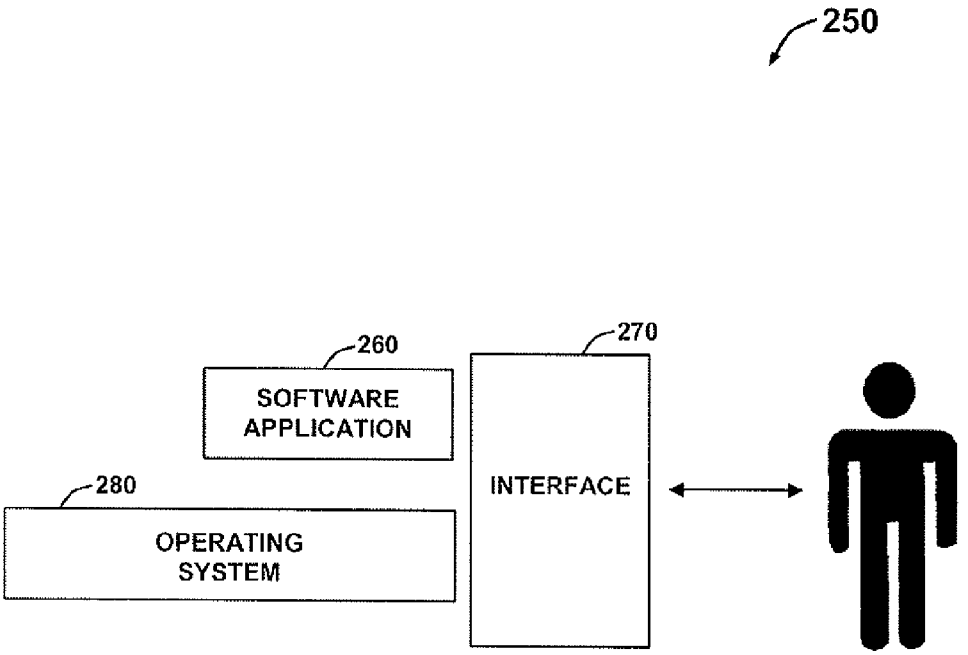
250
260
SOFTWARE APPLICATION
270
INTERFACE
280
OPERATING SYSTEM

FIG. 3

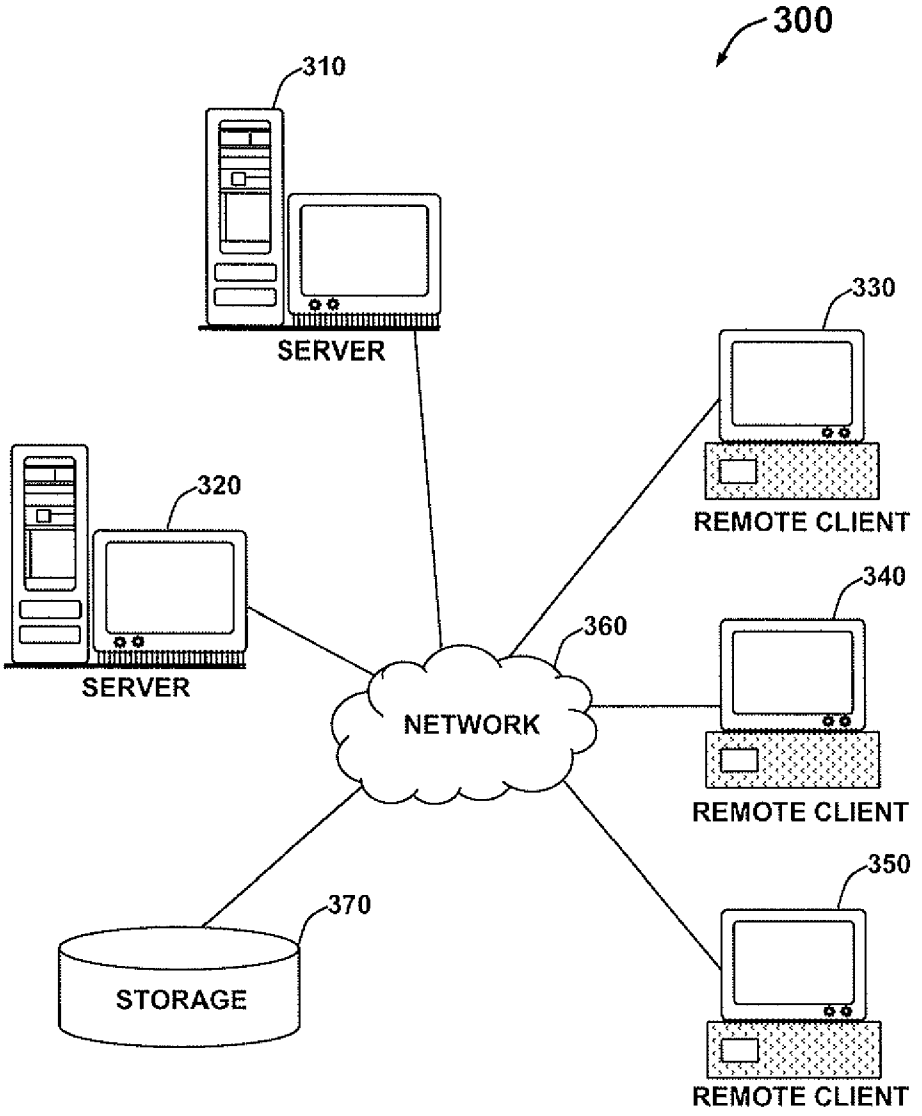
300
310
SERVER
330
REMOTE CLIENT
320
SERVER
340
360
NETWORK
REMOTE CLIENT
350
370
STORAGE
REMOTE CLIENT

FIG. 4

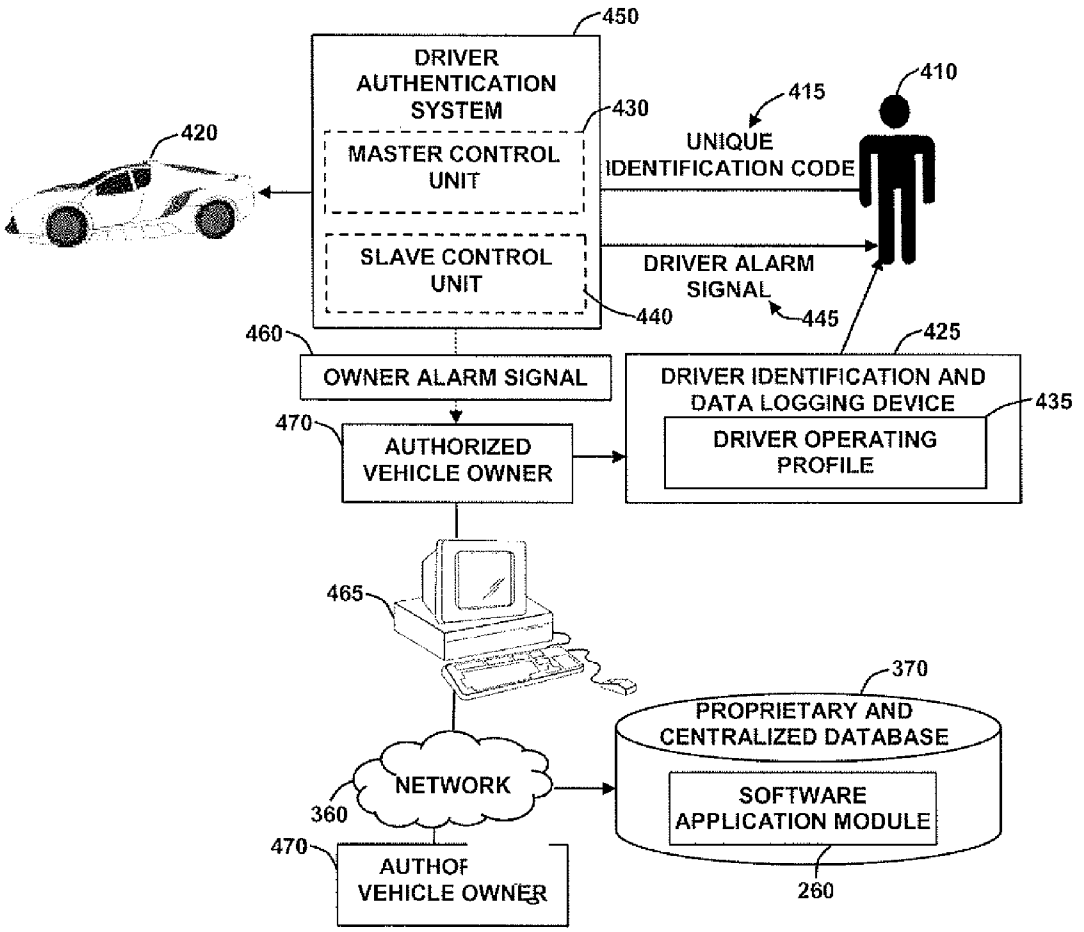
450
DRIVER AUTHENTICATION SYSTEM
430
MASTER CONTROL UNIT
SLAVE CONTROL UNIT
440
420
415
UNIQUE IDENTIFICATION CODE
410
DRIVER ALARM SIGNAL
445
460
OWNER ALARM SIGNAL
425
DRIVER IDENTIFICATION AND DATA LOGGING DEVICE
435
DRIVER OPERATING PROFILE
470
AUTHORIZED VEHICLE OWNER
465
370
PROPRIETARY AND CENTRALIZED DATABASE
SOFTWARE APPLICATION MODULE
NETWORK
360
470
AUTHOF VEHICLE OWNER
260

FIG. 5

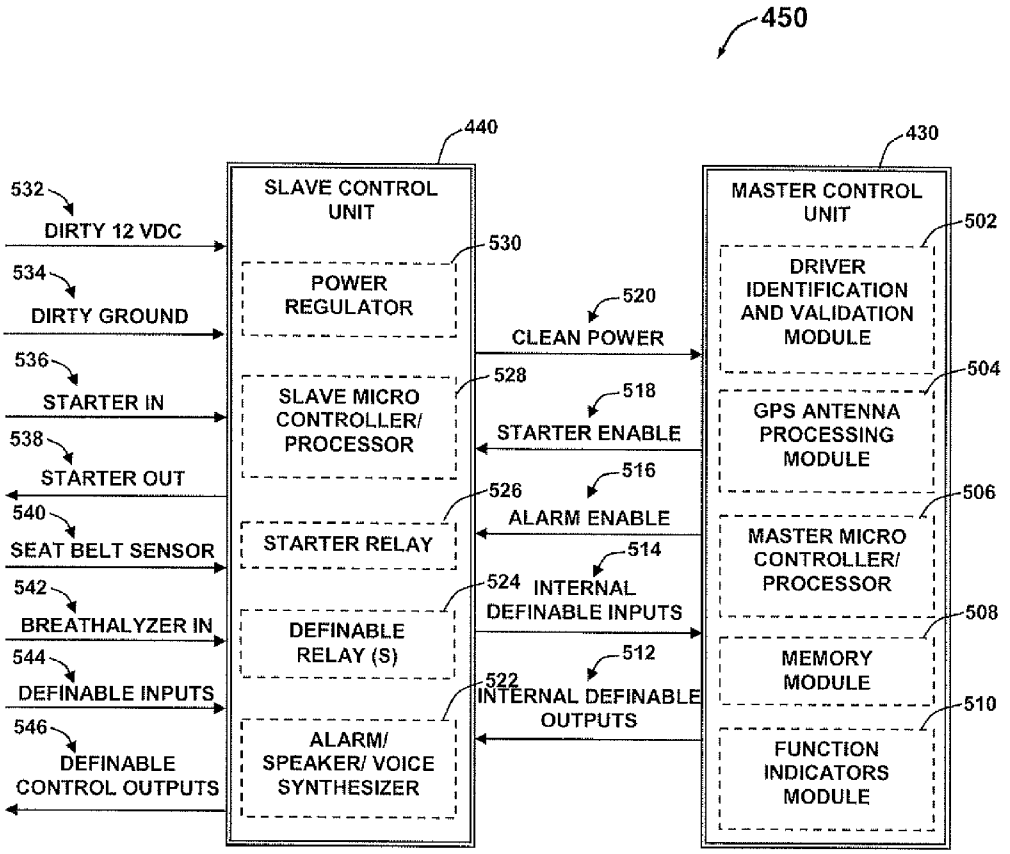
450
440
430
SLAVE CONTROL UNIT
MASTER CONTROL UNIT
532
DIRTY 12 VDC
534
DIRTY GROUND
536
STARTER IN
538
STARTER OUT
540
SEAT BELT SENSOR
542
BREATHALYZER IN
544
DEFINABLE INPUTS
546
DEFINABLE CONTROL OUTPUTS
530
POWER REGULATOR
528
SLAVE MICRO CONTROLLER/ PROCESSOR
526
STARTER RELAY
524
DEFINABLE RELAY (S)
522
ALARM/ SPEAKER/ VOICE SYNTHESIZER
520
CLEAN POWER
518
STARTER ENABLE
516
ALARM ENABLE
514
INTERNAL DEFINABLE INPUTS
512
INTERNAL DEFINABLE OUTPUTS
502
DRIVER IDENTIFICATION AND VALIDATION MODULE
504
GPS ANTENNA PROCESSING MODULE
506
MASTER MICRO CONTROLLER/ PROCESSOR
508
MEMORY MODULE
510
FUNCTION INDICATORS MODULE

FIG. 6

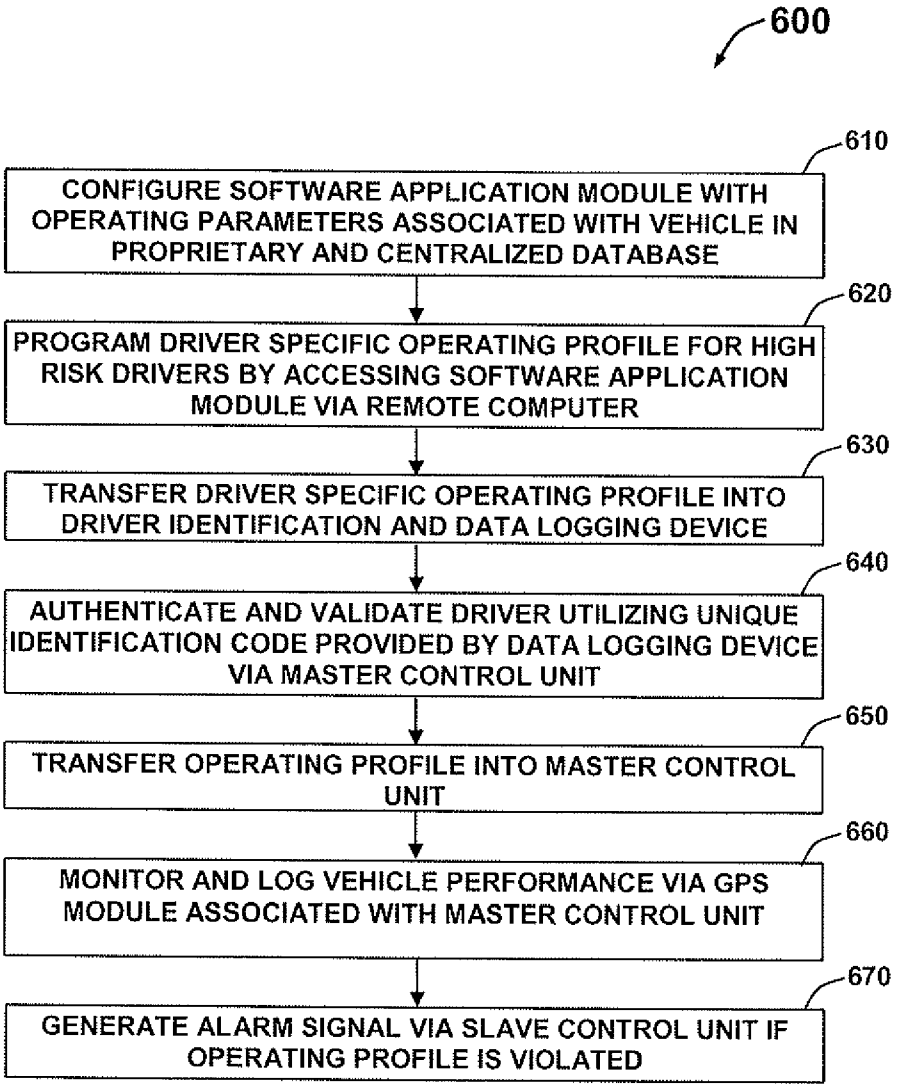
600
610
CONFIGURE SOFTWARE APPLICATION MODULE WITH OPERATING PARAMETERS ASSOCIATED WITH VEHICLE IN PROPRIETARY AND CENTRALIZED DATABASE
620
PROGRAM DRIVER SPECIFIC OPERATING PROFILE FOR HIGH RISK DRIVERS BY ACCESSING SOFTWARE APPLICATION MODULE VIA REMOTE COMPUTER
630
TRANSFER DRIVER SPECIFIC OPERATING PROFILE INTO DRIVER IDENTIFICATION AND DATA LOGGING DEVICE
640
AUTHENTICATE AND VALIDATE DRIVER UTILIZING UNIQUE IDENTIFICATION CODE PROVIDED BY DATA LOGGING DEVICE VIA MASTER CONTROL UNIT
650
TRANSFER OPERATING PROFILE INTO MASTER CONTROL UNIT
660
MONITOR AND LOG VEHICLE PERFORMANCE VIA GPS MODULE ASSOCIATED WITH MASTER CONTROL UNIT
670
GENERATE ALARM SIGNAL VIA SLAVE CONTROL UNIT IF OPERATING PROFILE IS VIOLATED

FIG. 7

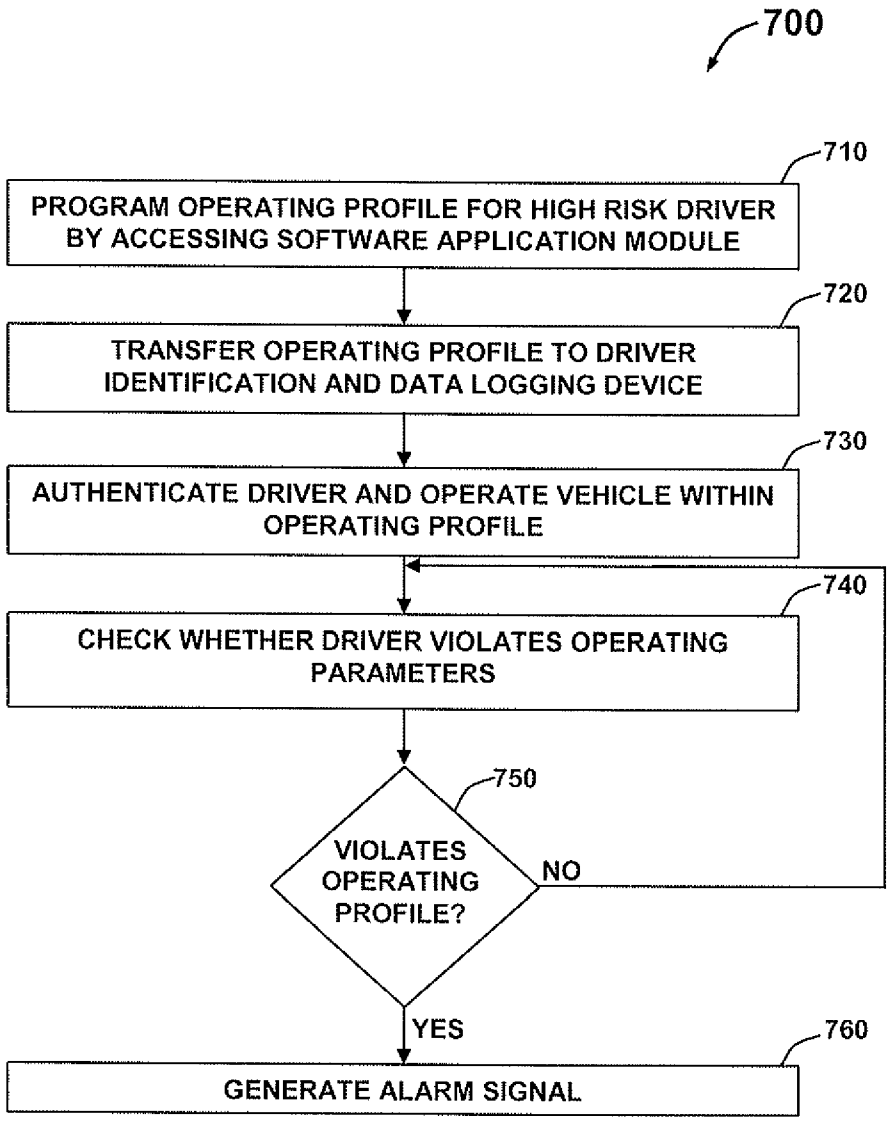
700
710
PROGRAM OPERATING PROFILE FOR HIGH RISK DRIVER BY ACCESSING SOFTWARE APPLICATION MODULE
720
TRANSFER OPERATING PROFILE TO DRIVER IDENTIFICATION AND DATA LOGGING DEVICE
730
AUTHENTICATE DRIVER AND OPERATE VEHICLE WITHIN OPERATING PROFILE
740
CHECK WHETHER DRIVER VIOLATES OPERATING PARAMETERS
750
VIOLATES OPERATING PROFILE?
NO
YES
760
GENERATE ALARM SIGNAL

FIG. 8

DRIVER AUTHENTICATION SYSTEM AND METHOD FOR MONITORING AND CONTROLLING VEHICLE USAGE

INVENTION PRIORITY

The present application is a continuation of nonprovisional patent application Ser. No. 12/496,509, entitled "Driver Authentication System and Method For Monitoring and Controlling Vehicle Usage," filed Jul. 1, 2009, which is a continuation of provisional patent application No. 61/077,568, entitled "Systems and methods for monitoring and controlling vehicle usage by young drivers", filed Jul. 2, 2008, which are all hereby incorporated by reference.

TECHNICAL FIELD

Embodiments are generally related to techniques for use in ensuring motor vehicle operation safety. Embodiments are also related to systems and methods for monitoring and controlling vehicle usage by high-risk drivers.

BACKGROUND OF THE INVENTION

The widespread usage of motor vehicles for both personal and work related activities places millions of vehicles on roads each day with their operation being largely unmonitored. Unmonitored vehicle operation can lead to issues including, for example, abusive use of the vehicle and lack of experience. With more young drivers getting licenses each year, there has been an unfortunate increase in accidents along with the ensuing damage, debilitating injuries and sometimes death. Most of these accidents are attributable to speeding and generally poor driving habits.

FIG. **1** illustrates a graphical representation **100** that depicts the actual deaths in passenger vehicles by age provided by National Highway Transportation Safety Administration (NHTSA). The curve **110** represents the death rate associated with male drivers and the curve **120** represents the death rate of female drivers. From the graph **100**, it is clear that the distribution of age related deaths is bi-modal, and clearly depicts the relationship between youth and auto fatality. Current data indicates that the offering of a driver education course result in a great increase in the number of young licensed drivers without any decrease in the rate of fatal and serious crash involvement. Although such driver's education programs do teach safety skills, students are not motivated to utilize them and they actually foster overconfidence and do not fully consider safety issues.

The factors that have been researched and proven as the leading contributors to accidents, injuries and fatalities among teens includes lack of driving experience, inadequate driving skills, risk-taking behavior, poor judgment and decision making, distraction and lack of focus. As a result of these factors, a higher proportion of teens are responsible for fatal crashes because of driving errors as evidenced by a larger percentage of crashes of single vehicles, a larger percentage of crashes involving speed, a larger percentage of crashes involving other passengers.

Based on the foregoing it is believed that a need exists for an improved driver authentication system and method for monitoring and controlling vehicle usage by a high-risk driver. A need also exists for an improved method for identifying and authenticating the driver and programming the vehicle operating parameters that trigger control and driver feedback intervention, as described in greater detail herein.

BRIEF SUMMARY

The following summary is provided to facilitate an understanding of some of the innovative features unique to the present invention and is not intended to be a full description. A full appreciation of the various aspects of the embodiments disclosed herein can be gained by taking the entire specification, claims, drawings, and abstract as a whole.

It is, therefore, one aspect of the present invention to provide for an improved driver authentication system and method.

It is another aspect of the present invention to provide for an improved system and method for monitoring and controlling vehicle usage by high-risk drivers.

It is further aspect of the present invention to provide for an improved method for identifying and authenticating the driver and programming the vehicle operating parameters that trigger control and driver feedback intervention.

The aforementioned aspects and other objectives and advantages can now be achieved as described herein. A driver authentication system and method for monitoring and controlling vehicle usage by a high-risk driver (e.g., teen driver, fleet or rental drivers, habitual reckless drivers, etc) is disclosed. A proprietary and centralized database comprising a software application can be accessed by an authorized user via a network utilizing a remote computer in order to configure a desired operating profile that matches requirements of the high-risk driver. The operating profile can be loaded to a driver identification and data logging device in conjunction with the remote computer. A master control unit can receive a unique identification code from the data logging device to authenticate the high-risk driver and to operate the vehicle within the desired operating profile. A slave control unit receives commands from the master control unit and generates a real time alarm signal if the driver violates the preprogrammed operating profile unique to the driver.

The alarm signal generated by the slave control unit can remain until the driver corrects the operating condition and brings the vehicle within the desired operating profile. Also, the system can provide an alarm signal to the authorized user (e.g., parent) utilizing an auto dial feature that communicates the authorized user via a telephone or internet when the driver violates preprogrammed operating profile. The operating parameters can be for example, but not limited to, data concerning maximum allowable vehicle speed, vehicle location, vehicle hours of operating and seat belt usage. The slave control unit can generate the alarm signal via a voice synthesized means, sounding a cabin buzzer, toggling the dome light and/or powering the radio off, etc. The driver identification and data logging device can allow identification of various drivers associated with the vehicle, thereby allowing the vehicle to perform in one way for the intended high-risk drivers, yet another way for the authorized user. The system can include a GPS (Global Positioning System) module to determine and measure parameters such as, time of day, speed and location data associated with the vehicle.

The driver authentication system can include additional features such as data logging, alarming, operation governance, ease of programmability and can utilize GPS technology to provide high-risk driver safety. The system also provides user awareness that reduce the likelihood of a high-risk driver injury or fatality by helping the high-risk drivers with safe driving habits through immediate and real time feedback and governing. The programmable operating parameters associated with the real time driver feedback can categorize the system as a unique driver safety device. Additionally, the system and method described herein can provide multiple

operating profiles for a single vehicle that allows the owners to operate the vehicle without any restrictions yet have restrictions in affect when the vehicle is operated by the high risk driver.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying figures, in which like reference numerals refer to identical or functionally-similar elements throughout the separate views and which are incorporated in and form a part of the specification, further illustrate the present invention and, together with the detailed description of the invention, serve to explain the principles of the present invention.

FIG. **1** illustrates a graphical representation depicting actual deaths in passenger vehicles by age;

FIG. **2** illustrates a schematic view of a computer system in which the present invention can be embodied;

FIG. **3** illustrates a schematic view of a software system including an operating system, application software, and a user interface that can be used for carrying out the present invention;

FIG. **4** depicts a graphical representation of a network of data processing systems in which aspects of the present invention can be implemented;

FIG. **5** illustrates a block diagram of a driver authentication system, in accordance with an embodiment;

FIG. **6** illustrates a schematic block diagram of the driver authentication system for monitoring and controlling vehicle usage, in accordance with an embodiment;

FIG. **7** illustrates a flow chart of operation illustrating logical operation steps of a method for monitoring and controlling vehicle usage, in accordance with embodiments; and

FIG. **8** illustrates a high level flow chart of operation illustrating logical operation steps of a method for monitoring and controlling vehicle usage by a high-risk driver, in accordance with embodiments.

DETAILED DESCRIPTION

The particular values and configurations discussed in these non-limiting examples can be varied and are cited merely to illustrate at least one embodiment and are not intended to limit the scope thereof.

FIGS. **2-4** are provided as exemplary diagrams of data processing environments in which embodiments of the present invention may be implemented. It should be appreciated that FIGS. **2-4** are only exemplary and are not intended to assert or imply any limitation with regard to the environments in which aspects or embodiments of the present invention may be implemented. Many modifications to the depicted environments may be made without departing from the spirit and scope of the present invention.

As depicted in FIG. **2**, the present invention may be embodied in the context of a data-processing apparatus **200** comprising a central processor **201**, a main memory **202**, an input/output controller **203**, a keyboard **204**, a pointing device **205** (e.g., mouse, track ball, pen device, or the like), a display device **206**, and a mass storage **207** (e.g., hard disk). Additional input/output devices, such as wireless communications **208**, may be included in the data-processing apparatus **200** as desired. The wireless communications **208** can include cellular, GPS, satellite, etc. As illustrated, the various components of the data-processing apparatus **200** communicate through a system bus **210** or similar architecture.

FIG. **3** illustrates a computer software system **250** for directing the operation of the data-processing apparatus **200** depicted in FIG. **1**. Software system **250**, which is stored in main system memory **202** and on disk memory **207**, can include a kernel or operating system **280** and a shell or interface **270**. One or more application programs, such as software application **260**, may be "loaded" (i.e., transferred from mass storage **207** into the main memory **202**) for execution by the data-processing apparatus **200**. The data-processing apparatus **200** receives user commands and data through user interface **270**; these inputs may then be acted upon by the data-processing apparatus **200** in accordance with instructions from operating module **280** and/or application module **260**.

The interface **270**, which is preferably a graphical user interface (GUI), also serves to display results, whereupon the user may supply additional inputs or terminate the session. In one possible embodiment, operating system **280** and interface **270** can be implemented in the context of menu-driven systems. It can be appreciated, of course, that other types of systems are possible. For example, rather than a traditional menu-driven system, other operation systems can also be employed with respect to operating system **280** and interface **270**. Software Application Module **260** can be adapted for monitoring and controlling vehicle usage high-risk drivers utilizing an operating profile. Software application module **260** can be adapted for providing a real time alarm signal if the driver violates the operating profile. Software application module **260**, on the other hand, can include instructions, such as the various operations described herein with respect to the various components and modules described herein, such as, for example, the method **600** depicted in FIG. **7**.

The following discussion is intended to provide a brief, general description of suitable computing environments in which the method and system may be implemented. Although not required, the method and system will be described in the general context of computer-executable instructions, such as program modules, being executed by a single computer. Generally, program modules include routines, programs, objects, components, data structures, etc., that perform particular tasks or implement particular abstract data types. Moreover, those skilled in the art will appreciate that the method and system may be practiced with other computer system configurations, including hand-held devices, multi-processor systems, microprocessor-based or programmable consumer electronics, networked PCs, minicomputers, mainframe computers, and the like.

FIG. **4** depicts a graphical representation of a network of data processing systems **300** in which aspects of the present invention may be implemented. Network data processing system **300** is a network of computers in which embodiments of the present invention may be implemented. Network data processing system **300** contains network **360**, which is the medium used to provide communications links between various devices and computers connected together within network data processing apparatus **200**. Network **360** may include connections, such as wire, wireless communication links, or fiber optic cables.

In the depicted example, server **310** and server **320** connect to network **360** along with storage unit **370**. In addition, remote clients **330**, **340**, and **350** connect to network **360**. These remote clients **330**, **340**, and **350** may be, for example, vehicle-based or portable computers. Data-processing apparatus **200** depicted in FIG. **2** can be, for example, a client such as client **330**, **340**, and/or **350**. Alternatively, data-processing apparatus **200** can be implemented as a server, such as servers **320** and/or **310**, depending upon design considerations.

In the depicted example, server **320** provides data, such as operating commands, operating system images, and applications to clients **330**, **340**, and **350**. Remote clients **330**, **340**,

and **350** are clients to server **320** in this example. Network data processing system **300** may include additional servers, clients, and other devices not shown. Specifically, clients may connect to any member of a network of servers which provide equivalent content.

In the depicted example, network data processing system **300** is the Internet with network **360** representing a worldwide collection of networks and gateways that use the Transmission Control Protocol/Internet Protocol (TCP/IP) suite of protocols to communicate with one another. At the heart of the Internet is a backbone of high-speed data communication lines between major nodes or host computers, consisting of thousands of commercial, government, educational and other computer systems that route data and messages. Of course, network data processing system **300** also may be implemented as a number of different types of networks, such as for example, cellular, satellite, or other wireless communications means.

The following description is presented with respect to embodiments of the present invention, which can be embodied in the context of a data-processing system such as data-processing apparatus **200**, computer software system **250** and network **360** depicted respectively in FIGS. **2-4**. The present invention, however, is not limited to any particular application or any particular environment. Instead, those skilled in the art will find that the system and methods of the present invention may be advantageously applied to a variety of system and application software, including database management systems, word processors, and the like. Moreover, the present invention may be embodied on a variety of different platforms, including Macintosh, UNIX, LINUX, and the like. Therefore, the description of the exemplary embodiments, which follows, is for purposes of illustration and not considered a limitation.

FIG. **5** illustrates a block diagram of a driver authentication system **450**, in accordance with an embodiment. Note that in FIGS. **1-8**, identical or similar blocks are generally indicated by identical reference numerals. The driver authentication system **450** can be utilized for monitoring and controlling vehicle usage by high-risk drivers such as driver **410**. The high-risk drivers can be, for example, teen drivers, fleet and rental drivers, and habitual wreck less drivers, etc. The authentication system **450** can provide effective training and safety means for the high-risk driver **410** by setting safe operating parameters. The system **450** monitors a vehicle **420** and provide a real time driver corrective feedback to an authorized vehicle owner **470** of the vehicle **420**.

The system **450** generally includes a master control unit **430** and a slave control unit **440** that can be accessed and programmed via the software application module **260** stored in the proprietary and centralized database **370**. Note that as utilized herein, the term "module" may refer to a physical hardware component and/or to a software module. In the computer programming arts, such a software "module" may be implemented as a collection of routines and data structures that performs particular tasks or implements a particular abstract data type. Modules of this type are generally composed of two parts. First, a software module may list the constants, data types, variable, routines, and so forth that can be accessed by other modules or routines. Second, a software module may be configured as an implementation, which can be private (i.e., accessible only to the module), and which contains the source code that actually implements the routines or subroutines upon which the module is based.

Therefore, when referring to a "module" herein, the inventors are generally referring to such software modules or implementations thereof. The methodology described herein can be implemented as a series of such modules or as a single software module. Such modules can be utilized separately or together to form a program product that can be implemented through signal-bearing media, including transmission media and recordable media. The present invention is capable of being distributed as a program product in a variety of forms, which apply equally regardless of the particular type of signal-bearing media utilized to carry out the distribution.

Examples of signal-bearing media can include, for example, recordable-type media, such as floppy disks, hard disk drives, CD ROMs, CD-Rs, etc., and transmission media, such as signals transmitted over digital and/or analog communication links. Examples of transmission media can also include devices such as modems, which permit information to be transmitted over standard cellular communications and/or the more advanced wireless data communications.

The proprietary and centralized database **370** including the software application **260** can be accessed via a remote computer **465** and the network **360**. Note that the remote computer **465** can be a data processing apparatus **200** depicted in FIG. **2**. The authorized vehicle owner **470** can access the software application **260** over a data network **360**, via the remote computer **465** in order to program a desired operating profile **435** representing various operating parameters associated with the vehicle **420**. Note that the operating parameters can be for example, but not limited to, data concerning maximum allowable vehicle speed, vehicle locations, vehicle hours of operation and seat belt usage associated with the vehicle **420**. The system **450** can also track various other features such as for example, data concerning hard braking and fast cornering, etc. Note that these features are not viewed as a key risk factor and therefore can be offered as additional features to the basic operating parameters of the driver authentication system **450**.

The authorized vehicle owner **470** can be for example, but not limited to a parent of a teen, a fleet manager or operator and a judicial authority, etc. The operating profile **435** programmed by the owner **470** can include a set of driving rules and conditions that best fit the requirements of the intended high-risk driver **410** within the vehicle **420**. Further, the operating profile **435** can be loaded to a driver identification and data logging device **425**. The driver identification and data logging device **425** can be a USB compatible device such as for example, iButton, radio frequency identification device (RFID), etc that can be utilized in conjunction with the remote computer **465** in order to load the operating profile **235** into the master control unit **430**. The driver identification and data logging device **225** can allow identification of various drivers **410** associated with the vehicle **420**, thereby allowing the vehicle **420** to perform one way for the intended high-risk driver **410**, yet another way for the authorized vehicle owner **470**.

The data logging device **425** can be connected to the remote computer **465** and the operating profile **435** can be stored. Once the required information is copied into the data logging device **425**, the device **425** can be disconnected from the remote computer **465** and can be placed on a driver key ring (not shown). The master control unit **430** can authenticate the driver **410** utilizing a unique identification code **415** provided by the driver identification and data logging device **425**. Further, the master control unit **430** can enable vehicle operation within the programmed operating profile **435**. If the driver **410** violates the preprogrammed operating profile **435** the master control unit **430** can communicate with the slave control unit **440** and generate a real time driver alarm signal **445**. The alarm signal **445** can result in an actual audible alarm, or it can be used to control/govern operational aspects of the vehicle. For example, the real time driver alarm signal

445 can be used to communicate conditions to the driver, limit/disable radio functionality, govern mechanical operations (e.g., lower/limit speed), remotely contact vehicle owners/fleet managers, and other electrical or mechanical functions, while maintaining driver and occupant safety.

The driver alarm signal **445** generated by the slave control unit **440** can remain until the driver **410** corrects the operating conditions and brings the vehicle **420** within the programmed operating profile **435**. The slave control unit **440** can generate the driver alarm signal **445** via a voice synthesized means, sounding a cabin buzzer, toggling the dome light and/or cutting the radio off, etc. Also, the system **450** can provide an owner alarm signal **460** that remotely alerts the authorized vehicle owner **470** regarding violation of the programmed operating profile **435**. The owner alarm signal **460** can be an auto dial feature that communicates the authorized owner **470** via a cellular or data network.

FIG. **6** illustrates a schematic block diagram of the driver authentication system **450**, in accordance with an embodiment. The master control unit **430** can authenticate the driver **410** utilizing the unique identification code **415** provided by the data logging device **425**. The data logging device **425** associated with the master control unit **430** can be collectively called as 'brain' of the driver authentication system **450**. The master control unit **430** can be installed in the vehicle **420** in a suitable place where the master control unit **430** can be directly exposed to the driver from a dash board of the vehicle **420**.

The master control unit **430** can be configured to include driver identification and validation module **502**, a GPS antenna processing module **504**, a master micro controller and processor **506**, a memory module **508** and a function indicator module **510**. The driver identification and validation module **502** can be utilized to authenticate the driver **410** utilizing the unique identification code **415** and enable the vehicle operation. The master control unit **430** can interpret driver authorization, and ascertain the vehicle speed. The master control unit **430** also interprets the location and time of day parameters versus maximum desired threshold limits.

The GPS antenna processing module **504** can be utilized to determine and measure time of day, speed and location data of the vehicle **420**. The GPS antenna processing module **504** provides location information associated with the vehicle **420** to the authorized vehicle owner **470** hence the system **450** is compatible for any vehicle for monitoring and controlling the high-risk driver **410**. The master microcontroller/processor **506** can process and control the operations associated with the master control unit **430**. The memory module **508** associated with the master control unit **430** can be utilized to store the driver authentication **415** and operating profile **435** associated with the driver **410**. The memory module **508** can further provide information for proper operation of the vehicle **420**. The function indicator module **510** can monitor various functions in association with the vehicle **420** such for example, power, fault detection and monitoring, and other functions.

The master control unit **430** can communicate and send commands to the slave control unit **440** associated with the driver authentication system **450**. The slave control unit **440** can include a power generator **530**, a slave micro controller and processor **528**, a starter relay **526**, a definable relay **524**, and an alarm synthesizer **522**. The slave control unit **440** can be mounted under the dash board of the vehicle **420**. The slave control unit **440** can receive wireless commands from master control unit **430** and generates the alarm signal **445** and **460**. The slave control unit **440** can include pins such as a dirty 12 VDC pin **532**, a dirty ground pin **534**, a starter in pin **536**, a starter out pin **538**, seat belt sensor pin **540**, a breathalyzer pin **542**, a definable input pin on dash slave control unit **440**.

The power regulator **530** can be utilized to regulate a power source and operate the system **450** via the dirty 12 VDC pin **532** and the dirty ground pin **534**. The starter relay **526** can be an electromechanical device that is operated by an electrical current that is provided by the starter in pin **536**. The starter relay **526** can be enabled by a starter enable signal **518** from the master control unit **430** when the driver **410** is authenticated. The starter relay **426** can generate an output via a starter out pin **538** that can be a mechanical function utilized to operate the vehicle **420**. The seat belt sensor pin **540** can be externally connected to a seat belt sensor associated with the vehicle **420** where it obtains the information regarding usage of seat belt by the driver **410**.

The breathalyzer **542** in pin **524** can provide status regarding alcohol consumption of the driver **410** while driving the vehicle **420**. The slave microcontroller/processor **528** can process and control the operations of the slave control unit **440**. The alarm/speaker/voice synthesizer **522** can receive the alarm enable signal **516** from the master control unit **430** and generate the owner programmed driver alarm signal **445** in the vehicle **420** when the driver **410** violates the programmed parameters. Further, the master control unit **430** and the slave control unit **440** can be communicated via various communication signal lines such as a clean power signal **520**, an alarm enable signal **516**, internal definable input signal **514** and an internal definable output signal **512**.

FIG. **7** illustrates a flow chart of operation illustrating logical operation steps of a method **600** for monitoring and controlling vehicle usage, in accordance with an embodiment. The software application module **260** with operating parameters associated with the vehicle **420** can be configured and stored in the proprietary and centralized database **370**, as depicted at block **610**. The driver specific operating profile **435** for the high-risk driver **410** can be programmed by accessing the software application **260** via the remote computer **465**, as indicated at block **620**. Note that the software application **260** can include programming software that can be utilized to program the features of the driver authentication system **450**. The software application module **260** monitors various parameters such as the 'trigger' levels for speed, and time of operation, etc. The software application module **260** can be accessible by the authorized owners **470** and can also be utilized to download the actual data logged during the operation of the vehicle **420**. Further, the software application **260** can also be intuitive for the customer through the process of selecting parameters, trigger thresholds, etc.

The operating profile **435** for the driver **410** can be loaded to the driver identification and data logging device **425**, as illustrated at block **630**. The master control unit **430** can authenticate and validate the driver **410** utilizing the unique identification code **415** provided by the driver identification and data logging device **425**, as indicated at block **640**. The operating profile **435** for the driver **410** can be transferred to the master control unit **430**, as shown at block **650**. The master control unit **430** monitors and logs vehicle performance via the GPS module **504** associated with master control unit **430**, as depicted at block **660**. The slave control unit **440** generates the driver alarm signal **445**, if the driver **410** violates the programmed operating profile **435**, as illustrated at block **670**.

FIG. **8** illustrates a high level flow chart of operation illustrating a method **700** for monitoring and controlling vehicle usage by the high-risk driver **410**, in accordance with an embodiment. Again as reminder, in FIGS. **1-8**, identical or similar blocks are generally indicated by identical reference numerals. The operating profile **435** for the high-risk driver

410 can be programmed by accessing the software application 260 via the remote computer 465, as depicted at block 710. The programmed operating profile 435 for the high-risk driver 410 can be transferred into the driver identification and data logging device 425, as illustrated at block 720.

The driver 410 can be authenticated utilizing the unique identification code 415 provided by the driver identification and data logging device 425 and the programmed operating profile 435 for the driver 410 can be copied into the driver authentication system 450, as depicted at block 730. A determination can be made whether the driver 410 violates the operating profile 435, as illustrated at block 740. If the driver violates the operating profile 435, as shown at block 750, the driver alarm 445 signal can be generated by the driver authentication system 450, as depicted at block 755. Otherwise, the process can be continued to block 740.

The driver authentication system includes features such as data logging, alarming, operation governance, ease of programmability and utilizes GPS technology to provide high-risk driver safety. The system provides user awareness that reduce the likelihood of a high-risk driver injury or fatality by helping the high-risk drivers with safe driving habits through immediate and real time feedback and governing. The programmable operating parameters associated with the real time driver feedback can categorize the system as unique driver safety device. Additionally, the system and method described herein can provide multiple operating profiles for a single vehicle that allows the owners to operate the vehicle without any restrictions yet have restrictions in affect when the vehicle is operated by the high risk driver.

It will be appreciated that variations of the above-disclosed and other features and functions, or alternatives thereof, may be desirably combined into many other different systems or applications. Also that various presently unforeseen or unanticipated alternatives, modifications, variations or improvements therein may be subsequently made by those skilled in the art which are also intended to be encompassed by the following claims.

What is claimed is:

1. A driver authentication and monitoring system, comprising:

a master control unit in a motor vehicle for authenticating at least one driver via a driver identification and data logging device wherein master control unit receives a unique identification code to permit said at least one driver to operate said vehicle within an operating profile; and

a slave control unit in a motor vehicle and in communication with said master control unit, said slave control unit configured to receive commands from said master control unit and to generate at least one of an alarm signal if said at least one driver violates said operating profile unique to said at least one driver thereby providing feedback about said vehicle usage and govern mechanical operations of said vehicle remotely thereby maintaining occupant safety.

2. The driver authentication and monitoring system of claim 1, further comprising a database comprising a program module including at least one operating parameter associated with a vehicle, said program module remotely accessible by an authorized user to program an operating profile with respect to at least one driver, said program module accessed by said authorized user via a network utilizing a remote computer.

3. The driver authentication and monitoring system of claim 1, wherein said driver identification and data logging device in conjunction with a remote computer load said operating profile for said at least one driver.

4. The driver authentication and monitoring system of claim 1, further comprising:

a driver identification and validation module; a GPS antenna processing module; a memory module; and a function indicator module.

5. The driver authentication and monitoring system of claim 4, wherein said operating profile is loaded into said memory module for enabling operation of said vehicle when said at least one driver is authenticated.

6. The driver authentication and monitoring system of claim 4, wherein said GPS antenna processing module provides location information in association with said vehicle.

7. The driver authentication and monitoring system of claim 1, wherein said slave control unit further comprises a power regulator module; a starter relay module; a definable relay module; a slave microcontroller; and an alarm synthesizer.

8. The driver authentication and monitoring system of claim 1, wherein said at least one operating parameter comprises at least one of: a maximum allowable vehicle speed; an allowable vehicle location; allowable hours of operation; and seatbelt usage.

9. The driver authentication and monitoring system of claim 1, wherein said slave control unit generates an alarm signal for alerting said authorized user when said at least one driver violates said operating profile.

10. The driver authentication and monitoring system of claim 1, wherein said driver identification and data logging device comprises one of:

a radio frequency identification device; and

a USB compatible device.

11. A driver authentication and monitoring system, comprising:

a master control unit in a motor vehicle for authenticating at least one driver via a driver identification and associating an operating profile with said at least one driver;

a GPS module providing at least location and speed information in association with movement of said motor vehicle;

a data logging device recording vehicle operation data associated with use of said motor vehicle by said at least one driver including location and speed information from said GPS module; and

a slave control unit in a motor vehicle and in communication with said master control unit, said slave control unit configured to receive commands from said master control unit and to generate an alarm signal if said at least one driver violates said operating profile unique to said at least one driver thereby providing feedback about said vehicle usage and govern mechanical operations of said vehicle remotely thereby maintaining occupant safety;

wherein master control unit permits said at least one driver to operate said vehicle within an operating profile if said master control unit receives at least one of a unique identification code to permit said at least one driver to operate said vehicle within an operating profile and said at least one driver has not violated said operating profile.

12. The driver authentication and monitoring system of claim 11, wherein said slave control unit further comprises a power regulator module; a starter relay module; a definable relay module; a slave microcontroller, and an alarm synthesizer.

13. The driver authentication and monitoring system of claim 11, wherein said operating profile comprises at least one operating parameter including at least one of: a maximum

allowable vehicle speed; an allowable vehicle location; allowable hours of operation; and seatbelt usage.

14. The driver authentication and monitoring system of claim **11** wherein said slave control unit generates an alarm signal for remotely alerting said authorized user when said at least one driver violates said operating profile.

15. A method of authenticating and monitoring drivers, comprising:

providing a motor vehicle with a driver authentication and monitoring system;

programming said driver authentication and monitoring system with an operating profile associated with a high risk driver;

authenticating said high risk driver and enable operation of said motor vehicle within said operating profile by monitoring operation of said motor vehicle to determine if said high profile driver is violating said operating profile;

generating an alarm signal if said high profile driver violates said operating profile while operating said motor vehicle; and

governing mechanical operations of said vehicle remotely if said high profile driver violates said operating profile thereby maintaining occupant safety.

16. The method of authenticating and monitoring drivers in claim **15**, wherein said motor vehicle includes a GPS module and said monitoring operation of said motor vehicle further comprises obtaining GPS data including motor vehicle speed and location.

17. The method of authenticating and monitoring drivers in claim **15**, wherein said step of generating an alarm signal includes providing an alarm remotely to an authorized user.

18. The method of authenticating and monitoring drivers in claim **16**, wherein said step of generating an alarm signal includes providing an alarm remotely to an authorized user.

19. The method of authenticating and monitoring drivers in claim **15**, wherein said step of generating an alarm signal includes providing a control signal that limits functionality within said motor vehicle.

20. The method of authenticating and monitoring drivers in claim **16**, wherein said step of generating an alarm signal includes providing a control signal that limits functionality within said motor vehicle.

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