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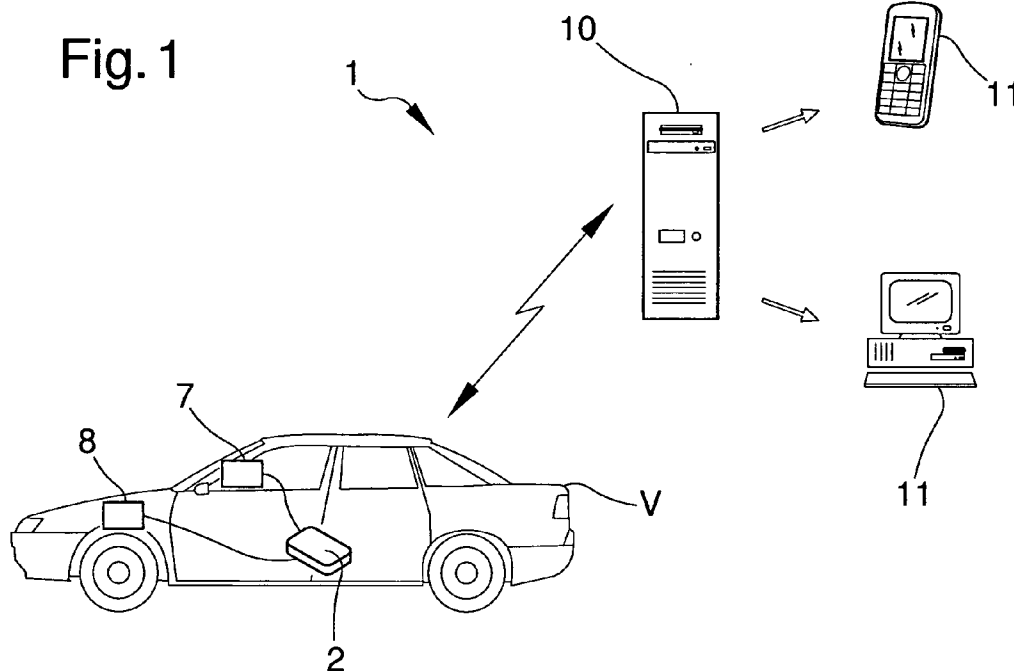
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(54) Title: SYSTEM FOR ACTIVE AND DYNAMIC SAFETY CONTROL ON A VEHICLE

Fig. 1



(57) Abstract: System for active and dynamic safety control on a vehicle, comprising at least one electronic apparatus installable on a vehicle and having a reading unit for reading data relating to the ways of driving the vehicle and a control unit for controlling the active safety on the vehicle. The electronic apparatus comprises at least one communication unit with at least one remote unit suitable for processing the data read by the reading unit and suitable for piloting the active safety control unit starting with the processed data.

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SYSTEM FOR ACTIVE AND DYNAMIC SAFETY CONTROL ON A VEHICLE

Technical Field

This invention relates to a system for active and dynamic safety control on a
5 vehicle.

Background Art

The growing number of road accidents has prompted the study and the use of an increasing number of instruments suitable for upgrading the active and passive safety of vehicles, many of which have become widely used or even mandatory
10 by law.

With special reference to so-called “active safety”, meaning all those instruments together suitable for limiting the possibility of an accident occurring, the use is known of mostly electronic-control apparatus, generally integrated in the vehicle electronics and suitable for indicating to the driver
15 potentially hazardous situations or operating directly and dynamically on the vehicle.

Such electronic apparatus can be of various types and find different applications on the vehicle, in particular, some of the best known and widespread are, e.g., the Antiblock Braking System (ABS) for controlling and optimising braking,
20 the Electronic Stability Program (ESP) system for the electronic control of the traction and the stability of the vehicle and the systems for the active control of the cruising speed of the vehicle.

The need is nevertheless felt to introduce new systems and apparatus able to improve the quality and the quantity of the data read during the use of the
25 vehicle, and able to ensure a more effective use of such data suitable for considerably limiting the possibility of road accidents.

Object of the Invention

The main aim of this invention is to find a system for active and dynamic safety control on a vehicle that permits collecting data indicating the ways of driving a
30 vehicle and which ensures the effective use of such data aimed at considerably limiting the possibilities of road accidents.

Another object of this invention is to provide a system for active and dynamic

safety control on a vehicle that allows to overcome the limits of the known technique within the ambit of a simple and rational solution, which is easy and effective to use, as well as having a low cost.

The aforementioned objects are all achieved by the present system for active and dynamic safety control on a vehicle, comprising at least one electronic apparatus installable on a vehicle and having a reading unit for reading data relating to the ways of driving the vehicle and a control unit for controlling the active safety on said vehicle, characterized by the fact that said electronic apparatus comprises at least one communication unit with at least one remote unit suitable for processing the data read by said reading unit and suitable for piloting said active safety control unit starting with the processed data.

Brief Description of the Drawings

Further characteristics and advantages of this invention will appear more evident from the description of a preferred, but not only, embodiment of a system for active and dynamic safety control on a vehicle, illustrated indicatively by way of non limiting example in the accompanying drawings, wherein:

figure 1 is a general diagram illustrating the elements of the system for active and dynamic safety control on a vehicle, according to the invention;
figure 2 is a general diagram illustrating a possible embodiment of the electronic apparatus installable on a vehicle, according to the invention.

Embodiments of the Invention

With particular reference to such illustrations, a system has been globally indicated by 1 for active and dynamic safety control on a vehicle, usable in particular to limit the possibility of an accident occurring during driving.

The system 1 comprises an electronic apparatus 2 installable on a vehicle V, of the type of a unit easily interfaceable with the electronics of the vehicle itself.

The electronic apparatus 2 has a reading unit 3 for reading data relating to the ways of driving the vehicle V such as, e.g., the instantaneous driving speed, the changes in instantaneous acceleration along one or more directions, the position of the vehicle V and more still.

The collection by means of the reading unit 3 of different types of data always

aimed at determining the driving style of the driver of the vehicle V cannot however be ruled out.

In particular, the reading unit 3 comprises a locator device 4 for locating the position of the vehicle V, having a satellite signal receiver of the type
5 commonly used in Global Positioning System (GPS), Galileo Positioning System satellite navigation systems or the like.

The reading unit 3 also comprises a measuring device 5 for measuring the instantaneous acceleration of the vehicle V along three directions substantially at right angles to one another. In particular, the measuring device 5 is composed
10 of an accelerometer with three axes.

Usefully, the arrangement of the three directions of measurement of the instantaneous acceleration with respect to the vehicle V is not of importance for purposes of the correct operation of the accelerometer 5.

Determination means are in fact provided for determining the instantaneous
15 acceleration of the vehicle V whatever the position of the accelerometer 5 and, therefore, of the three directions of measurement. Such determination means for determining the instantaneous acceleration can be, e.g., of the type of a software program integrated in the reading unit 3 in general or in the accelerometer 5 itself.

20 The presence of such determination means for determining the acceleration permits ample freedom as regards the positioning of the accelerometer 5 during the installation on the vehicle V, at the same time ensuring the reading of changes in acceleration along any direction in a reliable and safe way.

The possibility cannot however be ruled out of the locator device 4 and the
25 accelerometer 5 not being made integrated in the electronic apparatus 2, but externally, so they can be connected to the reading unit 3 and suitable for communicating with this by means of suitable communication protocols.

Furthermore, the reading unit 3 can be associated with the electronics of the vehicle V for the direct reading of the driving speed of the vehicle itself.

30 The electronic apparatus 2 also comprises a control unit 6 for controlling active safety on the vehicle V.

In particular, by "active safety" is meant the use of the control unit 6 for the

dynamic control of the vehicle V while the driver is driving, aimed at considerably limiting the occurrence of potentially hazardous situations.

Advantageously, the control unit 6 is associable with signalling means 7 on the vehicle V, of the acoustic or visual type, suitable for signalling the presence of
5 any potentially hazardous situations. Such signalling means 7 can be composed, e.g., of a monitor or, alternatively, they can be composed of the usual light indicators, of display units or of the acoustic indicators of the on-board instruments of the vehicle V, suitably interfaced with the control unit 6.

The interfacing of the control unit 6 with different signalling means 7 such as,
10 e.g., a mobile phone, a handheld computer, etc., cannot however be ruled out.

The control unit 6 is also associable with a speed limiting device 8 installed on the vehicle V.

In particular, the limiting device 8 can be operated from the control unit 6 in case potentially hazardous ways of driving are detected.

15 Usefully, the system 1 comprises a communication unit 9 for sending the read data through the reading unit 3 towards at least one remote unit 10.

In particular, the communication unit 9 comprises at least a transmitter and/or a receiver operating within the spectrum of frequencies with mobile telephony protocols of the GSM, GPRS, UMTS type or the like.

20 The remote unit 10, composed e.g. of an electronic computer, is suitable for processing the above data read by the reading unit 3, in particular by the locator device 4 and by the accelerometer 5, and is suitable for piloting the control unit 6 and therefore the limiting device 8 and the signalling means 7, starting with the processed data.

25 Usefully, the remote unit 10 comprises determination means for determining the instantaneous speed of the vehicle V. Such determination is made starting with the changes in position of the vehicle V read over time by the locator device 4. Such determination means can be, e.g. of the type of a dedicated software program or the like.

30 The remote unit 10 comprises first comparison means for comparing the instantaneous speed of the vehicle V thus determined with the speed allowed within the transit area of the vehicle V.

In particular, the speed allowed within the transit area is detected starting from the position read by the locator device 4 and following verification of the type of area corresponding to such position (e.g., urban area, interurban area, motorway).

- 5 The remote unit 10 also comprises second comparison means for comparing the instantaneous acceleration measurements read with reference acceleration measurements.

In particular, in the case of the acceleration measurements read being different to the reference acceleration measurements, then the second comparison means
10 detect an “anomalous” way of driving by the driver due, e.g., to his/her falling asleep, feeling ill or simply driving dangerously.

The first and the second comparison means can, e.g., be of the dedicated software program type or the like.

- Usefully, the remote unit 10 can comprise storage means for recording the read
15 data and the data processed over time.

Advantageously, the system 1 comprises at least one remote terminal 11, if necessary also accessible to a user different to the driver of the vehicle V, having a unit for receiving the data processed by the remote unit 10 and display means for displaying such processed data.

- 20 Advantageously, the remote terminal 11 comprises an interface, of a keyboard type or the like, suitable for the user to enter instructions for piloting the control unit 6, and a unit for transmitting such piloting instructions to the remote unit 10.

- The instructions entered from the remote terminal 11 can comprise, e.g.,
25 requests to activate the limiting device on the vehicle V, signals to be sent to the driver of the vehicle itself, etc.

- In particular, the remote terminal 11 can be composed of an electronic computer connected to the remote unit through the common Internet (with connection suitably protected to prevent the undesired access of other users) or through a
30 dedicated network.

Alternatively, the remote terminal 11 can be composed of a mobile phone, a handheld computer or the like, able to communicate with the remote unit 10 by

means of the common mobile telephony protocols.

Advantageously, the first and the second comparison means of the remote unit 10 are operatively associated with means of generation and transmission of at least one warning signal towards the remote terminal 11.

5 In particular, the warning signal is sent to the remote terminal 11 once the vehicle V has been found to exceed the maximum speed allowed inside the transit area, or, once sudden accelerations or decelerations of the vehicle V have been detected, such as to indicate anomalous and potentially dangerous ways of driving on the part of the driver.

10 During operation, while the vehicle is being used, the reading unit 3 collects data by means of the locator device 4 and the accelerometer 5.

In particular, such collected data are such as to dynamically determine the style of driving of the driver.

The data thus read are subsequently sent to the remote unit 10 by means of the
15 communication unit 9 and subsequently processed.

The processed data comprise data such as the instantaneous travelling speed of the vehicle V, determined starting with the data read by the locator device 4, and the changes in instantaneous acceleration of the vehicle itself.

During processing by the remote unit 10, the first and the second comparison
20 means determine whether or not there are any anomalous ways of driving on the part of the driver of the vehicle V and, if necessary, generate warning signals subsequently sent to the remote terminal 11.

A user other than the driver of the vehicle V can thus, by means of the remote terminal 11, see the data read and processed by the remote unit 10 and,
25 following the receiving of a warning signal, can intervene directly by means of the interface to enter instructions for piloting the control unit 6.

The instructions entered from the remote terminal 11 can comprise, e.g., requests to activate the limiting device on the vehicle V, signals to be sent to the driver of the vehicle itself, etc.

30 The instructions thus entered are sent to the remote unit 10, subsequently received by the communication unit 9 of the electronic apparatus 2 and sent to the control unit 6.

The control unit 6, according to the piloting instructions, activates the limiting device 8 and/or sends warning signals by means of the signalling means 7.

The triggering of the control unit 6 directly from the remote unit 10 cannot however be ruled out, starting with the comparison of the data read with
5 predefined reference parameters.

It has in point of fact been ascertained how the described invention achieves the proposed objects and in particular the fact is underlined that the presence of the accelerometer and of the locator device permit collecting data indicating the ways the vehicle is being driven.

10 Furthermore, the processing of the remote unit and, if necessary, the intervention by means of the remote terminal of a user other than the driver ensure an effective use of the collected data aimed at considerably restricting the possibility of road accidents.

The invention thus conceived is susceptible to numerous modifications and
15 variations, all of which falling within the scope of the inventive concept.

Furthermore all the details can be replaced with others that are technically equivalent.

In practice, the materials used, as well as the contingent shapes and dimensions, may be any according to requirements without because of this moving outside
20 the protection scope of the following claims.

CLAIMS

- 1) System for active and dynamic safety control on a vehicle, comprising at least one electronic apparatus installable on a vehicle and having a reading unit for reading data relating to the ways of driving the vehicle and a control unit for
5 controlling the active safety on said vehicle, characterized by the fact that said electronic apparatus comprises at least one communication unit with at least one remote unit suitable for processing the data read by said reading unit and suitable for piloting said active safety control unit starting with the processed data.
- 10 2) System according to claim 1, characterized by the fact that it comprises at least one remote terminal having a unit for receiving the data processed by said remote unit and display means for displaying said processed data.
- 3) System according to one or more of the preceding claims, characterized by the fact that said remote terminal comprises at least one interface suitable for the
15 user to enter instructions for piloting the active safety control unit on said vehicle, and a unit for transmitting said piloting instructions to said remote unit.
- 4) System according to one or more of the preceding claims, characterized by the fact that said control unit is associable with signalling means on said vehicle, of the acoustic or visual type.
- 20 5) System according to one or more of the preceding claims, characterized by the fact that said control unit is associable with at least one speed limiting device of said vehicle.
- 6) System according to one or more of the preceding claims, characterized by the fact that said reading unit comprises at least one locator device for locating
25 the position of said vehicle.
- 7) System according to one or more of the preceding claims, characterized by the fact that said reading unit is associable with at least one locator device for locating the position of said vehicle.
- 8) System according to one or more of the preceding claims, characterized by
30 the fact that said locator device comprises at least one satellite signal receiver.
- 9) System according to one or more of the preceding claims, characterized by the fact that said satellite signal receiver is of the type used in Global

Positioning System (GPS), Galileo Positioning System satellite navigation systems or the like.

10) System according to one or more of the preceding claims, characterized by the fact that said reading unit comprises at least one measuring device for
5 measuring the instantaneous acceleration of said vehicle along at least one direction.

11) System according to one or more of the preceding claims, characterized by the fact that said reading unit is associable with at least one measuring device for measuring the instantaneous acceleration of said vehicle along at least one
10 direction, said measuring device being installed on said vehicle.

12) System according to one or more of the preceding claims, characterized by the fact that said measuring device is suitable for measuring the instantaneous acceleration of said vehicle along three directions substantially at right angles to one another.

13) System according to one or more of the preceding claims, characterized by the fact that said electronic apparatus comprises determination means for determining the instantaneous acceleration of said vehicle whatever the position of said three directions with respect to the vehicle itself.

14) System according to one or more of the preceding claims, characterized by
20 the fact that said determination means are of the type of a software program.

15) System according to one or more of the preceding claims, characterized by the fact that said measuring device for measuring the instantaneous acceleration comprises at least one accelerometer.

16) System according to one or more of the preceding claims, characterized by
25 the fact that said accelerometer is of the type of an accelerometer with three axes.

17) System according to one or more of the preceding claims, characterized by the fact that said reading unit can be associated with the electronics of said vehicle for the reading of the instantaneous speed of the vehicle itself.

18) System according to one or more of the preceding claims, characterized by
30 the fact that said communication unit comprises at least a transmitter and/or a receiver operating within the spectrum of frequencies with mobile telephony

protocols.

19) System according to one or more of the preceding claims, characterized by the fact that said spectrum of frequencies and said mobile telephony protocol is selected from the group comprising GSM, GPRS, UMTS or the like.

5 20) System according to one or more of the preceding claims, characterized by the fact that said remote unit comprises storage means of said read data.

21) System according to one or more of the preceding claims, characterized by the fact that said remote unit comprises determination means for determining the instantaneous speed of said vehicle starting with the changes in position of
10 said vehicle over time.

22) System according to one or more of the preceding claims, characterized by the fact that said remote unit comprises first comparison means for comparing the instantaneous speed of said vehicle with the speed allowed within the transit area of the vehicle itself, said transit area being determined by said locator
15 device.

23) System according to one or more of the preceding claims, characterized by the fact that said remote unit comprises second comparison means for comparing the instantaneous acceleration measurements read by said accelerometer with reference acceleration measurements.

20 24) System according to one or more of the preceding claims, characterized by the fact that said first and said second comparison means are operatively associated with means of generation and transmission of at least one warning signal towards said remote terminal.

25 25) System according to one or more of the preceding claims, characterized by the fact that at least one among said determination means, said first comparison means and said second comparison means is of the type of a software program or the like.

26) System according to one or more of the preceding claims, characterized by the fact that said read data comprise the instantaneous travelling speed, the
30 changes in instantaneous acceleration along at least one direction, the position of the vehicle, etc.

27) System according to one or more of the preceding claims, characterized by

the fact that said processed data comprise warning signals suitable for signalling anomalous ways of driving the vehicle and determined starting with said read data.

1/1

Fig. 1

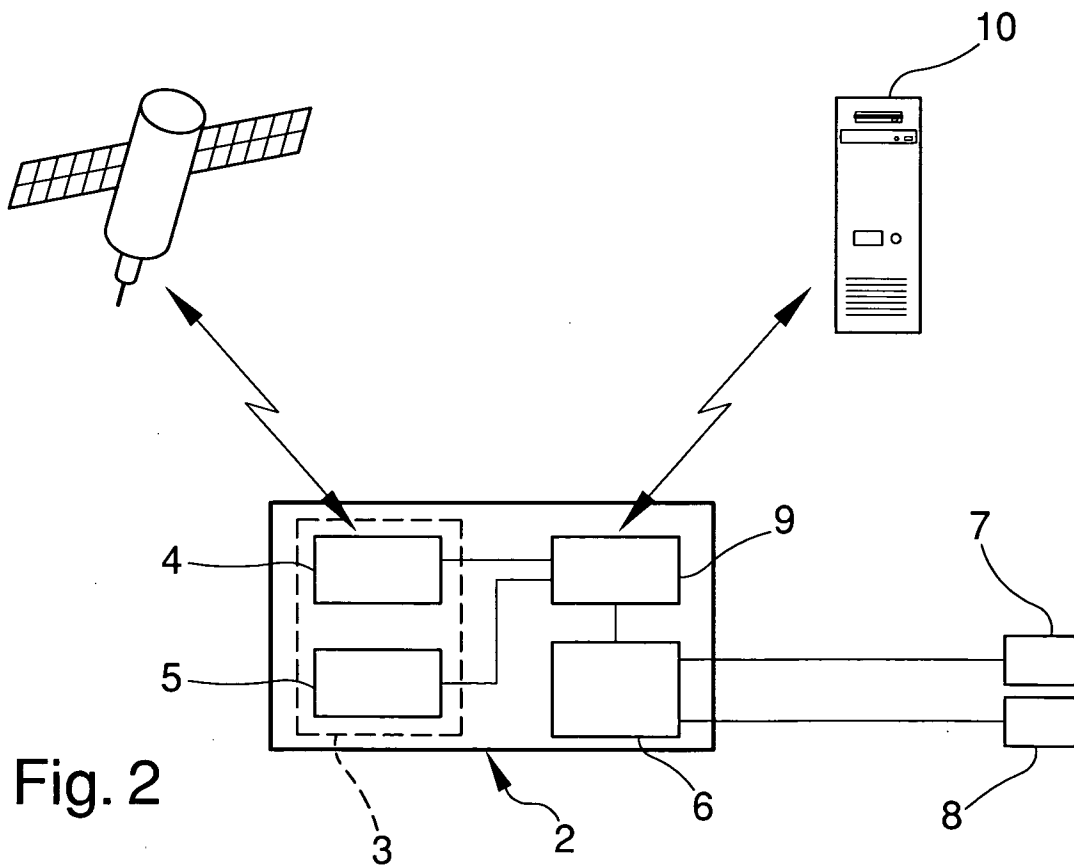
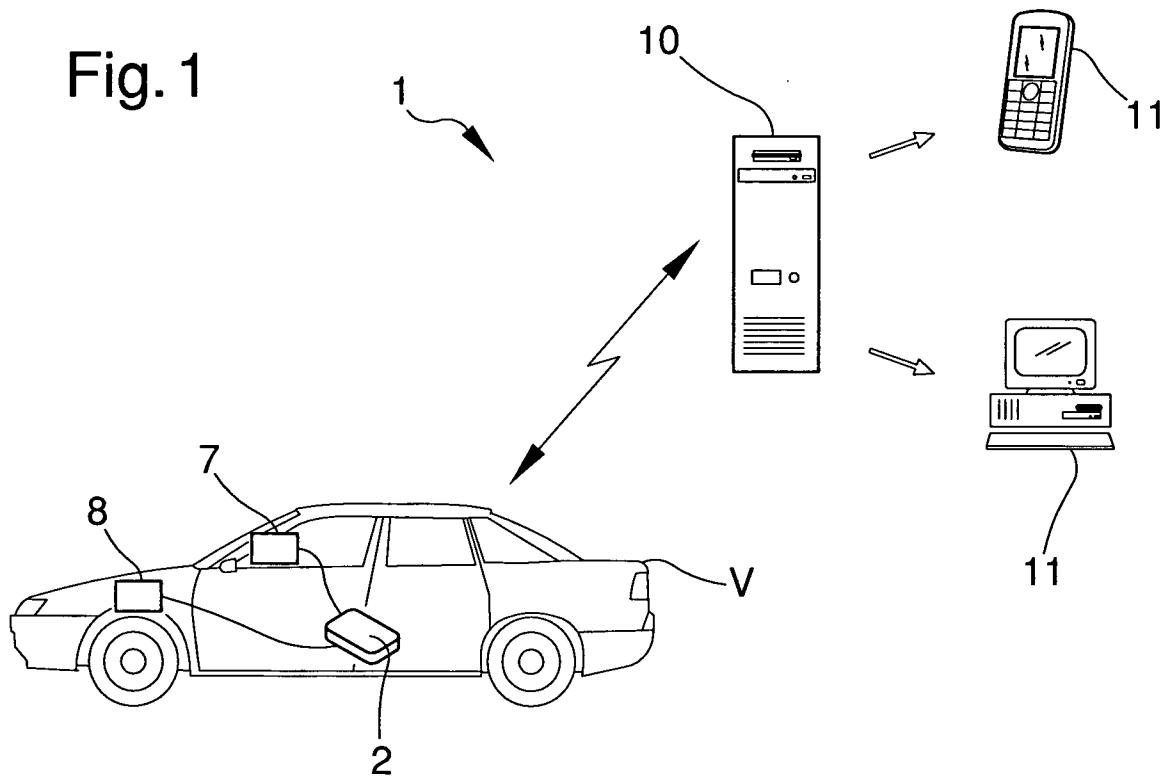


Fig. 2