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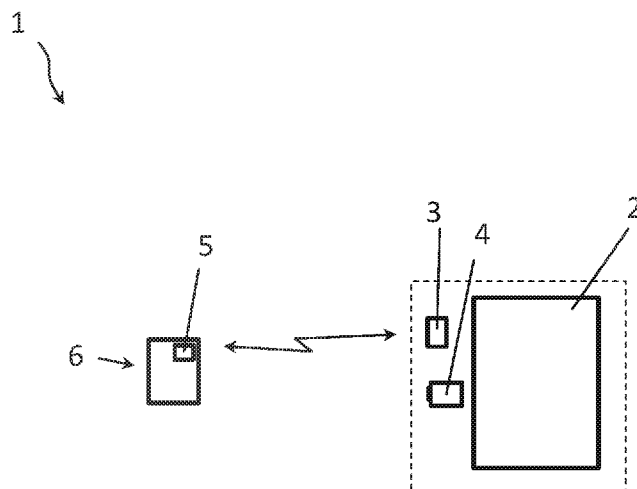


Fig. 1

(57) Abstract: A traffic information system is provided. The traffic information system comprises at least one wearable display device (2), the at least one wearable display device (2) being provided for being worn by a driver of a driver-exposed vehicle and being configured to display traffic-relevant information to traffic participants. The traffic information system further comprises a navigation device (6) which provides a traffic-relevant information, a sender (5), the sender being configured to send data representing the traffic-relevant information, and a receiver (3), the receiver (3) being configured to receive the data sent by the sender (5) for displaying the traffic relevant information on the at least one wearable display device (2).

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TRAFFIC INFORMATION SYSTEM

The present application relates to a traffic information system. In particular, it relates to a traffic information system for providing current traffic-relevant information to traffic participants.

In the prior art, traffic information systems are known including traffic signs, direction- and break indicators mounted on vehicle, or navigation systems with navigation devices mountable on the vehicle.

It is an object of this application to provide a novel traffic information system which can be used additionally to the existing traffic information systems in order to more comprehensive information to the traffic participants and to improve the traffic safety.

According to a first aspect of the present application, a traffic information system is provided. The traffic information system comprises at least one wearable display device, the at least one wearable display device being provided for being worn by a driver of a driver-exposed vehicle and being configured to display traffic-relevant information to traffic participants.

Driver-exposed vehicle can be any vehicle the driver of which - in particular the upper body of the driver of which - can be seen by traffic participants from outside of the vehicle. A driver-exposed vehicle can be a two-wheeler, such as a scooter, as a bike, or as a motorbike. It can also be a cabriolet, a quadricycle, a tractor, or similar.

The at least one display device can be in particular a wearable display device which is provided for being worn on the back of the driver and which is for instance mountable on the clothing of the driver.

The traffic information system further comprises a navigation device providing a traffic-relevant information, a sender which is configured to send data representing the traffic-relevant information, and a receiver which is configured to receive the data sent by the sender for displaying the traffic-relevant information on the at least one wearable display device.

Thus, a wireless communication between the navigation device and the receiver is provided and the traffic-relevant data can be wirelessly transmitted from the navigation device to the receiver.

Traffic participant in this context means any user of the road other than the driver of the driver-exposed vehicle, especially any driver of any vehicle in the vicinity of the driver-exposed vehicle, in particular surrounding or trailing the driver-exposed vehicle, who can see the display device of the traffic information system.

The traffic-relevant information can in particular include a current navigation information, such as a current map information, an information about actual traffic situation, including traffic jams, diversions or similar, future navigation options etc.

The traffic-relevant information can also include text messages which the driver of the driver-exposed vehicle wants to

communicate to other traffic participants, such as "Obstacle ahead", "Please stop", "Slow down" etc.

The traffic-relevant information can also include visual signals such as right arrow, left arrow, red triangle or similar.

By displaying the traffic relevant information on the wearable display, the traffic participants can be provided with additional traffic-relevant information, resulting in a better accident prevention and in an increased traffic safety. Besides, the text messages and visual signals can be used by special emergency services or police for organizing the traffic on the roads in emergency situations.

This can be also helpful for driving schools, in particular in coaching and instructing their students by showing such visual signals or text messages by the drivers of driver-exposed vehicles driving ahead.

The traffic information system can comprise a power supply, in particular a rechargeable power supply which is configured to power the at least one display device and the receiver.

Thus, the display device and the receiver can be operated autonomously, providing higher flexibility to the driver of the driver-exposed vehicle.

The navigation device can be a smart mobile device configured for running an app with a navigation function.

Thus, a smart mobile device can easily be adopted for serving as a navigation device for the traffic information system.

The traffic information system can further comprise a solar panel for recharging the rechargeable power supply. The solar panel can be a wearable solar panel. In particular, it can be mountable on the clothing of the driver.

Thus, the solar energy for charging the power supply can be used and the time of autonomous operation of the display device and the receiver can be increased.

The solar panel can be a flexible solar panel, in particular a silicon-based solar panel or an organic solar panel.

The flexible solar panel can be easily mounted on the clothing of the driver

The traffic information system can further comprise electrical wiring for electrically connecting individual components, in particular the display device, the power supply, and the receiver of the traffic information system.

The sender can be a Bluetooth sender and the receiver can be a Bluetooth receiver.

Bluetooth is a well-established standard and provides a reliable wireless communication between the sender and the receiver.

The receiver can be a BLE (Bluetooth Low Energy) receiver. A BLE receiver is characterized by low power consumption and provides an energy saving and cost-efficient solution.

The traffic information system can comprise a plurality of fixing elements for attaching and securing the display device, the power supply and the receiver on the clothing.

Thus, the traffic information system can be quickly assembled and brought to operational readiness.

According to a second aspect of the invention, a wearable apparatus is provided. The wearable apparatus comprises a carrier body, the carrier body being provided for being worn by a driver of a driver-exposed vehicle.

In particular, the carrier body can be shaped as a coat, as a waistcoat, as a backpack, as a jacket, as a bike jersey, as a motorbike jacket, as a shirt, as a T-shirt or similar.

The wearable apparatus further comprises at least one display device mounted on the carrier body, the at least one display device being configured to display a traffic-relevant information to traffic participants.

The wearable apparatus also comprises a receiver mounted on the carrier body, the receiver being configured to receive a traffic-relevant data for displaying a traffic-relevant information corresponding to the traffic-relevant data on the display device.

By displaying the traffic relevant information on the display device, the traffic participants can be provided with additional traffic-relevant information, resulting in a better accident prevention and in an increased traffic safety.

The receiver can comprise a Bluetooth receiver, in particular a BLE receiver.

Thus a standardised, a energy-saving solution for receiving the traffic-relevant by the receiver is provided.

The wearable apparatus can comprise a rechargeable power supply mounted on the carrier body, the rechargeable power supply can be configured to power the at least one display and the receiver.

Thus, the wearable apparatus be operated autonomously, providing higher flexibility to the driver of the driver-exposed vehicle.

The at least one display device can comprise an OLED display, in particular a flexible OLED display.

Due to its flexibility, the OLED display can be easily adopted to the carrier body, causing minimum inconveniences to the driver wearing the carrier body.

The carrier body can be formed as a top clothing, in particular as a waistcoat or as a jacket, wherein the at least one display device is provided on the back of the top clothing.

Providing the display device on the back of the top clothing of the driver of the driver-exposed vehicle allows the drivers of the vehicle trailing the driver-exposed vehicle to have a good view of the display device.

The wearable apparatus can further comprise a solar panel for recharging the rechargeable power supply.

Thus, the solar energy for charging the rechargeable power supply can be used and the time of autonomous operation of the wearable apparatus can be increased.

The solar panel can be a flexible solar panel, in particular a silicon-based solar panel or an organic solar panel.

The flexible solar panel can be easily adopted to the carrier body in order to cause minimum inconveniences to the driver wearing the carrier body.

The carrier body can comprise an electrical wiring which is at least partially woven in a tissue of the carrier body.

Thus, the display device, the receiver, and the power supply of the wearable apparatus can be easily connected with each other.

According to another aspect of the application, a method for operating a traffic information system is provided. The method comprises receiving a traffic-relevant data representing a traffic-relevant information and displaying the traffic-relevant information on a display device worn by a driver of a driver-exposed vehicle.

By displaying the traffic relevant information on the display device which is worn by the driver of the driver-exposed vehicle other traffic participants can be provided with additional traffic-relevant information. This results in a better accident prevention and in an increased traffic safety.

The traffic-relevant information can comprise a current navigation information sent from a sender of a navigation device of the driver-exposed vehicle.

By displaying the current navigation information of the driver-exposed vehicle the traffic participants can be preemptively informed about the upcoming events along the road.

The traffic-relevant information can comprise information which the driver of the driver-exposed vehicle wants to communicate to the traffic participants.

In particular, the traffic-relevant information can include text messages and visual signals which the driver of the driver-exposed vehicle wants to communicate to other traffic participants.

By displaying such text messages and visual signals, the traffic safety can be further increased. In particular, such text messages and visual signals can be used by special emergency services for organizing the traffic on the roads in emergency situations.

The traffic-relevant information can also comprise redundant visual signals, in particular a break signal or direction indication signals.

By displaying such redundant visual signals the traffic safety can be further increased, since the signals will not be easily overseen.

The exemplary embodiments will hereinafter be described in conjunction with the following drawing figures, wherein like numerals denote like elements, and wherein:

Fig. 1 shows schematically a traffic information system according to an embodiment,

Fig. 2 shows schematically a wearable apparatus according to an embodiment, and

Fig. 3 shows a usage of the apparatus of Fig. 2 on an example of a general traffic scenario.

In the following description, details are provided to describe embodiments of the application. It shall be apparent to one skilled in the art, however, that the embodiments may be practiced without such details.

Some parts of the embodiment have similar parts. The similar parts may have the same names or similar part numbers. The description of one similar part also applies by reference to another similar parts, where appropriate, thereby reducing repetition of text without limiting the disclosure.

Fig. 1 shows schematically a traffic information system according to an embodiment.

The traffic information system 1 of Fig. 1 comprises a display 2, a receiver 3, and a power supply 4. The traffic information system further comprises a sender 5 which is configured to send traffic-relevant data representing a traffic-relevant information. In this example, the sender 5 is a part of a navigation device 6. In this embodiment. The navigation device is a smart mobile device, in particular a smart phone.

The display 2, the receiver 3, and the power supply 4 are mountable on a clothing which is suitable for a driver of a vehicle.

The power supply 4 is a rechargeable battery which is configured to power the display 2 and the receiver 3.

The receiver 3 is configured to receive data sent by the sender 5 for displaying the traffic-relevant information on the

display 2. In this example, the receiver 3 is a BLE (Bluetooth Low Energy) receiver.

The traffic information system 1 also comprises an electrical wiring for electrically connecting the display 2, the receiver 3, and the power supply 4. The electrical wiring is not shown in Fig. 1.

In this embodiment, the display 2 is an LED display. In another embodiment the display 2 is a flexible OLED display.

In still another embodiment, the traffic information system 1 further includes a solar panel, in particular a flexible solar panel which is mountable on the clothing of the driver. The flexible solar panel can be a silicon-based solar panel or an organic solar panel.

In an embodiment, the traffic information system 1 also comprises a plurality of fixing elements for attaching the display 2, the power supply 4, and the receiver 3 to the clothing.

In an embodiment, the traffic information system also comprises an ambient light sensor for measuring a current ambient light intensity level and a controller 5, the controller is configured to send such control signals to the display 2 that the brightness of the display 2 is adjusted in accordance with the measured current ambient light intensity level. In an embodiment, the receiver, the controller and the ambient light sensor are provided as parts of the display device.

In an embodiment, the sender is configured to send data representing information or messages which the driver of the vehicle wants to be displayed on the display device in addition to

the traffic-relevant information provided by the navigation device.

Such messages can be chosen by the driver in a menu of the app running on the smart mobile device.

Fig. 2 shows a wearable apparatus according to another aspect of the application.

The wearable apparatus 10 is a wearable apparatus in form of a clothing garment. The apparatus 10 comprises a carrier body 11, a display 2, a receiver 3, and a power supply 4. The display 2, the receiver 3, and the power supply 4 are mounted on the carrier body 11.

The wearable apparatus 10 also contains fixing elements for attaching and securing the display 2, the receiver 3, and the power supply 4, on the carrier body 11. In an embodiment velcro strips are used as fixing elements. The fixing elements are not shown in Fig. 2.

The receiver 3 and the power supply 4 are arranged in the lower region of the carrier body 11, below the display 2.

The wearable apparatus 10 of Fig. 1 can be easily put together. First, the carrier body 11 is provided. The carrier body 11 can be any kind of garment body which can be put on by the driver or which can be attached to the body of the driver.

In particular, the carrier body 11 can be shaped as a coat, as a waistcoat, as a backpack, as a jacket, as a bike jersey, as a motorbike jacket, as a shirt, as a T-shirt or similar.

In this embodiment, the carrier body 11 and the wearable apparatus 10 are formed as a motorbike jacket.

The display 2, the receiver 3, and the power supply 4 are attached to the carrier body 11 and are secured by the fixing elements.

The display 2 is provided on the back-side of the carrier body 11. Thus, the display can be seen by drivers of vehicles which are behind the driver wearing the wearable apparatus 10.

The electrical wiring is also provided and connected to the display 2, the receiver 3, and the power supply 4 in such way that a functional connection between these elements is provided.

In an embodiment, the electrical wiring is fixed and secured by additional fixing elements.

In an embodiment, the electric wiring is at least partially woven in the carrier body 11, in particular in a tissue of the carrier body 11.

In an embodiment, the wearable apparatus 10 further comprises a solar panel, in particular a flexible solar panel. The flexible solar panel can be a silicon-based solar panel or an organic solar panel suitable for mounting on a flexible carrier body 11 of the wearable apparatus 10.

In an embodiment, the carrier body 11 of the wearable apparatus 10 comprises a holder of the navigation device, in particular in the region of a sleeve in which the navigation device 6 can be placed in such way that it is visible for the driver of the vehicle.

In operation, the power supply 4 is powering display 2 and the receiver 3.

The receiver 3 receives data representing traffic-relevant information from a sender which can be activated by the driver of the vehicle.

For instance, the sender can be a Bluetooth sender of a navigation device, in particular of a smart mobile device, which can be activated by starting an app with a navigation function by the driver of the vehicle.

On detection of the sender signal, a Bluetooth connection between the sender 5 and the receiver 3 is established and the apparatus 10 is switched from a standby mode, in which the display 2 is deactivated or switched off, into an active mode, in which the display 2 is activated or switched on in order to display the traffic-relevant information received by the receiver.

As an example, in Fig. 2 a navigation information as an example of traffic-relevant information, in Fig. 2 a navigation information is displayed, showing a right turn in 10 meters. This can be a helpful information for the traffic participants trailing for preparing and adjusting their driving accordingly.

Fig. 3 shows a usage of an apparatus according to an embodiment on an example of a general traffic scenario.

In this example, a motorbike 12 with a motorbike driver 13 and a car 14 with a car driver 15 are shown. The car 14 is trail-

ing the motorbike 12 such that the car driver 15 can see the back of the motorbike driver 13.

The motorbike driver 13 is wearing the apparatus 10 similar to the wearable apparatus 10 of Fig. 2.

The display 2, the receiver 3, and the power supply of apparatus 10 are shown schematically.

A navigation device 6 used by the motorbike driver 13 is shown schematically as well.

The navigation device 6 is a smart phone with a Bluetooth sender. The navigation device 6 can be attached both to the motorbike 12 or to a sleeve of the carrier body 11 of the wearable apparatus such that it is visible for the motorbike driver 13.

The navigation device 6 can be activated by starting an app with a navigation function by the driver 13 of the vehicle motorbike 13. The sender of the navigation device 16 is not shown in Fig. 3.

After starting the navigation app by the motorbike driver 13, the Bluetooth sender of the navigation device 6 is activated and it starts sending data representing traffic-relevant information. On detection of the activation of the Bluetooth sender in the navigation device 16, the wearable apparatus 10 is activated too. In particular, the wearable apparatus 10 is switched from a standby mode into an operational mode.

In the standby mode, the display 2 is switched off, and the receiver 3 is activated periodically for determining whether the sender signal is available or not.

In the operational mode, the display 2 is switched on and the receiver 3 receives the data sent out by the sender.

The traffic-relevant information displayed on the display 2 can be seen by the driver 15 of the car 14.

In an embodiment, in order to initiate the wireless connection between the sender 5 and the receiver of the wearable apparatus 10 an initialization is to be carried out. During the initialization, in which the Bluetooth connection is established, a specific code of the wearable apparatus 10 or of the receiver 3 is to be entered in the navigation device 16.

Although the above description contains much specificity, this should not be construed as limiting the scope of the embodiments but merely providing illustration of the foreseeable embodiments. The above stated advantages of the embodiments should not be construed especially as limiting the scope of the embodiments but merely to explain possible achievements if the described embodiments are put into practice. Thus, the scope of the embodiments should be determined by the claims and their equivalents, rather than by the examples given.

Examples for different aspects of the application are listed below.

Examples:

1. A traffic information system, the traffic information system comprising:
 - at least one wearable display device (2), the at least one wearable display device (2) being provided for being worn by a driver of a driver-exposed vehicle

- and being configured to display traffic-relevant information to traffic participants,
- a navigation device (6), providing a traffic-relevant information,
 - a sender (5), the sender being configured to send data representing the traffic-relevant information,
 - a receiver (3), the receiver (3) being configured to receive the data sent by the sender (5) for displaying the traffic relevant information on the at least one wearable display device (2).
2. The traffic information system of example 1, wherein the sender (5) is a Bluetooth sender and the receiver (3) is a Bluetooth receiver.
3. The traffic information system of example 1 or 2, wherein the navigation device is a smart mobile device configured for running an app with a navigation function.
4. A wearable apparatus, comprising:
- a carrier body (11), the carrier body (11) being provided for being worn by a driver of a driver-exposed vehicle,
 - at least one display (2) mounted on the carrier body (11), the at least one display (2) being configured to display a traffic-relevant information to traffic participants,
 - a receiver (3) mounted on the carrier body (11), the receiver (3) being configured to receive a traffic relevant data for displaying the traffic-relevant information corresponding to the traffic-relevant data on the display device (2).
5. The wearable apparatus of example 4, wherein

- the receiver (3) comprises a Bluetooth receiver, in particular a Bluetooth-Low-Energy receiver.
6. The wearable apparatus of example 4 or 5, the wearable apparatus further comprising a rechargeable power supply (4) mounted on the carrier body (11), the rechargeable power supply being configured to power the at least one display (2) and the receiver (3).
 7. The wearable apparatus of one of the examples 4 to 6, wherein the at least one display device (2) comprises an OLED display.
 8. The wearable apparatus of one of the examples 4 to 7, wherein
the carrier body (11) is formed as a top clothing, in particular as a waistcoat or as a jacket, and wherein the at least one display device (2) is provided on the back of the top clothing.
 9. The wearable apparatus of example 6, comprising a solar panel for recharging the rechargeable power supply.
 10. The wearable apparatus of one of the examples 4 to 9, wherein the carrier body (11) comprises an electrical wiring which is at least partially woven in a tissue of the carrier body (11).
 11. Method for operating a traffic information system, the method comprising:
 - receiving a traffic-relevant data representing a traffic-relevant information,

- displaying the traffic-relevant information on a display device (2) worn by a driver of a driver-exposed vehicle.
12. The method of example 11, wherein the traffic-relevant information comprises a current navigation information sent from a sender (5) of a navigation device (6) of the driver-exposed vehicle.
 13. The method of example 11 or 12, wherein the traffic-relevant information comprises information which the driver of the driver-exposed vehicle wants to communicate to other traffic participants.
 14. The method of one of the examples 11 to 13, wherein the traffic-relevant information comprises redundant visual signals, in particular a break signal or direction indication signals.

REFERENCE NUMBERS

- 1 traffic information system
- 2 display device
- 3 receiver
- 4 power supply
- 5 sender
- 6 navigation device

- 10 wearable apparatus
- 11 carrier body
- 12 motorbike
- 13 motorbike driver
- 14 car
- 15 car driver

CLAIMS

1. A traffic information system, the traffic information system comprising:
 - at least one wearable display device (2), the at least one wearable display device (2) being provided for being worn by a driver of a driver-exposed vehicle and being configured to display traffic-relevant information to traffic participants,
 - a navigation device (6), providing a traffic-relevant information,
 - a sender (5), the sender being configured to send data representing the traffic-relevant information,
 - a receiver (3), the receiver (3) being configured to receive the data sent by the sender (5) for displaying the traffic relevant information on the at least one wearable display device (2).
2. The traffic information system of claim 1, wherein the sender (5) is a Bluetooth sender and the receiver (3) is a Bluetooth receiver.
3. The traffic information system of claim 1, wherein the navigation device is a smart mobile device configured for running an app with a navigation function.
4. A wearable apparatus, comprising:
 - a carrier body (11), the carrier body (11) being provided for being worn by a driver of a driver-exposed vehicle,
 - at least one display (2) mounted on the carrier body (11), the at least one display (2) being configured to

display a traffic-relevant information to traffic participants,

- a receiver (3) mounted on the carrier body (11), the receiver (3) being configured to receive a traffic relevant data for displaying the traffic-relevant information corresponding to the traffic-relevant data on the display device (2).

5. The wearable apparatus of claim 4, wherein
 - the receiver (3) comprises a Bluetooth receiver, in particular a Bluetooth-Low-Energy receiver.
6. The wearable apparatus of claim 4, the wearable apparatus further comprising a rechargeable power supply (4) mounted on the carrier body (11), the rechargeable power supply being configured to power the at least one display (2) and the receiver (3).
7. The wearable apparatus of claim 4, wherein the at least one display device (2) comprises an OLED display.
8. The wearable apparatus of claim 4, wherein the carrier body (11) is formed as a top clothing, in particular as a waistcoat or as a jacket, and wherein the at least one display device (2) is provided on the back of the top clothing.
9. The wearable apparatus of claim 6, comprising a solar panel for recharging the rechargeable power supply.
10. The wearable apparatus of claim 4,

wherein the carrier body (11) comprises an electrical wiring which is at least partially woven in a tissue of the carrier body (11).

11. Method for operating a traffic information system, the method comprising:
 - receiving a traffic-relevant data representing a traffic-relevant information,
 - displaying the traffic-relevant information on a display device (2) worn by a driver of a driver-exposed vehicle.
12. The method of claim 11, wherein the traffic-relevant information comprises a current navigation information sent from a sender (5) of a navigation device (6) of the driver-exposed vehicle.
13. The method of claim 11, wherein the traffic-relevant information comprises information which the driver of the driver-exposed vehicle wants to communicate to other traffic participants.
14. The method of claims 11, wherein the traffic-relevant information comprises redundant visual signals, in particular a break signal or direction indication signals.

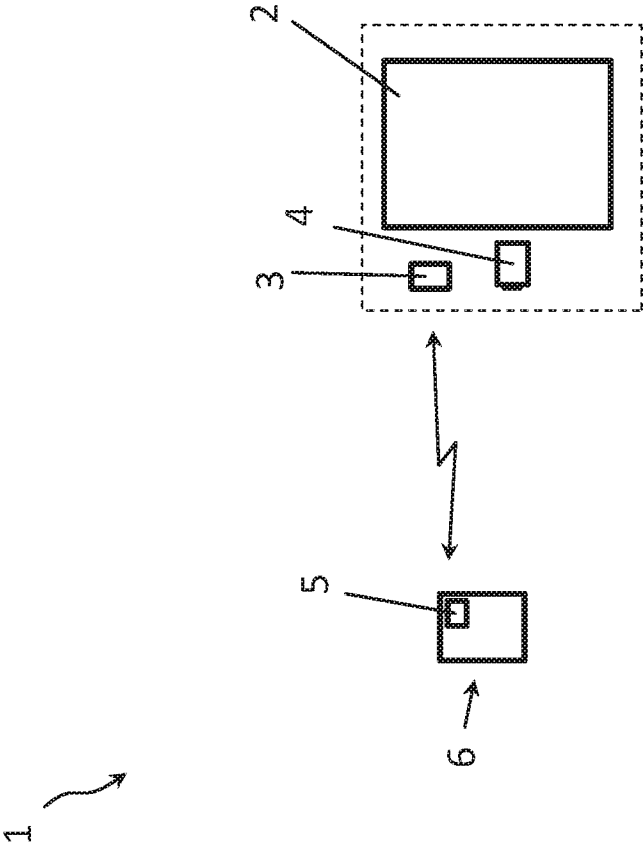


Fig. 1

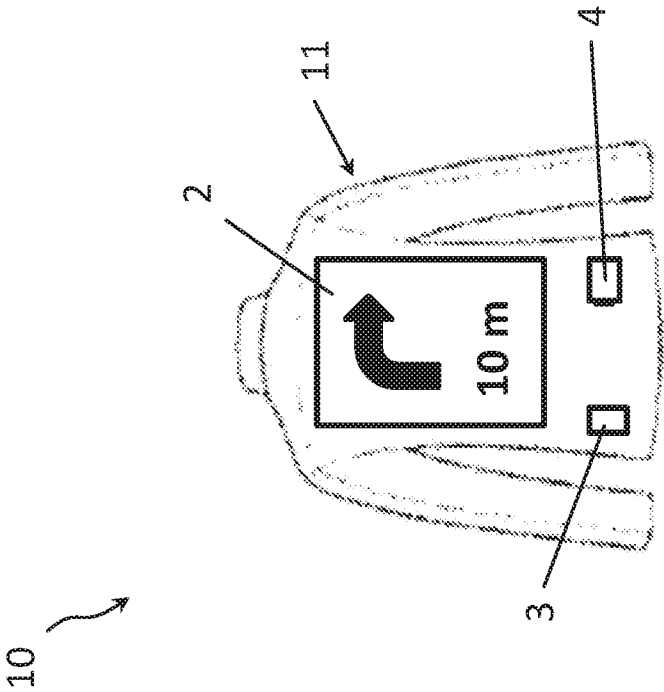


Fig. 2

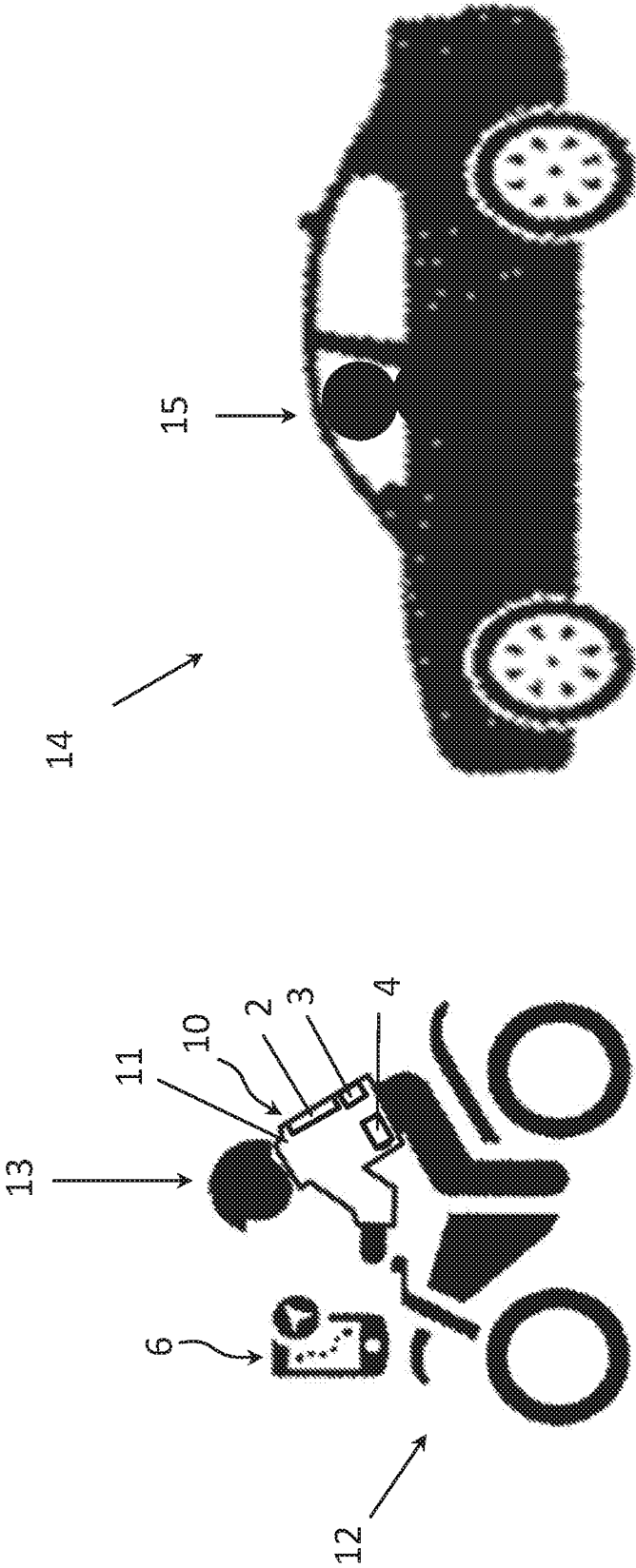


Fig. 3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2016/053251**A. CLASSIFICATION OF SUBJECT MATTER****G08G 1/09(2006.01)i, A41D 1/00(2006.01)i, A41D 13/01(2006.01)i, H01L 51/50(2006.01)i, H01L 31/04(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G08G 1/09; F21V 33/00; A41D 1/00; F21L 4/00; B60Q 1/34; G06K 9/00; A42B 3/04; A41D 27/08; A41D 13/01; H01L 51/50; H01L 31/04

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: traffic, wearable display, navigation, Bluetooth, vehicle

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2006-0291193 A1 (ROY HILL) 28 December 2006 See paragraphs [0007]-[0008], [0020]-[0031]; claims 1-19; and figures 1-6.	1-14
Y	US 2016-0110615 A1 (SKULLY INC.) 21 April 2016 See paragraphs [0029], [0057]-[0069]; claims 2, 7; and figure 6.	1-14
A	US 2002-0044052 A1 (ROBIN H. STEWART) 18 April 2002 See paragraphs [0014]-[0019], [0029]-[0041]; claims 1-20; and figures 1-5.	1-14
A	US 2004-0156215 A1 (WILLIAM WOOLDRIDGE) 12 August 2004 See paragraphs [0020]-[0035]; claims 1-21; and figures 1-4.	1-14
A	KR 10-1557607 B1 (BOUD CO., LTD.) 05 October 2015 See paragraphs [0016]-[0018], [0028]-[0050]; claim 1; and figure 2.	1-14



Further documents are listed in the continuation of Box C.



See patent family annex.

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search

07 February 2017 (07.02.2017)

Date of mailing of the international search report

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Name and mailing address of the ISA/KR

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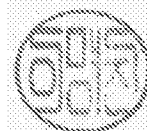
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INTERNATIONAL SEARCH REPORT

Information on patent family members

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