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KIM(10) **Pub. No.: US 2018/0256420 A1**(43) **Pub. Date: Sep. 13, 2018**(54) **AUTONOMOUS SMART CAR CAPABLE OF
FIRST AID AND METHOD FOR OPERATING
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Seongnam-si, Gyeonggi-do (KR)(21) Appl. No.: **15/573,829**(22) PCT Filed: **May 12, 2016**(86) PCT No.: **PCT/KR2016/005041**

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(57)

ABSTRACT

An autonomous smart car includes a bio-signal sensing unit sensing a bio-condition of a person in the autonomous smart car; a communication unit supporting wireless communication between the autonomous smart car and an external of the autonomous smart car; a memory unit storing basic data of the person in the autonomous smart car, general bio-signal data, bio-signal data sensed by the bio-signal sensing unit, and hospital information data; an autonomous driving unit autonomously driving the autonomous smart car to a destination; an emergency handling unit enabling the autonomous smart car to inform that an emergency patient is in the autonomous smart car to outside when the bio-condition of the person in the autonomous smart car indicates an emergency; and a control unit analyzing a current condition of the person by comparing a bio-signal sensed by the bio-signal sensing unit with the data stored in the memory unit.

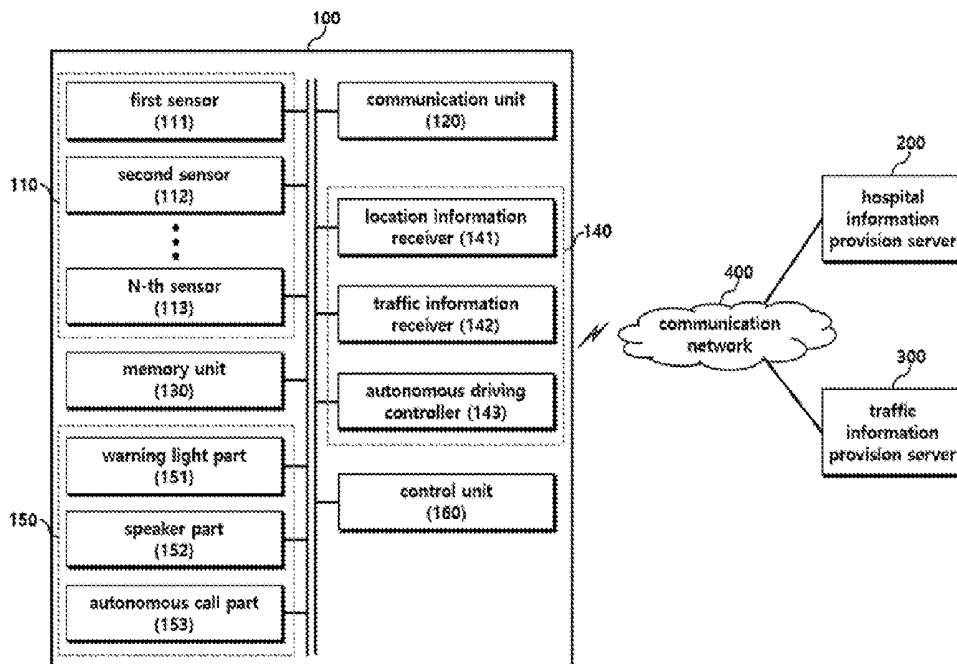


Fig. 1

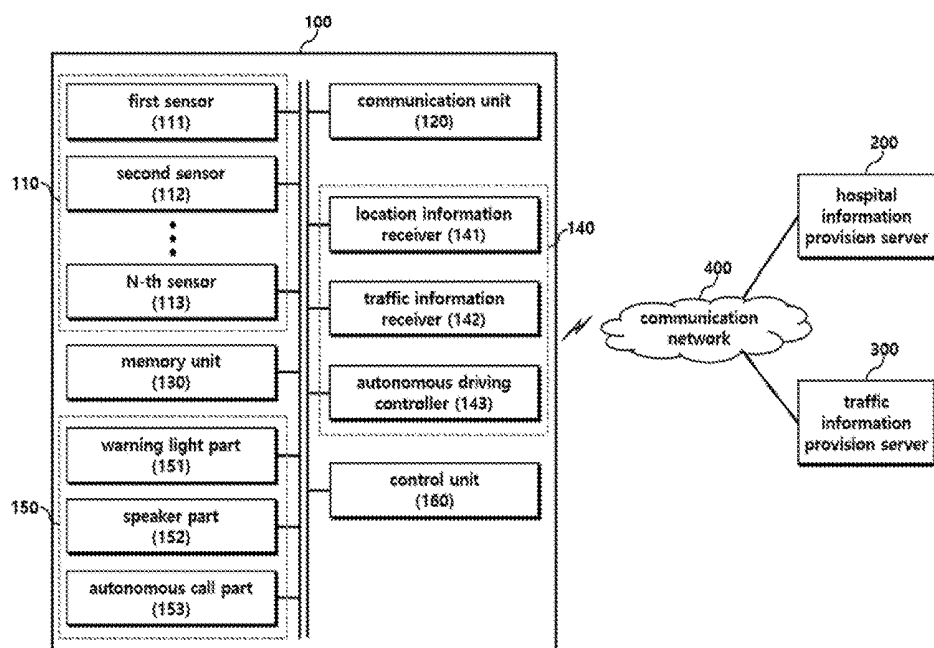
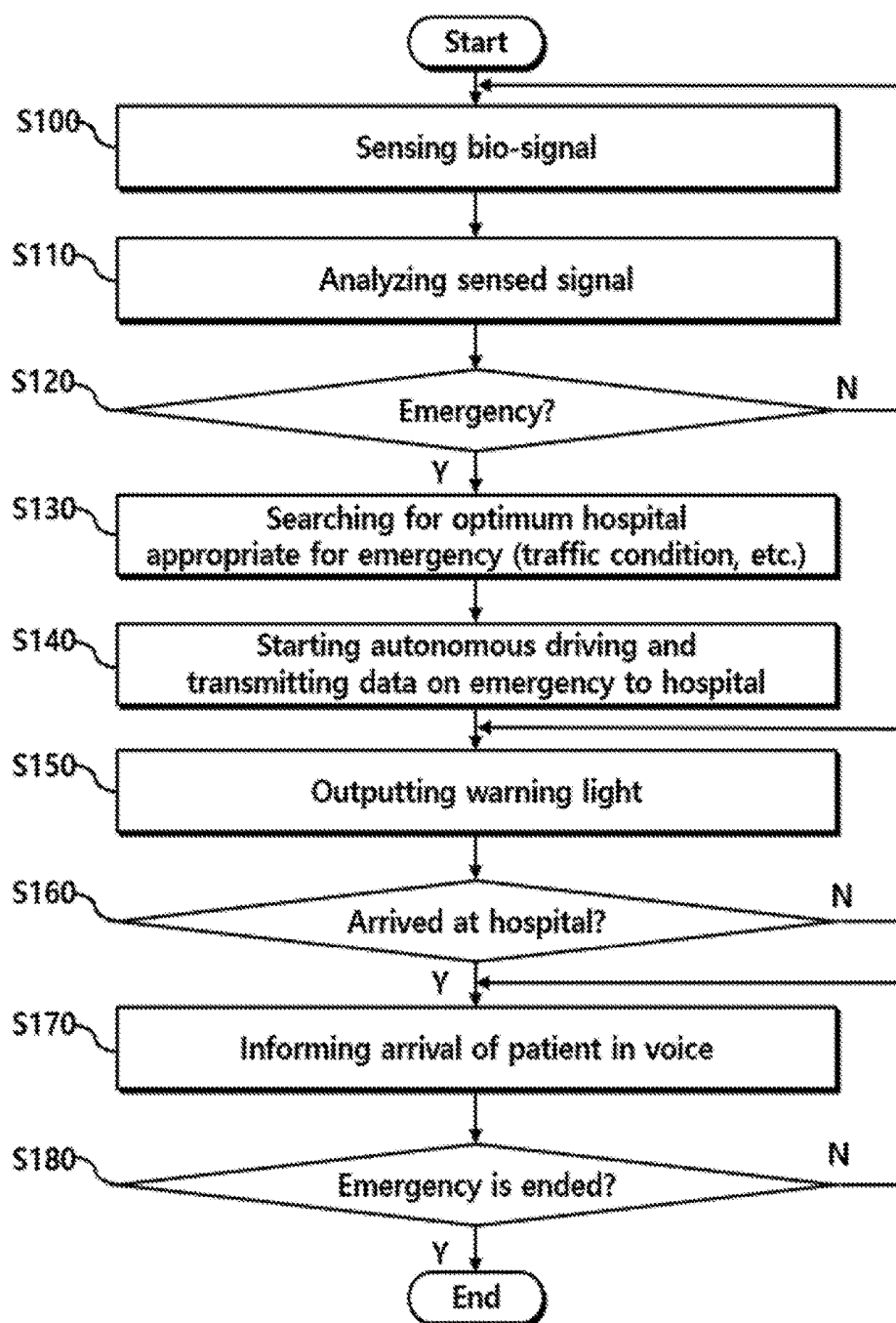


Fig. 2



AUTONOMOUS SMART CAR CAPABLE OF FIRST AID AND METHOD FOR OPERATING THEREOF

TECHNICAL FIELD

[0001] The present invention relates to autonomous smart cars. More particularly, the present invention relates to an autonomous smart car capable of first aid and method of operating the same that can sense a bio-signal of a person in an autonomous smart car for autonomous transport to hospital.

BACKGROUND ART

[0002] Recently, as image processing-related technologies and performances of sensors and hardware, etc. have rapidly developed, research on unmanned cars is competitively proceeding.

[0003] Actually, a GPS navigation device has already been popularized as a navigation service for drivers. Also, accuracy of GPS data has been gradually improved, and reliability has increased due to small error range.

[0004] The newest unmanned cars autonomously drive and park by utilizing a camera for observing forward and backward, a front-side radar sensor, the GPS, etc.

[0005] Since unmanned cars are an inevitable trend, research thereon has been conducted in various directions, but until now, they have been studied mainly only on unmanned driving of cars.

DISCLOSURE

Technical Problem

[0006] Accordingly, the present invention has been made keeping in mind the above problems occurring in the related art, and an object of the present invention is to provide an autonomous smart car capable of first aid and a method of operating the same, the autonomous smart car being provided with a sensing unit sensing a bio-signal of a person in the autonomous smart car that can autonomously drive, whereby when an emergency or a situation needed to go to hospital occurs an emergency person can be autonomously transported to an appropriate hospital based on sensed data.

Technical Solution

[0007] In order to accomplish the above object, the present invention provides an autonomous smart car capable of first aid, the autonomous smart car including: a bio-signal sensing unit sensing a bio-condition of a person in the autonomous smart car that autonomously drives; a communication unit supporting wireless communication between the autonomous smart car and an external of the autonomous smart car; a memory unit storing basic data of the person in the autonomous smart car, general bio-signal data, bio-signal data sensed by the bio-signal sensing unit, and hospital information data; an autonomous driving unit autonomously driving the autonomous smart car to a destination; an emergency handling unit enabling the autonomous smart car to inform that an emergency patient is in the autonomous smart car to outside when the bio-condition of the person in the autonomous smart car indicates an emergency; and a control unit analyzing a current condition of the person by comparing a bio-signal sensed by the bio-signal sensing unit with the data stored in the memory unit, the control unit

searching for a hospital where the autonomous smart car can arrive from a current location and controlling the autonomous smart car through the memory unit and the autonomous driving unit to autonomously drive to the hospital when determined as an emergency.

[0008] Here, the basic data of the person in the autonomous smart car may be data on at least one of a name, an age, a phone number, known diseases, treatment history, and a hospital where the person usually goes, the general bio-signal data may include emergency data and normal range data on a body temperature, a heartbeat, and a pulse, and the hospital information data may be at least one of emergency room information of a hospital, specialty information of a hospital and location information thereof, phone number information, and communication path information to each hospital server.

[0009] The hospital information data may be updated at a preset period through the communication unit.

[0010] Also, the autonomous driving unit may include: a location information receiver receiving information on a current location of the car; a traffic information receiver receiving traffic information to a destination when driving the autonomous smart car; and an autonomous driving controller enabling the autonomous smart car to autonomously drive from the current location of the car received by the location information receiver to the destination.

[0011] In the meantime, the emergency handling unit may include: a warning light part informing that the emergency patient is in the autonomous smart car when an emergency occurs; a speaker part informing arrival of the emergency patient at a hospital; and an automatic call part automatically making a call to a destination hospital when the person in the autonomous smart car is an emergency patient as a sensing result of the bio-signal sensing unit, the automatic call part automatically transmitting the sensing result sensed by the bio-signal sensing unit with at least one of a gender, a name, a car number of the emergency patient, and information on a current location of the car.

[0012] Here, the control unit may control the warning light part to turn on a warning light and controls the automatic call part to make an automatic call to the destination hospital, or when the memory unit stores communication path information to a destination hospital server, the control unit may control the communication unit to transmit data that informs a condition of a patient to the destination hospital server.

[0013] In the meantime, the autonomous smart car may communicate through a wired/wireless communication network with a hospital information provision server providing at least one piece of hospital information on a location, a specialty, and working hours of a hospital and a traffic information provision server providing traffic information in real-time.

[0014] Also, in order to accomplish the above object, the present invention provides a method of operating an autonomous smart car capable of first aid, the method including: sensing, by a bio-signal sensing unit of an autonomous smart car, a bio-signal of a person in the autonomous smart car; analyzing, by a control unit of the autonomous smart car, the bio-signal sensed by the bio-signal sensing unit; searching, by the control unit of the autonomous smart car, for a hospital to which an emergency patient is transported through a memory unit storing hospital information when determining the sensed bio-signal indicates an emergency; and controlling, by the control unit of the autonomous smart

car, an autonomous driving unit to autonomously drive the autonomous smart car to a destination hospital.

[0015] At the analyzing, by the control unit of the autonomous smart car, of the bio-signal sensed by the bio-signal sensing unit, sensed data of the person in the autonomous smart car may be analyzed by being compared with emergency data and normal range data on a body temperature, a heartbeat, and a pulse.

[0016] In the meantime, the searching for the hospital to which the emergency patient is transported may further include communicating with a hospital information provision server providing hospital information through a communication unit supporting wireless communication between the autonomous smart car and an external of the autonomous smart car.

[0017] Here, the controlling of the autonomous smart car to autonomously drive to the destination hospital may further include: making an automatic call to the hospital and transmitting at least one of a condition, a gender, a name, a car number of the emergency patient, and information on a current location of the car in a voice through an emergency handling unit informing that the autonomous smart car is in an emergency to outside; or transmitting data that informs the condition of the patient to a destination hospital server through the communication unit when there is communication path information to the destination hospital server.

[0018] The controlling of the autonomous smart car to autonomously drive to the destination hospital may further include: turning on a warning light part attached on the autonomous smart car, the warning light part informing that the autonomous smart car is in an emergency; outputting arrival of the patient in a voice through a speaker part outputting a voice when arrival at the destination hospital is confirmed; and turning off the warning light part and output of the speaker part when the emergency is ended.

Advantageous Effects

[0019] According to the present invention, the following effects may be obtained.

[0020] First, a sensing unit senses a bio-signal of a person in the autonomous smart car that can autonomously drive, whereby when an emergency or a situation needed to go to hospital occurs, an emergency person can be autonomously transported to an appropriate hospital based on sensed data.

[0021] Second, when a patient is unable to make a call, the autonomous smart car automatically calls a hospital and informs a condition of the patient, whereby it is possible to quickly cope with emergency.

[0022] Third, when transmitting a sensing result of a bio-signal through communication with a hospital server, it is possible to quickly cope with emergency such that a patient can be easily rescued from crises, compared to arrival of a patient at hospital.

DESCRIPTION OF DRAWINGS

[0023] FIG. 1 is a block diagram illustrating an autonomous smart car capable of first aid according to the present invention.

[0024] FIG. 2 is a flowchart illustrating a method of operating an autonomous smart car capable of first aid according to the present invention.

BEST MODE

[0025] Exemplary embodiments of the present invention will be described in detail with reference to the accompanying drawings.

[0026] Also, all terms used herein should be construed as having meanings that are obvious to one of ordinary skill in the art. However, some terms may be arbitrarily selected by the applicant, and in this case, the meaning of the selected terms will be described in detail in the detailed description of the present invention. Thus, the terms used herein should be defined based on the meaning of the terms together with the description throughout the specification. Also, detailed description of well-known functions and structures incorporated herein may be omitted to avoid obscuring the subject matter of the present invention. This aims to omit unnecessary description so as to make the subject matter of the present invention clear.

[0027] FIG. 1 is a block diagram illustrating an autonomous smart car capable of first aid according to the present invention.

[0028] An autonomous smart car capable of first aid according to the present invention includes: a bio-signal sensing unit 110, a communication unit 120, a memory unit 130, an autonomous driving unit 140, an emergency handling unit 150, and a control unit 160 as shown in FIG. 1.

[0029] Here, the bio-signal sensing unit 110 is composed of the first to N-th sensors 111, 112, and 113 sensing electrical signals between microscopic cells of the human body. The sensors measure small signals ranging from μV to mV . For example, a condition of a person in a car is sensed by sensing an electromyogram, an electrocardiogram, etc.

[0030] The communication unit 120 of an autonomous smart car 100 communicates with a hospital information provision server 200 and a traffic information provision server 300 outside of the autonomous smart car.

[0031] The memory unit 130 stores basic data of a person in a car (a name, an age, a phone number, a medical history (known diseases, treatment history, a hospital where the person usually goes, etc.), general bio-signal data, sensed bio-signal data, and hospital information data. Here, the general bio-signal data includes normal range data on a body temperature, a heartbeat, a pulse, etc. and emergency data that are stored in tabular form. Also, the hospital information data includes emergency room information of a hospital, specialty information of a hospital, location information of a hospital, phone number information of a hospital, communication path information to each hospital server, etc. It is desired that the hospital information data is periodically updated through the communication unit 120.

[0032] The autonomous driving unit 140 includes a location information receiver 141, a traffic information receiver 142, and an autonomous driving controller 143.

[0033] Here, the location information receiver 141 receives information on a current location of a car.

[0034] The traffic information receiver 142 receives traffic information to a destination when driving the autonomous smart car 100.

[0035] The autonomous driving controller 143 enables the autonomous smart car 100 to autonomously drive from the current location received by the location information receiver 141 to a destination, and controls a steering system, a brake, an accelerator, and a transmission of the car.

[0036] The emergency handling unit 150 includes a warning light part 151, a speaker part 152, and an automatic call

part 153. Here, the warning light part 151 informs that an emergency patient is in the car when an emergency occurs. The speaker part 152 informs arrival of the emergency patient at hospital. To this end, the speaker part 152 may be attached on outside of the car. In the meantime, based on a sensing result of the bio-signal sensing unit 110, it is determined that the person in the autonomous smart car 100 is an emergency patient and is unable to make a call (unconscious, etc.), the automatic call part 153 makes an automatic call to the destination hospital so as to automatically transmit a condition of a patient, gender of the patient, the name, the car number, and the information on the current location of the car.

[0037] The control unit 160 compares the bio-signal sensed by the bio-signal sensing unit 110 with data stored in the memory unit 130 to analyze a current condition of the sensed person. When determined as an emergency, a current location of the autonomous smart car 100 is detected by the location information receiver 141 and the optimum hospital appropriate for the current condition is searched through communication with the traffic information receiver 142 and the memory unit 130 or the hospital information provision server 200. Next, based on the search result, the autonomous smart car autonomously drives to a destination hospital through the autonomous driving controller 143.

[0038] Here, the control unit 160 turns on a warning light through the warning light part 151, and enables the automatic call part 153 to autonomously call the destination hospital. Alternatively, when the memory unit 130 stores communication path information to a destination hospital server, the control unit 160 controls the communication unit 120 to transmit data that informs the destination hospital server of a condition of a patient. Here, the autonomous smart car 100, the hospital information provision server 200, and the traffic information provision server 300 may communicate with each other through a wired/wireless communication network 400.

[0039] FIG. 2 is a flowchart illustrating a method of operating an autonomous smart car capable of first aid according to the present invention.

[0040] In the method of operating an autonomous smart car capable of first aid according to the present invention, as shown in FIG. 2, the bio-signal sensing unit 110 of the autonomous smart car 100 capable of first aid senses a bio-signal at step S100.

[0041] Next, the control unit 160 of the autonomous smart car 100 analyzes the sensed signal at step S110.

[0042] When determined as an emergency at step S120, the control unit 160 of the autonomous smart car 100 searches for the optimum hospital appropriate for the emergency through the memory unit 130 or the hospital information provision server 200 at step S130.

[0043] Next, the control unit 160 of the autonomous smart car 100 controls the autonomous driving unit 140 to autonomously drive to the destination hospital, and controls the emergency handling unit 150 to make an automatic call to a hospital so as to inform of a condition of a patient, gender of the patient, the name, the car number, and the information on the current location of the car related to emergency in a voice. Also, when the memory unit 130 stores communication path information to the destination hospital server, the control unit 160 of the autonomous smart car 100 controls the communication unit 120 to transmit data that informs a condition of a patient to the destination hospital server.

[0044] Also, the control unit 160 of the autonomous smart car 100 turns on the warning light part 151 of the emergency handling unit 150.

[0045] In the meantime, the control unit 160 of the autonomous smart car 100 determines whether arrival at the destination hospital has occurred based on the reception result of the location information receiver 141 at step S160. When arrival at the destination hospital is confirmed, arrival of the patient is output (informed) in a voice through the speaker part 152 at step S170.

[0046] Next, whether an emergency has ended is determined at step S180. When the emergency is ended, the warning light and the voice output are turned off at step S180.

[0047] Although the present invention has been described with reference to the accompanying drawings, this is merely an example of various embodiments containing the subject matter of the present invention, and is intended to allow those skilled in the art to easily implement the present invention. Thus, it is clear that the present invention is not restricted to the embodiments described above. Therefore, the scope of the present invention should be construed by claims below, and all technical spirits that fall within an equivalent range by change, substitution, replacement, etc. within the subject matter of the present invention will be included in the scope of a right of the present invention. In addition, some components of the drawings are intended to more clearly describe configurations, and thus it is clarified that the components are exaggerated or minimized when compared to actual components.

INDUSTRIAL APPLICABILITY

[0048] The present invention senses a bio-signal of a driver in an autonomous smart car to autonomously drive to a hospital based on a result thereof, and can be used in a technology of handling an emergency by using an autonomous smart car.

1. An autonomous smart car capable of first aid, the autonomous smart car comprising:

- a bio-signal sensing unit sensing a bio-condition of a person in the autonomous smart car that autonomously drives;
- a communication unit supporting wireless communication between the autonomous smart car and an external of the autonomous smart car;
- a memory unit storing basic data of the person in the autonomous smart car, general bio-signal data, bio-signal data sensed by the bio-signal sensing unit, and hospital information data;
- an autonomous driving unit autonomously driving the autonomous smart car to a destination;
- an emergency handling unit enabling the autonomous smart car to inform that an emergency patient is in the autonomous smart car to outside when the bio-condition of the person in the autonomous smart car indicates an emergency; and
- a control unit analyzing a current condition of the person by comparing a bio-signal sensed by the bio-signal sensing unit with the data stored in the memory unit, the control unit searching for a hospital where the autonomous smart car can arrive from a current location and controlling the autonomous smart car through

the memory unit and the autonomous driving unit to autonomously drive to the hospital when determined as an emergency.

2. The autonomous smart car of claim 1, wherein the basic data of the person in the autonomous smart car is data on at least one of a name, an age, a phone number, known diseases, treatment history, and a hospital where the person usually goes,

the general bio-signal data includes emergency data and normal range data on a body temperature, a heartbeat, and a pulse, and

the hospital information data is at least one of emergency room information of a hospital, specialty information of a hospital and location information thereof, phone number information, and communication path information to each hospital server.

3. The autonomous smart car of claim 2, wherein the hospital information data is updated at a preset period through the communication unit.

4. The autonomous smart car of claim 1, wherein the autonomous driving unit includes:

a location information receiver receiving information on a current location of the car;

a traffic information receiver receiving traffic information to a destination when driving the autonomous smart car; and

an autonomous driving controller enabling the autonomous smart car to autonomously drive from the current location of the car received by the location information receiver to the destination.

5. The autonomous smart car of claim 1, wherein the emergency handling unit includes:

a warning light part informing that the emergency patient is in the autonomous smart car when an emergency occurs;

a speaker part informing arrival of the emergency patient at a hospital; and

an automatic call part automatically making a call to a destination hospital when the person in the autonomous smart car is an emergency patient as a sensing result of the bio-signal sensing unit, the automatic call part automatically transmitting the sensing result sensed by the bio-signal sensing unit with at least one of a gender, a name, a car number of the emergency patient, and information on a current location of the car.

6. The autonomous smart car of claim 5, wherein the control unit controls the warning light part to turn on a warning light and controls the automatic call part to make an automatic call to the destination hospital, or

when the memory unit stores communication path information to a destination hospital server, the control unit controls the communication unit to transmit data that informs a condition of a patient to the destination hospital server.

7. The autonomous smart car of claim 1, wherein the autonomous smart car communicates through a wired/wireless communication network with a hospital information

provision server providing at least one piece of hospital information on a location, a specialty, and working hours of a hospital and a traffic information provision server providing traffic information in real-time.

8. A method of operating an autonomous smart car capable of first aid, the method comprising:

sensing, by a bio-signal sensing unit of an autonomous smart car, a bio-signal of a person in the autonomous smart car;

analyzing, by a control unit of the autonomous smart car, the bio-signal sensed by the bio-signal sensing unit;

searching, by the control unit of the autonomous smart car, for a hospital to which an emergency patient is transported through a memory unit storing hospital information when determining the sensed bio-signal indicates an emergency; and

controlling, by the control unit of the autonomous smart car, an autonomous driving unit to autonomously drive the autonomous smart car to a destination hospital.

9. The method of claim 8, wherein at the analyzing, by the control unit of the autonomous smart car, of the bio-signal sensed by the bio-signal sensing unit, sensed data of the person in the autonomous smart car is analyzed by being compared with emergency data and normal range data on a body temperature, a heartbeat, and a pulse.

10. The method of claim 8, wherein the searching for the hospital to which the emergency patient is transported further includes communicating with a hospital information provision server providing hospital information through a communication unit supporting wireless communication between the autonomous smart car and an external of the autonomous smart car.

11. The method of claim 10, wherein the controlling of the autonomous smart car to autonomously drive to the destination hospital further includes:

making an automatic call to the hospital and transmitting at least one of a condition, a gender, a name, a car number of the emergency patient, and information on a current location of the car in a voice through an emergency handling unit informing that the autonomous smart car is in an emergency to outside; or

transmitting data that informs the condition of the patient to a destination hospital server through the communication unit when there is communication path information to the destination hospital server.

12. The method of claim 10, wherein the controlling of the autonomous smart car to autonomously drive to the destination hospital further includes:

turning on a warning light part attached on the autonomous smart car, the warning light part informing that the autonomous smart car is in an emergency;

outputting arrival of the patient in a voice through a speaker part outputting a voice when arrival at the destination hospital is confirmed; and

turning off the warning light part and output of the speaker part when the emergency is ended.

* * * * *

专利名称(译)	能够急救的自主智能车及其操作方法		
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[标]发明人	KIM SANG CHEOL		
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摘要(译)

一种自主智能汽车，包括生物信号传感单元，用于感测自主智能汽车中人的生物状况；支持自主智能车与自主智能车外部无线通信的通信单元；存储单元，存储自主智能车中人的基本数据，一般生物信号数据，生物信号检测单元检测到的生物信号数据，以及医院信息数据；自动驾驶单元，自动驾驶自动智能车到达目的地；一种紧急处理单元，当自主智能车中的人的生物状况指示紧急情况时，使自主智能车能够通知紧急患者在自主智能车中到外面；控制单元通过将生物信号检测单元检测到的生物信号与存储在存储单元中的数据进行比较来分析人的当前状况。

