Name: Aditya Engineering College et al.
Application number:

No of sheets: 1
Sheet No: 1

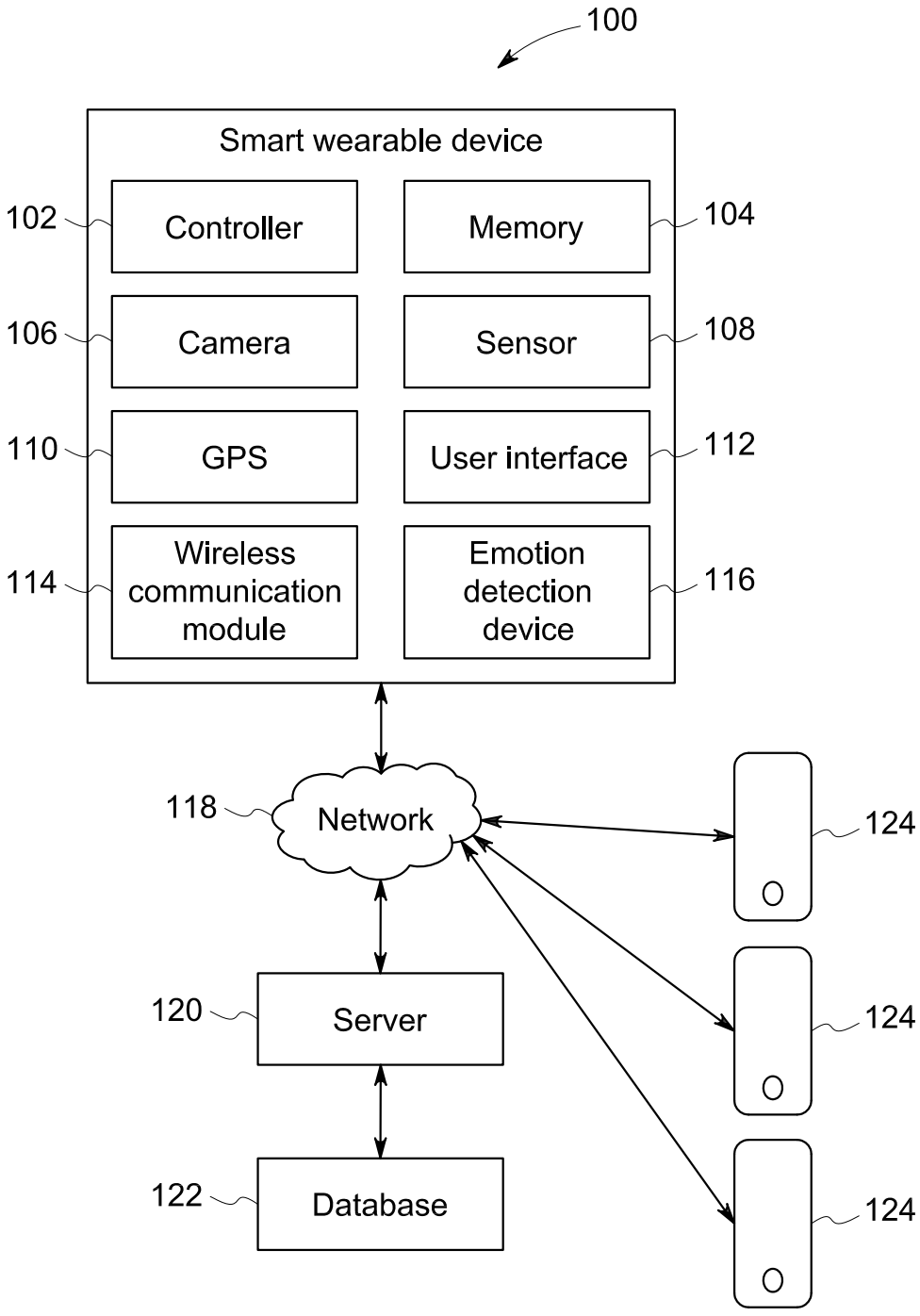


FIG. 1

Patent Agent Name: Hima Bindu Atti

INPA - 3925

FORM 2

THE PATENT ACT, 1970

(39 of 1970)

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The Patent Rules, 2003

COMPLETE SPECIFICATION

(See section 10 and rule 13)

1. TITLE OF THE INVENTION:

A SMART WEARABLE PROTECTION DEVICE

2. APPLICANT:

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3. Aditya College of Engineering **4. Aditya Pharmacy College**
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3. PREAMBLE TO THE DESCRIPTION:

The following specification particularly describes the invention and the manner in which it is to be performed:

4. DESCRIPTION:

TECHNICAL FIELD

[0001] The embodiments herein generally relate to a smart wearable protection device and more, particularly to a smart wearable protection device for the safety monitoring of a user.

BACKGROUND

[0002] Personal safety is an important concern in a part of life. Individuals may face danger or emergency situations when they are in a home, workplace or while traveling. Especially, numerous crimes and incidents of kidnapping and sexual assaults against women and children are increased. However, women and children unable to handle and escape from the danger or emergency situations. People in unprovoked violent situations need a way to inform and alert their loved ones or authorities, for example, cops that they are in danger. Despite extensive security measures, a robust police system and numerous security companies, personal safety remains a serious issue in today's society.

[0003] Many wearable devices have been developed to send an emergency signal to indicate that a wearer or a user is in distress. The conventional wearable devices allow the user to call their loved ones or authorities in order to inform their situation. Further, a speed dial number or even a button particularly may be programmed in the conventional wearable devices, thereby enabling the user to directly call to the emergency contacts or authorities in the danger situation. In addition, the conventional wearable devices can also measure user’s heart rate, blood pressure, temperature, oxygen level etc.

[0004] However, it is impractical for the user to inform or alert his or her emergency personnel or authorities, for example, police and explain about the dangerous or harmful situation during a call. Further, the conventional wearable devices are unable to detect user's emotional states based on biomedical signals, for example, a heart rate variability of the user.

[0005] Few existing patent references attempted to address the problems caused due to usage of computing devices within an organization are explained as follows.

[0006] A prior art US20160338642A1 assigned to Andrew Parara et al., discloses a wearable care security smart watch device. The wearable security device includes a strap and watch face base attached to the strap with a heart rate monitor for recording the vital signs of the user. The wearable security device also includes a memory for storage and at least one program configured to track and store the vital signs of the user. An internal system is programmed to send a wireless alert signal in response to a vital sign of the user that indicates that the user is in danger.

[0007] Another prior art US20200404090A1 assigned to Morgan Cohen, discloses a computer implemented method for enabling a personal safety service to notify a pre-defined group of emergency contacts about an occurrence of emergency associated with the user. The method can be performed by a personal safety service server comprising a processing device and a memory receives an indication of the emergency and a location of the emergency from a wearable mobile device and sends a notification message via a push notification displayed on user devices of a predefined group of emergency contacts indicating the occurrence of the emergency. The personal safety service server periodically receives updates to the

location of the wearable mobile device from the personal safety service client application.

[0008] However, the conventional smart watch devices and methods are unable to automatically capture multimedia data related to a user's surrounding environment for a time period in order to record the dangerous situation. Further, the emergency personnel or authorities could not able to identify and notify individual(s) that may have either been involved or been in proximity to an event or scene that requires assistance.

[0009] There is a need for a smart wearable protection device that reduces the overall response time involved to determine the user's current location, and enables the emergency personnel to access the multimedia data recorded by the smart wearable protection device, thereby analyzing the situation of the user's surrounding environment so as to provide assistance for the user within less time required as per usual.

OBJECTS

[0010] The principal object of embodiments herein is to provide a smart wearable protection device for safety monitoring of a user.

[0011] Another object of embodiments herein is to provide the smart wearable protection device with at least one camera, which is configured to rotate about 360 degrees for capturing and recording the user's surrounding environment.

[0012] Another object of embodiments herein is to provide the smart wearable protection device with at least one sensor, which is configured to detect a user's heart rate.

[0013] Another object of embodiments herein is to provide the smart wearable protection device with an emotion detection device, which is configured to detect user's emotional states based on the heart rate data, body temperature, sweating rate, shivering, and interactions with the user using artificial intelligence (AI) technology.

[0014] Another object of embodiments herein, the smart wearable protection device is configured to transfer the user's heart rate data to a server for analyzing by the AI system in order to determine human emotions when detects an abnormal heart rate.

[0015] Another object of embodiments herein, the server in communication with the smart wearable device is configured to send one or more signals in order to automatically actuate the camera for a time period to capture and record the multimedia data related to the user's surrounding environment.

[0016] Another object of embodiments herein, the smart wearable protection device is further configured to send at least one alert message including GPS coordinates of the smart wearable device to one or more user devices wirelessly connected to the smart wearable device or the database through the network.

[0017] Another object of embodiments herein is to perform an analysis of the multimedia data including images and videos related to the user's surrounding environment by the server using the artificial intelligence system.

[0018] Another object of embodiments herein, the server is configured to perform a quantitative analysis of the heart rate data of the user by the artificial intelligence system, thereby determining emotional states of the user.

[0019] Another object of embodiments herein, the smart wearable protection device is further configured to request the user to enter an authentication code, which is sent to a guardian of the user, thereby enabling the user to turn off the smart wearable protection device.

[0020] These and other objects of embodiments herein will be better appreciated and understood when considered in conjunction with following description and accompanying drawings. It should be understood, however, that the following descriptions, while indicating embodiments and numerous specific details thereof, are given by way of illustration and not of limitation. Many changes and modifications may be made within the scope of the embodiments, and the embodiments herein include all such modifications.

BRIEF DESCRIPTION OF DRAWINGS

[0021] The embodiments are illustrated in the accompanying drawings, throughout which like reference letters indicate corresponding parts in various figures. The embodiments herein will be better understood from the following description with reference to the drawings, in which:

[0022] FIG. 1 depicts a block diagram of a smart wearable protection device for safety monitoring of a user, according to embodiments as disclosed herein.

DETAILED DESCRIPTION

[0023] The embodiments herein and the various features and advantageous details thereof are explained more fully with reference to the non-limiting embodiments that are illustrated in the accompanying drawings and detailed in the following description. Descriptions of well-known components and processing techniques are

omitted so as to not unnecessarily obscure the embodiments herein. The examples used herein are intended merely to facilitate an understanding of ways in which the embodiments herein may be practiced and to further enable those of skill in the art to practice the embodiments herein. Accordingly, the examples should not be construed as limiting the scope of the embodiments herein.

[0024] The embodiments herein provide a smart wearable protection device for safety monitoring of a user. Further, embodiments herein to provide the smart wearable protection device that automatically sends at least one alert message including GPS coordinates to emergency personnel who wirelessly connected to the smart wearable device or a database through a network based on heart rate data of the user. Referring now to the drawings Fig. 1, where similar reference characters denote corresponding features consistently throughout the figures, there are shown embodiments.

[0025] FIG. 1 depicts a block diagram of a smart wearable protection device 100 for safety monitoring of a user, according to embodiments as disclosed herein. In an embodiment, the wearable protection device 100 is configured to send at least one alert message including GPS coordinates to emergency personnel who wirelessly connected to the wearable protection device 100 based on heart rate data of the user.

[0026] In an embodiment herein, the wearable protection device 100 comprises a controller 102 and a memory 104 for storing one or more programs configured for execution by the controller 102. In an embodiment herein, the memory 104 includes a software module executed by the controller 102. The software module is at least

one plug-in component and/or a browser extension. In an embodiment herein, the wearable protection device 100 is in communication with a server 120 for receiving data or services over a network 118.

[0027] In an embodiment, the wearable protection device 100 may be, but not limited to, a smart watch. The wearable protection device 100 is configured to be worn on a user's wrist. In an embodiment, the wearable protection device 100 further comprises at least one camera 106, at least one sensor 108, a global positioning system (GPS) 110, and a user interface 112.

[0028] In one embodiment, the wearable protection device 100 is in communication with a server 120 via a network 118. In an embodiment herein, the network 118 could be, but is not limited to, Wi-Fi, Bluetooth, a wireless local area network (WLAN)/Internet connection, and radio communication. In an embodiment herein, a database 122 is in communication with the server 120 via the network 118, where the database 122 is configured to store data related to users, heart rate data, multimedia captured by the camera 106, and GPS coordinates received by the wearable protection device 100.

[0029] In an embodiment herein, the server 120 is at least one of a general or special purpose computer. The server 120 could be operated as a single computer, which can be a hardware and/or software server, a workstation, a desktop, a laptop, a tablet, a mobile phone, a mainframe, a supercomputer, a server farm, and so forth. In some embodiments, the computer could be touchscreen and/or non-touchscreen and adopted to run on any type of OS, such as iOS, Windows, Android, Unix, Linux and/or others.

[0030] In an embodiment herein, the database 122 may be accessible by the server 120. The database 122 may be integrated into the server 120 or separate from it. In some embodiments, the database 122 resides in the connected server 120 or a cloud computing service. Regardless of location, the database 122 comprises a memory to store and organize certain data for use by the server 120.

[0031] In an embodiment herein, the wearable protection device 100 comprises at least one camera 106 in communication with the controller 102 is configured to rotate about 360 degrees for capturing and recording multimedia data related to surrounding environment to the user. In one embodiment, the camera 106 could be, but not limited to, a night vision audible and rotatable camera. The camera 106 is located in a position so as to rotate about 360 degrees for capturing and recording the multimedia data related to the user's surrounding environment.

[0032] In an embodiment, the sensor 108 in communication with the controller 102 is configured to detect a user's heart rate. When the user heart rate is abnormal, the wearable protection device 100 sends the heart rate data to the database 122 via the network 118 for determining emotional states of the user using the artificial intelligence system. The heart rate could be increased due to high tension, depression, feelings, anxiety, stress, mood swings, emotional outbursts, and other psychological or mental states of the user.

[0033] In an embodiment herein, the GPS 110 in communication with the controller 102 is configured to wirelessly receive GPS signals, thereby providing GPI location of the wearable protection device 100 to the controller 102. In an embodiment herein, the user interface 112 in communication with the controller 102 is

configured to enable the user to select and perform multiple operations. In an example herein, the user interface 112 could be, but not limited to, a touch screen or a keyboard. In an embodiment herein, the wearable protection device 100 further comprises a wireless communication module 114 so as to wirelessly connect to the server 120 and/or one or more user devices 124 through the network 118, for example, Wi-Fi.

[0034] In an embodiment, the wearable protection device 100 further comprises an emotion detection device 116. The emotion detection device 116 in communication with the controller 102 is configured to detect user's emotional states based on the heart rate data, body temperature, sweating rate, shivering, and interactions with the user using the AI technology. In some embodiments, the wearable protection device 100 may interact with the user so as to detect the emotional states of the user.

[0035] In one embodiment herein, the controller 102 is configured to enable the one or more programs to execute the steps of: receiving the user's heart rate data from the at least one sensor 108, transferring the user's heart rate data to the server 120 for analyzing by the artificial intelligence system in order to determine human emotions when detects an abnormal heart rate, receiving one or more signals from the server 120 based on the user's heart rate data to actuate the camera 106 for capturing and recording the multimedia data related to a user's surrounding environment; transferring the recoded multimedia data to the server 120 via the network 118 for analyzing by the artificial intelligence system, and sending at least one alert message including GPS coordinates of the wearable protection device 100

automatically to one or more user devices 124 wirelessly connected to the wearable protection device 100 or the database 122 through the network 118.

[0036] In one embodiment, the controller 102 is further configured to automatically turn on the camera 106 for a time period to capture the multimedia data and send to the server 120 via the network 118 when the user removes the wearable protection device 100. The captured multimedia data may be analyzed by the server 120 using the artificial intelligence system and, if required, it may send to one or more users who wirelessly connected to the wearable protection device 100. In one embodiment, the wearable protection device 100 is further configured to request the user to enter an authentication code, which is sent to a guardian i.e., father or mother of the user, thereby enabling the user to turn off the wearable protection device 100.

[0037] In one embodiment, multiple users including friends, family, and protection force may access the database 122 via the network 118 by wirelessly connecting to the server 120 using one or more user devices 124, thereby acquiring the multimedia data captured by the camera 106 and the GPS coordinates of the wearable protection device 100. The users can access the database 122 by providing credentials such as a user ID and a password. The user devices 124 may wirelessly connect to the wearable protection device 100 through the network 118, for example, Wi-Fi. In an embodiment, the wearable protection device 100 may be powered by a power source, for example, a rechargeable battery. The power source in communication with the controller 102 is configured to supply power to the wearable protection device 100.

[0038] In an embodiment, the server 120 is configured to perform an analysis of the multimedia data including images and videos related to the user's surrounding environment using the artificial intelligence system. The server 120 is further configured to perform a quantitative analysis of the heart rate data of the user by the artificial intelligence system, thereby determining emotional states of the user. In an embodiment, the database 122 includes a plurality of lookup tables for representing the heart rate data, the emotional states of the user corresponding to the heart rate, and the analysis of the multimedia data captured by the camera 106. The lookup tables can be constructed by examining a representative sample of heart rate data and the multimedia data including images and videos related to the user's surrounding environment, and identifying the user's emotions.

[0039] The technical advantages of the wearable protection device 100 for safety monitoring of the user are as follows: the wearable protection device 100 reduces the overall response time involved to determine the user's current location, and enables the emergency personnel to access the multimedia data recorded by the camera 106, thereby analyzing the situation of the user's surrounding environment so as to provide assistance for the user within less time required as per usual. The wearable protection device 100 assists the users to secure their lives without any tension and also prevents any illegal or unauthorized activities.

[0040] The foregoing description of the specific embodiments will so fully reveal the general nature of the embodiments herein that others can, by applying current knowledge, readily modify and/or adapt for various applications such specific embodiments without departing from the generic concept, and, therefore, such

adaptations and modifications should and are intended to be comprehended within the meaning and range of equivalents of the disclosed embodiments. It is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation. Therefore, while the embodiments herein have been described in terms of embodiments, those skilled in the art will recognize that the embodiments herein can be practiced with modifications within the scope of the embodiments as described herein.

5. CLAIMS

We claim:

1. A smart wearable protection device (100), comprising:

a controller (102) and a memory (104) for storing one or more programs configured for execution by the controller (102),

wherein the controller (102) is in communication with a server (120) via a network (118);

at least one camera (106) in communication with the controller configured to rotate about 360 degrees for capturing and recording multimedia data related to surrounding environment to the user;

at least one sensor (108) in communication with the controller (102) configured to detect a user's heart rate;

a global positioning system (GPS) (110) in communication with the controller (102) configured to wirelessly receive GPS signals, thereby providing GPI location of the smart wearable protection device (100) to the controller (102); and

a database (122) in communication with the server (120) configured to store data related to users, heart rate data, multimedia captured by the camera (106), and GPS coordinates received by the smart wearable protection device (100);

wherein the controller (102) is configured to enable the one or more programs to execute the steps of:

receiving the user's heart rate data from the at least one sensor (108);

transferring the user's heart rate data to the server (120) for analyzing by an artificial intelligence (AI) system in order to determine emotional states when detects an abnormal heart rate;

receiving one or more signals from the server (120) based on the user's heart rate data to actuate the camera (106) for capturing and recording the multimedia data related to a user's surrounding environment;

transferring the recoded multimedia data to the server (120) via the network (118) for analyzing by the artificial intelligence system; and

sending at least one alert message including GPS coordinates of the smart wearable protection device (100) automatically to one or more user devices (124) wirelessly connected to the smart wearable protection device (100) or the database (122) through the network (118) based on the emotional states of the user.

2. The smart wearable protection device (100) as claimed in claim 1, further comprises an emotion detection device (116) configured to detect user's emotional states based on the heart rate data, body temperature, sweating rate, shivering, and interactions with the user using AI technology.

3. The smart wearable protection device (100) as claimed in claim 1, wherein the server (120) is configured to perform an analysis of the multimedia data including images and videos related to the user's surrounding environment using the artificial intelligence system.

4. The smart wearable protection device (100) as claimed in claim 1, wherein the server (120) is further configured to perform a quantitative analysis of the heart rate data of the user by the artificial intelligence system, thereby determining emotional states of the user.

5. The smart wearable protection device (100) as claimed in claim 1, wherein the database (122) includes a plurality of lookup tables for representing the heart rate data, the emotional states of the user corresponding to the heart rate, and the analysis of the multimedia data captured by the camera (106).

6. The smart wearable protection device (100) as claimed in claim 1, wherein the camera (106) is a night vision audible and rotatable camera.

7. The smart wearable protection device (100) as claimed in claim 1, wherein the controller (102) is further configured to automatically turn on the camera (106) for a time period to capture the multimedia data and send to the server (120) via the network (118) when the user removes the smart wearable protection device (100).

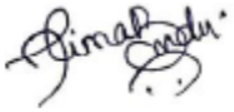
8. The smart wearable protection device (100) as claimed in claim 1, wherein the one or more user devices (124) wirelessly connect to the smart wearable protection device (100) and access the database (122) via the network (118), thereby enabling to acquire the multimedia data captured by the camera (106) and the GPS coordinates of the smart wearable protection device (100) by providing credentials.

9. The smart wearable protection device (100) as claimed in claim 1, is further configured to request the user to enter an authentication code, which is sent to a guardian of the user, thereby enabling the user to turn off the smart wearable protection device (100).

10. The smart wearable protection device (100) as claimed in claim 1, wherein the network (118) is at least any one of Wi-Fi, Bluetooth, a wireless local area network (WLAN)/Internet connection, and radio communication.

6. DATE AND SIGNATURE:

Dated this 02nd day of August, 2022



Patent Agent Name: Hima Bindu Atti

INPA-3925

7. ABSTRACT

Title: A SMART WEARABLE PROTECTION DEVICE

The disclosure herein relates to a smart wearable protection device (100) for the safety monitoring of a user. The wearable protection device (100) comprises a controller (102), a camera (106) configured to rotate about 360 degrees for capturing multimedia data, a sensor (108) for detecting a user's heart rate, and a global positioning system (GPS) (110). The controller (102) may transfer the user's heart rate data to the server (120) for analyzing by an artificial intelligence (AI) system, thereby determining emotional states when detects an abnormal heart rate. The server (120) may send signals to automatically actuate the camera (106) for capturing the multimedia data. The wearable protection device (100) sends an alert message including GPS coordinates automatically to one or more user devices (124), which are wirelessly connected to the wearable protection device (100) or the database (122) through the network (118) based on the emotional states of the user.

