US 20160065724A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2016/0065724 A1**

(43) **Pub. Date: Mar. 3, 2016**

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(54) **METHOD FOR PROVIDING CONTENT AND ELECTRONIC DEVICE THEREOF**

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(21) Appl. No.: **14/838,600**

(22) Filed: **Aug. 28, 2015**

(30) **Foreign Application Priority Data**

Aug. 29, 2014 (KR) 10-2014-0114325

Publication Classification

(51) **Int. Cl.**

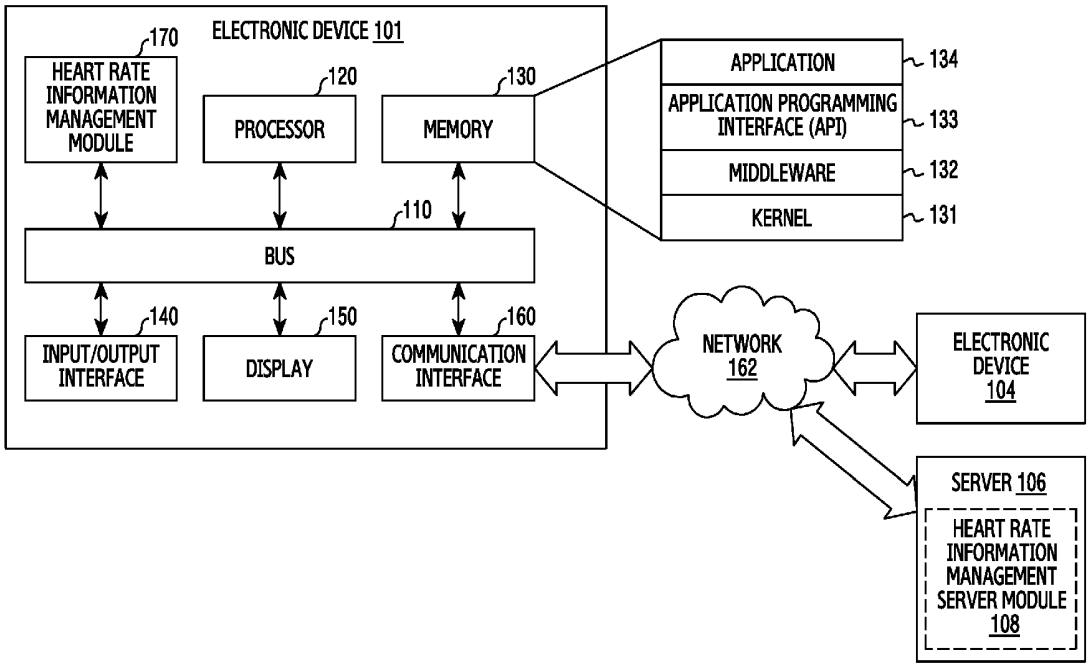
H04M 1/725	(2006.01)
A61B 5/16	(2006.01)
A61B 5/00	(2006.01)
A61B 5/024	(2006.01)

(52) **U.S. Cl.**

CPC ***H04M 1/72569*** (2013.01); ***A61B 5/02438*** (2013.01); ***A61B 5/165*** (2013.01); ***A61B 5/7278*** (2013.01); ***A61B 5/6898*** (2013.01); ***A61B 5/7435*** (2013.01); ***A61B 5/743*** (2013.01); ***H04M 1/72544*** (2013.01)

(57) **ABSTRACT**

A method and an electronic device are provided herein. The electronic device includes a processor. The processor may execute the method, including detecting, by a sensor, heart rate information while providing a content of the electronic device, determining, by a processor, an emotional quotient based on the detected heart rate information, and mapping the determined emotional quotient to the provided content.



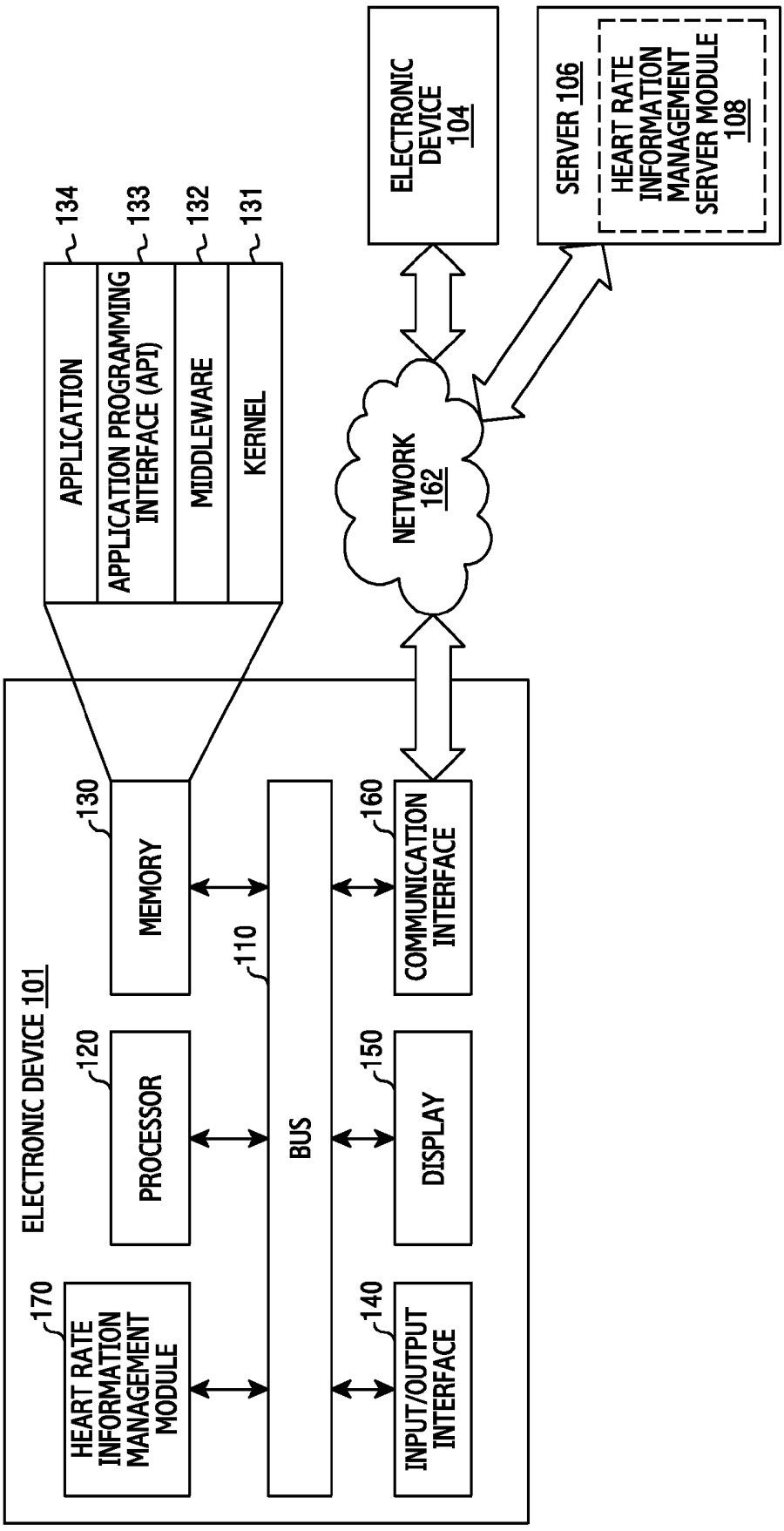

ELECTRONIC DEVICE 101
HEART RATE INFORMATION MANAGEMENT MODULE
170
PROCESSOR
120
MEMORY
130
BUS
110
INPUT/OUTPUT INTERFACE
140
DISPLAY
150
COMMUNICATION INTERFACE
160
APPLICATION
APPLICATION PROGRAMMING INTERFACE (API)
MIDDLEWARE
KERNEL
134
133
132
131
NETWORK 162
ELECTRONIC DEVICE 104
SERVER 106
HEART RATE INFORMATION MANAGEMENT SERVER MODULE 108

FIG. 1

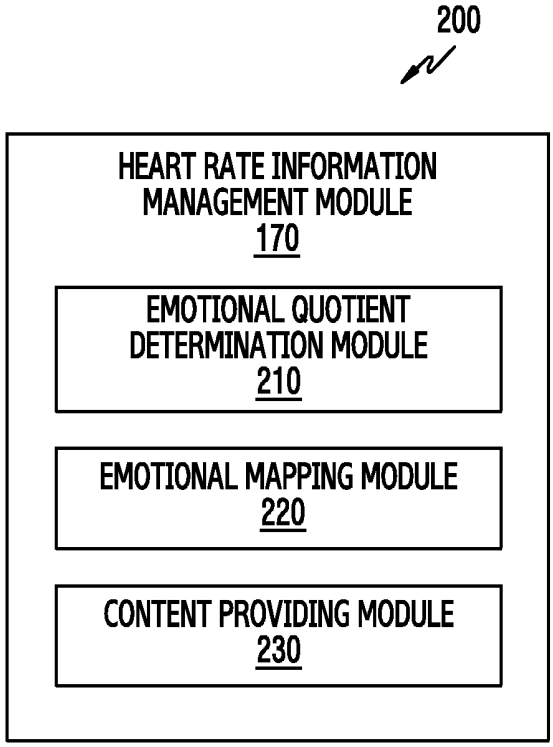

200
HEART RATE INFORMATION MANAGEMENT MODULE
170
EMOTIONAL QUOTIENT DETERMINATION MODULE
210
EMOTIONAL MAPPING MODULE
220
CONTENT PROVIDING MODULE
230

FIG.2

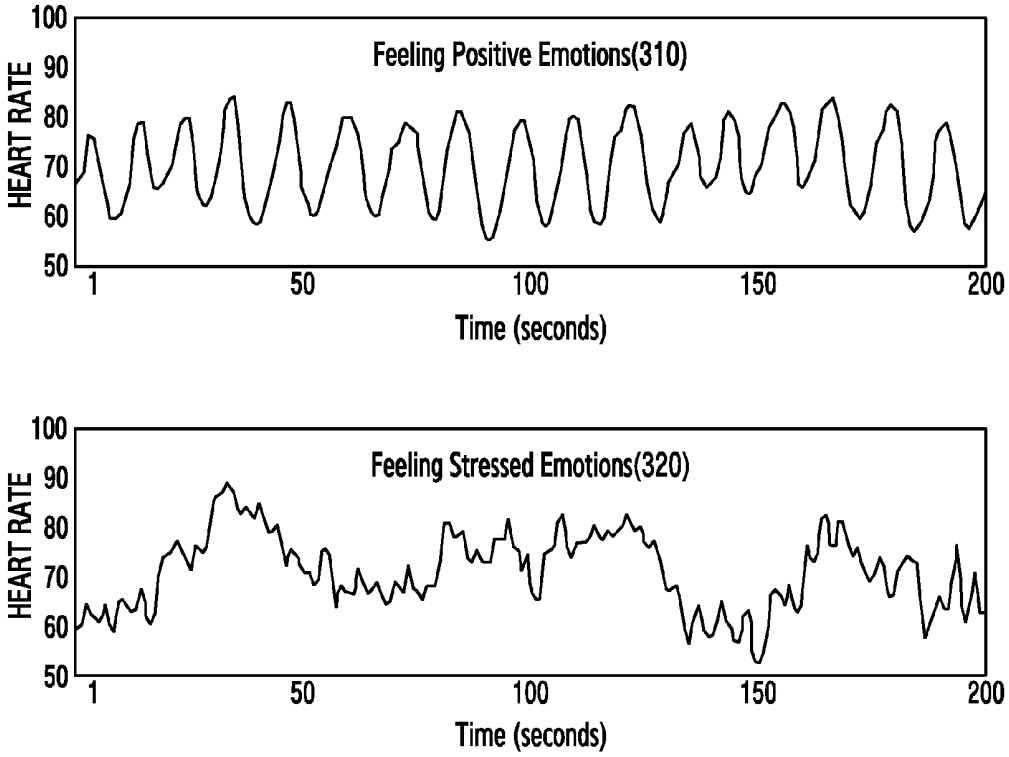

Feeling Positive Emotions(310)
HEART RATE
100
90
80
70
60
50
1
50
100
150
200
Time (seconds)
Feeling Stressed Emotions(320)
HEART RATE
100
90
80
70
60
50
1
50
100
150
200
Time (seconds)

FIG.3

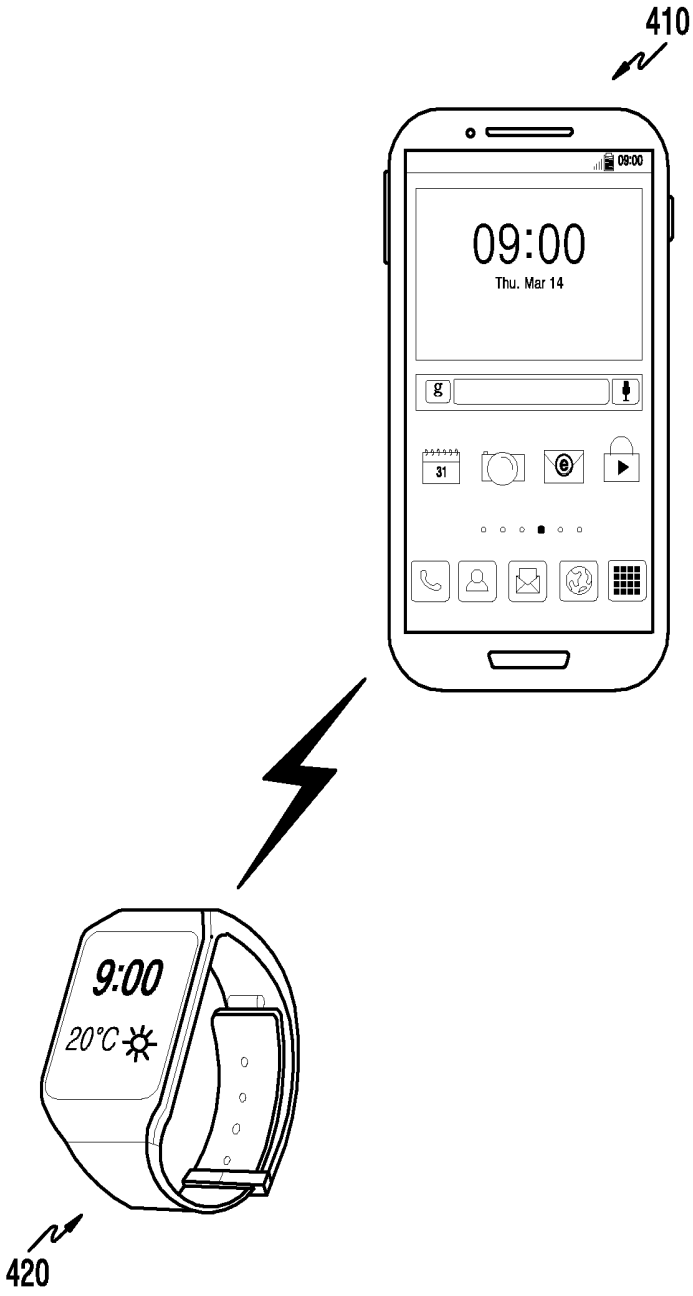


FIG.4

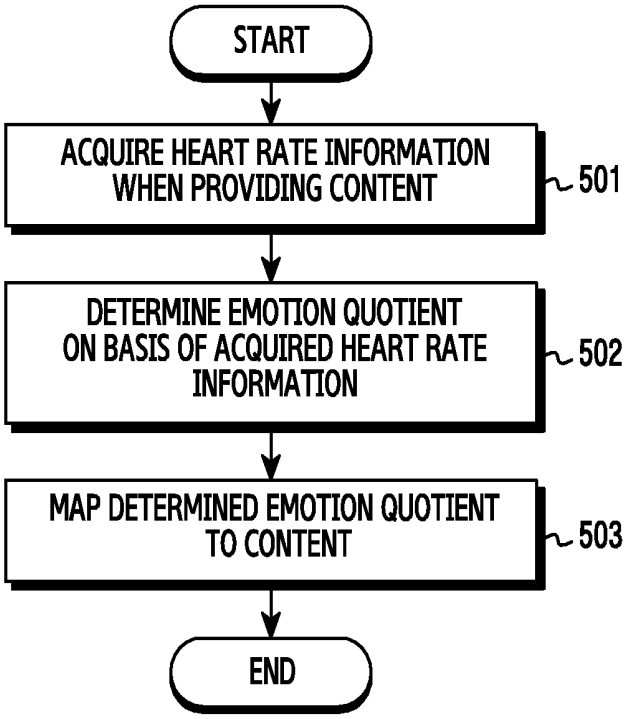

START
ACQUIRE HEART RATE INFORMATION WHEN PROVIDING CONTENT
501
DETERMINE EMOTION QUOTIENT ON BASIS OF ACQUIRED HEART RATE INFORMATION
502
MAP DETERMINED EMOTION QUOTIENT TO CONTENT
503
END

FIG.5

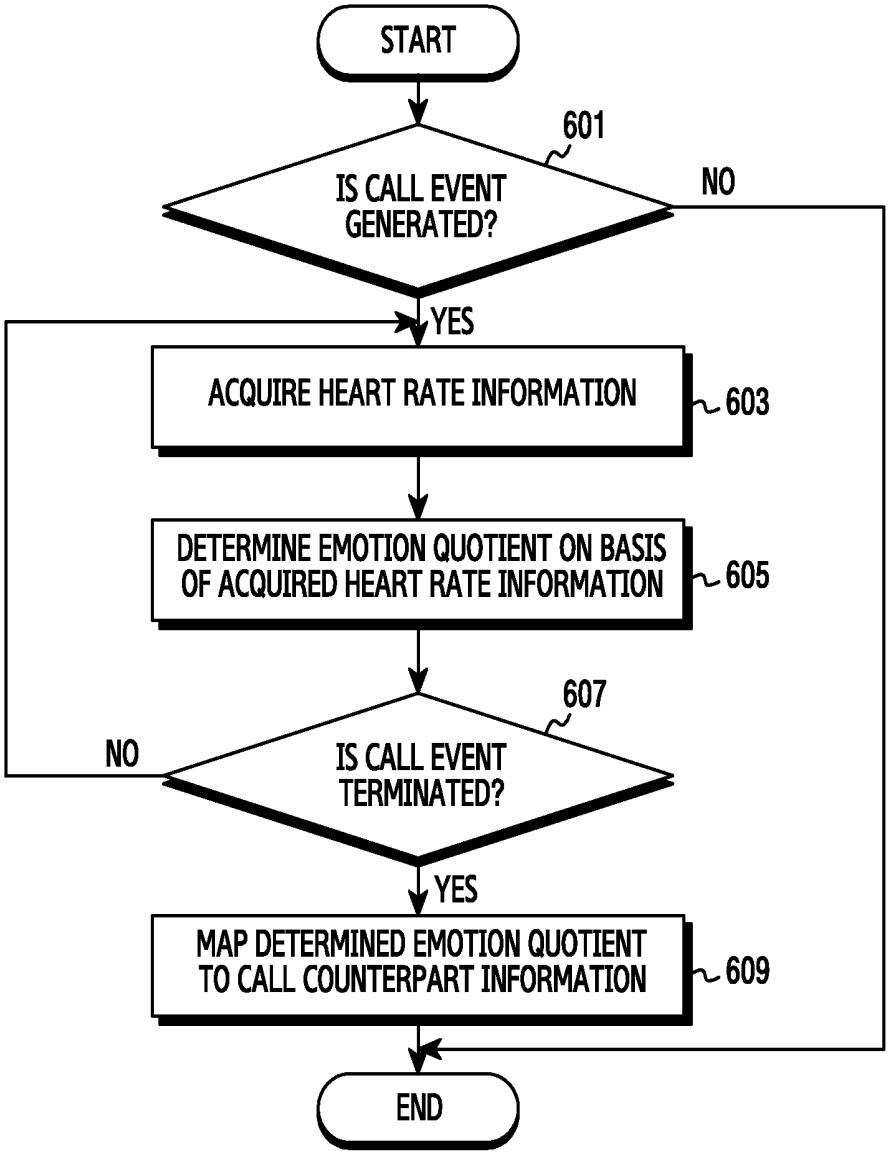

START
601
IS CALL EVENT GENERATED?
NO
YES
ACQUIRE HEART RATE INFORMATION
603
DETERMINE EMOTION QUOTIENT ON BASIS OF ACQUIRED HEART RATE INFORMATION
605
607
NO
IS CALL EVENT TERMINATED?
YES
MAP DETERMINED EMOTION QUOTIENT TO CALL COUNTERPART INFORMATION
609
END

FIG.6

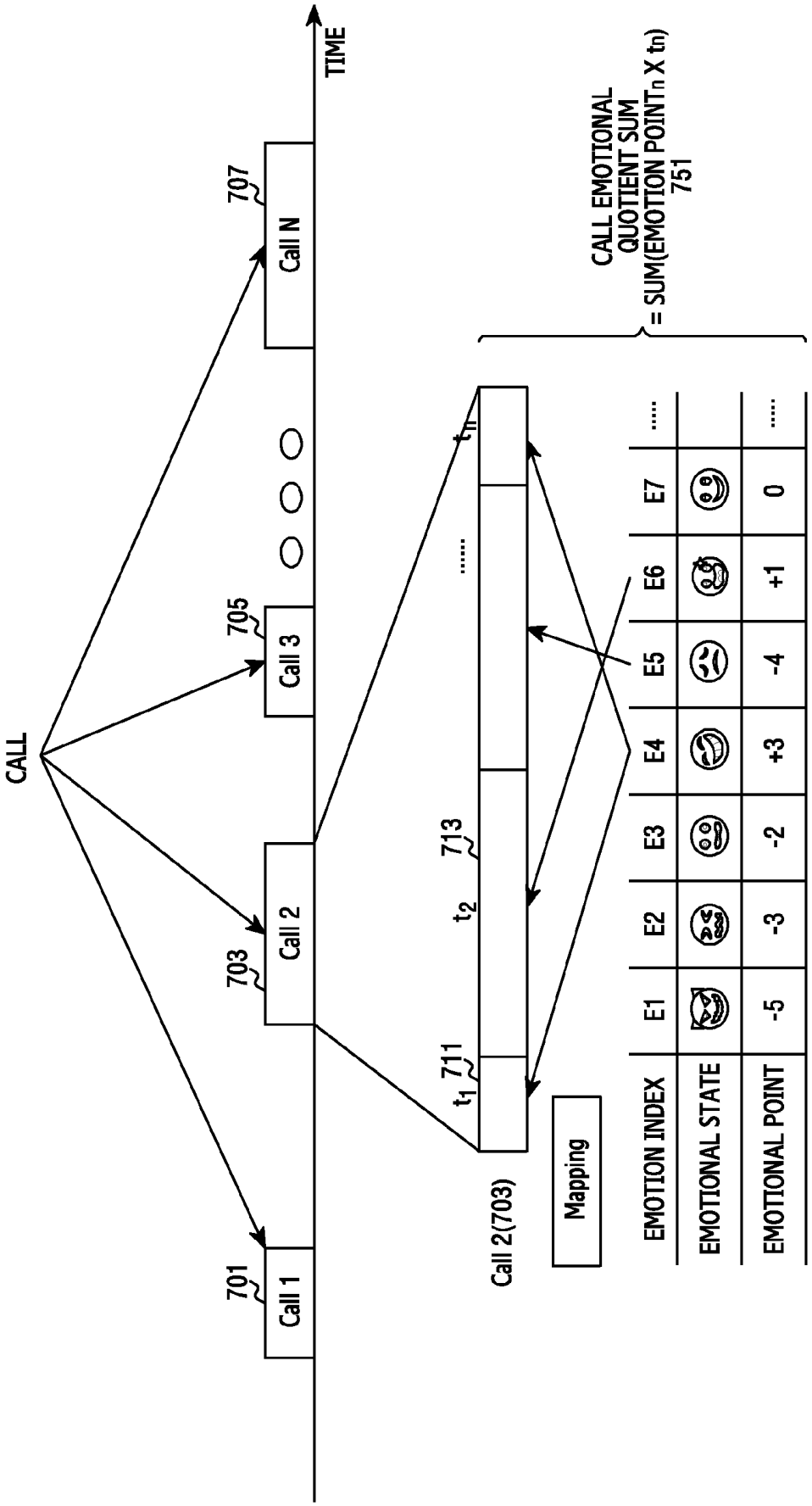

CALL
TIME
701
Call 1
703
Call 2
705
Call 3
707
Call N
Call 2(703)
t_1 711
t_2 713
t_n
Mapping
CALL EMOTIONAL QUOTIENT SUM
= SUM(EMOTION POINT$_n$ X t_n)
751
EMOTION INDEX
EMOTIONAL STATE
EMOTIONAL POINT
E1 E2 E3 E4 E5 E6 E7 .....
-5 -3 -2 +3 -4 +1 0 .....

FIG. 7

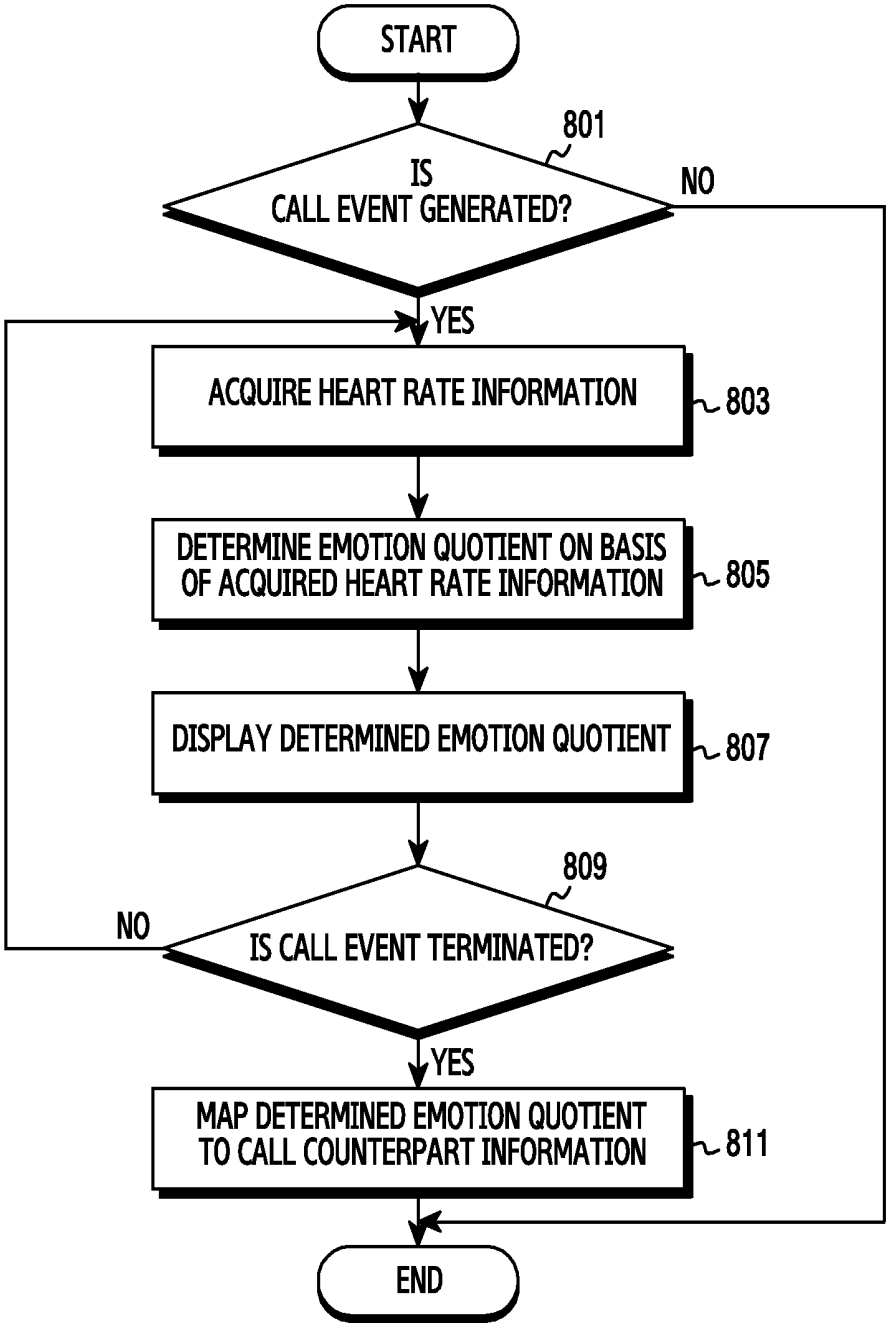

START
801
IS CALL EVENT GENERATED?
NO
YES
ACQUIRE HEART RATE INFORMATION
803
DETERMINE EMOTION QUOTIENT ON BASIS OF ACQUIRED HEART RATE INFORMATION
805
DISPLAY DETERMINED EMOTION QUOTIENT
807
809
NO
IS CALL EVENT TERMINATED?
YES
MAP DETERMINED EMOTION QUOTIENT TO CALL COUNTERPART INFORMATION
811
END

FIG.8

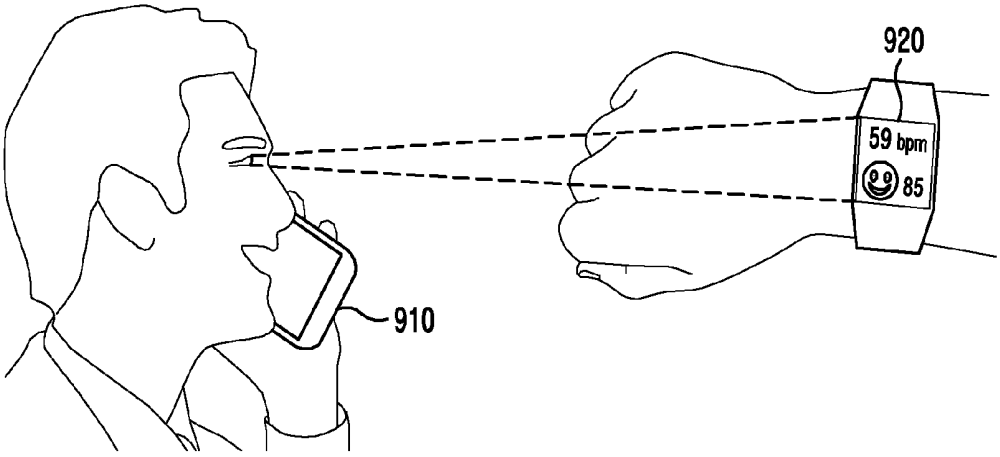


FIG.9

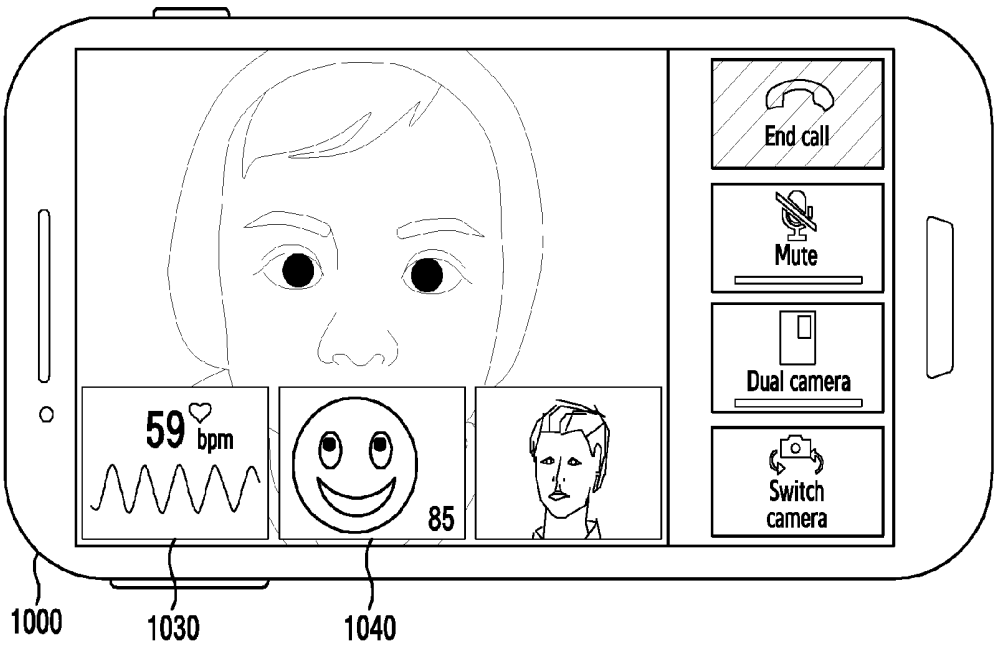

End call
Mute
Dual camera
Switch camera
59 bpm
85
1000
1030
1040

FIG.10

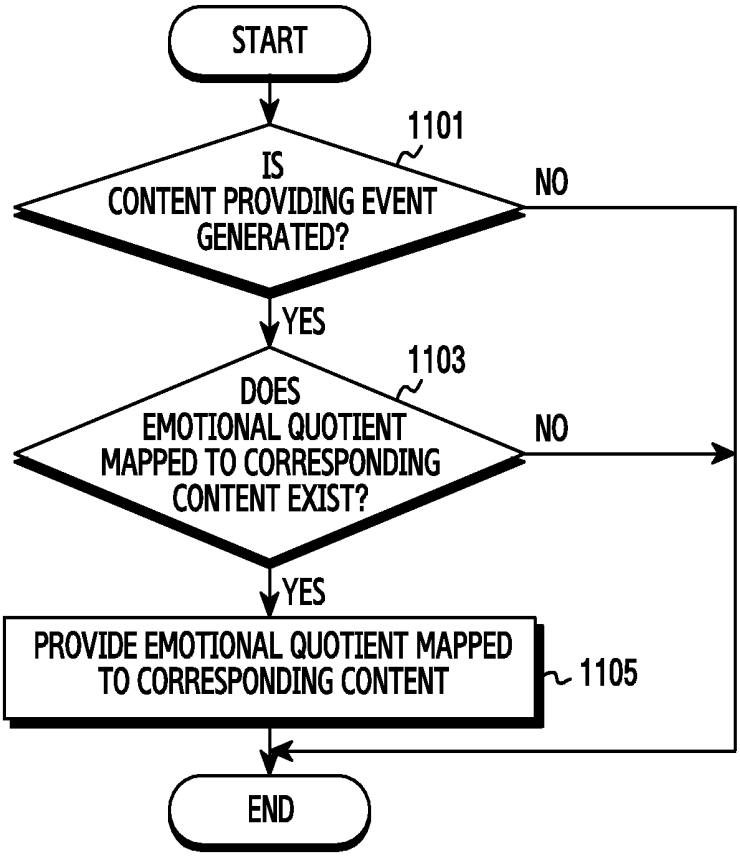

START
1101
IS CONTENT PROVIDING EVENT GENERATED?
NO
YES
1103
DOES EMOTIONAL QUOTIENT MAPPED TO CORRESPONDING CONTENT EXIST?
NO
YES
PROVIDE EMOTIONAL QUOTIENT MAPPED TO CORRESPONDING CONTENT
1105
END

FIG.11

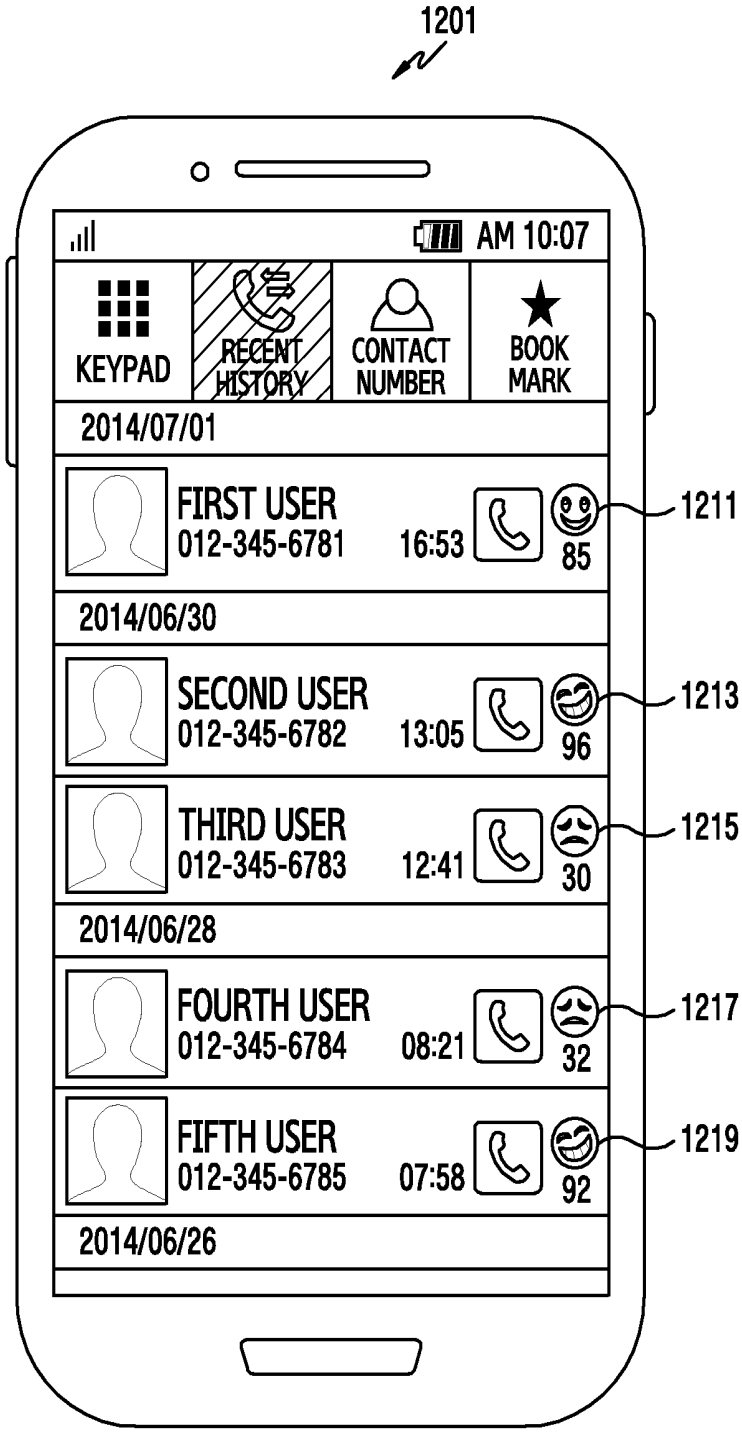

1201
AM 10:07
KEYPAD
RECENT HISTORY
CONTACT NUMBER
BOOK MARK
2014/07/01
FIRST USER
012-345-6781
16:53
85
1211
2014/06/30
SECOND USER
012-345-6782
13:05
96
1213
THIRD USER
012-345-6783
12:41
30
1215
2014/06/28
FOURTH USER
012-345-6784
08:21
32
1217
FIFTH USER
012-345-6785
07:58
92
1219
2014/06/26

FIG.12A

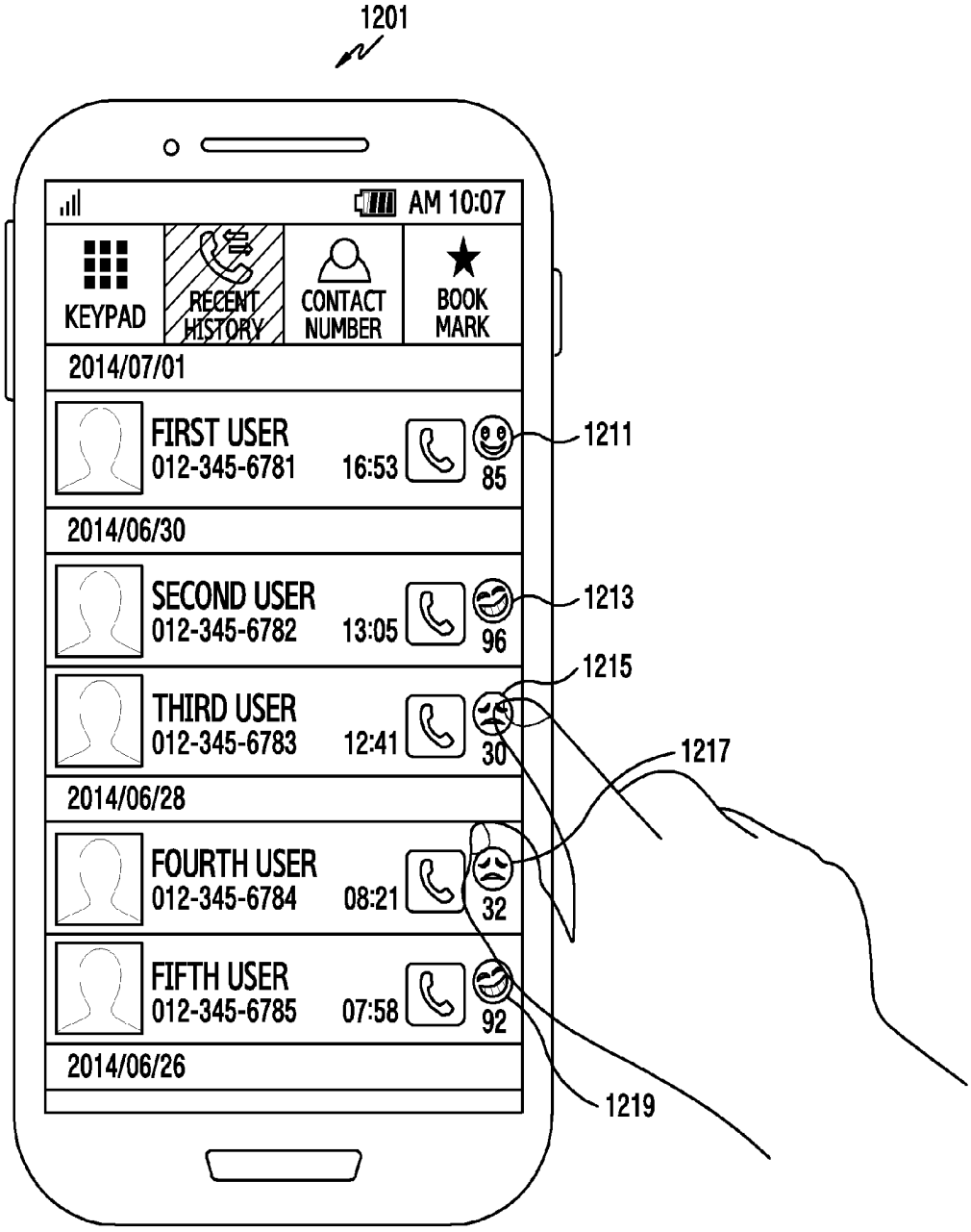

1201
AM 10:07
KEYPAD
RECENT HISTORY
CONTACT NUMBER
BOOK MARK
2014/07/01
FIRST USER
012-345-6781
16:53
85
1211
2014/06/30
SECOND USER
012-345-6782
13:05
96
1213
1215
THIRD USER
012-345-6783
12:41
30
1217
2014/06/28
FOURTH USER
012-345-6784
08:21
32
FIFTH USER
012-345-6785
07:58
92
2014/06/26
1219

FIG.12B

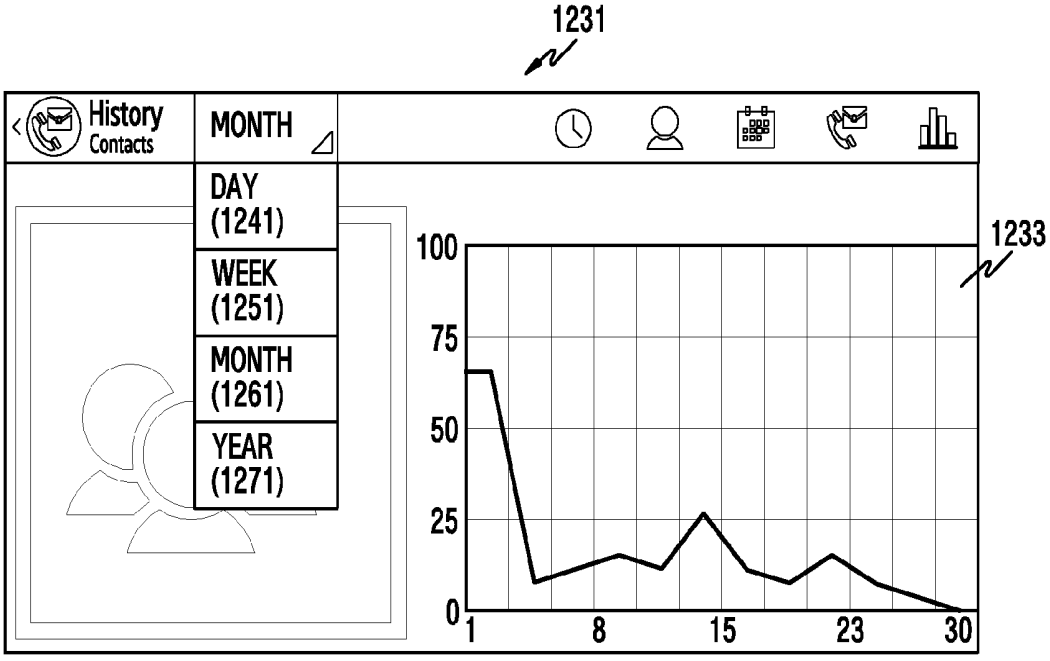

1231
History
Contacts
MONTH
DAY
(1241)
WEEK
(1251)
MONTH
(1261)
YEAR
(1271)
1233
100
75
50
25
0
1
8
15
23
30

FIG.12C

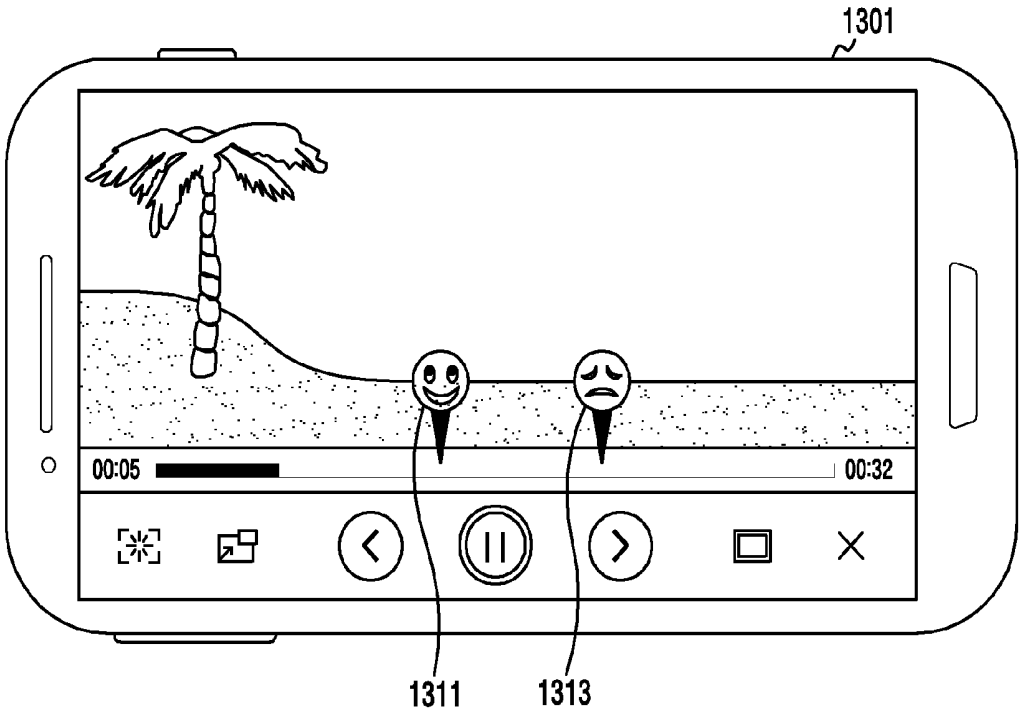


FIG.13

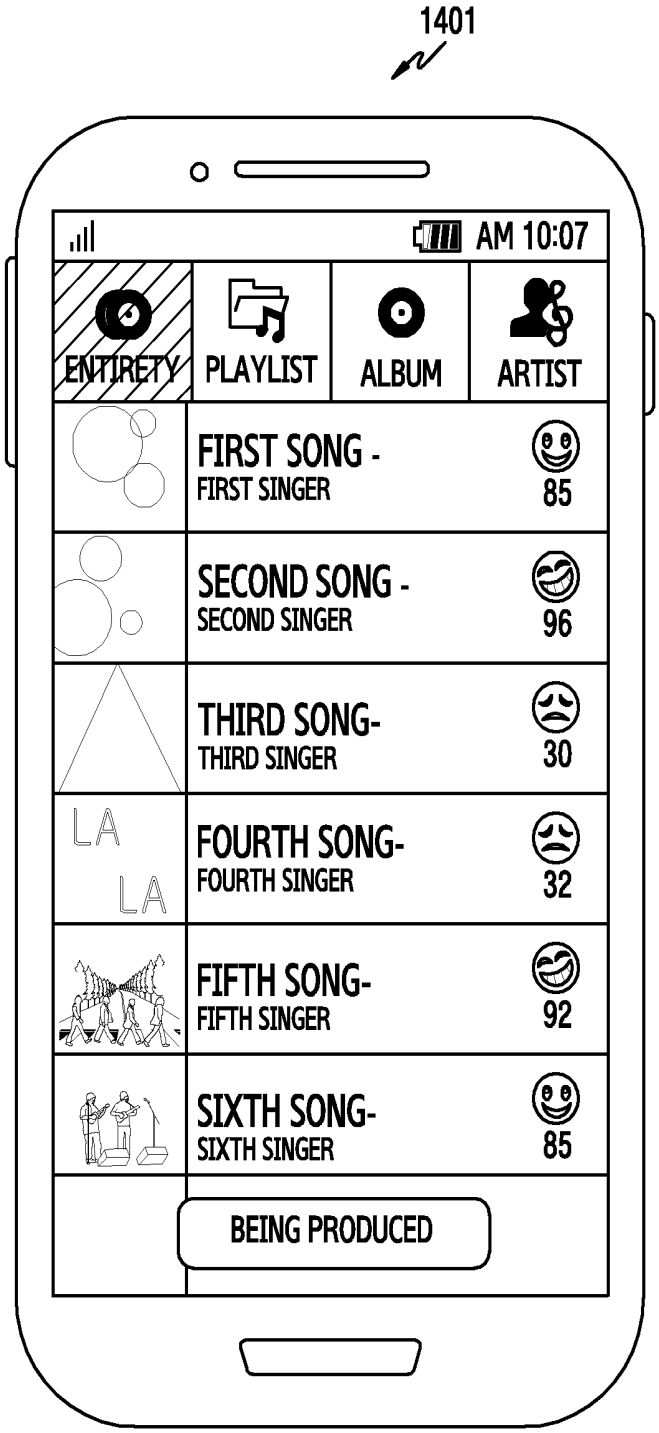

1401
AM 10:07
ENTIRETY
PLAYLIST
ALBUM
ARTIST
FIRST SONG -
FIRST SINGER
85
SECOND SONG -
SECOND SINGER
96
THIRD SONG-
THIRD SINGER
30
LA
LA
FOURTH SONG-
FOURTH SINGER
32
FIFTH SONG-
FIFTH SINGER
92
SIXTH SONG-
SIXTH SINGER
85
BEING PRODUCED

FIG.14

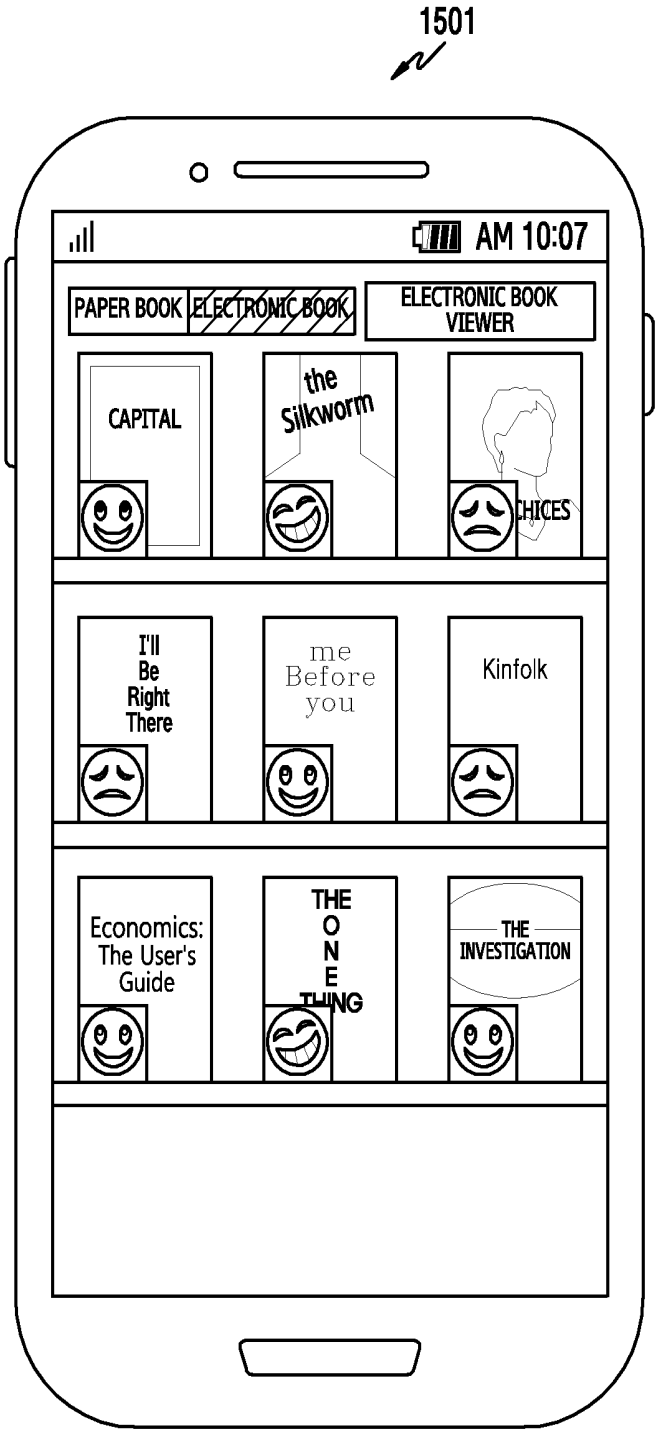

1501
AM 10:07
PAPER BOOK
ELECTRONIC BOOK
ELECTRONIC BOOK VIEWER
CAPITAL
the Silkworm
I'll Be Right There
me Before you
Kinfolk
Economics: The User's Guide
THE ONE THING
THE INVESTIGATION

FIG.15

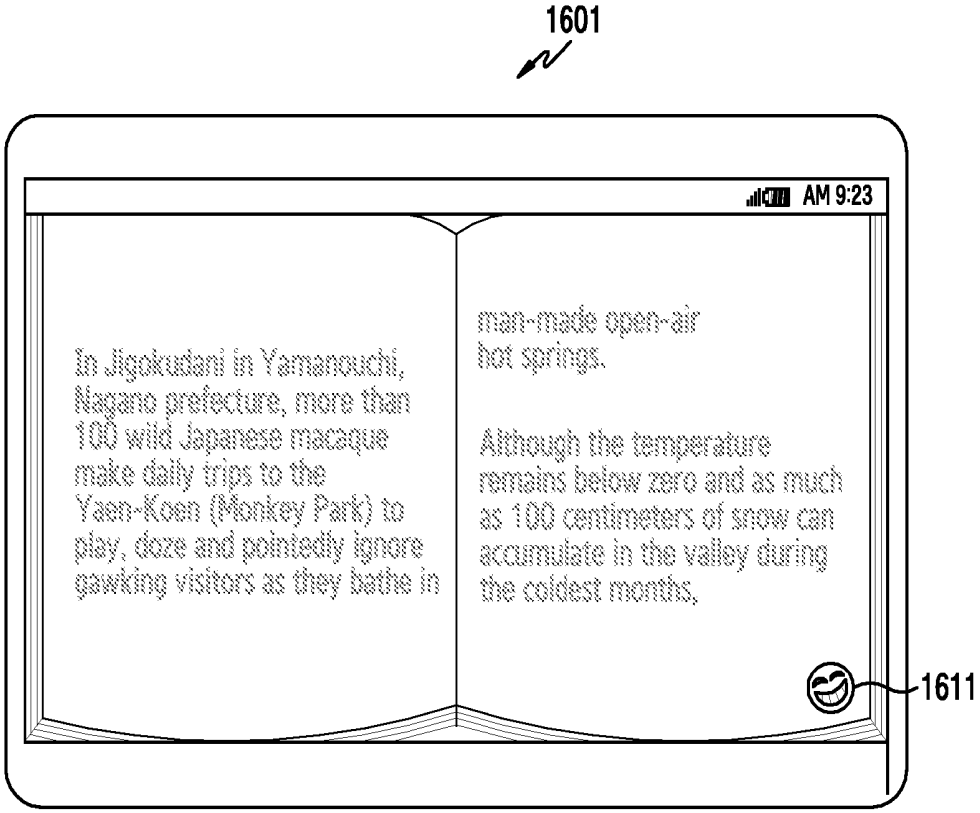

1601
AM 9:23
In Jigokudani in Yamanouchi, Nagano prefecture, more than 100 wild Japanese macaque make daily trips to the Yaen-Koen (Monkey Park) to play, doze and pointedly ignore gawking visitors as they bathe in
man-made open-air hot springs.
Although the temperature remains below zero and as much as 100 centimeters of snow can accumulate in the valley during the coldest months.
1611

FIG.16

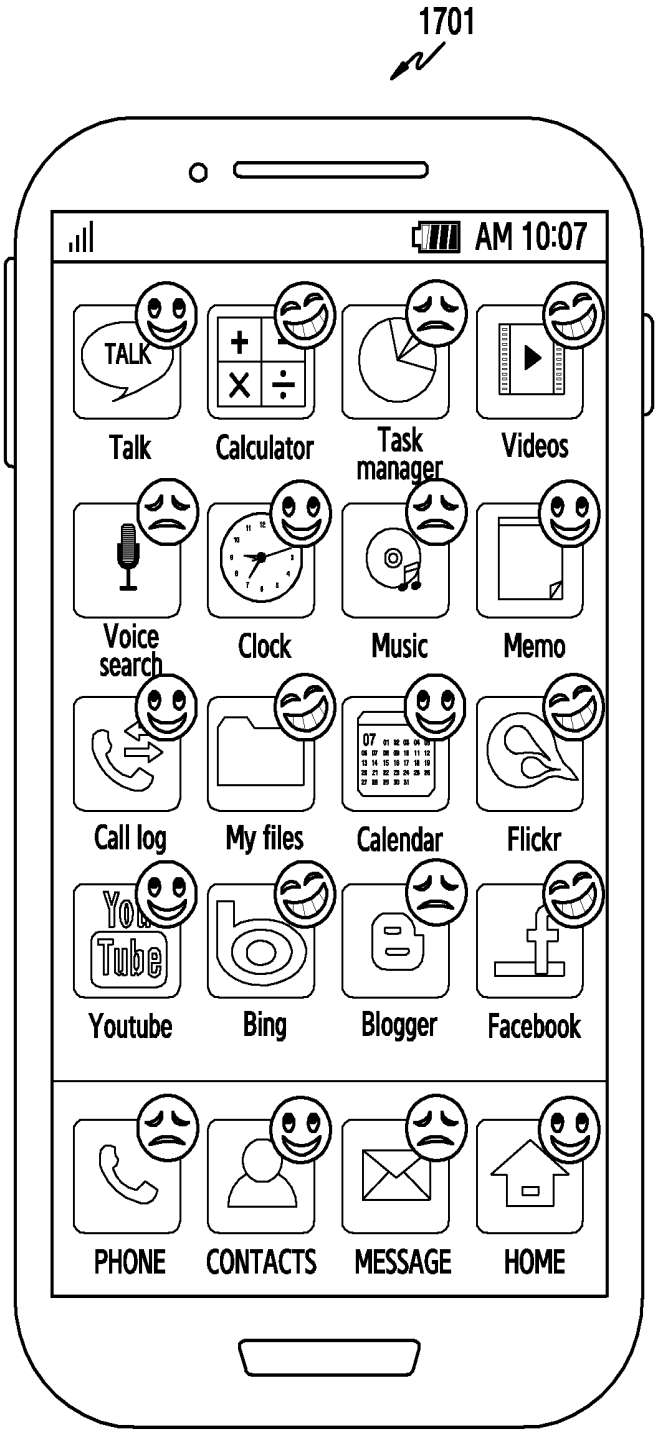

1701
AM 10:07
TALK
Talk
Calculator
Task manager
Videos
Voice search
Clock
Music
Memo
Call log
My files
Calendar
Flickr
Youtube
Bing
Blogger
Facebook
PHONE
CONTACTS
MESSAGE
HOME

FIG.17

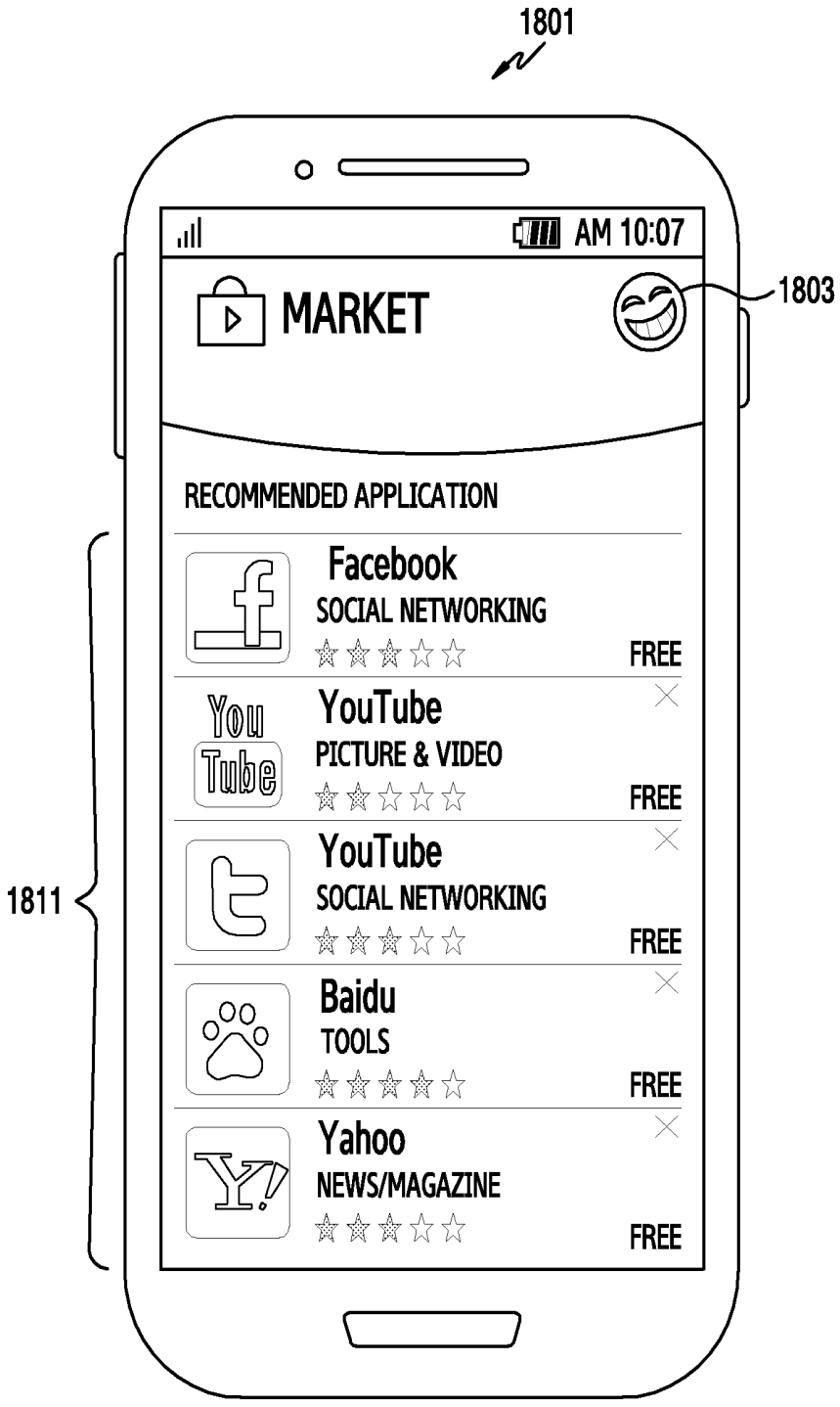

1801
AM 10:07
MARKET
1803
RECOMMENDED APPLICATION
Facebook
SOCIAL NETWORKING
FREE
YouTube
PICTURE & VIDEO
FREE
YouTube
SOCIAL NETWORKING
FREE
Baidu
TOOLS
FREE
Yahoo
NEWS/MAGAZINE
FREE
1811

FIG.18

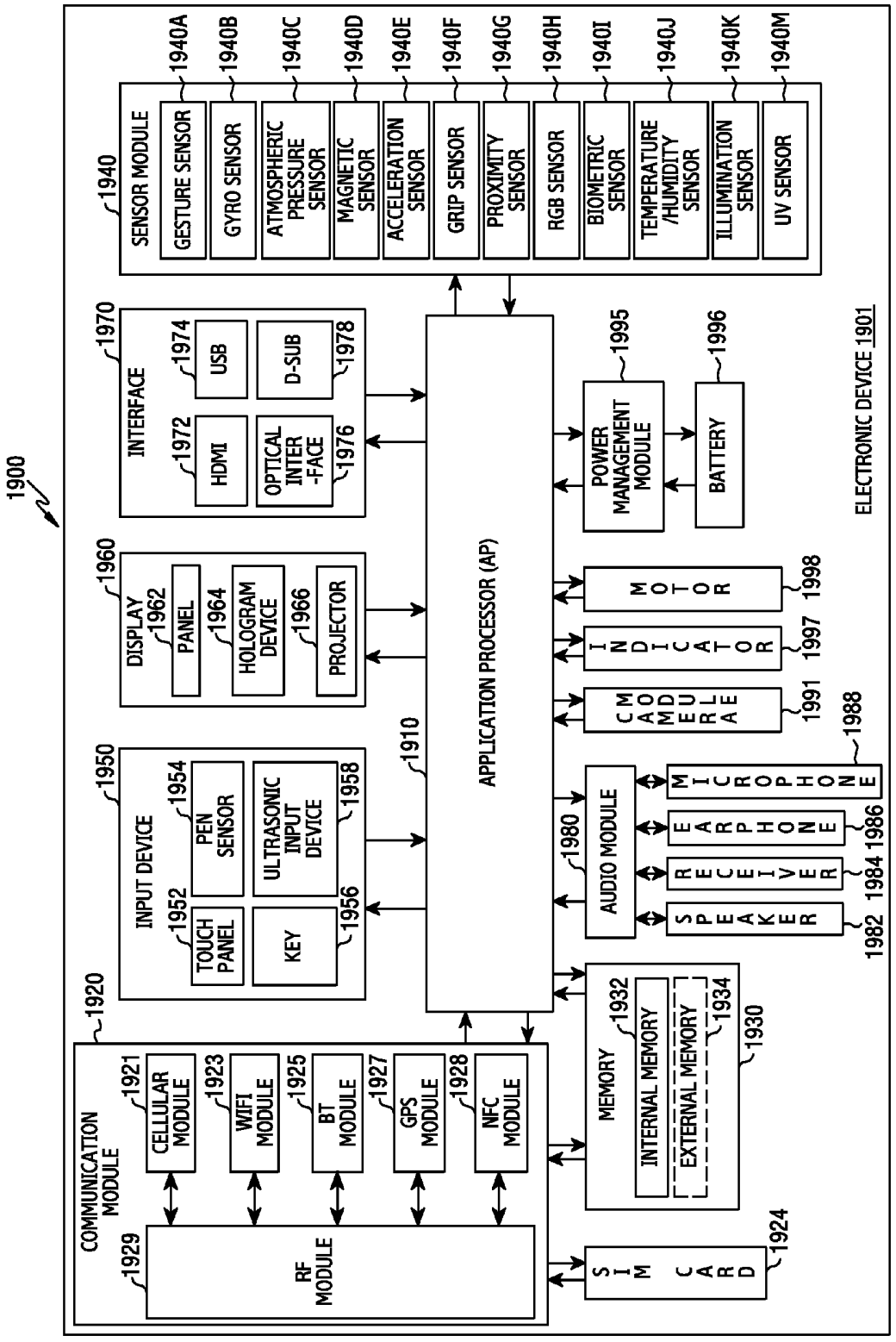

1900
ELECTRONIC DEVICE 1901
APPLICATION PROCESSOR (AP)
1910
SENSOR MODULE 1940
GESTURE SENSOR 1940A
GYRO SENSOR 1940B
ATMOSPHERIC PRESSURE SENSOR 1940C
MAGNETIC SENSOR 1940D
ACCELERATION SENSOR 1940E
GRIP SENSOR 1940F
PROXIMITY SENSOR 1940G
RGB SENSOR 1940H
BIOMETRIC SENSOR 1940I
TEMPERATURE /HUMIDITY SENSOR 1940J
ILLUMINATION SENSOR 1940K
UV SENSOR 1940M
INTERFACE 1970
USB 1974
D-SUB 1978
HDMI 1972
OPTICAL INTER-FACE 1976
DISPLAY 1960
PANEL 1962
HOLOGRAM DEVICE 1964
PROJECTOR 1966
INPUT DEVICE 1950
TOUCH PANEL 1952
PEN SENSOR 1954
KEY 1956
ULTRASONIC INPUT DEVICE 1958
POWER MANAGEMENT MODULE 1995
BATTERY 1996
CAMERA MODULE 1991
INDICATOR 1997
MOTOR 1998
AUDIO MODULE 1980
SPEAKER 1982
RECEIVER 1984
EARPHONE 1986
MICROPHONE 1988
COMMUNICATION MODULE 1920
CELLULAR MODULE 1921
WIFI MODULE 1923
BT MODULE 1925
GPS MODULE 1927
NFC MODULE 1928
RF MODULE 1929
MEMORY 1930
INTERNAL MEMORY 1932
EXTERNAL MEMORY 1934
SIM CARD 1924

FIG. 19

METHOD FOR PROVIDING CONTENT AND ELECTRONIC DEVICE THEREOF

CLAIM OF PRIORITY

[0001] The present application is related to and claims the benefit under 35 U.S.C. §119(a) of a Korean Patent Application Serial No. 10-2014-0114325, which was filed in the Korean Intellectual Property Office on Aug. 29, 2014, the entire disclosure of which is hereby incorporated by reference.

BACKGROUND

[0002] The present disclosure relates to a method and an apparatus for providing a content.

TECHNICAL FIELD

[0003] Electronic devices have gradually grown in complexity and capacity to perform one or more functions. Moreover, modern electronic devices are represented mainly by mobile terminals, more colloquially referred to as "smart phones". An electronic device such as a mobile terminal typically includes a large screen touch-sensitive display module and a high pixel camera module other than a basic function which is communication with a counterpart so that a still image or video can be photographed and a web surfing may be performed by connecting to a network. Recently, the electronic device further include a high-performance processor and thus can perform many diverse functions.

SUMMARY

[0004] An electronic device may acquire user heart rate information (e.g., a heart rate of a user of the electronic device) through a heart rate measurement sensor. Sometimes, the electronic device does not provide additional information beyond displaying the acquired heart rate information on a screen.

[0005] Accordingly, one aspect of the present disclosure is to provide a method and an apparatus for mapping an emotional quotient according to heart rate information to content and providing the mapped emotional quotient together when the content is provided.

[0006] In another aspect of the present disclosure, a method of operating an electronic device is provided. The method includes: detecting, by a sensor, heart rate information while providing a content of the electronic device, determining, by a processor, an emotional quotient based on the detected heart rate information, and mapping the determined emotional quotient to the provided content.

[0007] In another aspect of the present disclosure, an electronic device is provided. The electronic device includes a display, and a processor configured to: detect, by a sensor operatively coupled with the electronic device, heart rate information while providing content of the electronic device, determine an emotional quotient based on the detected heart rate information, and map the determined emotional quotient to the provided content.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The present disclosure will be more apparent from the following detailed description taken in conjunction with the accompanying drawings, in which:

[0009] FIG. **1** is a view illustrating a network environment including an electronic device according to various embodiments of the present disclosure;

[0010] FIG. **2** is a block diagram illustrating a heart rate information management module of an electronic device according to various embodiments of the present disclosure;

[0011] FIG. **3** is a graph illustrating a heart rate change according to an emotional state in an electronic device according to various embodiments of the present disclosure;

[0012] FIG. **4** is a view illustrating a method of acquiring user heart rate information in an electronic device according to various embodiments of the present disclosure.

[0013] FIG. **5** is a flow chart illustrating a procedure for mapping an emotional quotient to a content in an electronic device according to various embodiments of the present disclosure;

[0014] FIG. **6** is a flow chart illustrating a procedure for mapping an emotional quotient for each call in an electronic device according to various embodiments of the present disclosure;

[0015] FIG. **7** is a view illustrating a method of determining an emotional quotient for each call in an electronic device according to various embodiments of the present disclosure;

[0016] FIG. **8** is a flow chart illustrating a procedure for mapping and providing an emotional quotient for each call in an electronic device according to various embodiments of the present disclosure;

[0017] FIG. **9** is a view illustrating a method of providing an emotional quotient during a voice call in an electronic device according to various embodiments of the present disclosure;

[0018] FIG. **10** is a view illustrating a method of providing an emotional quotient during a video call in an electronic device according to various embodiments of the present disclosure;

[0019] FIG. **11** is a flow chart illustrating a procedure for providing an emotional quotient mapped to a content in an electronic device according to various embodiments of the present disclosure;

[0020] FIG. **12**A, FIG. **12**B, and FIG. **12**C are views illustrating a method of providing an emotional quotient mapped to a content in an electronic device according to various embodiments of the present disclosure;

[0021] FIG. **13** is a view illustrating a method of providing an emotional quotient mapped to a content in an electronic device according to various embodiments of the present disclosure;

[0022] FIG. **14** is a view illustrating a method of providing an emotional quotient mapped to a content in an electronic device according to various embodiments of the present disclosure;

[0023] FIG. **15** is a view illustrating a method of providing an emotional quotient mapped to a content in an electronic device according to various embodiments of the present disclosure;

[0024] FIG. **16** is a view illustrating a method of providing an emotional quotient mapped to a content in an electronic device according to various embodiments of the present disclosure;

[0025] FIG. **17** is a view illustrating a method of providing an emotional quotient mapped to a content in an electronic device according to various embodiments of the present disclosure;

[0026] FIG. **18** is a view illustrating a method of providing an emotional quotient mapped to a content in an electronic device according to various embodiments of the present disclosure; and

[0027] FIG. **19** is a block diagram illustrating an electronic device according to various embodiments of the present disclosure.

DETAILED DESCRIPTION

[0028] Hereinafter, various embodiments of the present disclosure will be described with reference to the accompanying drawings. The present disclosure may be modified in various forms and include various embodiments, but specific examples are illustrated in the drawings and described in the description. However, the description is not intended to limit the present disclosure to the specific embodiments, and it shall be appreciated that all the changes, equivalents and substitutions belonging to the present disclosure. In the description of the drawings, identical or similar reference numerals are used to designate identical or similar elements.

[0029] The term "include" or "may include" refers to the existence of a corresponding disclosed function, operation or component which can be used in various embodiments of the present disclosure and does not limit one or more additional functions, operations, or components. In the present disclosure, the terms such as "include" or "have" may be construed to denote a certain characteristic, number, step, operation, constituent element, component or a combination thereof, but may not be construed to exclude the existence of or a possibility of addition of one or more other characteristics, numbers, steps, operations, constituent elements, components or combinations thereof.

[0030] In various embodiments of the present disclosure, the expression "or" or "at least one of A or/and B" includes any or all of combinations of words listed together. For example, the expression "A or B" or "at least A or/and B" may include A, may include B, or may include both A and B.

[0031] The expression "1", "2", "first", or "second" used in various embodiments of the present disclosure may modify various components of various embodiments but does not limit the corresponding components. For example, the above expressions do not limit the sequence and/or importance of the elements. The above expressions are used merely for the purpose of distinguishing an element from the other elements. For example, a first electronic device and a second electronic device indicate different electronic devices although both of them are electronic devices. For example, without departing from the present disclosure, a first component element may be named a second component element. Similarly, the second component element also may be named the first component element.

[0032] In the case where an element is referred to as being "connected" or "accessed" to other elements, it should be understood that not only the element is directly connected or accessed to the other elements, but also another element may exist between them. Meanwhile, in the case where an element is referred to as being "directly connected to" or "directly accessing" other elements, it should be understood that there is no element therebetween.

[0033] The terms in various embodiments of the present disclosure are used to describe a specific embodiment, and are not intended to limit the present disclosure. As used herein, the singular forms are intended to include the plural forms as well, unless the context clearly indicates otherwise.

[0034] Unless defined differently, all terms used herein, which include technical terminologies or scientific terminologies, have the same meaning as a person skilled in the art to which the present disclosure belongs. Such terms as those defined in a generally used dictionary are to be interpreted to have the meanings equal to the contextual meanings in the relevant field of art, and are not to be interpreted to have ideal or excessively formal meanings unless clearly defined in the present disclosure.

[0035] An electronic device according to various embodiments of the present disclosure may be a device with a communication function. For example, the electronic device may include at least one of a smart phone, a tablet Personal Computer (PC), a mobile phone, a video phone, an e-book reader, a desktop PC, a laptop PC, a netbook computer, a PDA, a Portable Multimedia Player (PMP), an MP3 player, a mobile medical device, a camera, a wearable device (for example, a Head-Mounted-Device (HMD) such as electronic glasses, electronic clothes, an electronic bracelet, an electronic necklace, an electronic appcessory, an electronic tattoo, and/or a smart watch.

[0036] According to some embodiments, the electronic device may be a smart home appliance with a communication function. The smart home appliance as an example of the electronic device may include at least one of a television, a Digital Video Disk (DVD) player, an audio, a refrigerator, an air conditioner, a vacuum cleaner, an oven, a microwave oven, a washing machine, an air cleaner, a set-top box, a TV box (e.g., Samsung HomeSync™, Apple TV™, or Google TV™), a game console, an electronic dictionary, an electronic key, a camcorder, and/or an electronic picture frame.

[0037] According to some embodiments, the electronic device may include at least one of various types of medical devices (for example, Magnetic Resonance Angiography (MRA), Magnetic Resonance Imaging (MRI), Computed Tomography (CT), a scanning machine, ultrasonic wave device and the like), a navigation device, a Global Positioning System (GPS) receiver, an Event Data Recorder (EDR), a Flight Data Recorder (FDR), a car infotainment device, ship electronic equipment (for example, navigation equipment for a ship, a gyro compass and the like), avionics, a security device, and/or an industrial or home robot.

[0038] According to another embodiment, the electronic devices may include at least one of furniture or a part of a building/structure having a communication function, electronic boards, electronic signature receiving devices, projectors, or various measuring equipment (e.g., equipment for a water supply, an electricity, gases or radio waves).

[0039] An electronic device according to various embodiments of the present disclosure may be a combination of one or more of above described various devices. Also, an electronic device according to various embodiments of the present disclosure may be a flexible device. Also, an electronic device according to various embodiments of the present disclosure is not limited to the above described devices.

[0040] Hereinafter, an electronic device according to various embodiments will be described with reference to the accompanying drawings. The term "user" used in various embodiments may refer to a person who uses an electronic device or a device (for example, an artificial intelligence electronic device) that uses an electronic device.

[0041] FIG. **1** is a block diagram of an electronic device according to an embodiment of the present disclosure.

[0042] Referring to FIG. **1**, the electronic device **101** may include a bus **110**, a processor **120**, a memory **130**, an input/output interface **140**, a display **150**, a communication interface **160**, and a heart rate information management module **170**. According to an embodiment, the heart rate information management module **170** may be included in the processor **120** to operate or may be included in a separate module to interwork with the processor **120**.

[0043] The bus **110** may be a circuit that interconnects the above-described components and delivers communications (for example, a control message) between the above-described components.

[0044] The processor **120** may, for example, receive a command from other components (for example, the memory **130**, the input/output interface **140**, the display **150**, the communication interface **160**, the heart rate information management module **170**, etc.), through the bus **110**, may decrypt the received command, and may execute operation or data processing based on the decrypted command.

[0045] The memory **130** may store a command or data received from the processor **120** or other components (for example, the input/output interface **140**, the display **150**, the communication interface **160**, the heart rate information management module **170**, and the like), or generated by the processor **120** or other components.

[0046] The memory **130** may include programming modules, for example, a kernel **131**, a middleware **132**, an Application Programming Interface (API) **133**, an application **134**, and the like. Each of the aforementioned programming modules may be formed of software, firmware, hardware, or a combination of at least two thereof.

[0047] According to an embodiment, the kernel **131** may control or manage system resources, for example, the bus **110**, the processor **120**, the memory **130**, and the like, used for executing an operation or function implemented in other programming modules, for example, the middleware **132**, the API **133**, or the applications **134**. Also, the kernel **131** may provide an interface that enables the middleware **132**, the API **133**, or the applications **134** to access an individual component of the electronic device **101** for control or management.

[0048] According to an embodiment, the middleware **132** may execute operate as a relay so that the API **133** or the applications **134** communicates to exchange data with the kernel **131**. Also, in association with operation requests received from the application **134**, the middleware **132** may execute a control, for example, scheduling or load balancing, for an operation request, through use of, for example, a method of assigning, to at least one of application **134**, a priority of use of a system resource of the electronic device **101**, for example, the bus **110**, the processor **120**, the memory **130**, or the like).

[0049] According to an embodiment, the API **133** is an interface used by the applications **134** to control a function provided from the kernel **131** or the middleware **132**, and may include, for example, at least one interface or function, for example, an instruction, for a file control, a window control, image processing, a character control, or the like.

[0050] According to an embodiment, the applications **134** may include a Short Message Service (SMS)/Multimedia Message Service (MMS) application, an e-mail application, a calendar application, an alarm application, a health care application (for example, an application for measuring a work rate or a blood sugar), an environment information application (for example, an application for providing atmospheric pressure, humidity, or temperature information). Additionally or alternatively, the application **134** may be an application associated with exchanging of information between the electronic device **101** and an external electronic device (for example, an electronic device **104**). The application related to the information exchange may include, for example, a notification transmission application for transferring predetermined information to an external electronic device or a device management application for managing an external electronic device.

[0051] For example, the notification relay application may include a function of transferring, to the external electronic device, for example, the electronic device **104**, notification information generated from other applications of the electronic device **101**, for example, an SMS/MMS application, an e-mail application, a health management application, an environmental information application, and the like. Additionally or alternatively, the notification relay application may receive notification information from, for example, an external electronic device (for example, the electronic device **104**), and may provide the notification information to a user. For example, the device management application may manage (for example, install, delete, or update) a function for at least some parts of the external electronic device (for example, the electronic device **104**) communicating with the electronic device **101** (for example, a function of turning on/off the external electronic device itself, (or some components,) or a function of adjusting luminance (or a resolution) of the display), applications operating in the external electronic device, or services provided by the external electronic device (for example, a call service and a message service).

[0052] According to various embodiments, the applications **134** may include an application designated based on properties (for example, a type of electronic device) of an external electronic device (for example, the electronic device **104**). For example, when the external electronic device is an MP3 player, the application **134** may include an application related to the reproduction of music. Similarly, when the external electronic device is a mobile medical device, the application **134** may include an application related to health care. According to an one embodiment, the applications **134** may include at least one of applications received from an application designated for the electronic device **101** or an application received from an external electronic device (for example, a server **106** or the electronic device **104**).

[0053] According to an embodiment, the input/output interface **140** may transfer a command or data input by a user through an input/output device (for example, a sensor, a keyboard, or a touch screen) to the processor **120**, the memory **130**, the communication interface **160**, and the heart rate information management module **170**, for example, through the bus **110**. For example, the input/output interface **140** may provide, to the processor **120**, data associated with a touch of a user input through a touch screen. Further, the input/output interface **140** may output, for example, command or data received through the bus **110** from the processor **120**, the memory **130**, the communication interface **160**, and the heart rate information management module **170**, to an input/output device (for example, a speaker or display). For example, the input/output interface **140** may output voice data processed by the processor **120** to the user through a speaker.

[0054] According to an one embodiment, the display **150** may display various pieces of information (for example, multimedia data, text data, and the like) to a user.

[0055] According to one embodiment, the communication interface **160** may connect communication between the electronic device **101** and an electronic device (for example, the electronic device **104** or the server **106**). For example, the communication interface **160** may be connected to the network **162** through wireless communication or wired communication, and may communicate with an external device. The wireless communication may include at least one of, for example, Wi-Fi, Bluetooth (BT), Near Field Communication (NFC), Global Positioning System (GPS) and/or cellular communication (for example LTE, LTE-A, CDMA, WCDMA, UMTS, WiBro, GSM, etc.). The wired communication may include at least one of, for example, a Universal Serial Bus (USB), a High Definition Multimedia Interface (HDMI), a Recommended Standard 232 (RS-232), and/or a Plain Old Telephone Service (POTS).

[0056] According to one embodiment, the network **162** may be a communication network. The telecommunication network may include at least one of a computer network, Internet, Internet of things, and/or a telephone network. According to an one embodiment, a protocol (for example, a transport lay protocol, data link layer protocol, or a physical layer protocol) for communication between the electronic device **101** and the external device may be supported by at least one of the applications **134**, the application programming interface **133**, the middleware **132**, the kernel **131**, and/or the communication interface **160**.

[0057] According to an embodiment, a server **106** performs at least one operation (or function) implemented in an electronic device **101** to support an operation of the electronic device **101**. For example, the server **106** may include a heart rate information management server module **108** which supports a heart rate information management module **170** implemented in the electronic device **101**. For example, the heart rate information management server module **108** includes at least one component of the heart rate information management module **170** and then may perform (e.g., deputize) at least one operation of operations which the heart rate information management module **170** also performs.

[0058] The heart rate information management module **170** may perform an operation of acquiring heart rate information when content is provided, an operation of determining an emotional quotient on the basis of the acquired heart rate information, and an operation of mapping the determined emotional quotient to the content.

[0059] The heart rate information management module **170** may perform an operation of identifying whether the emotional quotient mapped to a content exists when the content is provided and an operation of providing the emotional quotient mapped to the content.

[0060] Additional information on the heart rate information management module **170** will be provided through FIG. **2** described below.

[0061] FIG. **2** is a block diagram **200** illustrating a heart rate information management module **170** of an electronic device (for example, electronic device **101**) according to various embodiments of the present disclosure.

[0062] Referring to FIG. **2**, the heart rate information management module **170** may include an emotional quotient determination module **210**, an emotional mapping module **220**, and a content providing module **230**.

[0063] The emotional quotient determination module **210** may determine an emotional quotient on the basis of user heart rate information acquired from an electronic device (e.g., electronic device **101**) or an external electronic device (e.g., electronic device **104**) connected to the electronic device, when the electronic device provides a content.

[0064] The emotional mapping module **220** may map an emotional quotient determined in the emotional quotient determination module **210** to the content.

[0065] The content providing module **230** may provide an emotional quotient mapped to the content by the emotional mapping module **220** together with a corresponding content.

[0066] FIG. **3** is a graph illustrating a heart rate change according to an emotional state in an electronic device according to various embodiments of the present disclosure.

[0067] Referring to FIG. **3**, an electronic device (e.g., electronic device **101**) may determine whether an emotional state is in a peaceful state **310** or a stressed state **320** on the basis of user heart rate information. Herein, even though two examples of the emotional state determined on the basis of the user's heart rate information have been described, other diverse example emotional states determined on the basis of heart rate information are contemplated in various alternative embodiments of the present disclosure. According to an embodiment, the electronic device may determine user's various emotional states such as calmness, happiness, anger, fatigue, sadness, surprise, pain, thrill and others on the basis of heart rate information.

[0068] FIG. **4** is a view illustrating a method of acquiring user heart rate information in an electronic device according to various embodiments of the present disclosure.

[0069] Referring to FIG. **4**, an electronic device **410** may acquire user heart rate information through a heart rate measurement sensor included in the electronic device **410**. According to an embodiment, the electronic device **410** may acquire the user's heart rate information through an external electronic device **420** communicatively connected or otherwise operatively coupled to the electronic device **410**. According to an embodiment, the external electronic device **420** may transmit heart rate information measured from the external electronic device **420** to the electronic device **410** through wireless communication, in response to a transmission request of the electronic device **410**. According to an embodiment, the electronic device **410** may transmit heart rate information measured from the electronic device **410** to the external electronic device **420** through wireless communication, on the basis of (or in response to) a transmission request of the external electronic device **420**. Although two examples of a method of acquiring the user heart rate information have been described, it is understood that other diverse methods of obtaining heart rate information may be utilized in other various embodiments according to the present disclosure.

[0070] FIG. **5** is a flow chart illustrating a procedure for mapping an emotional quotient to a content in an electronic device according to various embodiments of the present disclosure.

[0071] Referring to FIG. **5**, in operation **501**, an electronic device (e.g., electronic device **101**) may acquire heart rate information when a content is provided. According to one embodiment, content may include at least one of services provided by the electronic device, such as a call function, an electronic book, or playback of a music and/or a video, or execution of an application. In various embodiments of the present disclosure, even though content provided by the electronic device has been described as an example, it is understood the disclosure is not limited thereto.

[0072] According to one embodiment, when providing the content, the electronic device may then acquire heart rate information for a user who utilizing the electronic device (or an external electronic device) to receive the content, where the electronic device (or external electronic device) includes a heart rate sensor. According to an embodiment, the electronic device may receive user heart rate information acquired from the electronic device (or external electronic device—e.g., electronic device **104**) communicatively connected to the electronic device.

[0073] In operation **502**, the electronic device may determine an emotional quotient based on the acquired heart rate information. According to one embodiment, the electronic device may determine (or detect) an emotion corresponding to and based on the heart rate information currently acquired for each piece of a preconfigured emotion. According to an embodiment, the electronic device may convert the determined emotion into an icon and/or a numerical value.

[0074] In operation **503**, the electronic device may map the determined emotional quotient to some content. According to an embodiment, the electronic device maps an emotional quotient based on user acquired heart rate information to a corresponding content while providing a current content so that the emotional quotient mapped to the corresponding content can be provided to a user in providing the corresponding content later.

[0075] Hereinafter, various embodiments will be described in which, in an electronic device, an emotional quotient is mapped to content when the content is provided, and when a corresponding content is provided, it is provided together with the mapped emotional quotient.

[0076] FIG. **6** is a flow chart illustrating a procedure for mapping an emotional quotient for each call in an electronic device according to various embodiments of the present disclosure.

[0077] Referring to FIG. **6**, in operation **601**, an electronic device (e.g., electronic device **101**) may identify whether a call event is generated. According to an embodiment, an electronic device may identify whether a voice or video call event is generated. According to an embodiment, the electronic device may identify whether an outgoing or incoming call event is generated.

[0078] In operation **603**, the electronic device may acquire heart rate information. According to an embodiment, the electronic device may acquire user heart rate information through a heart rate sensor included in the electronic device. According to an embodiment, the electronic device may acquire user heart rate information through an external electronic device communicatively connected to the electronic device.

[0079] In operation **605**, the electronic device may determine an emotional quotient for the user on the basis of the acquired heart rate information. According to an embodiment, the electronic device may determine an emotional quotient corresponding to heart rate information acquired during or within a reference time interval. For example, the electronic device may determine an emotion quotient based on heart rate information acquired during an interval defined by, for example, a current time point from N seconds to the current time point. In another example, the electronic device may determine an emotion quotient based on heart rate information acquired during or within an interval spanning from a call start time point to a current time point.

[0080] In operation **607**, the electronic device may identify whether a call event is terminated. When the call event is not terminated, the electronic device may continue to monitor and acquire heart rate information, as described in operation **603**. That is, the electronic device may periodically acquire user heart rate information until the call is terminated and determine an emotional quotient based on the acquired heart rate information.

[0081] In operation **609**, the electronic device may map the determined emotional quotient to counterpart information. According to an embodiment, the electronic device may store an emotion quotient based on user heart rate information acquired during an execution of a call within counterpart information (e.g., contact number, or the like). According to an embodiment, the electronic device may store a corresponding emotional quotient with the counterpart information particularly when a call is performed over the reference time interval.

[0082] FIG. **7** is a view illustrating a method of determining an emotional quotient for each call in an electronic device according to various embodiments of the present disclosure.

[0083] Referring to FIG. **7**, for example, an operation will be described for determining an emotional quotient for a second call information **703**, which is one of multiple pieces of call information **701**, **703**, **705**, and **707** stored in an electronic device (e.g., electronic device **101**).

[0084] According to one embodiment, the electronic device may determine that user emotion corresponds to "E4" during a time interval "t1" **711** and user emotion corresponds to E6 during a time interval "t2" **713**, for the second call information **703** representing the duration of the second call.

[0085] According to an embodiment, the electronic device may determine a call emotional quotient **751** for the entirety of second call information **703**. For example, one method of determining the call emotion quotient **751** is to calculate a numerical value by multiplying a duration (e.g., "t2" **713**) on which one emotion (e.g., E6) is maintained in during a portion of a call information representing a length of a call (e.g., the second call information **703**) by a point of a corresponding emotion (e.g., −4). That is, when multiple emotions exist in one call, the electronic device may calculate a numerical value by multiplying a duration on which each emotion is maintained by a point corresponding to each emotion, and adding each numerical value to determinate an emotional quotient. According to one embodiment, the electronic device may calculate an average of points for each emotion included in one call information and then determine an overall or average emotion for the corresponding call information.

[0086] FIG. **8** is a flow chart illustrating a procedure for mapping and providing an emotional quotient for each call in an electronic device according to various embodiments of the present disclosure.

[0087] Referring to FIG. **8**, in operation **801**, an electronic device (e.g., electronic device **101**) may identify whether a call event is generated. According to one embodiment, an electronic device may identify whether a voice or video call event is generated. According to another embodiment, the electronic device may identify whether an outgoing or incoming call event is generated.

[0088] In operation **803**, the electronic device may acquire heart rate information. According to one embodiment, the electronic device may acquire user heart rate information through a heart rate sensor included in the electronic device. According to another embodiment, the electronic device may acquire user heart rate information through an external electronic device in communication with the electronic device.

[0089] In operation **805**, the electronic device may determine an emotional quotient on the basis of the acquired heart rate information. According to an embodiment, the electronic device may determine an emotional quotient corresponding to heart rate information acquired during a reference time interval. For example, the electronic device may determine an emotion quotient on the basis of heart rate information acquired during an interval starting from a current time point to N seconds before the current time point. In another example, the electronic device may determine an emotion quotient on the basis of heart rate information acquired during an interval from a call start time point to a current time point.

[0090] In operation **807**, the electronic device may display the emotional quotient determined based on the acquired heart rate information. For example, according to one embodiment, as shown in FIG. **9**, an external electronic device **912** may display an emotional quotient detected based on heart rate information acquired while performing a call of a counterpart through the heart rate sensor of an external electronic device **920** connected to the electronic device **910**. That is, the external electronic device **920** may include a display installed thereto for display of the heart rate information and/or the emotional quotient, as seen in FIG. **9**. According to one embodiment, as shown in FIG.

[0091] **10**, when an electronic device **1000** provides a video call service, the electronic device **1000** may display an emotional quotient **1040**, which is determined on the basis of the heart rate information acquired during a video call with a counterpart, on a screen of the electronic device **1000**. Additionally, the electronic device **1000** may display heart rate information **1030** in real time.

[0092] In operation **809**, the electronic device may identify whether the call event is terminated. When the call event is not terminated, the electronic device may continue to acquire heart rate information as described in operation **803**. That is, the electronic device may periodically acquire user heart rate information until the call is terminated, determine an emotional quotient on the basis of the acquired heart rate information, and display the determined emotional quotient.

[0093] In operation **811**, when the call event is terminated, the electronic device may map the determined emotional quotient to counterpart call information. According to an embodiment, the electronic device may store an emotion quotient determined on the basis of user heart rate information acquired during an execution of a call in counterpart information for the call, such as, for example, a contact number for the contact that was just called, or the like). According to one embodiment, the electronic device may store a corresponding emotional quotient in the counterpart information in a case in which a call is performed over the reference time interval.

[0094] FIG. **11** is a flow chart illustrating a procedure for providing an emotional quotient mapped to a content in an electronic device according to various embodiments of the present disclosure.

[0095] Referring to FIG. **11**, in operation **1101**, an electronic device (e.g., electronic device **101**) may identify whether a content providing event is generated. According to an embodiment, a content providing event may including, for example at least one services provided by the electronic device, such as execution of a call, display of an electronic book, playback of music and/or video, and/or executing an application.

[0096] When the content providing event is generated, in operation **1103**, the electronic device may identify whether an emotional quotient mapped to a corresponding content exists.

[0097] When the emotional quotient mapped to the corresponding content exists, in operation **1105**, the electronic device may provide the emotional quotient mapped to the corresponding content. Hereinafter, through FIGS. **12**A, **12**B, **12**C, **13**, **14**, **15**, **16**, **17**, and **18**, various embodiments for providing emotional quotient mapped to the content will be described.

[0098] FIGS. **12**A, **12**B, **12**C, **13**, **14**, **15**, **16**, **17** and **18** are views illustrating various examples of providing an emotional quotient mapped to a content in an electronic device, according to various embodiments of the present disclosure.

[0099] Referring to FIG. **12**A, an electronic device **1201** may provide emotional quotients **1211**, **1213**, **1215**, **1217**, and **1219** for each respective call contact when providing a recent call history. That is, the electronic device **1201** may display an emotional quotient determined based on user heart rate information detected by the electronic device **1201** in each call with each of the "first user" to "fifth user." According to one embodiment, the electronic device **1201** may display an emotional quotient **1211**-**1219** determined in each call with at least one of an icon and/or a numerical value.

[0100] As shown in FIG. **12**B and FIG. **12**C, when an emotional quotient **1215** for a call with a third user in a recent call history has been selected (as seen in FIG. **12**B), the electronic device may provide (or display) details **1231** (as seen in FIG. **12**C) of determined in a call with the third user. According to an embodiment, an electronic device **1201** may provide (display) the details **1231** of the emotional quotient by day **1241**, week **1251**, month **1261**, and by year **1271**. According to an embodiment, the electronic device **1201** may provide the details **1231** of the emotional quotient with a graph **1233**, as shown in FIG. **12**C.

[0101] Referring to FIG. **13**, an electronic device **1301** may provide (e.g., display) emotional quotients according to time in providing a video content. According to one embodiment, the electronic device **1301** may display icons **1311** and **1313** corresponding to and indicating emotional quotients existing at respective time points of the reproduction and playback of the video content. That is, the electronic device may map emotional quotients determined from user heart rate information to respective playback locations of a corresponding video content.

[0102] Referring to FIG. **14**, an electronic device **1401** may provide (or display) an emotional quotient for respective songs when providing playback for audio content. That is, the electronic device may map each song to an emotional quotient determined from user heart rate information, as detected during playback of the respective corresponding song. Thus, an emotional quotient for each song may be provided when a user accesses audio content. According to one embodiment, the electronic device may arrange and display songs according to each predefined emotional quotient. According to an embodiment, the electronic device may also display a song that is similar to an emotional quotient similar to a current user emotion.

[0103] Referring to FIG. **15**, an electronic device **1501** may provide (or display) an emotional quotient for each electronic book when providing an electronic book content. That is, the electronic device maps, to a corresponding electronic book, an emotional quotient determined from user heart rate information detected while the corresponding electronic book is

provided, so that an emotional quotient for each electronic book may be provided when a user accesses the electronic book content. According to one embodiment, the electronic device may arrange and display electronic books according to each respective emotional quotient. According to one embodiment, the electronic device may display an electronic book that is mapped to an emotional quotient similar to a current user.

[0104] Referring to FIG. **16**, an electronic device **1601** may provide (or display) an emotional quotient **1611** for each page during display of electronic book content. That is, the electronic device may maps to a page of a corresponding electronic book an emotional quotient determined from user heart rate information detected while the corresponding electronic book is displayed, so that an emotional quotient for each page of the electronic book may be provided when a user accesses the electronic book content. According to one embodiment, the electronic device may arrange and display pages of the electronic book according to each emotional quotient. According to one embodiment, the electronic device may display a page of the electronic book mapped to an emotional quotient similar to current user emotion.

[0105] Referring to FIG. **17**, an electronic device **1701** may provide (or display) an emotional quotient for each application in providing an application list. That is, the electronic device maps, to a corresponding application, an emotional quotient determined from user heart rate information detected while the corresponding application is executed or provided so that an emotional quotient for each application may be provided when a user accesses an application list. According to one embodiment, the electronic device may arrange and display applications according to each respective emotional quotient.

[0106] According to one embodiment, the electronic device may display an application to which an emotional quotient similar to a current user emotion is mapped.

[0107] According to one embodiment, as shown in FIG. **18**, an electronic device **1801** may identify an application mapped to an emotional quotient similar to current user emotion quotient **1803**, and then recommend (or display) similar applications **1811** from, for example, an application market. According to one embodiment, the similar applications **1811** may be applications belonging to a same category in some classification of applications. According to one embodiment, the similar applications **1811** may be applications belonging to same application provider.

[0108] FIG. **19** illustrates a block diagram **1900** of an electronic device **1901** according to various embodiments of the present disclosure. The electronic device **1901** may, for example, include all or a part of the electronic device **101** shown in FIG. **1**.

[0109] Referring to FIG. **19**, the electronic device **1901** may include at least one Application Processor (AP) **1910**, a communication module **1920**, a Subscriber Identification Module (SIM) card **1924**, a memory **1930**, a sensor module **1940**, an input device **1950**, a display **1960**, an interface **1970**, an audio module **1980**, a camera module **1991**, a power management module **1995**, a battery **1996**, an indicator **1997**, and/or a motor **1998**.

[0110] The AP **1910** may control a plurality of hardware or software components connected to the AP **1910** by driving an operating system or an application program and perform processing of various pieces of data including multimedia data and calculations. The AP **1910** may, for example, be implemented by a system on chip (SoC). According to an embodiment, the AP **1910** may further include a Graphic Processing Unit (GPU).

[0111] The communication module **1920** may transmit and receive data in communication between the electronic device **1901** (for example, the electronic device **101**) and other electronic devices (for example, the electronic device **104** or the server **106**) connected thereto through a network. According to an embodiment, the communication module **1920** may include a cellular module **1921**, a Wi-Fi module **1923**, a BT module **1925**, a GPS module **1927**, an NFC module **1928**, and a Radio Frequency (RF) module **1929**.

[0112] The cellular module **1921** may provide a voice call, a video call, a text message service, or an Internet service through a communication network (for example, LTE, LTE-A, CDMA, WCDMA, UMTS, WiBro, or GSM). Further, the cellular module **1921** may perform identification and authentication of electronic devices in a communication network using, for example, a subscriber identification module (for example, the SIM card **1924**). According to an embodiment, the cellular module **1921** may perform at least some functions which the AP **1910** may provide. For example, the cellular module **1921** may perform at least some of the multimedia control functions.

[0113] According to an embodiment, the cellular module **1921** may include a Communication Processor (CP). Furthermore, the cellular module **1921** may be implemented by, for example, an SoC. Although the components such as the cellular module **1921** (for example, a communication processor), the memory **1930**, and the power management module **1995** are illustrated as components separate from the AP **19410** in FIG. **19**, the AP **1910** may include at least some of the aforementioned components (for example, the cellular module **1921**) according to one embodiment.

[0114] According to an embodiment, the AP **1910** or the cellular module **1921** (for example, the communication processor) may load a command or data received from at least one of a non-volatile memory and other components connected thereto in a volatile memory, and may process the loaded command or data. Furthermore, the AP **1910** or the cellular module **1921** may store data received from or generated by at least one of other elements in a non-volatile memory.

[0115] Each of the Wi-Fi module **1923**, the BT module **1925**, the GPS module **1927**, and the NFC module **1928** may include, for example, a processor for processing data transmitted/received through the corresponding module. Although the cellular module **1921**, the Wi-Fi module **1923**, the BT module **1925**, the GPS module **1927**, and the NFC module **1928** are illustrated as separate blocks in FIG. **19**, at least some (for example, two or more) of the cellular module **1921**, the Wi-Fi module **1923**, the BT module **1925**, the GPS module **1927**, and the NFC module **1928** may be included in one Integrated Chip (IC) or one IC package in one embodiment. For example, at least some (for example, the communication processor corresponding to the cellular module **1921** and the Wi-Fi processor corresponding to the Wi-Fi module **1923**) of the processors corresponding to the cellular module **1921**, the Wi-Fi module **19235**, the BT module **19257**, the GPS module **19278**, and the NFC module **19228** may be implemented as one SoC.

[0116] The RF module **1929** may transmit/receive data, for example, an RF signal. Although not illustrated, the RF module **1929** may include, for example, a transceiver, a Power

Amp Module (PAM), a frequency filter, a Low Noise Amplifier (LNA), or the like. Further, the RF module **1929** may further include a component for transmitting/receiving electronic waves over a free air space in wireless communication, for example, a conductor, a conducting wire or the like. Although the cellular module **1921**, the Wi-Fi module **1923**, the BT module **1925**, the GPS module **1927**, and the NFC module **1928** share one RF module **729** in FIG. **19**, at least one of the cellular module **1921**, the Wi-Fi module **1923**, the BT module **1925**, the GPS module **1927**, and/or the NFC module **1928** may transmit/receive an RF signal through a separate RF module in one embodiment.

[0117] The SIM card **1924** may be a card including a subscriber identification module, and may be inserted into a slot formed in a particular portion of the electronic device. The SIM card **1924** may include unique identification information (for example, an Integrated Circuit Card IDentifier (ICCID)) or subscriber information (for example, an International Mobile Subscriber IDentity (IMSI)).

[0118] The memory **1930** (for example, the memory **190**) may include an internal memory **1932** or an external memory **1934**. The internal memory **1932** may include at least one of a volatile memory (for example, a Dynamic Random Access Memory (DRAM), a Static RAM (SRAM), a Synchronous Dynamic RAM (SDRAM), and the like) and a non-volatile memory (for example, a One Time Programmable Read Only Memory (OTPROM), a Programmable ROM (PROM), an Erasable and Programmable ROM (EPROM), an Electrically Erasable and Programmable ROM (EEPROM), a mask ROM, a flash ROM, a NAND flash memory, a NOR flash memory, and/or the like).

[0119] According to an embodiment, the internal memory **1932** may be a Solid State Drive (SSD). The external memory **1934** may further include a flash drive, for example, a Compact Flash (CF), a Secure Digital (SD), a Micro Secure Digital (Micro-SD), a Mini Secure Digital (Mini-SD), an extreme Digital (xD), a memory stick or the like. The external memory **1934** may be functionally connected with the electronic device **1901** through various interfaces. According to an embodiment, the electronic device **1901** may further include a storage device (or a storage medium) such as a hard disc drive.

[0120] The sensor module **1940** may measure a physical quantity or detect an operation state of the electronic device **1901**, and may convert the measured or detected information to an electrical signal. The sensor module **1940** may include at least one of, for example, a gesture sensor **1940**A, a gyro sensor **1940**B, an atmospheric pressure sensor **1940**C, a magnetic sensor **1940**D, an acceleration sensor **1940**E, a grip sensor **1940**F, a proximity sensor **1940**G, a color sensor **1940**H (for example, a Red/Green/Blue (RGB) sensor), a biometric sensor **1940**I, a temperature/humidity sensor **1940**J, an illumination sensor **1940**K, and/or an Ultra Violet (UV) sensor **1940**M. Additionally or alternatively, the sensor module **1940** may include, for example, an E-nose sensor (not illustrated), an electromyography (EMG) sensor (not illustrated), an electroencephalogram (EEG) sensor (not illustrated), an electrocardiogram (ECG) sensor (not illustrated), an Infrared (IR) sensor (not illustrated), an iris sensor (not illustrated), and a fingerprint sensor (not illustrated). The sensor module **1940** may further include a control circuit for controlling one or more sensors included in the sensor module.

[0121] The input device **1950** may include a touch panel **1952**, a (digital) pen sensor **1954**, a key **1956**, or an ultrasonic input device **1958**. The touch panel **1952** may recognize a touch input through at least one of, for example, a capacitive type, a resistive type, an infrared type, and/or an ultrasonic type. The touch panel **1952** may further include a control circuit. A capacitive touch panel may recognize a physical contact or proximity. The touch panel **1952** may further include a tactile layer. In this case, the touch panel **1952** may provide a tactile reaction to the user.

[0122] The (digital) pen sensor **1954** may be implemented, for example, using the same or similar method to receiving a user's touch input or using a separate recognition sheet. The key **1956** may include, for example, a physical button, an optical key, or a keypad. The ultrasonic input device **1958** may identify data by detecting an acoustic wave with a microphone (for example, a microphone **1988**) of the electronic device **1901** through an input unit generating an ultrasonic signal, and may perform wireless recognition. According to an embodiment, the electronic device **1901** may receive a user input from an external device (for example, a computer or server) connected thereto using the communication module **1920**.

[0123] The display **1960** may be installed to the electronic device **1901**, and include a panel **1962**, a hologram device **1964** or a projector **1966**. The panel **1962** may be, for example, a Liquid Crystal Display (LCD), Active-Matrix Organic Light Emitting Diode (AM-OLED), or the like. The panel **1962** may be implemented to be, for example, flexible, transparent, or wearable. The panel **1962** may be configured as one module together with the touch panel **1952**. The hologram device **1964** may show a stereoscopic image in the air by using interference of light. The projector **1966** may project light onto a screen to display an image. The screen may be located, for example, inside or outside the electronic device **1901**. According to an embodiment, the display **1960** may further include a control circuit for controlling the panel **1962**, the hologram device **1964**, or the projector **1966**.

[0124] The interface **1970** may include, for example, a High-Definition Multimedia Interface (HDMI) **1972**, a Universal Serial Bus (USB) **1974**, an optical interface **1976**, or a D-subminiature (D-sub) **1978**. The interface **1970** may be included in, for example, the communication interface **160** illustrated in FIG. **1**. Additionally or alternatively, the interface **1970** may include, for example, a Mobile High-definition Link (MHL) interface, a Secure Digital (SD) card/Multi-Media Card (MMC) interface, or an Infrared Data Association (IrDA) standard interface.

[0125] The audio module **1980** may bilaterally convert a sound and an electrical signal. The audio module **1980** may process sound information input or output through, for example, a speaker **1982**, a receiver **1984**, earphones **1986**, the microphone **1988** or the like.

[0126] The camera module **1991** is a device for capturing a still image or a video, and according to an embodiment, may include one or more image sensors (for example, a front sensor or a rear sensor), a lens (not illustrated), an Image Signal Processor (ISP) (not illustrated), or a flash (not illustrated) (for example, an LED or xenon lamp).

[0127] The power management module **1995** may manage power of the electronic device **1901**. Although not illustrated, the power management module **1995** may include, for example, a Power Management Integrated Circuit (PMIC), a

charger Integrated Circuit (IC), or a battery or fuel gauge. The PMIC may be mounted to, for example, an integrated circuit or an SoC semiconductor.

[0128] Charging methods may be classified into a wired charging method and a wireless charging method. The charger IC may charge a battery and prevent over voltage or over current from a charger. According to an embodiment, the charger IC may include a charger IC for at least one of the wired charging method and/or the wireless charging method. Examples of the wireless charging may include magnetic resonance charging, magnetic induction charging, and electromagnetic charging, and an additional circuit such as a coil loop, a resonance circuit, and a rectifier may be added for the wireless charging.

[0129] The battery gauge may measure, for example, a remaining quantity of the battery **1996**, or a voltage, a current, or a temperature during the charging. The battery **1996** may store or generate electricity, and may supply power to the electronic device **1901** using the stored or generated electricity. The battery **1996** may include, for example, a rechargeable battery or a solar battery.

[0130] The indicator **1997** may display a specific status of the electronic device **1901** or the part (for example, the AP **1910**) of electronic device **1901**, for example, a booting status, a message status, a charging status, and the like. The motor **1998** may convert an electrical signal to a mechanical vibration. Although not illustrated, the electronic device **1901** may include a processing unit (for example, a GPU) for supporting mobile TV. The processing unit for supporting mobile TV may process media data according to a standard of Digital Multimedia Broadcasting (DMB), Digital Video Broadcasting (DVB), media flow or the like.

[0131] According to various embodiments, an electronic device maps an emotional quotient determined on the basis of measured heart rate information to a content when a content is provided so that an emotional quotient mapped to a corresponding content may easily be identified when a user uses the corresponding content.

[0132] The above described components of the electronic device according to various embodiments of the present disclosure may be formed of one or more components, and a name of a corresponding component element may be changed based on the type of electronic device. The electronic device according to the present disclosure may include one or more of the aforementioned components or may further include other additional components, or some of the aforementioned components may be omitted. Further, some of the components of the electronic device according to the various embodiments of the present disclosure may be combined to form a single entity, and thus, may equivalently execute functions of the corresponding elements prior to the combination.

[0133] The "module" used in various embodiments of the present disclosure may refer to, for example, a "unit" including one of hardware, software, and firmware, or a combination of two or more of the hardware, software, and firmware. The "module" may be interchangeably used with a term, such as unit, logic, logical block, component, or circuit. The "module" may be the smallest unit of an integrated component or a part thereof. The "module" may be the smallest unit that performs one or more functions or a part thereof The "module" may be mechanically or electronically implemented. For example, the "module" according to various embodiments of the present disclosure may include at least one of an Application-Specific Integrated Circuit (ASIC) chip, a Field-Programmable Gate Arrays (FPGAs), and a programmable-logic device for performing operations which have been known or are to be developed hereafter.

[0134] According to various embodiments, at least some of the devices (for example, modules or functions thereof) or the method (for example, operations) according to the present disclosure may be implemented by a command stored in a computer-readable storage medium in a programming module form. When he command is executed by one or more processors (for example, the processor **120**), the one or more processors may execute a function corresponding to the command. The computer-readable storage medium may be, for example, the memory **190**. At least a part of the programming module may, for example, be implemented (e.g., executed) by the processor **120**. At least some of the programming modules may include, for example, a module, a program, a routine, a set of instructions or a process for performing one or more functions.

[0135] The computer readable recoding medium may include magnetic media, such as a hard disk, a floppy disk and a magnetic tape, optical media, such as a Compact Disc Read Only Memory (CD-ROM) and a Digital Versatile Disc (DVD), magneto-optical media, such as a floptical disk, and a hardware device specially configured to store and execute a program instruction (for example, a programming module), such as a Read Only Memory (ROM), a Random Access Memory (RAM), a flash memory, and the like. In addition, the program instructions may include high class language codes, which can be executed in a computer by using an interpreter, as well as machine codes made by a compiler. The aforementioned hardware device may be configured to operate as one or more software modules in order to perform the operation of various embodiments of the present disclosure, and vice versa.

[0136] A module or a programming module according to the present disclosure may include at least one of the described component elements, a few of the component elements may be omitted, or additional component elements may be included. Operations executed by a module, a programming module, or other component elements according to various embodiments of the present disclosure may be executed sequentially, in parallel, repeatedly, or in a heuristic manner. Further, some operations may be executed according to another order or may be omitted, or other operations may be added.

[0137] The embodiments of the present disclosure disclosed in the specification and the drawings are only particular examples proposed in order to easily describe the technical matters of the present disclosure and help with comprehension of the present disclosure, and do not limit the present disclosure. Therefore, in addition to the embodiments disclosed herein, the various embodiments of the present disclosure should be construed to include all modifications or modified forms drawn based on the technical idea of the various embodiments of the present disclosure.

[0138] The above-described embodiments of the present disclosure can be implemented in hardware, firmware or via the execution of software or computer code that can be stored in a recording medium such as a CD ROM, a Digital Versatile Disc (DVD), a magnetic tape, a RAM, a floppy disk, a hard disk, or a magneto-optical disk or computer code downloaded over a network originally stored on a remote recording medium or a non-transitory machine readable medium and to be stored on a local recording medium, so that the methods

described herein can be rendered via such software that is stored on the recording medium using a general purpose computer, or a special processor or in programmable or dedicated hardware, such as an ASIC or FPGA. As would be understood in the art, the computer, the processor, microprocessor controller or the programmable hardware include memory components, e.g., RAM, ROM, Flash, etc. that may store or receive software or computer code that when accessed and executed by the computer, processor or hardware implement the processing methods described herein. In addition, it would be recognized that when a general purpose computer accesses code for implementing the processing shown herein, the execution of the code transforms the general purpose computer into a special purpose computer for executing the processing shown herein. Any of the functions and steps provided in the Figures may be implemented in hardware, software or a combination of both and may be performed in whole or in part within the programmed instructions of a computer. No claim element herein is to be construed under the provisions of 35 U.S.C. 112, sixth paragraph, unless the element is expressly recited using the phrase "means for". In addition, an artisan understands and appreciates that a "processor" or "microprocessor" may be hardware in the claimed disclosure. Under the broadest reasonable interpretation, the appended claims are statutory subject matter in compliance with 35 U.S.C. §101.

What is claimed is:

1. A method in an electronic device, comprising:

detecting, by a sensor, heart rate information while providing a content of the electronic device;

determining, by a processor, an emotional quotient based on the detected heart rate information; and

mapping the determined emotional quotient to the provided content.

2. The method of claim **1**, wherein the sensor is included in the electronic device or included in an external electronic device operatively coupled to the electronic device.

3. The method of claim **2**, wherein the sensor is a heart rate measurement sensor, and detecting the heart rate information further comprises:

activating the heart rate measurement sensor of the electronic device or the external electronic device, and detecting the heart rate information using the activated heart rate measurement sensor.

4. The method of claim **1**, further comprising:

displaying on a display of the electronic device the determined emotional quotient that is mapped to the content while the content is provided.

5. The method of claim **4**, wherein the determined emotional quotient that is mapped to the content is displayed using at least one of an icon and a numerical value representing the determined emotional quotient.

6. The method of claim **4**, wherein the emotion quotient mapped to the content while the content is provided on the display which is included in the electronic device.

7. The method of claim **4**, wherein the emotion quotient mapped to the content while the content is provided through the display which is included in an external electronic device operatively coupled to the electronic device.

8. The method of claim **1**, wherein providing the content further comprises:

identifying whether a stored emotional quotient that is mapped to the provided content exists; and

when the stored emotional quotient that is mapped to the content exists, displaying on the display the stored emotional quotient that is mapped to the content.

9. The method of claim **8**, wherein the stored emotion quotient mapped to the content is displayed on the display which is included in the electronic device.

10. The method of claim **8**, wherein the stored emotion quotient mapped to the content is displayed through the display which is included in an external electronic device operatively coupled to the electronic device.

11. An electronic device comprising: a display; and

a processor configured to:

detect, by a sensor operatively coupled with the electronic device, heart rate information while providing content of the electronic device;

determine an emotional quotient based on the detected heart rate information; and

map the determined emotional quotient to the provided content.

12. The electronic device of claim **11**, wherein the processor is further configured to detect the heart rate information through the sensor which is either included in the electronic device or included in an external electronic device operatively coupled to the electronic device.

13. The electronic device of claim **12**, wherein the sensor is a heart rate measurement sensor, the processor further configured to:

detect the heart rate information by activating the heart rate measurement sensor of the electronic device or the external electronic device, and detect the heart rate information using the activated heart rate measurement sensor.

14. The electronic device of claim **11**, wherein the processor is further configured to control the display to display the determined emotion quotient that is mapped to the content while the content is provided.

15. The electronic device of claim **14**, wherein the processor is further configured to control the display to display the determined emotion quotient using at least one of an icon and a numerical value.

16. The electronic device of claim **14**, wherein the processor is further configured to control the display to display the emotion quotient mapped to the content while the content is provided.

17. The electronic device of claim **14**, wherein the processor is further configured to control a second display installed to an external electronic device operatively coupled to the electronic device to display the determined emotion quotient that is mapped to the content while the content is provided.

18. The electronic device of claim **11**, wherein the processor is further configured to provide the content by:

identifying whether a stored emotion quotient that is mapped to the provided content exists; and

when the stored emotion quotient that is mapped to the content exists, controlling the display to display the stored emotion quotient that is mapped to the content.

19. The electronic device of claim **18**, wherein the processor is further configured to control the display to display the stored emotion quotient mapped to the content.

20. The electronic device of claim **18**, wherein the processor is further configured to display the stored emotion quo-

tient mapped to the content through a second display which is included in an external electronic device operatively coupled to the electronic device.

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专利名称(译)	提供内容的方法及其电子设备		
公开(公告)号	US20160065724A1	公开(公告)日	2016-03-03
申请号	US14/838600	申请日	2015-08-28
[标]申请(专利权)人(译)	三星电子株式会社		
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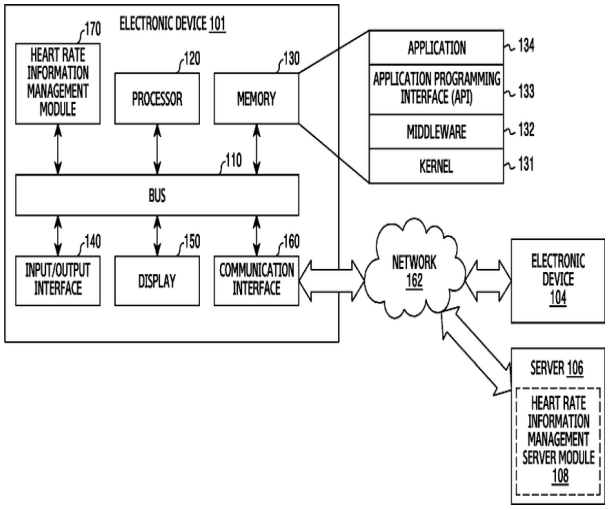
IPC分类号	H04M1/725 A61B5/00 A61B5/024 A61B5/16		
CPC分类号	H04M1/72569 A61B5/02438 A61B5/165 H04M1/72544 A61B5/6898 A61B5/7435 A61B5/743 A61B5/7278 A61B5/0022 A61B5/681 G16H40/63 H04M1/72519 H04M1/7253		
优先权	1020140114325 2014-08-29 KR		
其他公开文献	US9641665		
外部链接	Espacenet USPTO		

摘要(译)

本文提供了一种方法和电子设备。电子设备包括处理器。处理器可以执行该方法，包括由传感器检测心率信息，同时提供电子设备的内容，由处理器基于检测到的心率信息确定情绪商，并将确定的情商映射到提供的内容。