US 20160284351A1

(19) United States

(12) Patent Application Publication

HA et al.

(10) Pub. No.: US 2016/0284351 A1

(43) Pub. Date: Sep. 29, 2016

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

(71) Applicant: **Samsung Electronics Co., Ltd.**, Suwon-si (KR)

(72) Inventors: **Hye Min HA**, Suwon-si (KR); **Kyung Jun LEE**, Suwon-si (KR); **Bong Won LEE**, Seoul (KR); **Hyun Yeul LEE**, Seoul (KR); **Pragam RATHORE**, Seoul (KR)

(21) Appl. No.: **15/082,499**

(22) Filed: **Mar. 28, 2016**

(30) **Foreign Application Priority Data**

Mar. 26, 2015 (KR) 10-2015-0042740

Publication Classification

(51) **Int. Cl.**

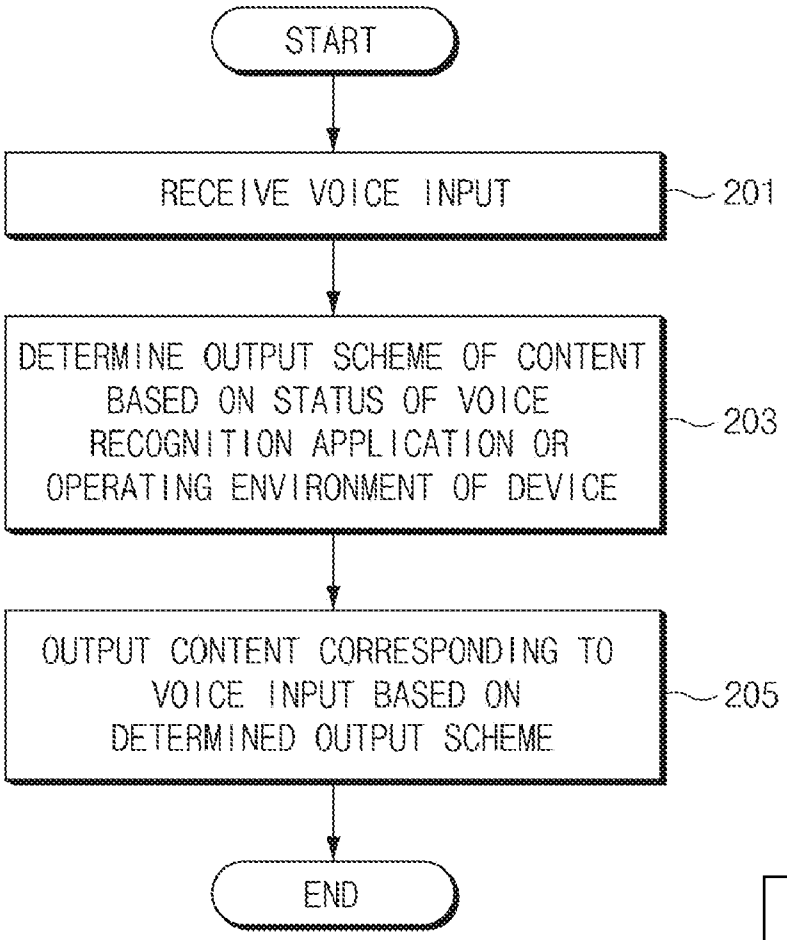
G10L 15/22	(2006.01)
G06F 3/0481	(2006.01)
H04N 5/225	(2006.01)
G06F 3/01	(2006.01)
G10L 17/06	(2006.01)
G06F 3/16	(2006.01)

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

CPC ***G10L 15/22*** (2013.01); ***G10L 17/06*** (2013.01); ***G06F 3/16*** (2013.01); ***H04N 5/225*** (2013.01); ***G06F 3/013*** (2013.01); ***G06F 3/04817*** (2013.01)

(57) **ABSTRACT**

A method and an electronic device for providing content are provided. The electronic device includes a voice input module configured to receive a voice input, an audio output module, a display, a memory configured to store a voice recognition application which provides content in response to the voice input, and a processor configured to execute the voice recognition application and determine an output scheme of the content to be outputted through the audio output module or the display based on a status of the voice recognition application or an operating environment of the electronic device.



Amazon v. SoundClear
US Patent 11,244,675
Amazon Ex. 1011

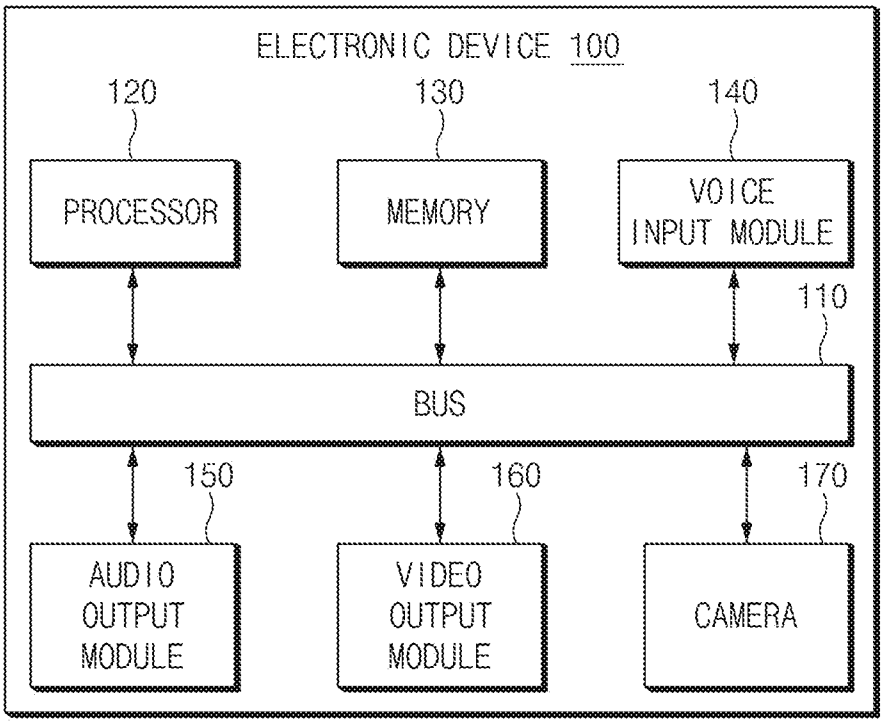

ELECTRONIC DEVICE 100
120
130
140
PROCESSOR
MEMORY
VOICE INPUT MODULE
110
BUS
150
160
170
AUDIO OUTPUT MODULE
VIDEO OUTPUT MODULE
CAMERA

FIG.1

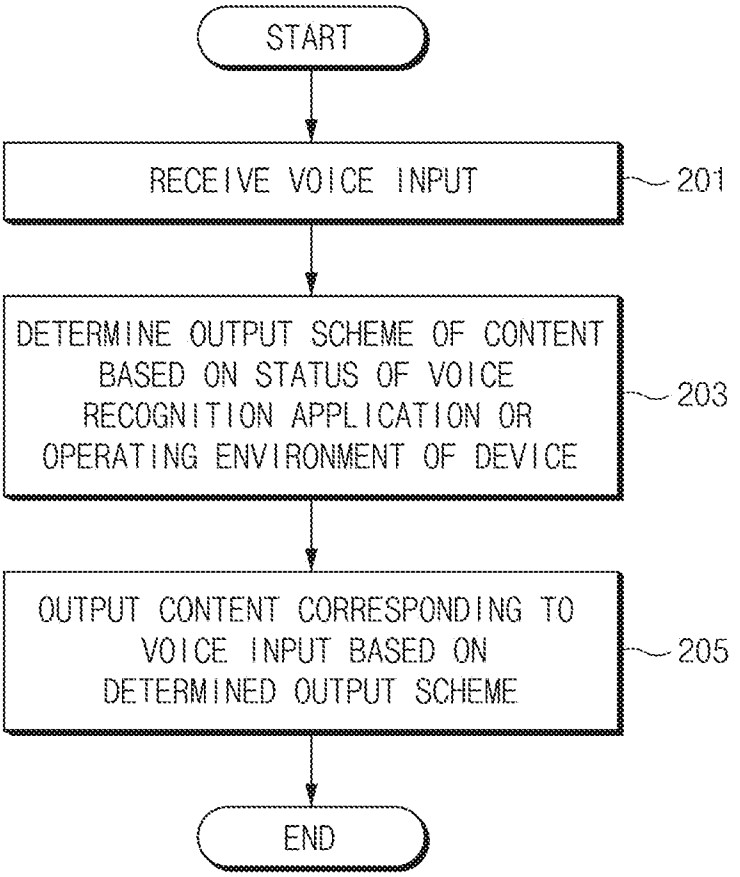

START
RECEIVE VOICE INPUT
201
DETERMINE OUTPUT SCHEME OF CONTENT BASED ON STATUS OF VOICE RECOGNITION APPLICATION OR OPERATING ENVIRONMENT OF DEVICE
203
OUTPUT CONTENT CORRESPONDING TO VOICE INPUT BASED ON DETERMINED OUTPUT SCHEME
205
END

FIG.2

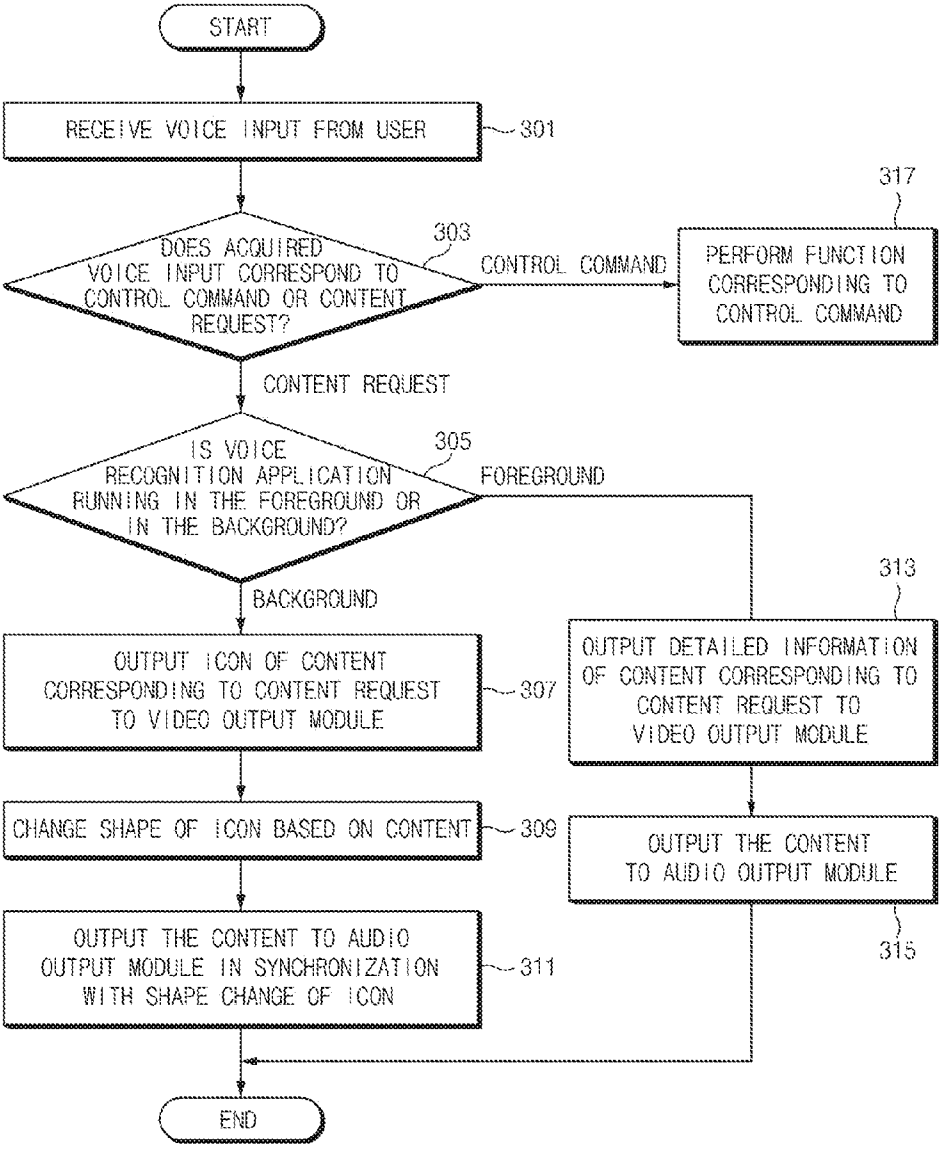

START
RECEIVE VOICE INPUT FROM USER
301
DOES ACQUIRED VOICE INPUT CORRESPOND TO CONTROL COMMAND OR CONTENT REQUEST?
303
CONTROL COMMAND
PERFORM FUNCTION CORRESPONDING TO CONTROL COMMAND
317
CONTENT REQUEST
IS VOICE RECOGNITION APPLICATION RUNNING IN THE FOREGROUND OR IN THE BACKGROUND?
305
FOREGROUND
BACKGROUND
OUTPUT ICON OF CONTENT CORRESPONDING TO CONTENT REQUEST TO VIDEO OUTPUT MODULE
307
OUTPUT DETAILED INFORMATION OF CONTENT CORRESPONDING TO CONTENT REQUEST TO VIDEO OUTPUT MODULE
313
CHANGE SHAPE OF ICON BASED ON CONTENT
309
OUTPUT THE CONTENT TO AUDIO OUTPUT MODULE
315
OUTPUT THE CONTENT TO AUDIO OUTPUT MODULE IN SYNCHRONIZATION WITH SHAPE CHANGE OF ICON
311
END

FIG.3

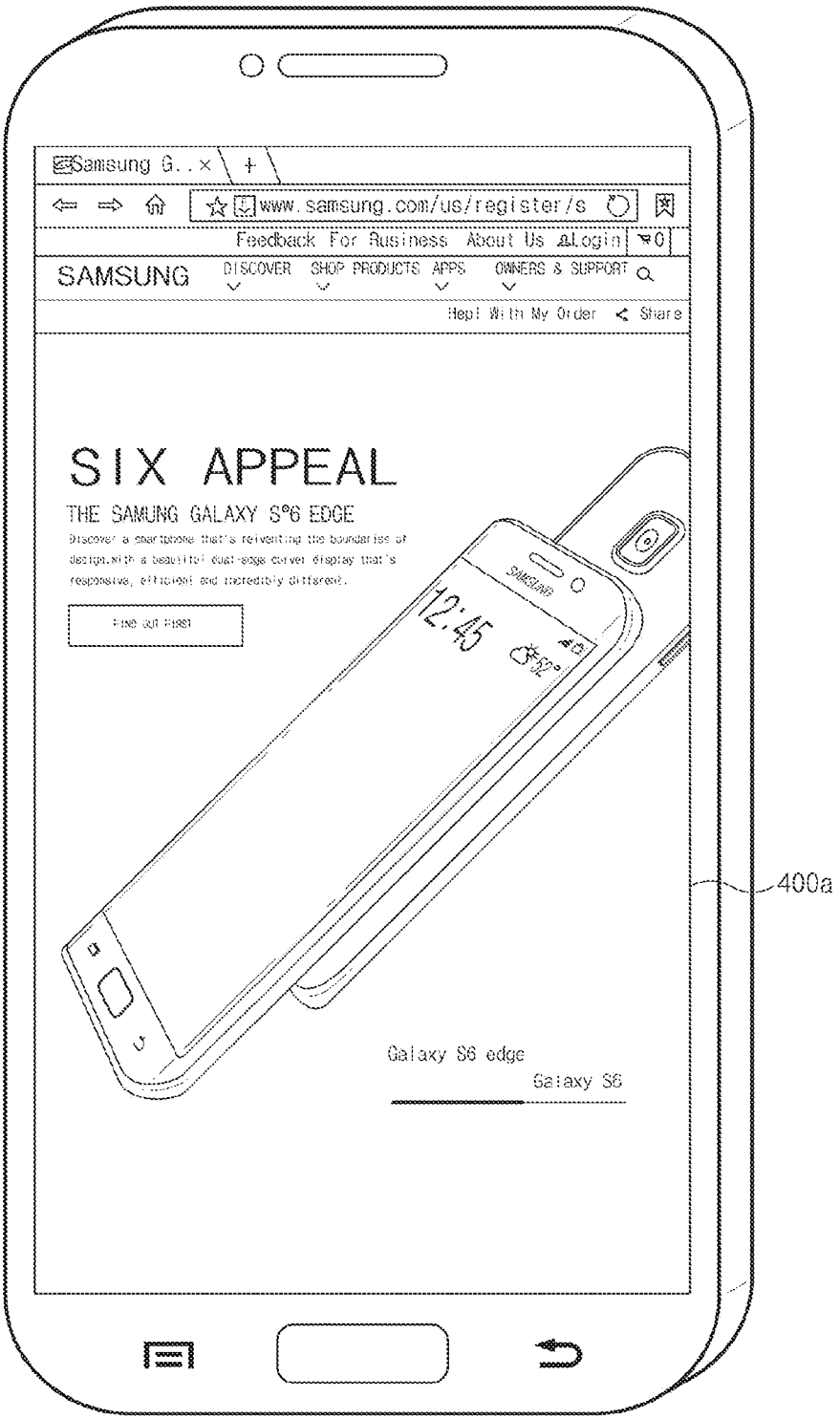

Samsung G..
www.samsung.com/us/register/s
Feedback For Business About Us Login
SAMSUNG
DISCOVER SHOP PRODUCTS APPS OWNERS & SUPPORT
Help With My Order Share
SIX APPEAL
THE SAMUNG GALAXY S®6 EDGE
Discover a smartphone that's reinventing the boundaries of design,with a beautiful dual-edge curved display that's responsive, efficient and incredibly different.
FIND OUT MORE
12:45
Galaxy S6 edge
Galaxy S6
400a

FIG.4A

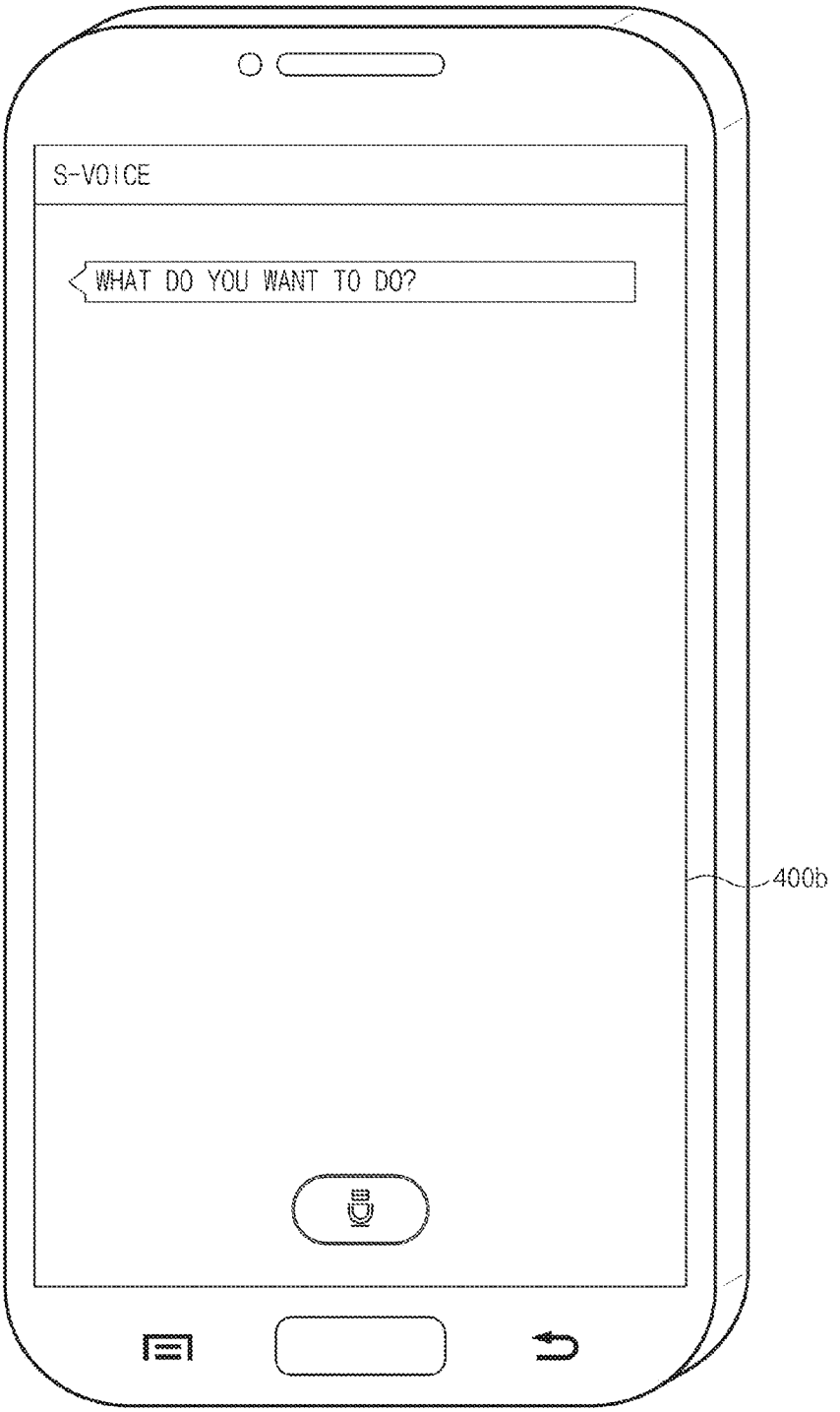


FIG.4B

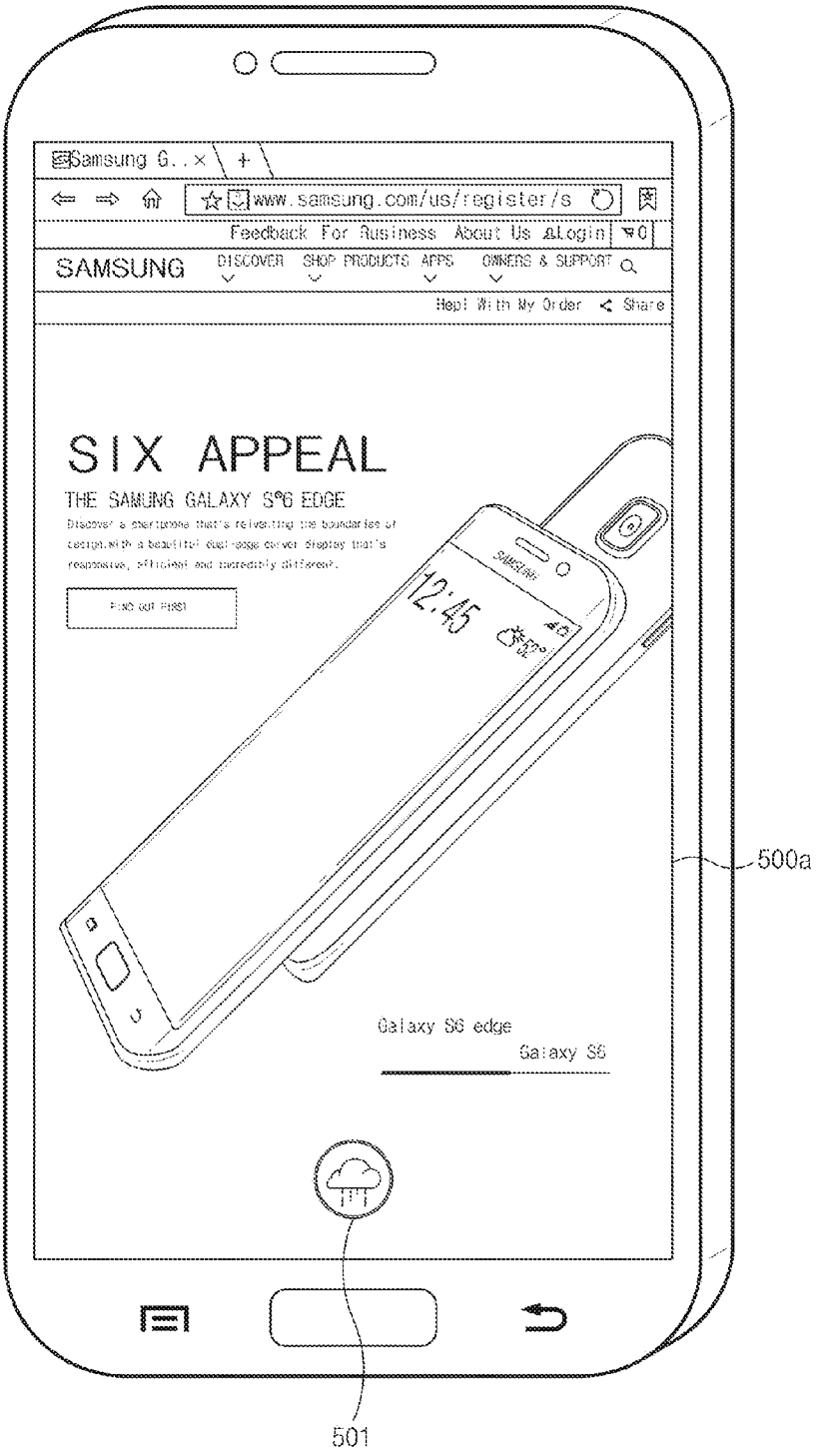

Samsung G..
www.samsung.com/us/register/s
Feedback For Business About Us Login
SAMSUNG
DISCOVER SHOP PRODUCTS APPS OWNERS & SUPPORT
Help With My Order
Share
SIX APPEAL
THE SAMUNG GALAXY S®6 EDGE
Galaxy S6 edge
Galaxy S6
500a
501

FIG.5A

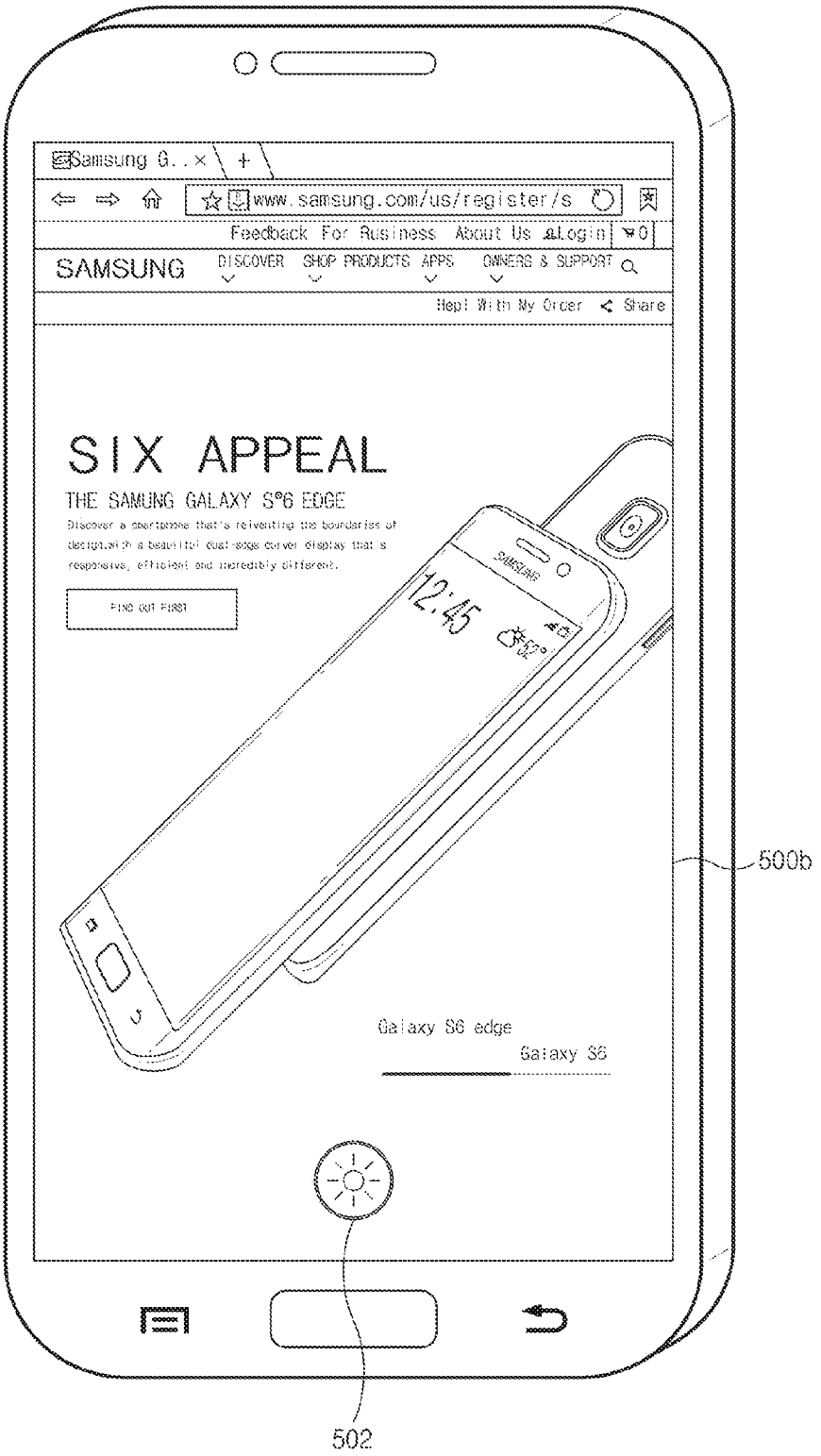

Samsung G..
www.samsung.com/us/register/s
Feedback For Business About Us Login
SAMSUNG
DISCOVER SHOP PRODUCTS APPS OWNERS & SUPPORT
Help With My Order
Share
SIX APPEAL
THE SAMUNG GALAXY S®6 EDGE
Discover a smartphone that's reinventing the boundaries of design,with a beautiful dual-edge curved display that's responsive, efficient and incredibly different.
FIND OUT MORE
12:45
Galaxy S6 edge
Galaxy S6
500b
502

FIG.5B

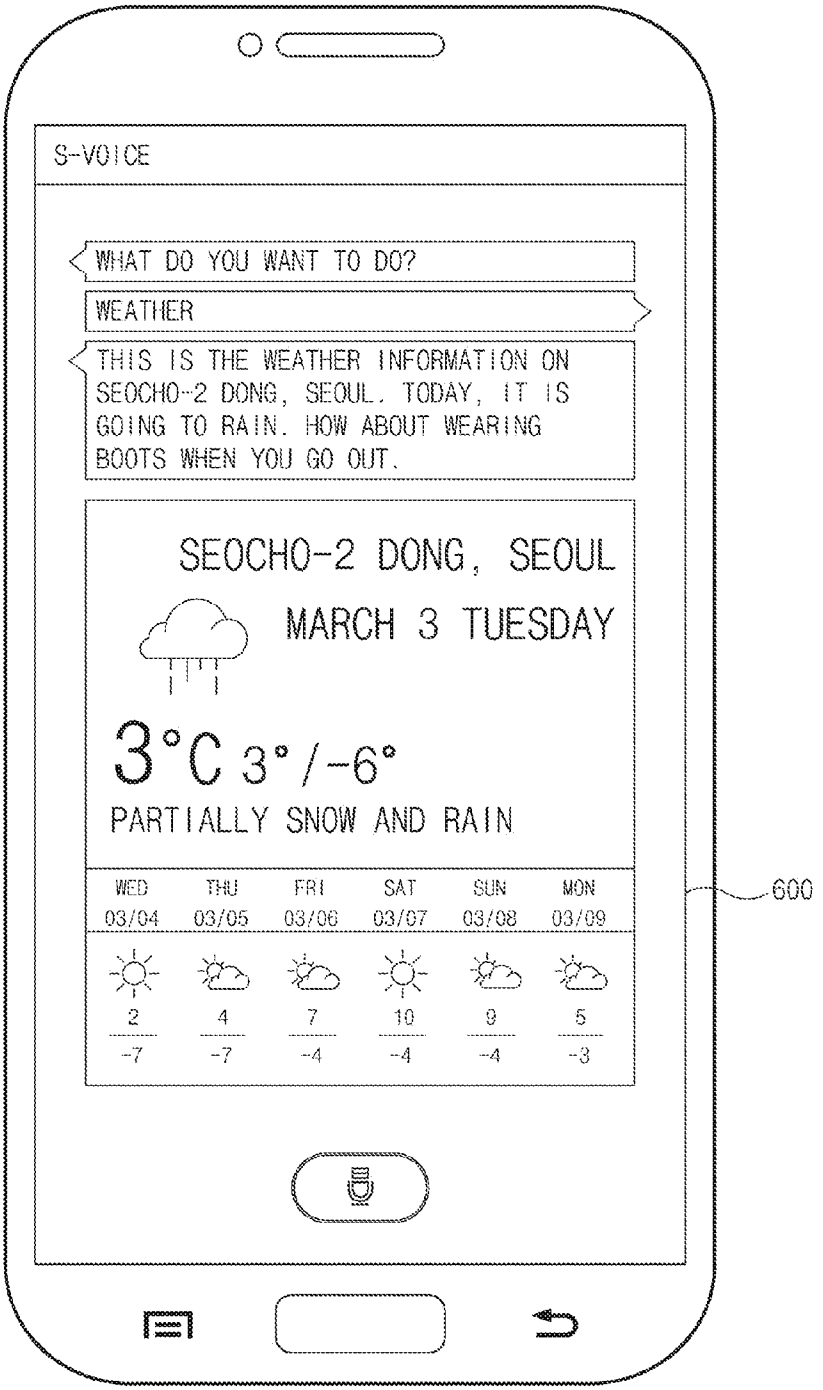

S-VOICE
WHAT DO YOU WANT TO DO?
WEATHER
THIS IS THE WEATHER INFORMATION ON SEOCHO-2 DONG, SEOUL. TODAY, IT IS GOING TO RAIN. HOW ABOUT WEARING BOOTS WHEN YOU GO OUT.
SEOCHO-2 DONG, SEOUL
MARCH 3 TUESDAY
3°C 3°/-6°
PARTIALLY SNOW AND RAIN
WED 03/04 2 -7
THU 03/05 4 -7
FRI 03/06 7 -4
SAT 03/07 10 -4
SUN 03/08 9 -4
MON 03/09 5 -3
600

FIG.6

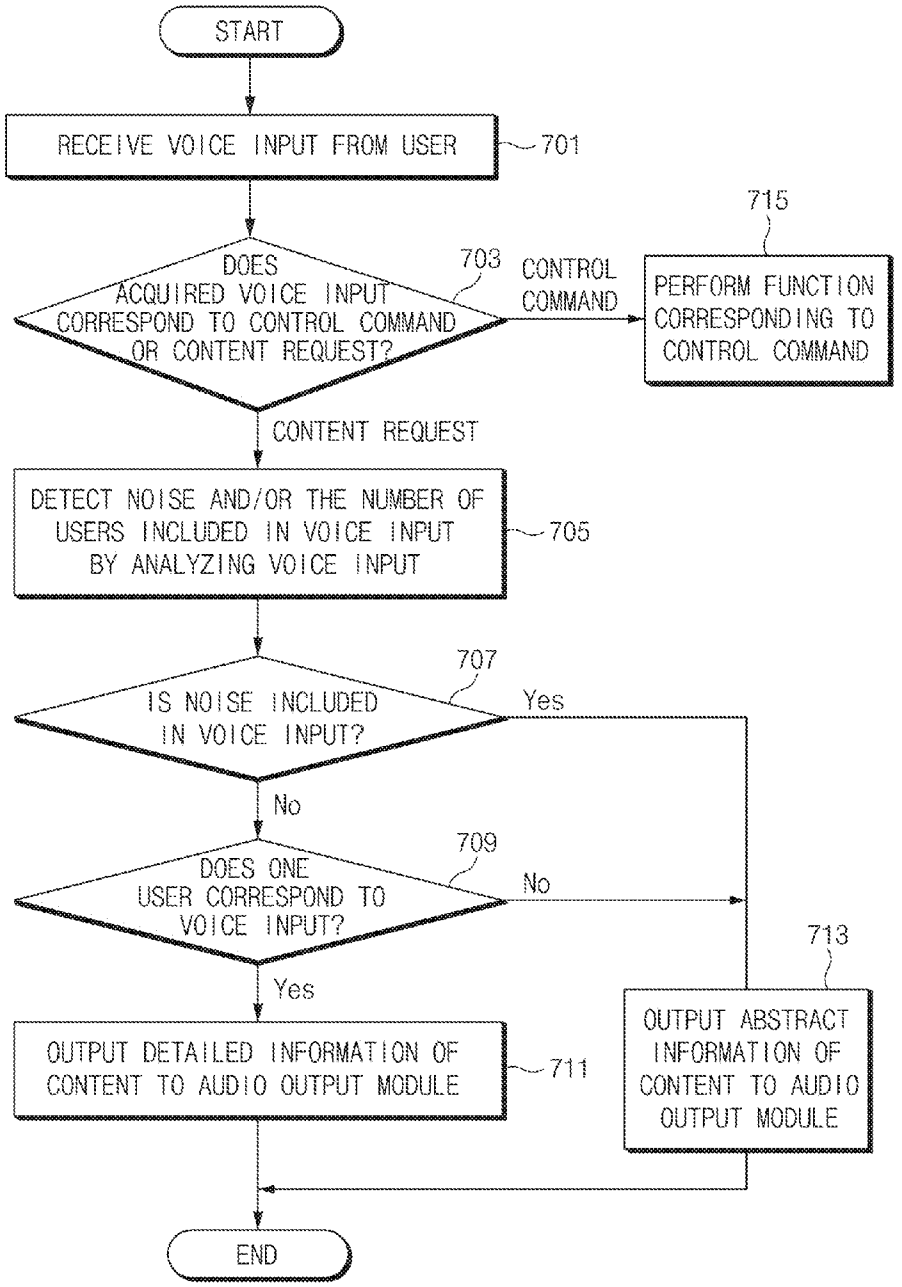

START
RECEIVE VOICE INPUT FROM USER
701
DOES ACQUIRED VOICE INPUT CORRESPOND TO CONTROL COMMAND OR CONTENT REQUEST?
703
CONTROL COMMAND
PERFORM FUNCTION CORRESPONDING TO CONTROL COMMAND
715
CONTENT REQUEST
DETECT NOISE AND/OR THE NUMBER OF USERS INCLUDED IN VOICE INPUT BY ANALYZING VOICE INPUT
705
IS NOISE INCLUDED IN VOICE INPUT?
707
Yes
No
DOES ONE USER CORRESPOND TO VOICE INPUT?
709
No
Yes
OUTPUT DETAILED INFORMATION OF CONTENT TO AUDIO OUTPUT MODULE
711
OUTPUT ABSTRACT INFORMATION OF CONTENT TO AUDIO OUTPUT MODULE
713
END

FIG.7

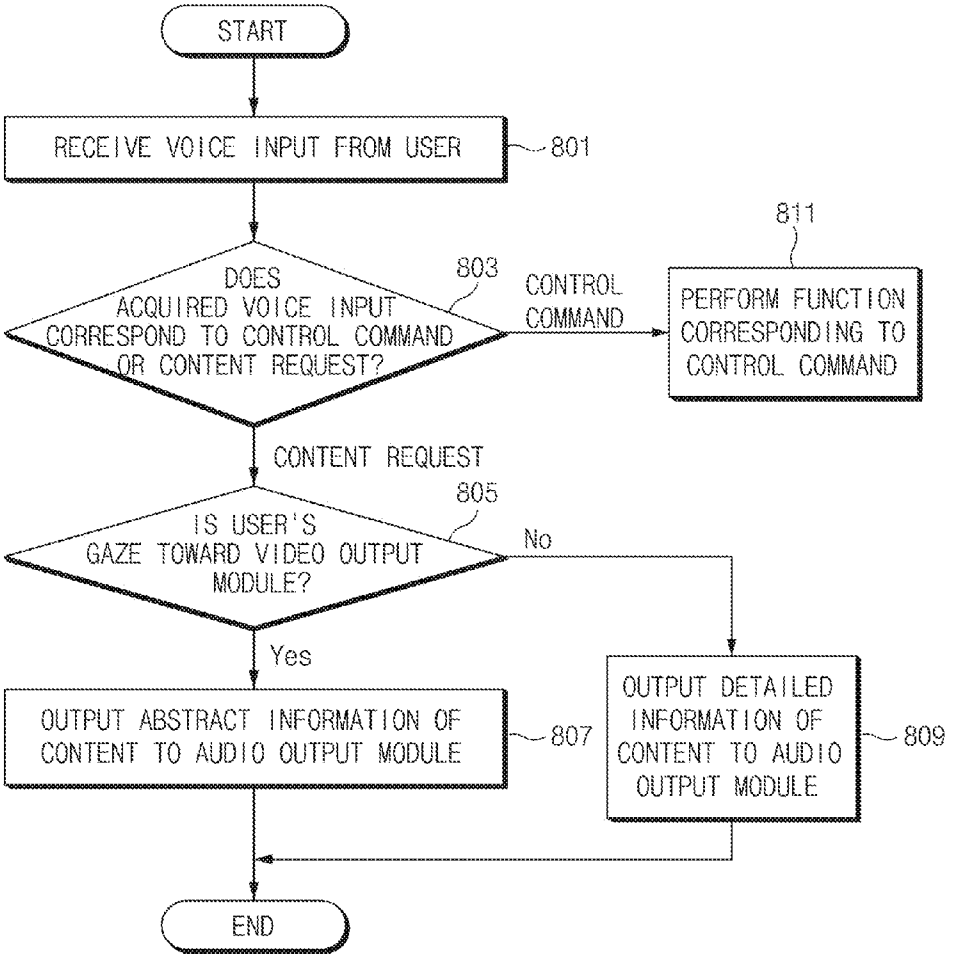

START
RECEIVE VOICE INPUT FROM USER
801
DOES ACQUIRED VOICE INPUT CORRESPOND TO CONTROL COMMAND OR CONTENT REQUEST?
803
CONTROL COMMAND
811
PERFORM FUNCTION CORRESPONDING TO CONTROL COMMAND
CONTENT REQUEST
IS USER'S GAZE TOWARD VIDEO OUTPUT MODULE?
805
No
Yes
OUTPUT ABSTRACT INFORMATION OF CONTENT TO AUDIO OUTPUT MODULE
807
OUTPUT DETAILED INFORMATION OF CONTENT TO AUDIO OUTPUT MODULE
809
END

FIG.8

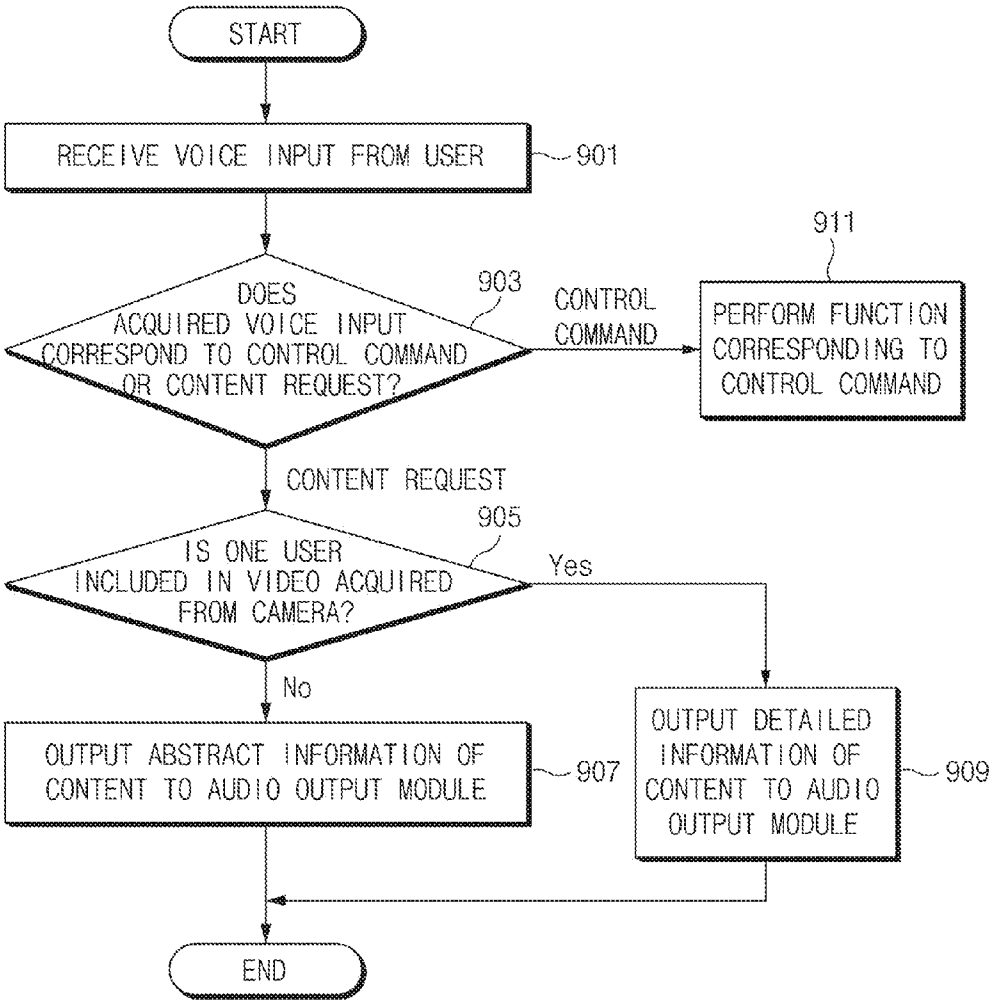

START
RECEIVE VOICE INPUT FROM USER
901
DOES ACQUIRED VOICE INPUT CORRESPOND TO CONTROL COMMAND OR CONTENT REQUEST?
903
CONTROL COMMAND
911
PERFORM FUNCTION CORRESPONDING TO CONTROL COMMAND
CONTENT REQUEST
IS ONE USER INCLUDED IN VIDEO ACQUIRED FROM CAMERA?
905
Yes
No
OUTPUT ABSTRACT INFORMATION OF CONTENT TO AUDIO OUTPUT MODULE
907
OUTPUT DETAILED INFORMATION OF CONTENT TO AUDIO OUTPUT MODULE
909
END

FIG.9

METHOD AND ELECTRONIC DEVICE FOR PROVIDING CONTENT

CROSS-REFERENCE TO RELATED APPLICATION(S)

[0001] This application claims the benefit under 35 U.S.C. §119(a) of a Korean patent application filed on Mar. 26, 2015 in the Korean Intellectual Property Office and assigned Serial number 10-2015-0042740, the entire disclosure of which is hereby incorporated by reference.

TECHNICAL FIELD

[0002] The present disclosure relates to a method and an electronic device for providing content in response to a voice input.

BACKGROUND

[0003] Currently, a user input interface applied to electronic devices is implemented to support a user input based on a voice input as well as a user input (e.g., an input through a button type key pad, a keyboard, a mouse, a touch panel, and the like) based on the physical manipulation by a user.

[0004] An electronic device that has a voice interface, such as an interface based on a user's voice, receives the user's voice to convert the received user's voice into an electrical signal and performs a function set in advance by processing the electrical signal.

[0005] The above information is presented as background information only to assist with an understanding of the present disclosure. No determination has been made, and no assertion is made, as to whether any of the above might be applicable as prior art with regard to the present disclosure.

SUMMARY

[0006] Aspects of the present disclosure are to address at least the above-mentioned problems and/or disadvantages and to provide at least the advantages described below. Accordingly, an aspect of the present disclosure is to provide a content providing method which is capable of outputting content corresponding to a voice input in the most suitable way based on an operating environment of the electronic device or a status of a voice recognition application and an electronic device performing the same.

[0007] In accordance with an aspect of the present disclosure, the electronic device is provided. The electronic device includes a voice input module configured to receive a voice input, an audio output module, a video output module, a memory configured to store a voice recognition application which provides content in response to the voice input, and a processor configured to execute the voice recognition application, and determine an output scheme of the content to be outputted through the audio output module or the video output module based on a status of the voice recognition application or an operating environment of the electronic device.

[0008] Other aspects, advantages, and salient features of the disclosure will become apparent to those skilled in the art from the following detailed description, which, taken in conjunction with the annexed drawings, discloses various embodiments of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The above and other aspects, features, and advantages of certain embodiments of the present disclosure will be more apparent from the following description taken in conjunction with the accompanying drawings, in which:

[0010] FIG. **1** is a block diagram illustrating a configuration of an electronic device according to an embodiment of the present disclosure;

[0011] FIG. **2** is a flow chart illustrating a method for providing content according to an embodiment of the present disclosure;

[0012] FIG. **3** is a flow chart illustrating a method for providing content based on a status of a voice recognition application according to an embodiment of the present disclosure;

[0013] FIG. **4**A is a diagram illustrating an electronic device in which a voice recognition application is running in a background according to an embodiment of the present disclosure;

[0014] FIG. **4**B is a diagram illustrating an electronic device in which a voice recognition application is running in a foreground according to an embodiment of the present disclosure;

[0015] FIG. **5**A illustrates an electronic device in which an icon is outputted when a voice recognition application is running in a background according to an embodiment of the present disclosure;

[0016] FIG. **5**B illustrates an electronic device in which a shape of an icon is changed according to an embodiment of the present disclosure;

[0017] FIG. **6** illustrates an electronic device in which detailed information of content is displayed according to an embodiment of the present disclosure;

[0018] FIG. **7** is a flow chart illustrating a method for providing content based on an analysis of a voice input according to an embodiment of the present disclosure;

[0019] FIG. **8** is a flow chart illustrating a method for providing content based on determination of a user's gaze according to an embodiment of the present disclosure; and

[0020] FIG. **9** is a flow chart illustrating a method for providing content based on a video processing according to an embodiment of the present disclosure.

[0021] Throughout the drawings, it should be noted that like reference numbers are used to depict the same or similar elements, features, and structures.

DETAILED DESCRIPTION

[0022] The following description with reference to accompanying drawings is provided to assist in a comprehensive understanding of various embodiments of the present disclosure as defined by the claims and their equivalents. It includes various specific details to assist in that understanding but these are to be regarded as merely exemplary. Accordingly, those of ordinary skill in the art will recognize that various changes and modifications of the various embodiments described herein can be made without departing from the scope and spirit of the present disclosure. In addition, descriptions of well-known functions and constructions may be omitted for clarity and conciseness.

[0023] The terms and words used in the following description and claims are not limited to the bibliographical meanings, but, are merely used by the inventor to enable a clear and consistent understanding of the present disclosure. Accordingly, it should be apparent to those skilled in the art that the

following description of various embodiments of the present disclosure is provided for illustration purpose only and not for the purpose of limiting the present disclosure as defined by the appended claims and their equivalents.

[0024] It is to be understood that the singular forms "a," "an," and "the" include plural referents unless the context clearly dictates otherwise. Thus, for example, reference to "a component surface" includes reference to one or more of such surfaces.

[0025] An electronic device according to various embodiments of the present disclosure may include at least one of smartphones, tablet personal computers (PCs), mobile phones, video telephones, electronic book readers, desktop PCs, laptop PCs, netbook computers, workstations, servers, personal digital assistants (PDAs), portable multimedia players (PMPs), Motion Picture Experts Group (MPEG-1 or MPEG-2) Audio Layer 3 (MP3) players, mobile medical devices, cameras, or wearable devices. According to various embodiments of the present disclosure, a wearable device may include at least one of an accessory type (e.g., watch, ring, bracelet, ankle bracelet, necklace, glasses, contact lens, or head-mounted-device (I-IMD)), a fabric or clothing type (e.g., electronic apparel), a physical attachment type (e.g., skin pad or tattoo), or a body implantation type (e.g., implantable circuit).

[0026] According to various embodiments, the electronic device may be one of the above-described devices or a combination thereof. An electronic device according to an embodiment may be a flexible electronic device. Furthermore, an electronic device according to an embodiment may not be limited to the above-described electronic devices and may include other electronic devices and new electronic devices according to the development of technologies.

[0027] Hereinafter, electronic devices according to an embodiment of the present disclosure will be described with reference to the accompanying drawings. The term "user" used herein may refer to a person who uses an electronic device or may refer to a device (e.g., an artificial intelligence electronic device) that uses an electronic device.

[0028] FIG. **1** is a block diagram illustrating a configuration of an electronic device according to an embodiment of the present disclosure.

[0029] Referring to FIG. **1**, an electronic device **100** according to an embodiment of the present disclosure may include a bus **110**, a processor **120**, a memory **130**, a voice input module **140**, an audio output module **150**, a video output module **160**, and a camera **170**. The electronic device **100** may not include at least one of the above-described components or may further include other component(s).

[0030] The bus **110** may interconnect the above-described components **120** to **170** and may be a circuit for conveying communications (e.g., a control message and/or data) among the above-described components.

[0031] The processor **120** may include one or more of a central processing unit (CPU), an application processor (AP), or a communication processor (CP). The processor **120** may perform, for example, data processing or an operation associated with control and/or communication of at least one other component(s) of the electronic device **100**.

[0032] The processor **120** may execute a voice recognition application (e.g., S-Voice) stored in the memory **130** and may convert a voice input to a control command or a content request based on the voice recognition application. If the voice input is converted to the control command, the processor **120** may control various modules included in the electronic device **100** based on the control command. For example, in the case where a voice input is "Turn on Bluetooth.", the processor **120** may activate a Bluetooth module embedded in the electronic device **100**.

[0033] Furthermore, if the voice input is converted to a content request, the processor **120** may output corresponding content based on the content request. For example, if a voice input, such as "Let me know today's weather.", is converted to a request about weather content, the processor **120** may provide the weather content to a user.

[0034] According to an embodiment of the present disclosure, the processor **120** may determine an output scheme of content to be outputted through the audio output module **150** or the video output module **160** based on a status of the voice recognition application or an operating environment of the electronic device **100**. The processor **120** may output content corresponding to the voice input through the audio output module **150** or the video output module **160** based on the determined output scheme.

[0035] For example, in the case where the voice recognition application is running in a foreground of the electronic device **100**, the processor **120** may determine to control the video output module **160** to output detailed information of content corresponding to a voice input. Furthermore, in the case where the voice recognition application is running in a background of the electronic device, the processor **120** may determine to control the video output module **160** to output an icon associated with the content.

[0036] In this specification, that an application is running in the foreground should be understood as an execution screen of the application is displayed on the whole area or the almost whole area of the video output module **160** of the electronic device **100**. Furthermore, a state in which an application is running in the background should be understood as the application is running in a non-foreground state.

[0037] For example, if the voice recognition application is running in the foreground, a screen of the voice recognition application (e.g., a screen displayed according to S-Voice, refer to FIG. **4**B) may be displayed on the video output module **160**. At this time, if a voice input is received from a user, the processor **120** may display corresponding content on a screen of the voice recognition application in response to the voice input.

[0038] However, if the voice recognition application is running in the background, a screen (e.g., a screen displayed according to a web browsing application, refer to FIG. **4**A) of an application which is different from the voice recognition application may be displayed on the video output module **160**. At this time, if a voice input is received from a user, the processor **120** may additionally display an icon (e.g., a first icon **501** of FIG. **5**A) associated with the content on the screen of another application in response to the voice input. At this time, if the user selects the icon (e.g., touch), the processor **120** may output detailed information of the content associated with the icon through the video output module **160** in response to the selection of the icon.

[0039] Furthermore, if a voice input is received from a user while the voice recognition application is running in the background, the processor **120** may display the icon and may simultaneously change a shape of the icon based on the content.

[0040] For example, the icon associated with the content may be dynamically implemented in the form of an anima-

tion. Furthermore, content corresponding to a voice input may be provided to a user through the audio output module **150** based on text to speech (hereinafter referred to as "TTS"). In this case, the processor **120** may perform synchronization between an output of content by the audio output module **150** and a shape change of an icon displayed on the video output module **160**.

[0041] Furthermore, the processor **120** according to an embodiment of the present disclosure may analyze a voice input received from the voice input module **140** and may detect a noise included in the voice input and/or the number of users corresponding to the voice input based on the analyzed result. The processor **120** may determine an output scheme of content to be outputted through the audio output module **150** based on the detection result.

[0042] For example, if a noise which satisfies a specified condition is detected in a voice input, the processor **120** may determine to control the audio output module **150** to output abstract information of content corresponding to the voice input. Furthermore, if the noise which satisfies the specified condition is not detected in the voice input, the processor **120** may determine to control the audio output module **150** to output detailed information of content.

[0043] The noise which satisfies the specified condition may be detected based on an analysis of frequency, wave shape, or amplitude. For example, the noise which satisfies the specified condition may include a residential noise at an outdoor space. Furthermore, a usual white noise may not be considered in determining whether the noise which satisfies the specified condition is included in the voice input. Accordingly, the processor **120** may determine whether the user is in an outdoor public space or in a private space.

[0044] Furthermore, according to an embodiment, if a plurality of users corresponding to a voice input is detected in the voice input, the processor **120** may determine to control the audio output module **150** to output abstract information of content. If a user corresponding to the voice input is detected in the voice input, the processor **120** may determine to control the audio output module **150** to output detailed information of content.

[0045] The detection of the number of users corresponding to a voice input may be performed, for example, through a frequency analysis about the voice input. The processor **120** may determine whether only a user who uses the electronic device **100** exists in the vicinity of the electronic device **100** or whether the user exists with another user in the vicinity of the electronic device **100**, through the frequency analysis.

[0046] According to an embodiment of the present disclosure, the processor **120** may determine an output scheme of the video output module **160** based on an output scheme of the audio output module **150**. For example, if a noise which satisfies a specified condition is detected in a voice input or if a plurality of users corresponding to the voice input is detected in the voice input, the processor **120** may output abstract information of content through the audio output module **150** and may simultaneously output detailed information of the content through the video output module **160**.

[0047] The processor **120** according to an embodiment of the present disclosure may determine an output scheme of the content to be outputted through the audio output module **150** based on a result of determining a gaze at the camera **170**.

[0048] For example, if it is determined that a user's gaze is toward the video output module **160**, the processor **120** may determine to control the audio output module **150** to output abstract information of content. If it is determined that the user's gaze is not toward the video output module **160**, the processor **120** may determine to control the audio output module **150** to output detailed information of content.

[0049] The processor **120** may determine an output scheme of the video output module **160** based on an output scheme of the audio output module **150**. For example, if it is determined that a user's gaze is toward the video output module **160**, the processor **120** may output abstract information of content through the audio output module **150** and may simultaneously output detailed information of the content through the video output module **160**.

[0050] Furthermore, the processor **120** according to an embodiment of the present disclosure may determine an output scheme of the content to be outputted through the audio output module **150** or the video output module **160** based on a video of the vicinity of the electronic device **100** shot by the camera **170**.

[0051] For example, the processor **120** may determine the output scheme of the content based on the number of users included in the shot video. When determining the number of users, the processor **120** may apply a face recognition algorithm to the shot video and may determine the number of users included in the shot video or may recognize a specific user.

[0052] For example, if it is determined that a user is included in the shot video, the processor **120** may determine to control the audio output module **150** and/or the video output module **160** to output detailed information of content. In contrast, if it is determined that a plurality of users is included in the shot video, the processor **120** may determine to control the audio output module **150** and/or the video output module **160** to output abstract information of content or not to output information of content.

[0053] Furthermore, as another example, if it is determined that an authenticated user of the electronic device **100** is included in the shot video, the processor **120** may determine to control the audio output module **150** and/or the video output module **160** to output detailed information of content. In contrast, if it is determined that an unauthenticated user is included in the shot video, the processor **120** may determine to control the audio output module **150** and/or the video output module **160** to output abstract information of content or not to output information of content.

[0054] Abstract information of content may be information of a portion of content or summarized information of the content or may correspond to a portion of the content. In some embodiments, the abstract information of content may be understood as including an icon associated with the content. Furthermore, detailed information of content may be all information about the content.

[0055] The abstract information and the detailed information of the content may be acoustically provided to a user through the audio output module **150** based on a voice output function, such as TTS. Furthermore, abstract information and detailed information of the content may be visually provided to the user through the video output module **160**.

[0056] The memory **130** may include a volatile and/or a nonvolatile memory. For example, the memory **130** may store instructions or data associated with at least one other component(s) of the electronic device **100**. According to an embodiment of the present disclosure, the memory **130** may store software, an application program which performs a content providing method according to various embodiments of the

present disclosure, a voice recognition application, a web browsing application and data for executing the above-mentioned software or applications. For example, the memory **130** may store a control command and/or a content request corresponding to a voice input or may store abstract information and/or detailed information of content corresponding to the content request.

[0057] The voice input module **140** may receive a voice input uttered from a user. It may be understood that the voice input module **140** includes a physical microphone and additionally, a circuitry (e.g., analog-digital converter (ADC)) which performs a signal processing about the received voice input.

[0058] The audio output module **150** may include a speaker, a headphone, an earphone, a corresponding driver, an audio output interface, and the like. Abstract information or detailed information of content may be outputted as a sound through the audio output module **150** so as to be acoustically provided to a user.

[0059] For example, the video output module **160** may correspond to a display. The display may include, for example, a liquid crystal display (LCD), a light-emitting diode (LED) display, an organic LED (OLED) display, a microelectromechanical systems (MEMS) display, or an electronic paper display. Abstract information or detailed information of content may be outputted as a screen through the video output module **160** so as to be visually provided to a user.

[0060] The video output module **160** may display, for example, various contents (e.g., a text, an image, a video, an icon, a symbol, and the like) to a user. The video output module **160** may include a touch screen and may receive, for example, a touch, gesture, proximity, or hovering input using an electronic pen or a portion of a user's body.

[0061] For example, the camera **170** may shoot a still image and a video. According to an embodiment of the present disclosure, at least one of the camera **170** may include one or more image sensors, lenses, an image processing module, and the like. Furthermore, the electronic device **100** may include one or more cameras **170**. The camera **170** may shoot a video of the vicinity of the electronic device **100** and at least a portion (e.g., face) of a user's body existing in the vicinity of the electronic device **100**.

[0062] According to an embodiment, the camera **170** (in conjunction with the processor **120**) may determine whether a user of the electronic device **100** is detected. For example, a method for tracking a user's pupil (so-called, eye tracking) may be used in determining a user's gaze.

[0063] FIG. **2** is a flow chart illustrating a method for providing content according to an embodiment of the present disclosure.

[0064] Referring to FIG. **2**, in operation **201**, the voice input module **140** may receive a voice input from a user through a voice recognition application. The received voice input may be provided to the processor **120** which executes the voice recognition application.

[0065] In operation **203**, the processor **120** may determine content to be outputted based on the voice input and may determine an output scheme of the content based on a status of the voice recognition application or an operating environment of the electronic device **100**. The content to be outputted may be set in advance by the voice recognition application in response to the voice input.

[0066] In operation **205**, the processor **120** may output the content corresponding to the voice input based on the output scheme determined in operation **203** using at least one of the audio output module **150** or the video output module **160**.

[0067] FIG. **3** is a flow chart illustrating a method for providing content based on a status of a voice recognition application according to an embodiment of the present disclosure.

[0068] Referring to FIG. **3**, a content providing method based on a status of a voice recognition application according to an embodiment of the present disclosure may include operation **301** to operation **317**.

[0069] In operation **301**, the voice input module **140** may receive a voice input from a user. For example, the voice input may be a simple word, such as "weather", "schedule", "Bluetooth", "wireless fidelity (Wi-Fi)", and the like, or may be a sentence, such as "Let me know today's weather.", "Let me know today's schedule.", "Read today's news.", "Turn on Bluetooth.", "Turn on Wi-Fi.", and the like. Furthermore, the voice input may be a control command (e.g., "Turn on Bluetooth.") to control a specific module embedded in the electronic device **100** or may be a content request (e.g., "Let me know today's weather.") which requests specific content.

[0070] In operation **303**, the processor **120** may determine whether the received voice input is the control command about the module embedded in the electronic device **100** or is the content request which requests an output of the specific content. If the voice input corresponds to the content request, the procedure proceeds to operation **305**. If the voice input corresponds to the control command, the procedure proceeds to operation **317**. For example, if the voice input corresponds to a "weather", the procedure proceeds to operation **305**. If the voice input corresponds to "Turn on Bluetooth.", the procedure proceeds to operation **317**.

[0071] In operation **305**, the processor **120** may determine a status of the voice recognition application and may determine whether the voice recognition application is running in the background or in the foreground. If the voice recognition application is running in the background, the procedure proceeds to operation **307**. If the voice recognition application is running in the foreground, the procedure proceeds to operation **313**.

[0072] FIG. **4**A illustrates an electronic device in which a voice recognition application is running in a background according to an embodiment of the present disclosure.

[0073] Referring to FIG. **4**A, a web browsing application may be running in the foreground in the electronic device **100**. A screen **400***a* of the web browsing application may be displayed on the video output module **160** of the electronic device **100**. If the voice recognition application is running in the background, a screen of the voice recognition application may not be displayed. However, since the voice recognition application is running in the background, the electronic device **100** may receive the voice input from the user through the voice input module **140**. According to an embodiment of the present disclosure, before providing the voice input (e.g., "weather") to the electronic device **100**, the user may provide a voice (e.g., "Hi, Galaxy."), which is specified in advance, such that a state of the voice recognition application is switched from a sleep state to an active state.

[0074] FIG. **4**B illustrates an electronic device in which a voice recognition application is running in a foreground according to an embodiment of the present disclosure.

[0075] Referring to FIG. **4**B, the voice recognition application may be running in the foreground in the electronic device

100. A screen **400***b* of the voice recognition application may be displayed on the video output module **160** of the electronic device **100**. According to an embodiment of the present disclosure, before providing the voice input to the electronic device **100**, the user may provide a voice which is specified in advance or may select (touch) an object, which has a shape of a microphone illustrated in the bottom of the screen **400***b*, such that a state of the voice recognition application is switched from a sleep state to an active state.

[0076] In operation **307**, the processor **120** may determine to control the video output module **160** to output an icon associated with content corresponding to the voice input (content request).

[0077] FIG. **5**A illustrates an icon which is to be outputted when a voice recognition application is running in a background in an electronic device according to an embodiment of the present disclosure.

[0078] Referring to FIG. **5**A, a screen **500***a* of the electronic device **100** may be displayed following the screen **400***a* of FIG. **4**A. For example, if the voice input corresponding to the "weather" is received from the user, the processor **120** of the electronic device **100** may display a first icon **501** associated with the weather (e.g., cloudy and rain) of the day, on which the voice input is received, on the screen **500***a* on which the web browsing application is displayed. According to an embodiment of the present disclosure, a dynamic animation effect may be added to the first icon **501**. For example, the animation effect, such as rain from the cloud, may be applied to the first icon **501**.

[0079] According to an embodiment of the present disclosure, the processor **120** may determine to control the video output module **160** to output detailed information of content related to the first icon **501** in response to the selection (e.g., touch) about the first icon **501**. For example, if the user touched the first icon **501**, the video output module **160** may be switched from the screen **500***a* of FIG. **5**A to a screen of the voice recognition application and may output detailed information of weather content on the screen (e.g., a screen **600** of FIG. **6**) of the voice recognition application.

[0080] In operation **309**, the processor **120** may determine to change a shape of the icon displayed in operation **307** based on the corresponding content.

[0081] FIG. **5**B illustrates that a first icon of FIG. **5**A is changed to a second icon based on corresponding content according to an embodiment of the present disclosure.

[0082] Referring to FIG. **5**B, for example, if a voice input corresponding to the "weather" is received from the user, the processor **120** of the electronic device **100** may change the first icon **501** of FIG. **5**A to the second icon **502** of FIG. **5**B such that the weather (e.g., clear up in the afternoon after cloudy and rain) of the day on which the voice input is received is symbolically displayed. Furthermore, according to an embodiment, the animation effect may be added in changing the first icon **501** of FIG. **5**A to a second icon **502** of FIG. **5**B. With this kind of the animation effect, the electronic device **100** may more effectively provide corresponding weather content to the user.

[0083] In operation **311**, the processor **120** may output corresponding content through the audio output module **150** in synchronization with the shape change of the icon in operation **309**. For example, in synchronization with the change from the first icon **501** of FIG. **5**A to the second icon **502** of FIG. **5**B, the processor **120** may determine to control the audio output module **150** to output weather content, such as "Today, rain in the morning and sunny in the afternoon". For example, when an audio corresponding to "Today, rain in the morning." is outputted, the first icon **501** may be outputted. However, when an audio corresponding to "Sunny in the afternoon." is outputted, the first icon **501** may be changed to the second icon **502**.

[0084] In operation **313**, if the voice recognition application is running in the foreground, the processor **120** may determine to control the video output module **160** to output detailed information of content corresponding to the voice input (content request).

[0085] FIG. **6** illustrates a case in which a voice input from a user corresponds to a word "weather" according to an embodiment of the present disclosure.

[0086] Referring to FIG. **6**, a screen **600** may be displayed after displaying of the screen **400***b* of FIG. **4**B in response to the voice input from the user. For example, the processor **120** of the electronic device **100** may output detailed information (detailed information of weather content) of a weather of an area, on which the electronic device **100** is located, through the video output module **160** in response to the voice input of the "weather". As illustrated in FIG. **6**, the detailed information of the weather may include weather information, dress suggestion according to the weather, a weekly weather, and the like.

[0087] In operation **315**, the processor **120** may determine to control the audio output module **150** to output content corresponding to the content request. For example, FIG. **6** illustrates that the processor **120** outputs content, such as "This is the weather information on Seocho-2 Dong, Seoul. Today, it is going to rain. How about wearing boots when you go out.", through the audio output module **150** based on TTS.

[0088] Since operation **317** corresponds to the case where the received voice input corresponds to the control command, the processor **120** may perform a function corresponding to the control command. For example, in the case where the voice input corresponds to "Bluetooth" or "Turn on Bluetooth.", the processor **120** may perform control to activate the Bluetooth module.

[0089] According to an embodiment of the present disclosure, the processor **120** may perform a function corresponding to the control command and may simultaneously display an icon associated with the function corresponding to the control command on the screen of the video output module **160**. For example, if the voice input module **140** receives the voice input corresponding to "Turn on Bluetooth." while the web browsing application is running in the foreground as shown in FIG. **5**A, the processor **120** may activate the Bluetooth module, and at the same time, may display an icon associated with Bluetooth instead of the first icon **501** of FIG. **5**A on the screen **500***a* of the video output module **160**.

[0090] According to various embodiments of the present disclosure, the output scheme (e.g., icon display or detailed information provision) of the video output module **160** may be automatically determined based on an execution status of the voice recognition application. As such, the electronic device **100** may effectively provide content according to the voice recognition without interrupting the situation (e.g., output situation of the video output module **160**) in which the user currently uses the electronic device **100**.

[0091] Furthermore, according to an embodiment of the present disclosure, in the case where the voice recognition application is running in the background, only an icon which does not interfere with a different application may be dis-

played on the video output module **160** in response to the voice input. That is, since the voice recognition application is not running in the foreground even though the voice input is received, the user may more effectively use an application.

[0092] FIG. **7** is a flow chart illustrating a method for providing content based on an analysis of a voice input according to an embodiment of the present disclosure.

[0093] Referring to FIG. **7**, a content providing method based on an analysis of a voice input according to an embodiment of the present disclosure may include operation **701** to operation **715**. Since operation **701**, operation **703**, and operation **715** of FIG. **7** correspond to operation **301**, operation **303**, and operation **317** of FIG. **3**, respectively, the duplicated descriptions will be omitted. However, a voice input received in operation **701** may correspond to "Let me know today's schedule".

[0094] In operation **705**, the processor **120** may analyze the voice input and may detect a noise included in the voice input and the number of users corresponding to the voice input. The detection result may be used to determine an output scheme of content.

[0095] In operation **707**, the processor **120** may determine whether a noise which satisfies a specified condition is included in the voice input. For example, the processor **120** may determine whether a noise which generally occurs in the outside is included in the voice input. For example, a fine noise which is generated in the quiet inside or a noise according to an internal operation of the electronic device **100** may not be considered in determining whether the noise satisfies the specified condition in operation **707**. If the noise which satisfies the specified condition is included in the voice input, the procedure proceeds to operation **713**. Otherwise, the procedure proceeds to operation **709**.

[0096] In operation **709**, the processor **120** may determine the number of users corresponding to the voice input. For example, the processor **120** may determine the number of users corresponding to the voice input through an analysis of frequency or wave shape. If the number of users corresponding to the voice input is a user, the procedure proceeds to operation **711**. If the number of users corresponding to the voice input is a plurality of users, the procedure proceeds to operation **713**.

[0097] In operation **711**, in the case where the noise which satisfies the specified condition is not included in the voice input, and a user corresponding to the voice input is detected in the voice input, the processor **120** may output detailed information of content through the audio output module **150**. For example, when the user is alone indoors without a surrounding noise, the user may be acoustically provided with detailed information of schedule content, such as "Today, there is a team meeting at 9:30 AM and a date at 8 PM." in response to the voice input, such as "Let me know today's schedule".

[0098] In operation **713**, in the case where the noise which satisfies the specified condition is included in the voice input, and a plurality of users corresponding to the voice input is detected in the voice input, the processor **120** may output abstract information of content through the audio output module **150**. For example, the user who is talking with other users or is in the noisy outside may be acoustically provided with abstract information of schedule content, such as "Today, there are two schedules.", in response to the voice input, such as "Let me know today's schedule".

[0099] According to various embodiments of the present disclosure, the electronic device **100** may analyze the voice input and may grasp the operating environment of the electronic device **100**. The electronic device **100** may determine an output scheme of content based on the grasped operating environment. Furthermore, since the output scheme of content is differently set by distinguishing between the case where one user is present indoors and the case where a plurality of users is present, the content, such as detailed information of "schedule", which causes a difficult situation if the content is known to the outside may not be outputted through the audio output module **150**.

[0100] FIG. **8** is a flow chart illustrating a method for providing content based on determination of a user's gaze according to an embodiment of the present disclosure.

[0101] Referring to FIG. **8**, according to an embodiment of the present disclosure, a content providing method based on determination of a user's gaze may include operation **801** to operation **811**. Since operation **801**, operation **803**, and operation **811** correspond to operation **301**, operation **303**, and operation **317** of FIG. **3**, respectively, the duplicated descriptions will be omitted. However, in operation **801**, a received voice input may correspond to "Read today's news".

[0102] In operation **805**, the processor **120** may determine whether a gaze of the user of the electronic device **100** is toward the video output module **160**. The processor **120** may determine an output scheme of content (e.g., headline news article) to be outputted through the audio output module **150** and/or the video output module **160** based on a result of determining the user's gaze. If it is determined that the user's gaze is toward the video output module **160**, the procedure proceeds to operation **807**. If it is determined that the user's gaze is not toward the video output module **160**, the procedure proceeds to operation **809**.

[0103] In operation **807**, the processor **120** may determine to control the audio output module **150** to output abstract information of content. For example, the user may be acoustically provided with only a title of the headline news article (abstract information of content) through the audio output module **150** in response to the voice input, such as "Read today's news".

[0104] In operation **809**, the processor **120** may determine to control the audio output module **150** to output detailed information of the content. For example, the user may be acoustically provided with the title and content of the headline news article (detailed information of content) through the audio output module **150** in response to the voice input, such as "Read today's news".

[0105] According to various embodiments of the present disclosure, an output scheme of content may be determined based on whether the user's gaze is toward to the video output module **160**, that is, an operating environment of the electronic device **100**. For example, the user who is provided with the content through the video output module **160** may increase the capacity to concentrate in a content acquisition since the user does not need to be repeatedly provided with detailed information of the same content through the audio output module **150**. Furthermore, when it is difficult for the user's gaze to be toward the video output module **160** of the electronic device **100**, for example, when the user is in driving, the user may be acoustically provided with detailed information of content.

[0106] FIG. **9** is a flow chart illustrating a method for providing content based on a video processing according to an embodiment of the present disclosure.

[0107] Referring to FIG. **9**, a content providing method based on a video processing according to an embodiment of the present disclosure may include operation **901** to operation **911**. Since operation **901**, operation **903**, and operation **911** of FIG. **9** correspond to operation **301**, operation **303**, and operation **317** of FIG. **3**, respectively, the duplicated descriptions will be omitted. However, a voice input received in operation **901** may correspond to "Let me know today's schedule".

[0108] In operation **905**, the processor **120** may determine whether a user is included in the video obtained from the camera **170** or whether a plurality of users is included in the video obtained from the camera **170**. For example, the processor **120** may determine how many users are included in the video shot by the camera **170**. For example, the processor **120** may recognize a user's face through a face recognition algorithm and thus may determine the number of users based on the face recognition algorithm. If a user is included in the video, the procedure proceeds to operation **909**. If a plurality of users is included in the video, the procedure proceeds to operation **907**.

[0109] Furthermore, according to an embodiment, the processor **120** may recognize a specific user through the face recognition algorithm. For example, the processor **120** may determine whether there is an authenticated user of the electronic device **100** in the video shot by the camera **170**. If a user included in the video is the authenticated user, the procedure proceeds to operation **909**. If a user included in the video is not the authenticated user, the procedure proceeds to operation **907**.

[0110] In operation **907**, the processor **120** may determine to control the audio output module **150** to output abstract information of content. If a plurality of users (i.e., two or more) is included in the video shot by and received from the camera **170**, the processor **120** may output abstract information of content through the audio output module **150**. Alternatively and additionally, the processor **120** may output an icon associated with content through the video output module **160**.

[0111] For example, in the case where there is a plurality of users in a vicinity of the electronic device **100**, the user of the electronic device **100** may be acoustically provided with abstract information of schedule content, such as "Today, there are two schedules.", in response to the voice input, such as "Let me know today's schedule". Furthermore, the user of the electronic device **100** may be acoustically provided with abstract information of the schedule content and may be visually provided with an icon (e.g., a calendar icon associated with the schedule content) associated with the content through the video output module **160** at the same time.

[0112] Furthermore, according to an embodiment, if a user (authenticated user) of the electronic device **100** is not included in the video received from the camera **170**, the processor **120** may output abstract information of content through the audio output module **150**. Alternatively, if the authenticated user of the electronic device **100** is not included in the received video, the processor **120** may not even output abstract information of content.

[0113] In operation **909**, the processor **120** may determine to control the audio output module **150** to output detailed information of content. If a user is included in the video shot by and received from the camera **170**, the processor **120** may output detailed information of content through the audio output module **150**. Alternatively and additionally, the processor **120** may output detailed information of content through the video output module **160**.

[0114] For example, when only a user is present in the vicinity of the electronic device **100**, the user may be acoustically provided with detailed information of schedule content, such as "Today, there is a team meeting at 9:30 AM and a date at 8 PM." in response to the voice input, such as "Let me know today's schedule". Furthermore, the user of the electronic device **100** may be acoustically provided with detailed information of the schedule content and may be visually provided with a screen, on which the detailed information of the content is displayed, through the video output module **160** at the same time.

[0115] Furthermore, according to an embodiment of the present disclosure, if a true user (authenticated user) of the electronic device **100** is included in the video shot by and received from the camera **170**, the processor **120** may output detailed information of content through the audio output module **150**. Alternatively, if the true user of the electronic device **100** is included in the received video, the processor **120** may output abstract information of content.

[0116] According to various embodiments of the present disclosure, the electronic device **100** may grasp an operating environment of the electronic device **100** by analyzing a video obtained from the camera **170**. The electronic device **100** may determine an output scheme of content based on the grasped operating environment. Furthermore, since the output scheme of content is set differently according to the case where a user is present and the case where a plurality of users is present, the content, such as detailed information of "schedule", which causes a difficult situation if the content is known to the outside may not be outputted through the audio output module **150**.

[0117] Furthermore, in an embodiment in which a specific user is recognized, the electronic device **100** may authenticate whether a user present in the vicinity of the electronic device **100** is the true user using the face recognition algorithm. Accordingly, the true user of the electronic device **100** may be provided with content, which causes a difficult situation if the content is known to the outside, with higher security.

[0118] Meanwhile, content providing methods described in FIGS. **3**, **7**, **8**, and **9** are examples and may not be limited to a description given with reference to accompanying drawings. Furthermore, at least two or more of the content providing methods described in FIGS. **3**, **7**, **8**, and **9** may be combined.

[0119] For example, when an e-book application is running in the foreground in the electronic device **100**, a user who is in the noisy outside may perform an voice input, such as "Hi, Galaxy." and "Let me know today's schedule." with respect to the electronic device **100**. In this case, the electronic device **100** may display an icon (e.g., an icon of calendar shape) associated with "schedule" on a screen of the e-book application. Furthermore, the electronic device **100** may provide abstract information of content, such as "There is one schedule, today.", through the audio output module **150** together with the display of the icon, based on TTS.

[0120] The term "module" used herein may represent, for example, a unit including one or more combinations of hardware, software and firmware. The term "module" may be interchangeably used with the terms "unit", "logic", "logical block", "component" and "circuit". The "module" may be a minimum unit of an integrated component or may be a part

thereof. The "module" may be a minimum unit for performing one or more functions or a part thereof. The "module" may be implemented mechanically or electronically. For example, the "module" may include at least one of an application-specific integrated circuit (ASIC) chip, a field-programmable gate array (FPGA), and a programmable-logic device for performing some operations, which are known or will be developed.

[0121] At least a portion of an apparatus (e.g., modules or functions thereof) or a method (e.g., operations) according to various embodiments of the present disclosure may be, for example, implemented by instructions stored in a computer-readable storage media in the form of a program module. The instruction, when executed by one or more processors (e.g., a processor **120**), may cause the one or more processors to perform a function corresponding to the instruction. The computer-readable storage media, for example, may be the memory **130**.

[0122] A computer-readable recording medium may include a hard disk, a magnetic media, a floppy disk, a magnetic media (e.g., a magnetic tape), an optical media (e.g., a compact disc read only memory (CD-ROM) and a digital versatile disc (DVD), a magneto-optical media (e.g., a floptical disk), and hardware devices (e.g., a ROM, a random access memory (RAM), or a flash memory). Also, a program instruction may include not only a mechanical code such as things generated by a compiler but also a high-level language code executable on a computer using an interpreter. The above-mentioned hardware device may be configured to operate as one or more software modules to perform operations according to various embodiments of the present disclosure, and vice versa.

[0123] Modules or program modules according to various embodiments of the present disclosure may include at least one or more of the above-mentioned components, some of the above-mentioned components may be omitted, or other additional components may be further included therein. Operations executed by modules, program modules, or other elements may be executed by a successive method, a parallel method, a repeated method, or a heuristic method. Also, a portion of operations may be executed in different sequences, omitted, or other operations may be added.

[0124] According to an embodiment of the present disclosure, the electronic device may grasp a status of a voice recognition application or an operating environment of the electronic device and may determine an output scheme of content based on the grasped operating environment. With this method, the content may be provided in the output scheme which is the most suitable to a situation in which a user utilizes an electronic device.

[0125] While the present disclosure has been shown and described with reference to various embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the present disclosure as defined by the appended claims and their equivalents.

What is claimed is:

1. An electronic device comprising:

a voice input module configured to receive a voice input;

an audio output module;

a display;

a memory configured to store a voice recognition application which provides content in response to the voice input; and

a processor configured to:

execute the voice recognition application, and

determine an output scheme of the content to be outputted through the audio output module or the display based on a status of the voice recognition application or an operating environment of the electronic device.

2. The electronic device of claim **1**, wherein, the processor is further configured to:

control the display, if the voice recognition application is running in a foreground, to output detailed information of the content, and

control the display, if the voice recognition application is running in a background, to output an icon associated with the content.

3. The electronic device of claim **2**, wherein the processor is further configured to change a shape of the icon based on the content.

4. The electronic device of claim **3**, wherein the processor is further configured to synchronize an output of the content by the audio output module and a shape change of the icon.

5. The electronic device of claim **2**, wherein the processor is further configured to control the display to output the detailed information of the content in response to a selection of the icon.

6. The electronic device of claim **1**, wherein the processor is further configured to:

analyze the voice input,

detect a noise included in the voice input or the number of users corresponding to the voice input, and

determine an output scheme of content to be outputted through the audio output module based on the detection result.

7. The electronic device of claim **6**, wherein if a noise which satisfies a specified condition is detected in the voice input, the processor is further configured to control the audio output module to output abstract information of the content.

8. The electronic device of claim **6**, wherein if a noise which satisfies a specified condition is not detected in the voice input, the processor is further configured to control the audio output module to output detailed information of the content.

9. The electronic device of claim **6**, wherein if a plurality of users corresponding to the voice input is detected in the voice input, the processor is further configured to control the audio output module to output abstract information of the content.

10. The electronic device of claim **6**, wherein if a user corresponding to the voice input is detected in the voice input, the processor is further configured to control the audio output module to output detailed information of the content.

11. The electronic device of claim **1**, further comprising:

a camera configured to detect a gaze of a user of the electronic device,

wherein the processor is further configured to determine the output scheme of the content to be outputted through the audio output module based on a result of determining the gaze.

12. The electronic device of claim **11**, wherein, if it is determined that the user's gaze is toward the display, the processor is further configured to control the audio output module to output abstract information of the content.

13. The electronic device of claim **11**, wherein, if it is determined that the user's gaze is not toward the display, the processor is further configured to control the audio output module to output detailed information of the content.

14. The electronic device of claim **1**, further comprising:

a camera configured to shoot a video of a vicinity of the electronic device, and

wherein the processor is further configured to determine the output scheme of the content to be outputted through the audio output module or the display based on the video of the vicinity of the electronic device.

15. A method for providing content in an electronic device, the method comprising:

receiving a voice input through a voice recognition application;

determining content to be outputted, based on the voice input;

determining an output scheme of the content based on a status of the voice recognition application or an operating environment of the electronic device; and

outputting the content corresponding to the voice input using at least one of a display or an audio output module of the electronic device, based on the determined output scheme.

16. The method of claim **15**, wherein the determining of the output scheme of the content comprises:

displaying on the display detailed information of the content, if the voice recognition application is running in a foreground, and

displaying on the display an icon associated with the content, if the voice recognition application is running in a background.

17. The method of claim **16**, wherein the displaying on the display of the icon comprises:

changing a shape of the icon based on the content.

18. The method of claim **17**, wherein the determining of the output scheme of the content further comprises:

outputting by the audio output module the content in synchronization with a shape change of the icon.

19. The method of claim **15**, further comprising:

analyzing the received voice input; and

detecting a noise included in the voice input or the number of users corresponding to the voice input based on the analyzed result,

wherein the determining of the output scheme of the content comprise determining an output scheme of content to be outputted through the audio output module based on the detection result.

20. The method of claim **15**, further comprising:

determining a gaze of a user of the electronic device,

wherein the determining of the output scheme of the content comprises determining an output scheme of content to be outputted through the audio output module based on the result of determining the gaze.

* * * * *