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(71) Applicant *(for all designated States except US)*: **MOTOROLA, INC.** [US/US]; 1303 East Algonquin Road, Schaumburg, Illinois 60196 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **BODAS, Rohit, S.,** [IN/US]; 300 E. Pine Lake Circle, Vernon Hills, Illinois 60061 (US). **O'CONNOR, Jay, D.,** [US/US]; 3113 W. Lawrence, #D402, Chicago, Illinois 60625 (US).

(74) Agents: **BRETSCHER, John T.,** et al.; 1303 East Algonquin Road, Schaumburg, Illinois 60196 (US).

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[Continued on next page]

(54) Title: DISPLAYING A MESSAGE ON A PERSONAL COMMUNICATION DEVICE

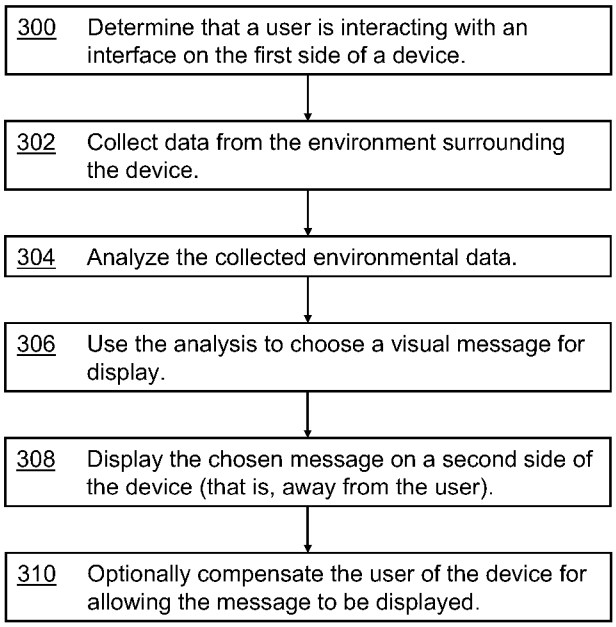


FIG. 3

(57) Abstract: Disclosed is a method for re-orienting hardware not currently being used to a new purpose. Sensors (206, 214, 400, 402) on a personal communication device (104) monitor (302) the environment around the device (104). Based on an analysis (304, 404) of that monitoring, an appropriate visual message (408) is shown (308) on an outside display screen (204) of the device (104). The visual message (408) is targeted toward those (106) around the device (104) rather than to the device's user (102). In some embodiments, the monitoring devices include a camera (206) and a microphone (214). Images taken (302) by the camera (206) are analyzed (304, 404) in an attempt to detect persons (106, 108, 110) or objects around the user (102) or to determine where the user (102) is located. Captured speech is analyzed (304, 404) to determine topics of conversation. The results of these analyses are fed into a decision-making process that determines (306, 406) what visual messages (408) would be appropriate. In one embodiment, the visual message is an advertisement (408).

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DISPLAYING A MESSAGE ON A PERSONAL COMMUNICATION DEVICE

FIELD OF THE INVENTION

[0001] The present invention is related generally to displaying messages on computer screens and, more particularly, to choosing messages to display based on environmental factors.

BACKGROUND OF THE INVENTION

[0002] A trend in personal communication devices (e.g., cellular telephones and personal digital assistants) is to make the devices more capable by adding more hardware. Cameras are common on these devices, as are multiple display screens. GPS receivers are becoming more common. Other devices for monitoring either the environment around the device (e.g., a thermometer) or for monitoring the user of the device (e.g., a heartbeat detector) have been proposed.

[0003] Useful as this additional hardware can be in particular situations, much of it is used only rarely. The cost of the hardware is paid for (directly or indirectly) by the user, but the hardware provides only a very limited return on that cost. Ready to perform, this hardware spends most of the time taking up space in the device, adding weight, cost, and operational complexity, and only occasionally providing a service to the device's user.

BRIEF SUMMARY

[0004] The above considerations, and others, are addressed by the present invention, which can be understood by referring to the specification, drawings, and claims. According to aspects of the present invention, hardware that is not currently being used is re-oriented to a new purpose. Sensors on a personal communication device monitor the environment around the device. Based on an analysis of that monitoring, an appropriate visual message is shown on a display screen of the device. The visual message is targeted toward those around the device rather than to the device's user.

[0005] In some embodiments, the monitoring devices include a camera and a microphone. Images taken by the camera are analyzed in an attempt to detect persons

or objects around the user or to determine where the user is located. Captured speech is analyzed to determine topics of conversation. The results of these analyses are fed into a decision-making process that determines what visual messages would be appropriate.

[0006] In one embodiment, the visual message is an advertisement. Based on the monitoring, an advertisement is chosen and displayed. The device's owner may receive some compensation from the advertiser for allowing his device to display advertisements. While not expected to be very significant, the compensation can offset the cost of the hardware that, in the past, went unused for long periods of time.

[0007] Some embodiments are directed toward "clamshell" cellular telephones. Most of these devices include a display on the "outside," visible when the telephone is in the closed position, and another display on the "inside," visible to the user when the user opens the telephone to make a call. Detecting that the device is open and in use (and therefore that the outside display is pointed away from the user and toward people around him, if any), visual messages are displayed on the outside display.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0008] While the appended claims set forth the features of the present invention with particularity, the invention, together with its objects and advantages, may be best understood from the following detailed description taken in conjunction with the accompanying drawings of which:

[0009] Figure 1 is an overview of a representational environment in which the present invention may be practiced;

[0010] Figures 2a, 2b, and 2c are simplified schematics of a personal communication device that displays visual messages on its outer surface;

[0011] Figure 3 is a flowchart of an exemplary method for analyzing an environment around a device and for displaying a visual message appropriate to that environment; and

[0012] Figure 4 is a dataflow diagram showing how visual messages can be supplied to a device.

DETAILED DESCRIPTION

[0013] Turning to the drawings, wherein like reference numerals refer to like elements, the invention is illustrated as being implemented in a suitable environment. The following description is based on embodiments of the invention and should not be taken as limiting the invention with regard to alternative embodiments that are not explicitly described herein.

[0014] In Figure 1, a person 102 is communicating via her personal communication device 104. While in use, the "outside" of the device 104 faces away from the user 102. (In this discussion, the "inside" of the device 104 is defined to be the side closest to the user 102 when she is using the device 104 to communicate. The "outside" of the device 104 is the side facing away from the user 102.) The device 104 of the user 102 is in a communications environment 100 (e.g., the device 104 has access to a cellular telephone network) that allows the device 104 to access other devices, in particular, the message server 112.

[0015] According to aspects of the present invention, the personal communication device 104 can display visual messages on its outside face. The visual messages may, for example, be sent to the device 104 from the message server 112, or the visual messages may be stored or generated locally on the device 104.

[0016] The visual messages presented by the personal communication device 104 are not intended to be seen by the user 102 of the device 104. Instead, they are intended to be seen by other people in the near vicinity of the device 104. In Figure 1, some people, e.g., the person 106, are positioned so that they can see the visual messages displayed on the outside of the device 104. Other people, e.g., the person 108, are not in a position to see the visual messages. Some people, e.g., the person 110, are in a position where they could see the visual messages, but they are busy in their own tasks and so are not looking at the device 104.

[0017] Figures 2a, 2b, and 2c show a personal communication device 104 (e.g., a cellular telephone, personal digital assistant, or personal computer) that incorporates an embodiment of the present invention. Figures 2a and 2c show the device 104 in an open configuration, presenting its main display screen 200 to the user 102. Typically, the main display 200 is used for most high-fidelity interactions with the user. For example, the main display 200 is used to show video or still images, is part of a user interface for changing configuration settings, and is used for viewing call logs and contact lists. To support these interactions, the main display 200 is of high resolution and is as large as can be comfortably accommodated in the device 104. The typical user interface of the device 104 includes, in addition to the main display 200, a keypad 202 or other user-input devices.

[0018] Figure 2b shows the other or "outside" face of the personal communication device 104. This is the side that generally faces away from the user 102 when she is using the device 104 to communicate. On this side, the device 104 includes a second display screen 204, usually smaller than the main display screen 200. Many devices 104 include a camera 206 on this outside face.

[0019] Figure 2c illustrates some of the more important internal components of the personal communication device 104. The device 104 includes a communications transceiver 208, a processor 210, and a memory 212. A microphone 214 (or two) and a speaker 216 are usually present.

[0020] Figure 3 presents one method for displaying visual messages on the screen 204 on the outside face of the personal communication device 104, according to aspects of the present invention. Figure 4 shows how data flow through a system embodying aspects of the present invention. In the following discussion, these two figures are considered together.

[0021] The method of Figure 3 begins in step 300. The method wishes to determine whether the outside screen 204 of the personal communication device 104 is facing toward other people in the near vicinity of the user 102. Because this cannot be directly determined, as a substitute step 300 determines that the user 102 of the device 104 is interacting with the inside face of the device 104. For example, where

the device 104 is a clamshell cellular telephone as illustrated in Figures 2a, 2b, and 2c, this can mean that the user 102 has opened the device 104 and is making a call. By determining this, the system of the present invention can reasonably assume that the outside screen 204 of the device 104 is facing away from the user 102 and is thus in a favorable position for displaying visual messages to people in the near vicinity of the user 102.

[0022] There are several ways of knowing that the user 102 is interacting with the inside face of the personal communication device 104. Possibly the best detection method involves determining that the user 102 is actually in a call using the device 104 without the assistance of an external microphone or speaker (e.g., a wired or wireless headset) (400 in Figure 4). In this case, the user 102 is almost certainly holding the device 104 in a manner that positions its outside screen 204 toward other people. A simpler embodiment may react whenever the user 102 opens the device 104 or interacts with the user interface 202 on the inside face of the device 104. While this detection method is not ideal (when interacting with the user interface 202, the outside screen 204 of the device 104 may be facing down rather than toward other people), it can work especially when accompanied by a timer. For example, the visual messages are displayed (step 308 of Figure 3, discussed below) for five minutes after the most recent interaction with the user interface 202. During the period of the timer, the user 102 will probably move the device 104 into a position where its outside screen 204 is directed toward other people.

[0023] In step 302, the personal communication device 104 attempts to collect data from the environment surrounding the device 104. This collection process can begin after step 300 determines that a favorable opportunity exists, or it may go on continually. In any case, the collected data may include sounds collected by the microphone 214 or images collected by the camera 206. (Note that some devices 104 include two microphones 214 in order to cancel out background noise. In some embodiments of the present invention, one microphone 214 is dedicated to the user 102, while the other microphone 214 is used to collect environmental data.) Some devices 104 have other sensors (402 in Figure 4) that can be used. For example, a

GPS sensor can tell the location of the device, a clock can tell the time of day, or a light sensor (possibly tied to the camera 206) can sense ambient lighting.

[0024] In step 304, the collected environmental data are analyzed (404 in Figure 4). Images from the camera 206 may indicate the number of people surrounding the user 102 of the personal communication device 104. Specific faces, landmarks, or printed words may be recognized. The GPS location of the device 104 can be correlated with a map to know the venue in which the user 102 is located. Keywords can be extracted from conversations overheard.

[0025] The analysis of step 304 is used in step 306 to choose an appropriate visual message to display on the outside screen 204 of the personal communication device 104. For example, the analysis may reveal that the user 102 is in an arena at a sporting event. The appropriate visual messages can then be advertising messages related to that event or to the teams participating in the event. If keywords extracted from overheard conversations indicate that dinner choices are being discussed, that information can be combined with a location determination to select advertisements for local restaurants.

[0026] Other inputs can be made to the selection of appropriate visual messages (406 in Figure 4). For example, the preferences of the user 102 can be considered, and messages deemed offensive by the user 102 can be selected against. A sponsor of visual messages can also impose preferences. For example, a restaurant sponsor may not wish to display advertising at times when the restaurant is closed.

[0027] The sensor data, preferences, and other rules are applied to choose one or more appropriate visual messages for display. The selection process of step 306 can occur locally on the personal communication device 104, remotely on the message server 112, or on a combination of the two.

[0028] The chosen visual message is retrieved either from the personal communication device 104 itself or from the remote message server 112 and is displayed on the outside screen 204 of the device 104 (step 308 of Figure 3). Because the outside screen 204 is usually quite small, many visual messages are expected to be

simple logos or other images easily interpreted by people at a distance of a few feet from the outside screen 204. The process of collecting data, analyzing, choosing, and displaying a visual message can cycle as long as the device 104 is determined to be in a favorable position for displaying visual messages.

[0029] Step 310 is optional but potentially important. For visual messages that are advertisements, the message sponsor can compensate the user 102 for displaying the messages. This compensation is meant to induce the user 102 to agree to display the advertisements, subject, of course, to the stated preferences of the user 102. In a simple system, the user 102 is compensated for each visual message displayed. A more sophisticated system can analyze (possibly using the same sensors discussed above in reference to step 302) the environment of the personal communication device 104 at the time when each visual message is displayed. The compensation is then varied depending upon those circumstances. For example, a visual message displayed when many people are in the vicinity of the user 102 may be worth more to the message sponsor than the same visual message displayed when few people are around.

[0030] The methods of the present invention therefore allow a message sponsor to reach a small, but potentially relevant, audience. Compensation arrangements can benefit the user 102 for allowing the message sponsor to use the small message "billboard" of her outside screen 204 that would otherwise be unused while the user 102 is making a call.

[0031] In view of the many possible embodiments to which the principles of the present invention may be applied, it should be recognized that the embodiments described herein with respect to the drawing figures are meant to be illustrative only and should not be taken as limiting the scope of the invention. For example, messages other than advertisements, e.g., public service notices, can be displayed. Other arrangements for compensation are possible and may be called for in various environments. Therefore, the invention as described herein contemplates all such embodiments as may come within the scope of the following claims and equivalents thereof.

CLAIMS

We claim:

1. A method for displaying a message (408) on a personal communication device (104), the device (104) comprising a first side and a second side opposite the first side, the method comprising:

determining (300, 400) that a user (102) is interacting with a user interface (200, 202, 214) on the first side of the device (104);

collecting (302) data from an environment around the device (104), the data collected (302) by an element selected from the group consisting of: a camera (206) on the device (104) and a microphone (214) on the device (104);

analyzing (304, 404) at least some of the collected data;

based, at least in part, on a result of the analyzing, choosing (306, 406) a visual message (308); and

on a display (204) on the second side of the device (104), displaying (308) the chosen message (408).

2. The method of claim 1 wherein determining that a user is interacting with a user interface comprises detecting an element selected from the group consisting of: an opening of the device to reveal the first side, a telephone conversation mediated by the device, an Internet interaction mediated by the device, an entry made by the user on the user interface, and a media presentation on the user interface.

3. The method of claim 1 wherein analyzing at least some of the collected data comprises analyzing collected image data in an attempt to determine a venue of the device.

4. The method of claim 1 further comprising:

recording circumstances of displaying the chosen message; and

compensating the user of the device, the compensating based, at least in part, on the recorded circumstances.

5. A personal communication device (104) comprising:

a user interface (200, 202, 214) on a first side of the device (104);

a display (204) on a second side of the device (104), the second side opposite the first side; and

a processor (210) configured to:

determine (300, 400) that a user (102) is interacting with the user interface (200, 202, 214) on the first side of the device (104);

collect (302) data from an environment around the device (104), the data collected (302) by an element selected from the group consisting of: a camera (206) on the device (104) and a microphone (214) on the device (104);

analyze (304, 404) at least some of the collected data; and

on the display (204) on the second side of the device (104), display (308) a message (408).

6. The personal communication device of claim 5 wherein determining that a user is interacting with a user interface comprises detecting an element selected from the group consisting of: an opening of the device to reveal the first side, a telephone conversation mediated by the device, an Internet interaction mediated by the device, an entry made by the user on the user interface, and a media presentation on the user interface.

7. The personal communication device of claim 5 wherein analyzing at least some of the collected data comprises analyzing collected image data in an attempt to determine a venue of the device.

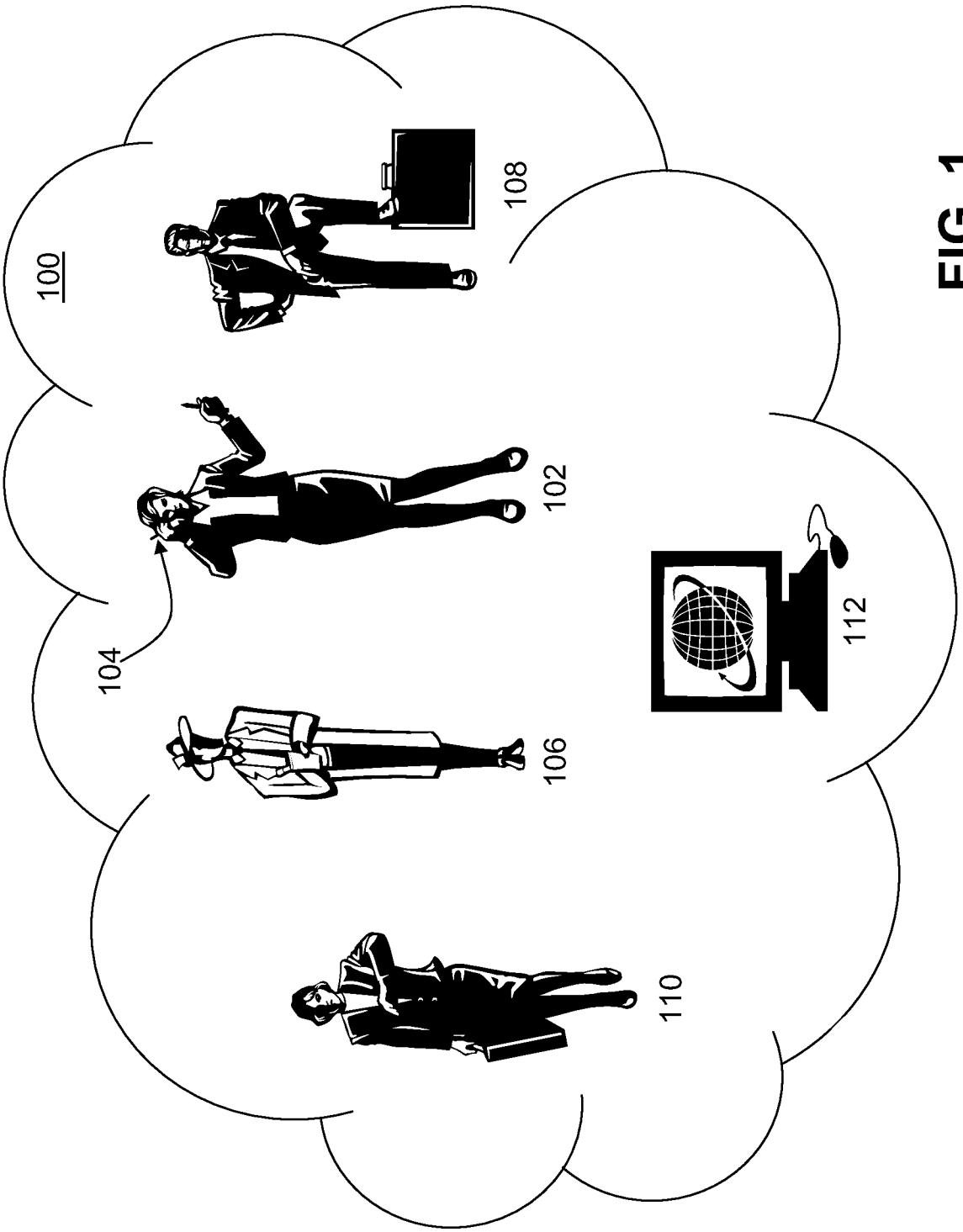


FIG. 1

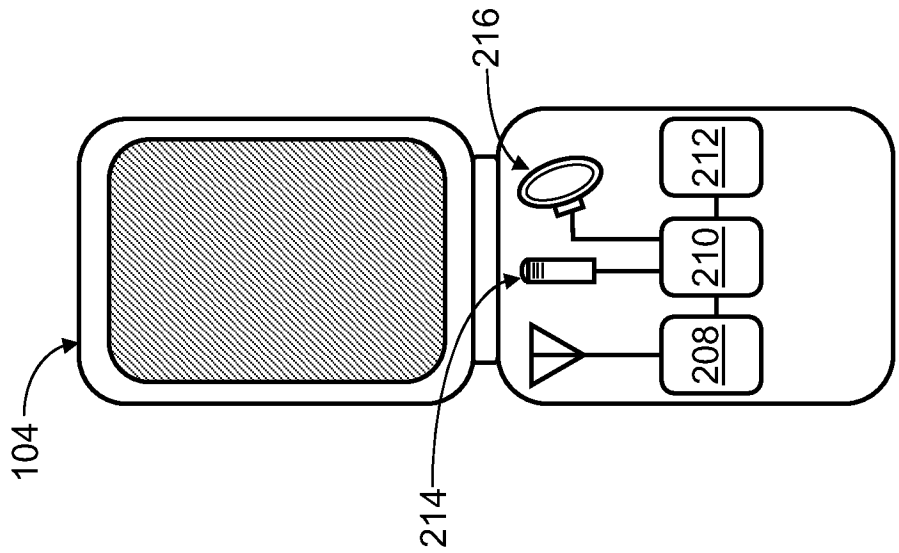


FIG. 2c

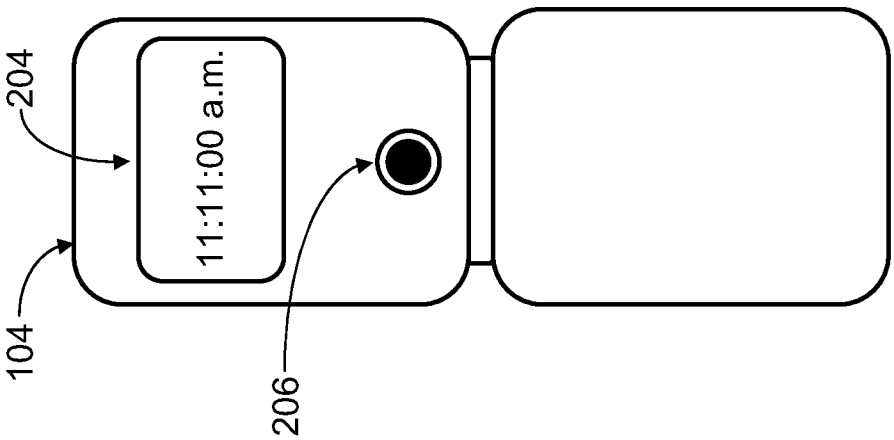


FIG. 2b

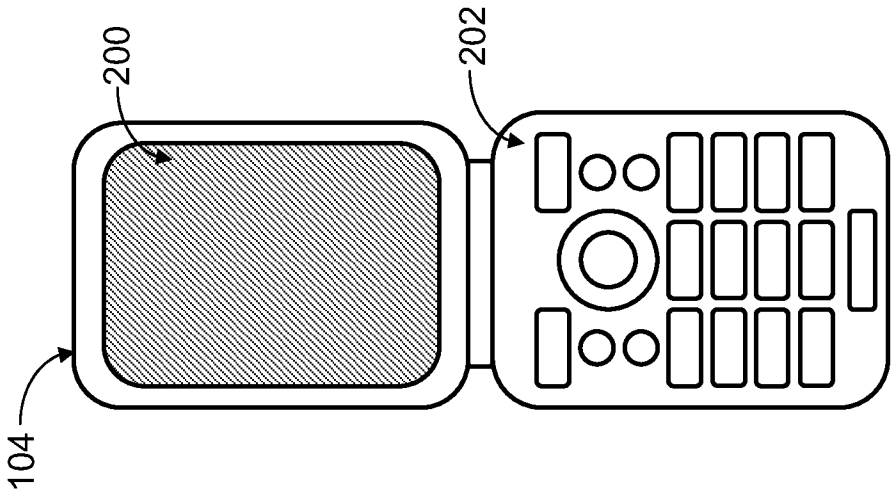


FIG. 2a

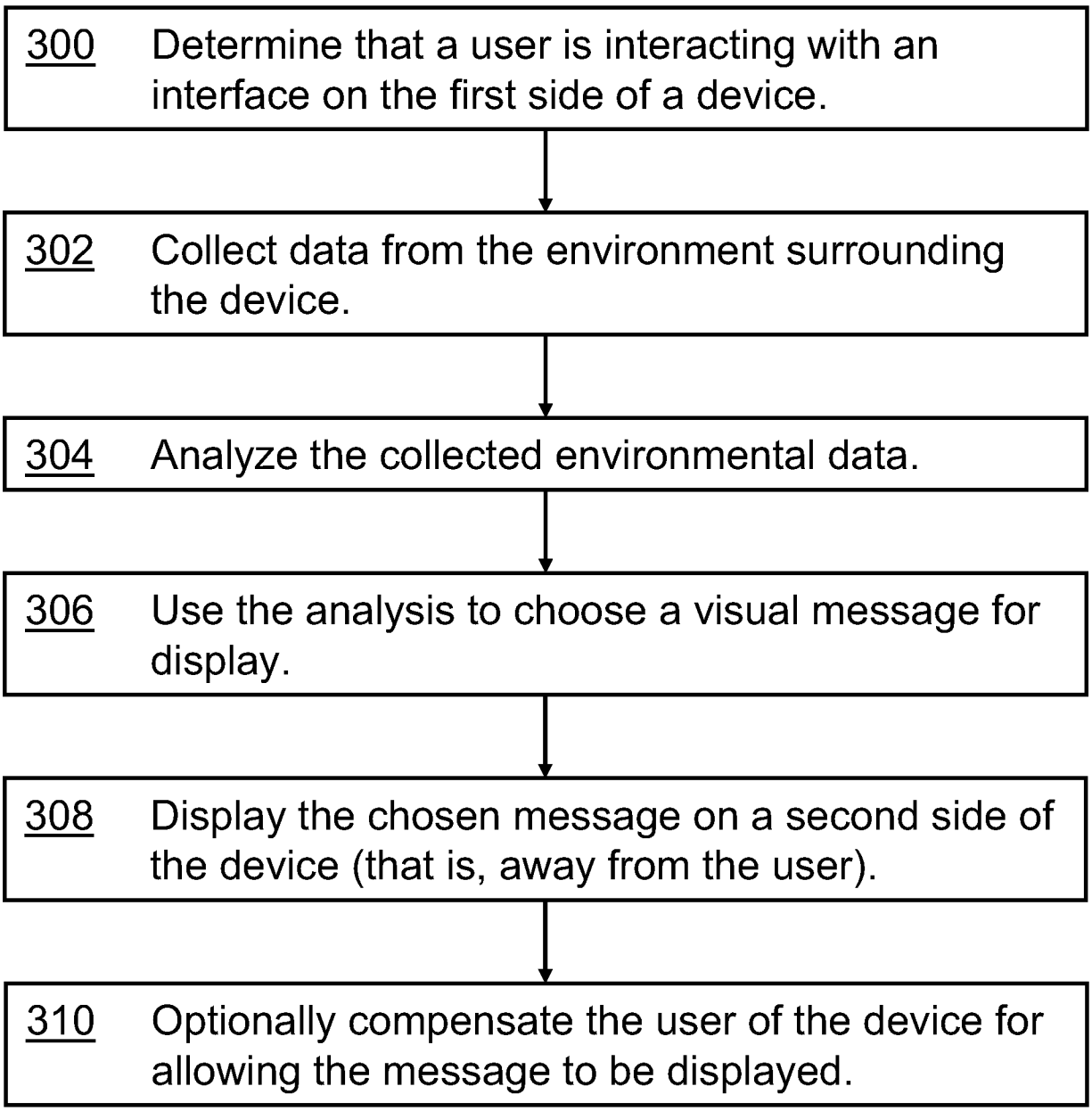

300 Determine that a user is interacting with an interface on the first side of a device.
302 Collect data from the environment surrounding the device.
304 Analyze the collected environmental data.
306 Use the analysis to choose a visual message for display.
308 Display the chosen message on a second side of the device (that is, away from the user).
310 Optionally compensate the user of the device for allowing the message to be displayed.

FIG. 3

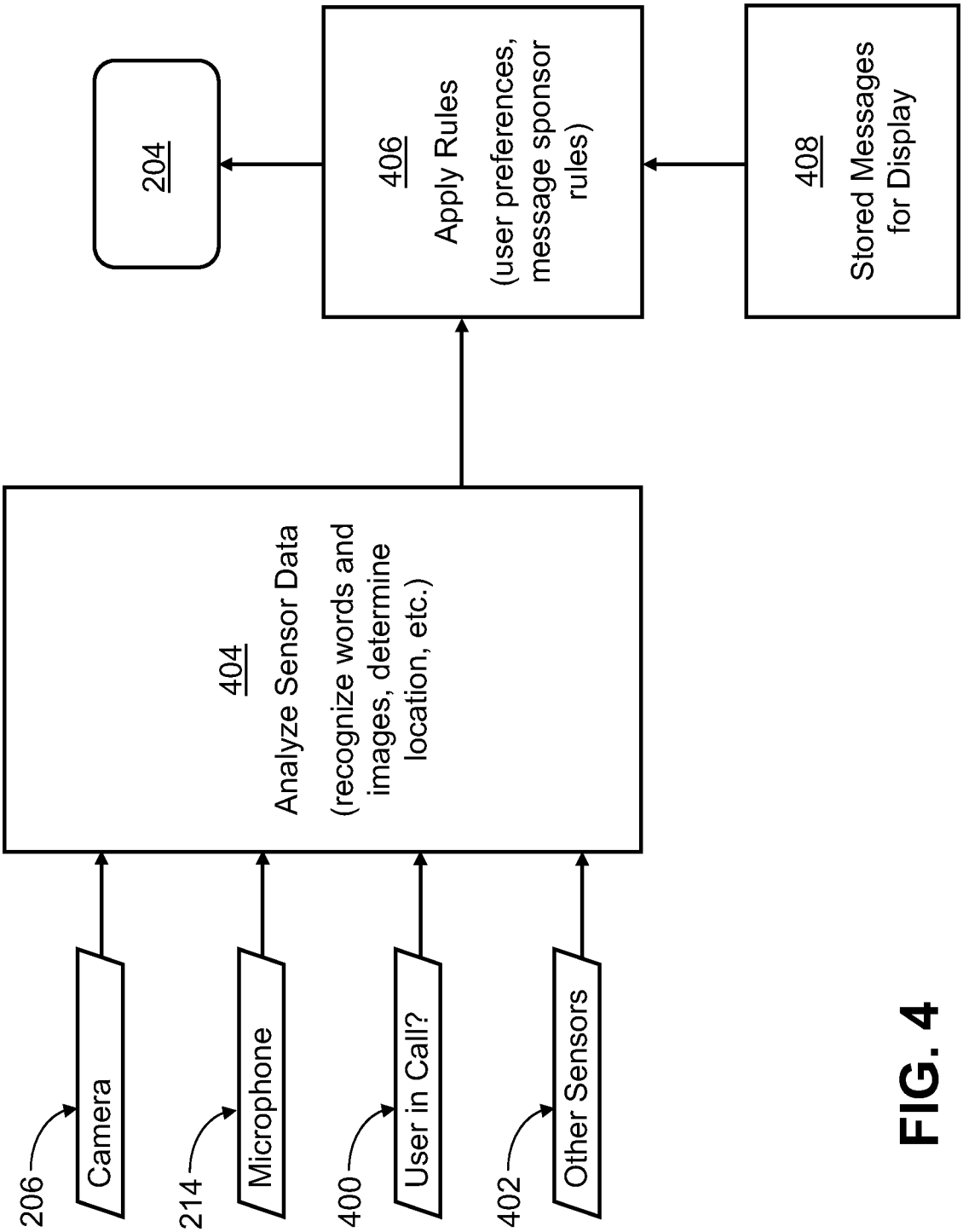

206
Camera
214
Microphone
400
User in Call?
402
Other Sensors
404
Analyze Sensor Data
(recognize words and images, determine location, etc.)
406
Apply Rules
(user preferences, message sponsor rules)
408
Stored Messages for Display
204

FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/064766

A. CLASSIFICATION OF SUBJECT MATTER

H04W 4/12(2009.01)i, H04W 88/02(2009.01)i, G06Q 30/00(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H04W 4/12; G06F 17/60; G06K 9/00; H04B 1/38; H04M 11/00; H04N 7/14; H04Q 7/20

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

Korean utility models and applications for utility models
Japanese utility models and applications for utility models
(Chinese Patents and application for patent)

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

eKOMPASS(KIPO internal) & Keywords: outside display, advertisement, mobile

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	US 7218956 B2 (OKAWA, M.) 15 May 2007 See the abtract, fig.2, claims 6 and 8-9	1-3,5-7 4
Y A	JP 2003-087420 A (TOKASHIKI, M.) 20 March 2003 See the abstract, paras.[0038]-[0042], claims 1-4	1-3,5-7 4
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PA	US 2009-0097712 A1 (HARRIS S. C.) 16 April 2009 See the abstract, claims 13 and 14	1-7

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 MAY 2010 (11.05.2010)	**13 MAY 2010 (13.05.2010)**

Name and mailing address of the ISA/KR

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Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea

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Authorized officer

Park Ji Eun

Telephone No. 82-42-481-5696

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2009/064766

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