



US 20140195925A1

(19) **United States**

(12) **Patent Application Publication**
Wikander

(10) **Pub. No.: US 2014/0195925 A1**

(43) **Pub. Date: Jul. 10, 2014**

(54) **SHORT-RANGE RADIO FREQUENCY
WIRELESS COMMUNICATION DATA
TRANSFER METHODS AND RELATED
DEVICES**

Publication Classification

(51) **Int. Cl.**
H04M 1/725 (2006.01)
G06F 3/01 (2006.01)
H04B 5/00 (2006.01)
(52) **U.S. Cl.**
CPC *H04M 1/72519* (2013.01); *H04B 5/0031*
(2013.01); *G06F 3/017* (2013.01)
USPC **715/748**

(75) Inventor: **Anders Wikander, Oxie (SE)**

(73) Assignee: **Sony Ericsson Mobile
Communications AB, Lund (SE)**

(21) Appl. No.: **14/128,420**

(22) PCT Filed: **Aug. 24, 2011**

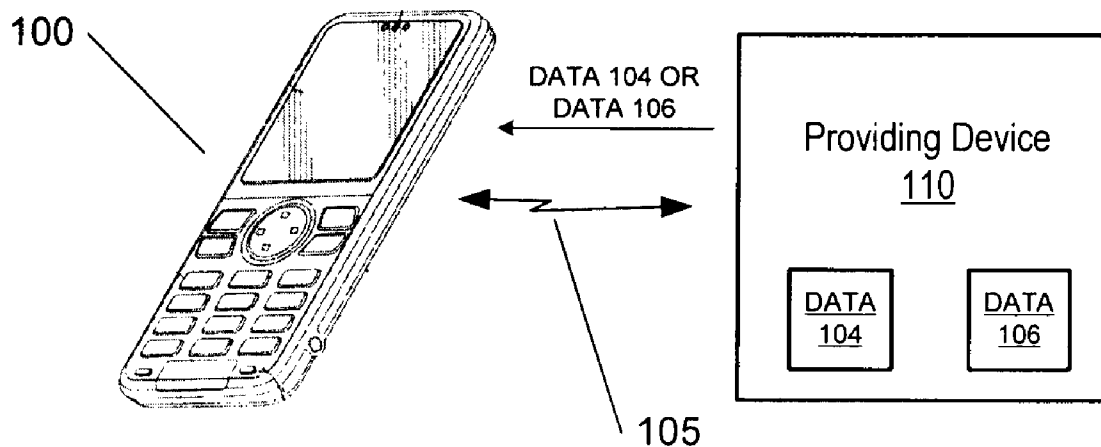
(86) PCT No.: **PCT/IB2011/001935**

§ 371 (c)(1),

(2), (4) Date: **Dec. 20, 2013**

(57) **ABSTRACT**

A data transfer method may include processing device gesture data at a providing device in response to a gesture made by movement or orientation of one of the providing device (110) and the requesting device (100) while proximately located to the other one of the providing device and the requesting device. The device gesture data may indicate the movement or orientation. The data transfer method may also include initiating a data transfer from the providing device to the requesting device in response to the device gesture data.



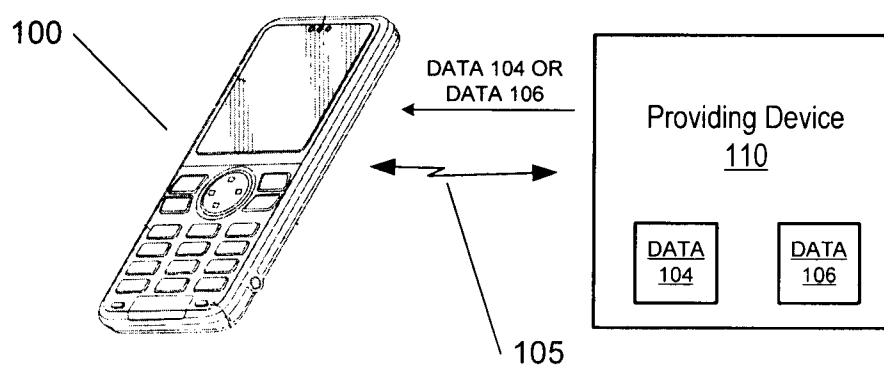
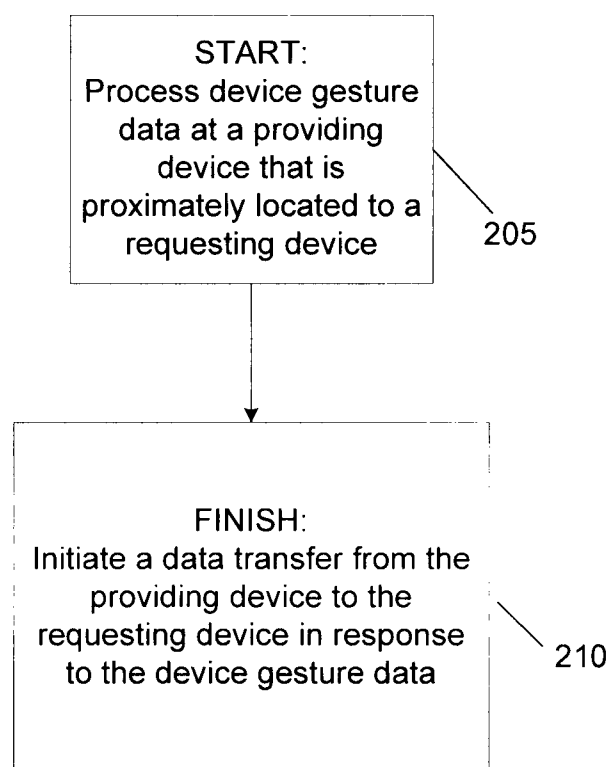


FIGURE 1

**FIGURE 2**

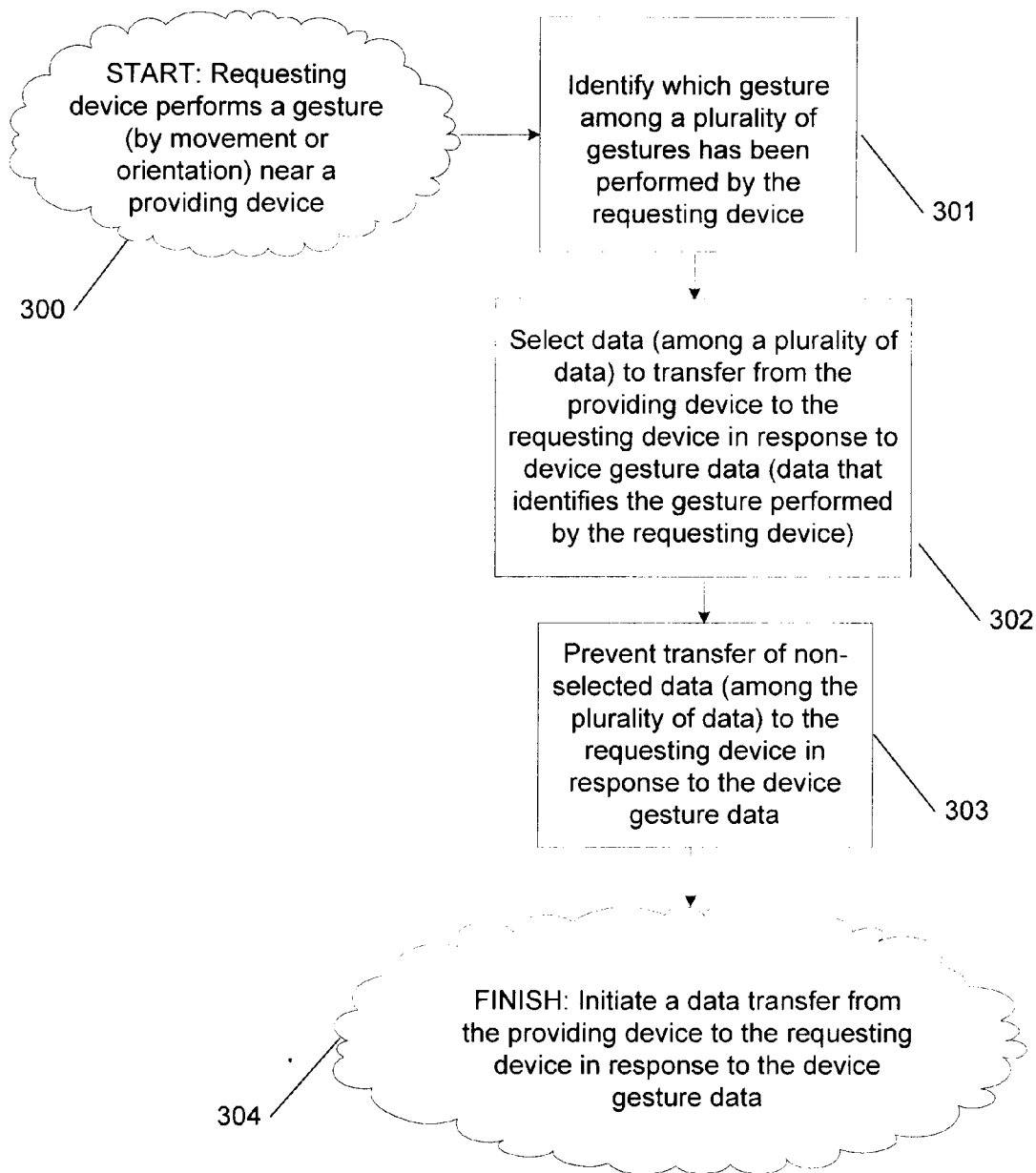


FIGURE 3

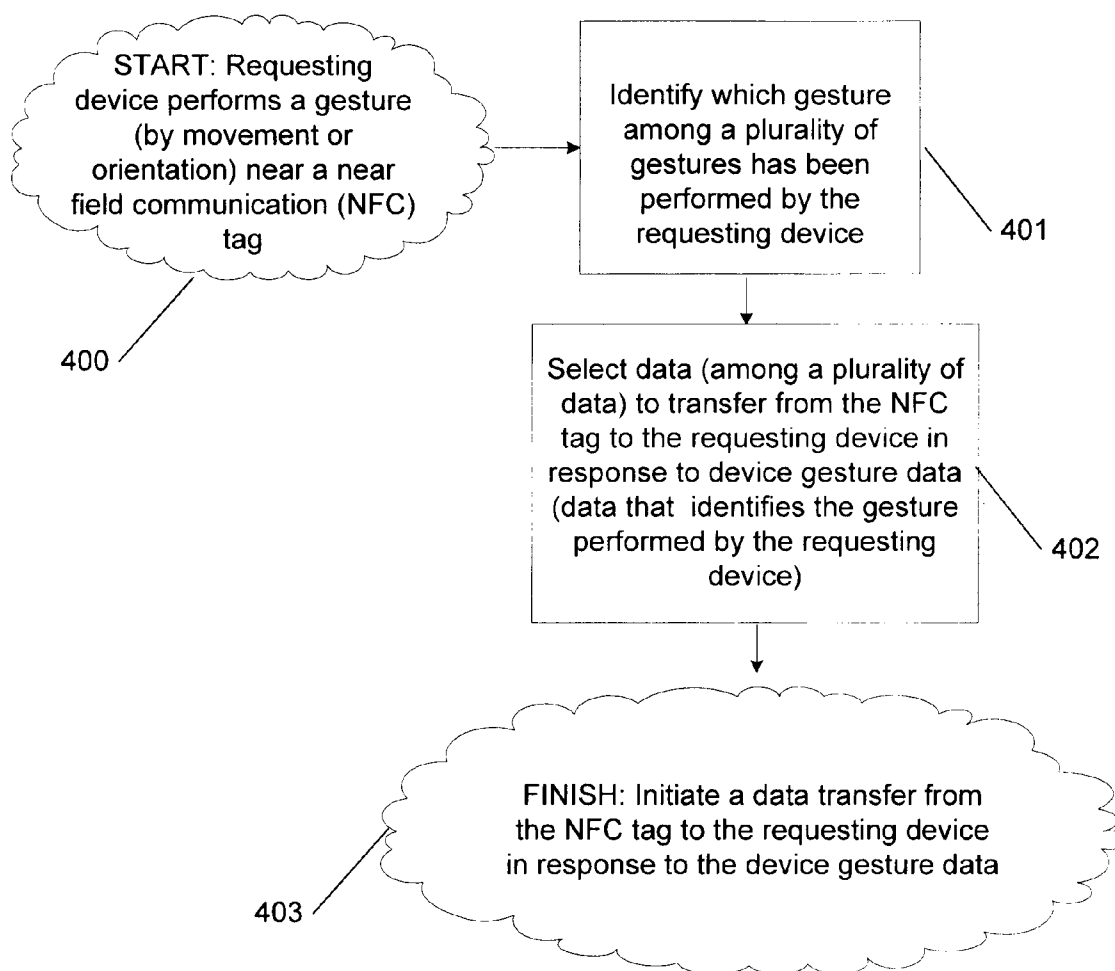


FIGURE 4

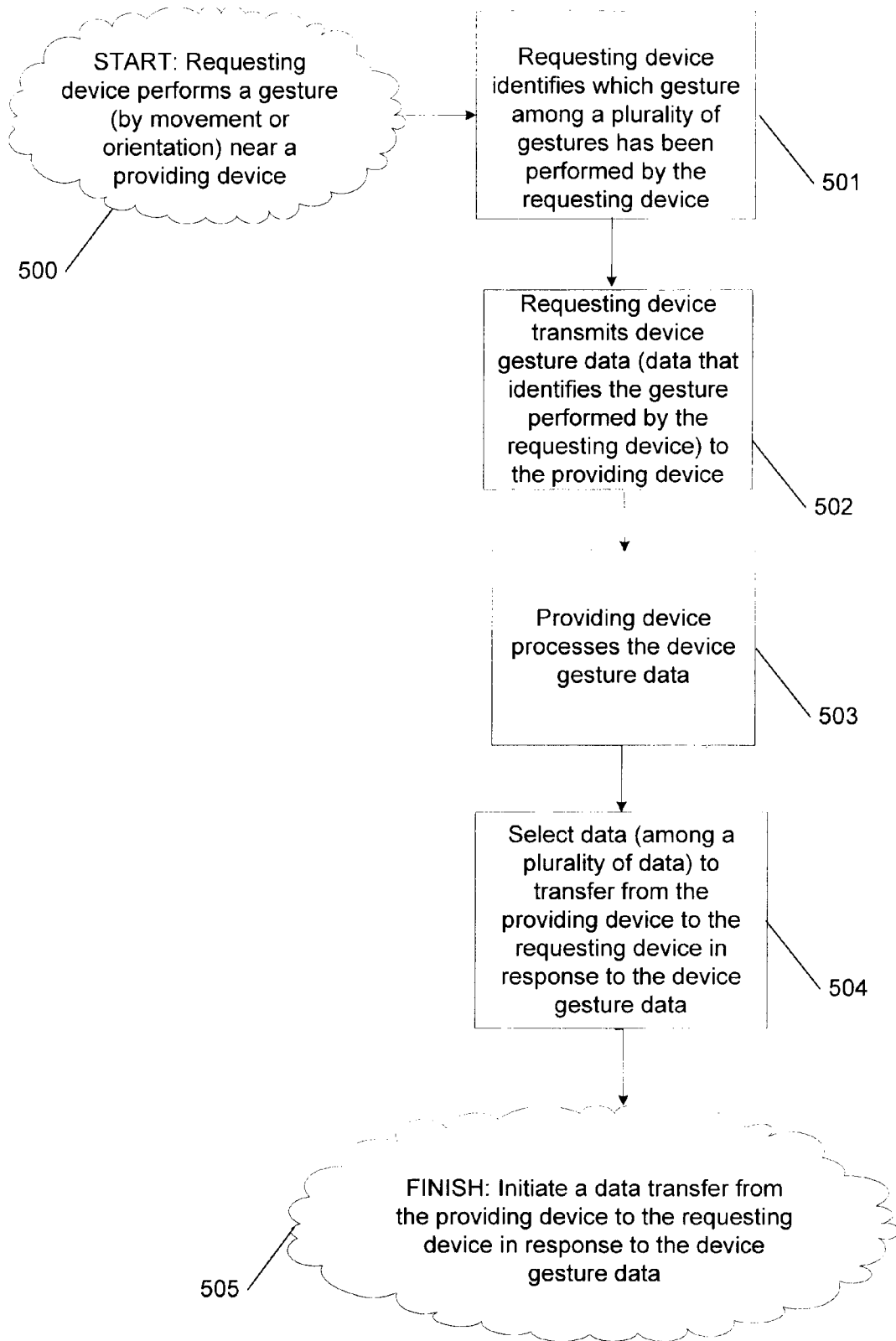


FIGURE 5

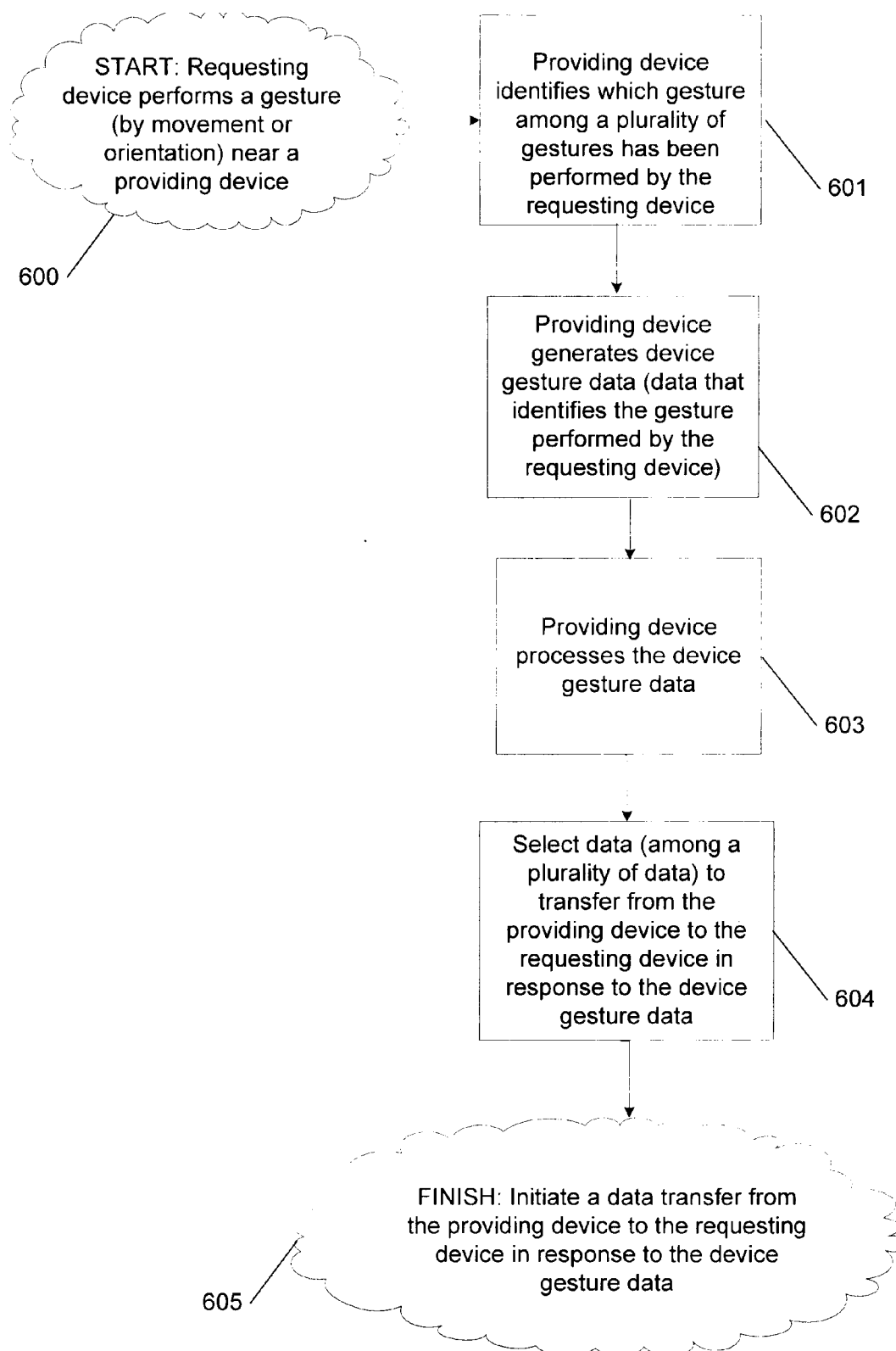


FIGURE 6

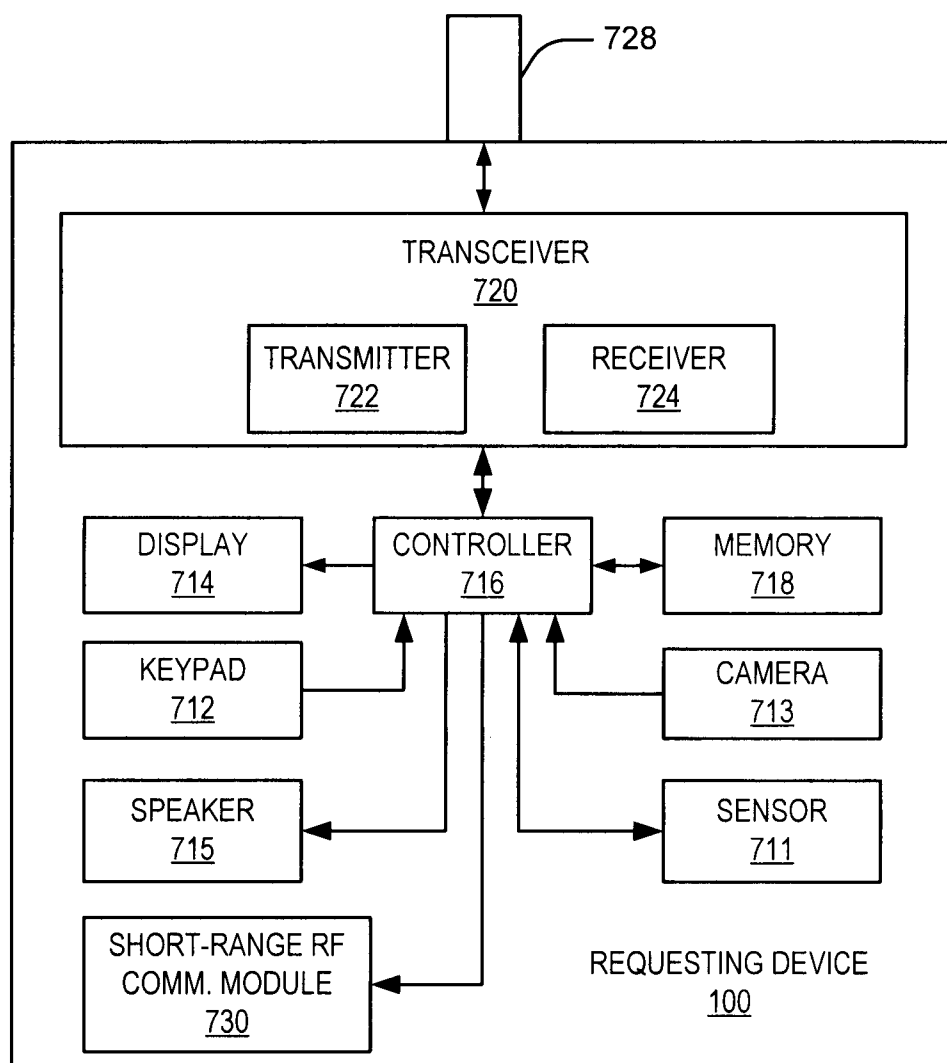


FIGURE 7

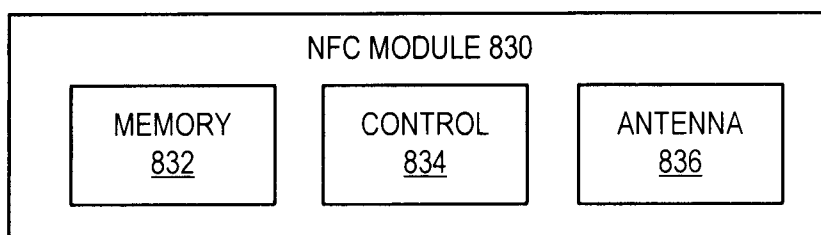


FIGURE 8

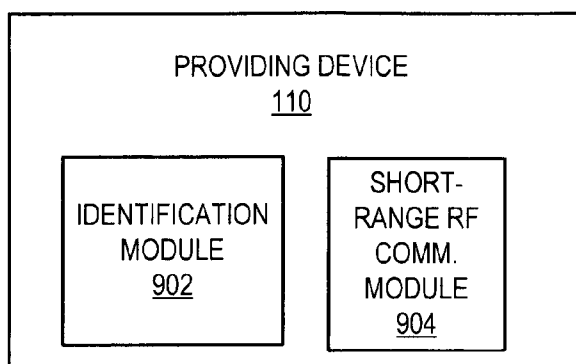


FIGURE 9A

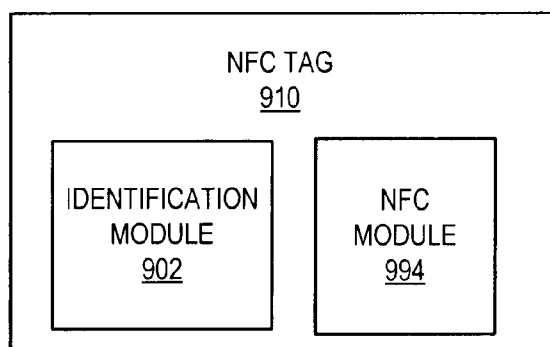


FIGURE 9B

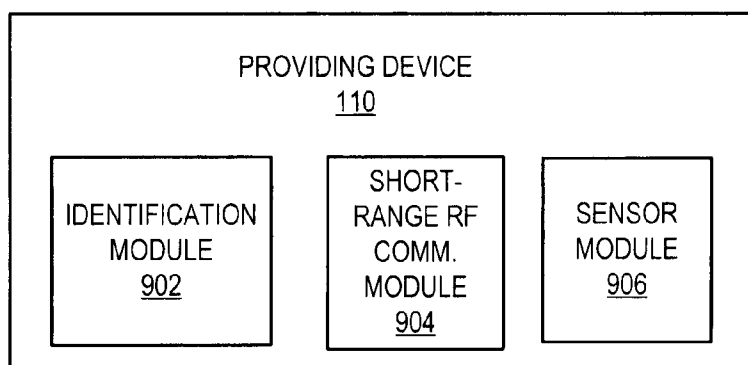


FIGURE 9C

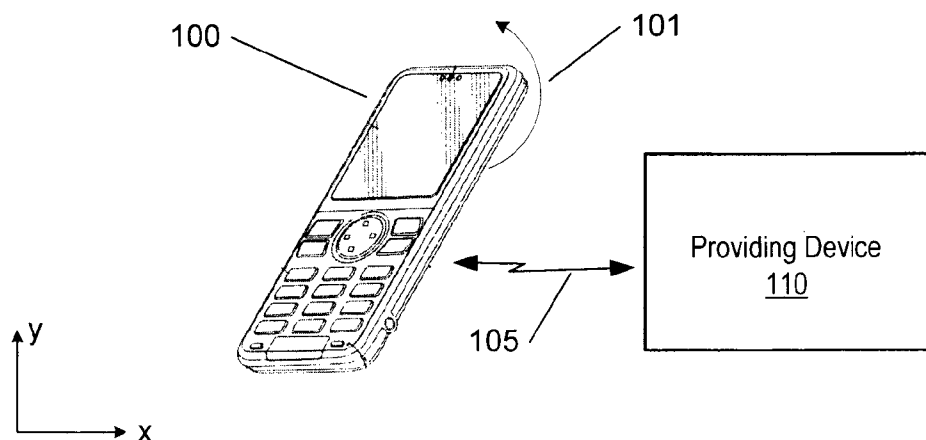


FIGURE 10A

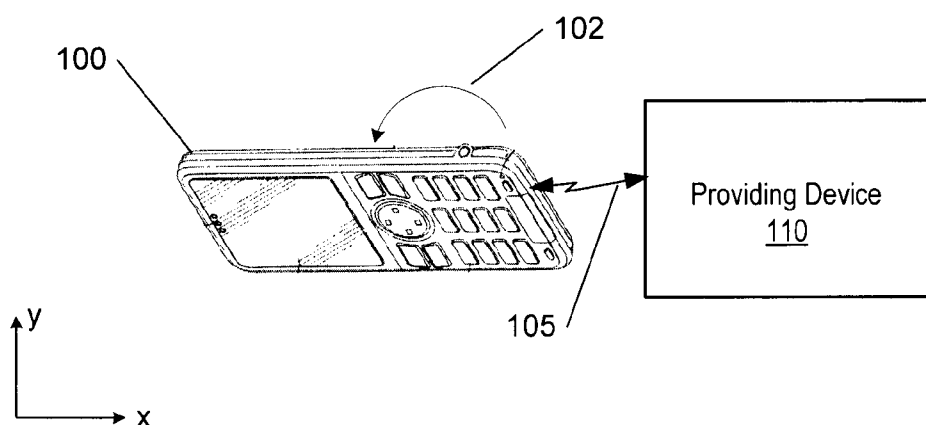


FIGURE 10B

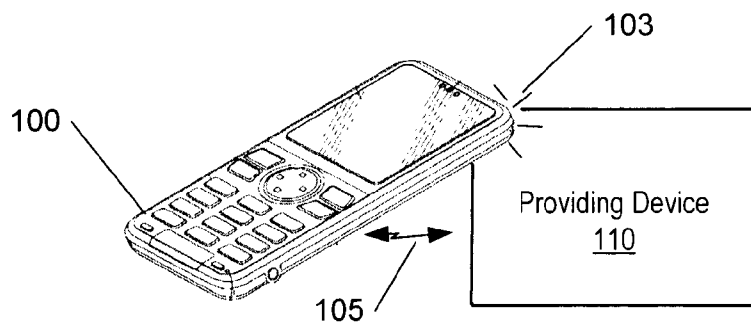


FIGURE 10C

**SHORT-RANGE RADIO FREQUENCY
WIRELESS COMMUNICATION DATA
TRANSFER METHODS AND RELATED
DEVICES**

FIELD

[0001] The present inventive concept generally relates to the field of communications and, more particularly, to short-range Radio Frequency (RF) wireless communication data transfer methods and related devices.

BACKGROUND

[0002] Short-range RF wireless communications may include Near Field Communications (NFC). NFC is a wireless communication technology that enables short-range communications between closely-positioned (e.g., less than twenty (20.0) centimeters (cm)) wireless devices. NFC may operate at a frequency of 13.56 Megahertz (MHz), which, in some countries, falls in an unlicensed ISM (industrial, scientific, medical) frequency range. The 13.56 MHz operating frequency may also be used for Radio Frequency Identification (RFID) applications. Thus, an NFC device can communicate with other NFC devices in a peer-to-peer communication mode, as well as with RFID devices in a read/write mode. Like RFID, NFC uses magnetic field induction for communication. In magnetic field induction, two communicating devices each include loop antennas. When placed in close proximity (e.g., less than twenty (20.0) cm), an electrical signal on one of the loop antennas can induce an electrical signal in the other of the loop antennas, thus providing a communication path between the devices.

[0003] NFC tags may be used to provide information (e.g., retail payment information) between a mobile phone and the NFC tags. For example, a user of the mobile phone may initiate or finalize a communication session with an NFC tag by bringing the mobile phone into close proximity with the NFC tag. One example of such a communication may be communicating with an NFC tag near a painting to receive more information at the mobile phone about the artist of the painting. Another example of the communication session may be communicating with an NFC tag near a cash register to pay for merchandise using the mobile phone.

[0004] Communication sessions between mobile phones and NFC tags may be integrated with additional interaction with mobile phone users. For example, a user of a mobile phone may initiate a communication session with an NFC tag and then provide additional input (e.g., to sort through menu options or to answer requests) using the keypad of the mobile phone.

SUMMARY

[0005] Some embodiments of the present inventive concept include a data transfer method. The data transfer method may include processing device gesture data at a providing device in response to a gesture made by movement or orientation of one of the providing device and the requesting device while proximately located to the other one of the providing device and the requesting device. The device gesture data may indicate the movement or orientation. The data transfer method may also include initiating a data transfer from the providing device to the requesting device in response to the gesture indicated by the device gesture data.

[0006] In some further embodiments, the device gesture data is transmitted through a near field communication (NFC) link.

[0007] In some further embodiments, the providing device includes an NFC tag, and the data transfer is performed from the NFC tag.

[0008] In some further embodiments, the providing device includes a portable electronic device, and the data transfer is performed from the portable electronic device.

[0009] In some further embodiments, the providing device is configured to transfer first and second data. Also, the data transfer method may further include selecting one of the first and second data and transferring the selected data from the providing device to the requesting device in response to the gesture identified from the device gesture data.

[0010] In some further embodiments, the one of the requesting device and the providing device may be configured to identify first and second device gestures. Also, the data transfer method may further include identifying which of the first and second device gestures has been performed by the one of the requesting device and the providing device.

[0011] In some further embodiments, selecting one of the first and second data to transfer from the providing device to the requesting device may include transferring the first data and preventing transfer of the second data in response to identifying the first device gesture.

[0012] In some further embodiments, selecting one of the first and second data to transfer from the providing device to the requesting device may include transferring the second data and preventing transfer of the first data in response to identifying the second device gesture.

[0013] In some further embodiments, the requesting device may be configured to identify which of the first and second device gestures has been performed by the requesting device. Also, the device gesture data may indicate which of the first and second device gestures has been performed by the requesting device. Moreover, the device gesture data may be transmitted by the requesting device to the providing device.

[0014] In some further embodiments, the providing device may be configured to identify which of the first and second device gestures has been performed by the providing device. Also, the device gesture data may indicate which of the first and second device gestures has been performed by the providing device. Moreover, the device gesture data may be generated by the providing device.

[0015] In some further embodiments, the data transfer method may further include transmitting identification information from the requesting device to the providing device.

[0016] According to some other embodiments, a portable electronic device may include a short-range radio frequency (RF) wireless communication module and a sensor. The short-range RF wireless communication module may be configured to exchange at least one of first and second data with a proximately-located electronic device. The sensor may be configured to identify occurrence of one of first and second device gestures that are made by movement or orientation of the portable electronic device while proximately located to the proximately-located electronic device. The short-range RF wireless communication module may exchange the at least one of the first and second data in response to the portable electronic device identifying a respective one of the first and second device gestures.

[0017] In some further embodiments, the short-range RF wireless communication module may include a near field

communication (NFC) module. Also, the proximately-located electronic device may include an NFC tag.

[0018] In some further embodiments, the portable electronic device and the proximately-located electronic device may include different types of devices.

[0019] In some further embodiments, the portable electronic device may include at least one of a mobile terminal, an electronic reading device, a music player, and a video player. Additionally, the proximately-located electronic device may include a near field communication (NFC) tag. Moreover, the portable electronic device may be configured to selectively activate the at least one of the mobile terminal, the electronic reading device, the music player, and the video player in response to determining that a corresponding device gesture has occurred.

[0020] In some further embodiments, the sensor may be further configured to detect the first and second device gestures. Also, the portable electronic device may further include a transceiver configured to transmit device gesture data identifying one of the first and second device gestures to the proximately-located electronic device in response to the sensor detecting the one of the first and second device gestures.

[0021] In some further embodiments, the sensor may include at least one of a motion sensor, a rotation sensor, a tap sensor, and a proximity sensor.

[0022] A short-range radio frequency (RF) wireless communication providing device according to some other embodiments may include an identification module configured to process device gesture data. The providing device can include a short-range RF wireless communication module configured to initiate a transfer of one of first and second data to a proximately-located requesting device in response to the device gesture data identifying one of first and second device gestures that are made by movement or orientation of one of the providing device and the requesting device while proximately located to the other one of the providing device and the requesting device.

[0023] In some further embodiments, the providing device may include an NFC tag.

[0024] In some further embodiments, the providing device may further include a sensor module configured to detect the one of the first and second device gestures made by the providing device. Also, the identification module may be configured to generate the device gesture data in response to the sensor module detecting the one of the first and second device gestures.

[0025] Other methods and/or devices according to embodiments of the inventive concept will be or become apparent to one with skill in the art upon review of the following drawings and detailed description. It is intended that all such additional devices and/or systems be included within this description, be within the scope of the present inventive concept, and be protected by the accompanying claims. Moreover, it is intended that all embodiments disclosed herein can be implemented separately or combined in any way and/or combination.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] FIG. 1 illustrates a requesting device and a providing device that communicate with each other through a short-range Radio Frequency (RF) wireless communication link, according to some embodiments of the present inventive concept.

[0027] FIG. 2 is a flowchart illustrating a method of transferring data from the providing device to the requesting device in response to device gesture data, according to some embodiments of the present inventive concept.

[0028] FIG. 3 is a flowchart illustrating a data transfer method that includes selecting data to transfer and preventing the transfer of non-selected data, according to some embodiments of the present inventive concept.

[0029] FIG. 4 is a flowchart illustrating a method of transferring data from a Near Field Communication (NFC) tag to the requesting device in response to device gesture data, according to some embodiments of the present inventive concept.

[0030] FIG. 5 is a flowchart illustrating a data transfer method in which the requesting device transmits the device gesture data to the providing device, according to some embodiments of the present inventive concept.

[0031] FIG. 6 is a flowchart illustrating a data transfer method in which the providing device identifies the device gesture, according to some embodiments of the present inventive concept.

[0032] FIG. 7 is a block diagram illustrating the portable electronic device, according to some embodiments of the present inventive concept.

[0033] FIG. 8 is a block diagram illustrating an NFC module, according to some embodiments of the present inventive concept.

[0034] FIGS. 9A-9C are block diagrams illustrating the providing device, according to some embodiments of the present inventive concept.

[0035] FIGS. 10A-10C illustrate device gestures performed by the portable electronic device, according to some embodiments of the present inventive concept.

DETAILED DESCRIPTION OF EMBODIMENTS

[0036] The present inventive concept now will be described more fully with reference to the accompanying drawings, in which embodiments of the inventive concept are shown. However, the present application should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete, and to fully convey the scope of the embodiments to those skilled in the art. Like reference numbers refer to like elements throughout.

[0037] The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the embodiments. As used herein, the singular forms “a,” “an,” and “the” are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms “comprises,” “comprising,” “includes,” and/or “including,” when used herein, specify the presence of stated features, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, steps, operations, elements, components, and/or groups thereof.

[0038] It will be understood that when an element is referred to as being “coupled,” “connected,” or “responsive” to another element, it can be directly coupled, connected, or responsive to the other element, or intervening elements may also be present. In contrast, when an element is referred to as being “directly coupled,” “directly connected,” or “directly responsive” to another element, there are no intervening elements

ments present. As used herein the term “and/or” includes any and all combinations of one or more of the associated listed items.

[0039] Spatially relative terms, such as “above”, “below”, “upper”, “lower” and the like, may be used herein for ease of description to describe one element or feature’s relationship to another element(s) or feature(s) as illustrated in the figures. It will be understood that the spatially relative terms are intended to encompass different orientations of the device in use or operation in addition to the orientation depicted in the figures. For example, if the device in the figures is turned over, elements described as “below” other elements or features would then be oriented “above” the other elements or features. Thus, the exemplary term “below” can encompass both an orientation of above and below. The device may be otherwise oriented (rotated 90 degrees or at other orientations) and the spatially relative descriptors used herein interpreted accordingly. Well-known functions or constructions may not be described in detail for brevity and/or clarity.

[0040] It will be understood that, although the terms first, second, etc. may be used herein to describe various elements, these elements should not be limited by these terms. These terms are only used to distinguish one element from another. Thus, a first element could be termed a second element without departing from the teachings of the present embodiments.

[0041] Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one of ordinary skill in the art to which these embodiments belong. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

[0042] It is to be understood that the functions/acts indicated in the illustrated blocks may occur out of the order noted in the operational illustrations. For example, two blocks shown in succession may in fact be executed substantially concurrently or the blocks may sometimes be executed in the reverse order, depending upon the functionality/acts involved.

[0043] Although Near Field Communication (NFC) links have been used to facilitate payments for merchandise (as well as to provide other information) for users of devices communicating through the NFC links, communication sessions using the NFC links have been somewhat basic (e.g., limited to initiating or finalizing payments for merchandise). For example, although NFC links have facilitated payment processes, the payment processes have been integrated with additional user inputs (e.g., selecting menu options using a keypad). Accordingly, the payment processes have involved multiple steps and additional user inputs.

[0044] However, some embodiments of the data transfer methods and related devices described herein may provide options to a user of a portable electronic device in a relatively easily-accessible manner. For example, some embodiments described herein may combine short-range Radio Frequency (RF) wireless communications (e.g., NFC communications) with multiple device gestures to provide multiple options to the user of the portable electronic device. In particular, in one example, an NFC tag may transfer specific data (among a plurality of available transferrable data) to the portable electronic device in response a particular device gesture (among a plurality of possible device gestures) performed by the por-

table electronic device. Also, some embodiments described herein may provide relatively fast (e.g., instant) data transfers to the portable electronic device without requiring additional user inputs through manipulation of a user interface (e.g., keypad/keyboard/touch interface) beyond the particular device gesture performed with the portable electronic device. For example, the specific data may be transferred from the NFC tag to the portable electronic device in response to occurrence of the particular device gesture without requiring the user to look at a display screen of the portable electronic device and provide further input to the portable electronic device through a user interface. Accordingly, the particular device gesture performed by the portable electronic device may determine what specific data should be transferred by the NFC tag to the portable electronic device, and can initiate that specific data transfer. Alternatively, the particular device gesture performed by the portable electronic device may determine what specific data should be transferred from the portable electronic device to another device (e.g., another portable electronic device or the NFC tag).

[0045] Referring to FIG. 1, an illustration is provided of a portable electronic device (e.g., a requesting device) **100** and a proximately-located electronic device (e.g., a providing device) **110** that may communicate with each other through a short-range RF wireless communication link **105**, according to some embodiments of the present inventive concept. The providing device **110** may transfer data to the requesting device **100** through the short-range RF wireless communication link **105** or through another link/channel (e.g., the Internet, a Wireless Local Area Network (WLAN), Bluetooth, etc.). For example, the providing device **110** may be configured to select among a plurality of different data (e.g., audio, video, and/or information content/files) for transfer to the requesting device **100**. As an example, the providing device **110** may be configured to transfer data **104** and data **106** to the requesting device **100**. According to some embodiments, the providing device **110** may be configured to selectively transfer a particular one of the data **104** and the data **106** in response to a particular device gesture (e.g., a motion or orientation) performed by the requesting device **100** by operation of a user. Alternatively, the portable electronic device **100** may be a providing device that is configured to selectively transfer a particular one of the data **104** and the data **106** to another device in response to a particular device gesture. The particular one of the data **104** and the data **106** may be transferred through the short-range RF wireless communication link **105** or through another link/channel. For example, the providing device **110** may receive device gesture data through the short-range RF wireless communication link **105**, and may transfer the data **104** to the requesting device **100** through the Internet in response to the device gesture data.

[0046] Referring now to FIG. 2, a flowchart is provided illustrating a method of transferring data (e.g., the data **104**, **106**) from the providing device **110** to the requesting device **100** in response to device gesture data, according to some embodiments of the present inventive concept. The device gesture data may identify a gesture made by movement and/or orientation of one of the providing device **110** and the requesting device **100** while proximately located to the other one of the providing device **110** and the requesting device **100**. For example, the device gesture data may indicate a shake or a rotation (e.g., a spin or a flip) of the requesting device **100**. In another example, the device gesture data may

indicate a tap (or multiple taps) on the requesting device 100 (e.g., taps with a stylus or a user's finger), or a tap (or multiple taps) by the requesting device 100 on the providing device 110. In a further example, the device gesture data may indicate an orientation of the requesting device 100 (e.g., an orientation with respect to the ground or with respect to the providing device 110). For example, the device gesture data may indicate that a portion (e.g., a display) of the requesting device 100 faces (or doesn't face, or is oriented at a given angle with respect to) the providing device 110. In an additional example, the device gesture data may indicate that the requesting device 100 is held (e.g., held substantially motionless) near or on the providing device 110 for a given amount of time.

[0047] Referring still to FIG. 2, the data transfer method may include processing the device gesture data at the providing device 110 (Block 205). For example, processing the device gesture data at the providing device 110 may include determining what particular device gesture (e.g., shake, spin, flip, tilt, tap, hold/lack-of-motion, angle-of-facing, direction-of-facing, etc.) is indicated by the device gesture data. Processing the device gesture data at the providing device 110 may additionally, or alternatively, include selecting specific data to transfer to the requesting device 100 in response to the device gesture data (e.g., in response to the particular device gesture).

[0048] As further illustrated in Block 205, the providing device 110 and the requesting device 100 may be proximately located to each other. For example, the providing device 110 and the requesting device 100 may be within about four (4.0) centimeters (cm) of each other. In another example the providing device 110 and the requesting device 100 may be within about twenty (20.0) cm of each other.

[0049] As illustrated in Block 210 of FIG. 2, according to some embodiments, the data transfer method may further include initiating a data transfer from the providing device 110 to the requesting device 100 (e.g., through the short-range RF communication link 105 or through another link/channel) in response to the device gesture data. The device gesture data may indicate the movement or orientation of one of the providing device 110 and the requesting device 100, and either one (or both) of the providing device 110 and the requesting device 100 may identify/detect/sense the movement or orientation. For example, the requesting device 100 may identify/detect/sense the movement or orientation of the requesting device 100, and the providing device 110 may subsequently process device gesture data that indicates the movement or orientation of the requesting device 100.

[0050] Referring now to FIG. 3, a flowchart is provided illustrating a data transfer method that includes selecting data to transfer and preventing the transfer of non-selected data, according to some embodiments of the present inventive concept. The data transfer method includes the requesting device 100 performing a device gesture near (e.g., proximately to) the providing device 110 (Block 300). The data transfer method may also include identifying which device gesture among the plurality of device gestures (e.g., shake, spin, flip, tilt, tap, hold, angle-of-facing, direction-of-facing, etc.) has been performed by the requesting device 100 (Block 301).

[0051] Referring again to FIG. 1, the providing device 110 may be configured to transfer a plurality of data (e.g., data 104 and data 106 and/or additional data). Accordingly, the data transfer method illustrated in FIG. 3 may further include selecting one of the data 104 and the data 106 to transfer from

the providing device 110 to the requesting device 100 in response to the device gesture data, which identifies the device gesture performed by the requesting device 100 (Block 302). For example, in response to transfer of the data 106 being triggered by spinning the requesting device 100, the data 106 will be selected for transfer in response to the device gesture data identifying the device gesture as a spin. Although FIGS. 3-6 indicate that the requesting device 100 performs the device gesture, it will be understood that the device gesture may be performed by the providing device 110 in some embodiments.

[0052] As further illustrated in FIG. 3, the data transfer method may also include preventing the transfer of non-selected data among the plurality of data to the requesting device 100 in response to the device gesture data (Block 303). Moreover, the data transfer method may further include initiating a data transfer from the providing device 110 to the requesting device 100 (e.g., through the short-range RF communication link 105 or through another link/channel) in response to the device gesture data (Block 304). For example, the data transfer method may include transferring the data 104 while preventing the transfer of the data 106 in response to the device gesture data. In particular, transfer of the data 104 may be triggered by one of the device gestures (e.g., a shake), whereas transfer of the data 106 may be triggered by a different one of the device gestures (e.g., a tap). Accordingly, the data transfer method may include transferring the data 104 while preventing the transfer of the data 106 in response to the device gesture data indicating a shake.

[0053] Referring now to FIG. 4, a flowchart is provided illustrating a method of transferring data from an NFC tag to the requesting device 100 in response to the device gesture data, according to some embodiments of the present inventive concept. For example, referring again to FIG. 1, the providing device 110 may be an NFC tag. Also, the short-range RF wireless communication link 105 may be an NFC link. As such, according to some embodiments, the data transfer method includes the requesting device 100 performing a device gesture near the NFC tag 110 (Block 400). The data transfer method may also include identifying which device gesture among the plurality of device gestures has been performed by the requesting device 100 (Block 401). The data transfer method may further include selecting particular data among the plurality of data to transfer from the NFC tag 110 to the requesting device 100 in response to the device gesture data, which identifies the device gesture performed by the requesting device 100 (Block 402). Moreover, the data transfer method may further include initiating a data transfer from the NFC tag 110 to the requesting device 100 (e.g., through the NFC link 105 or through another link/channel) in response to the device gesture data (Block 403).

[0054] Referring now to FIG. 5, a flowchart is provided illustrating a data transfer method in which the requesting device 100 transmits the device gesture data to the providing device 110, according to some embodiments of the present inventive concept. The data transfer method may include the requesting device 100 performing a device gesture near the providing device 110 (Block 500). The data transfer method may also include the requesting device 100 identifying which gesture among a plurality of gestures has been performed by the requesting device 100 (Block 501). For example, the requesting device 100 may be configured to identify the device gesture as a spin, a hold, or a tap, and the requesting device 100 may generate device gesture data that identifies

the device gesture as the particular one of the spin, the hold, or the tap. The requesting device 100 may then transmit the device gesture data to the providing device 110 (Block 502).

[0055] After the providing device 110 receives the device gesture data from the requesting device 100, the providing device 110 may process the device gesture data (Block 503). For example, the providing device 110 may process the device gesture data to determine that the device gesture has been identified as a spin. In response to the device gesture data (e.g., in response to the processed device gesture data), particular data among a plurality of data may be selected for transfer from the providing device 110 to the requesting device 100 (Block 504). For example, in response to transfer of the data 104 illustrated in FIG. 1 being triggered by a spin of the requesting device 100, the data 104 will be selected for transfer from the providing device 110 to the requesting device 100 in response to the device gesture data identifying a spin. As further illustrated in FIG. 5, the data transfer method may also include initiating a data transfer from the providing device 110 to the requesting device 100 (e.g., through the short-range RF communication link 105 or through another link/channel) in response to the device gesture data (Block 505).

[0056] Referring now to FIG. 6, a flowchart is provided illustrating a data transfer method in which the providing device 110 identifies the device gesture, according to some embodiments of the present inventive concept. The data transfer method may include the requesting device 100 performing a device gesture near the providing device 110 (Block 600). The data transfer method may also include the providing device 110 identifying which gesture among a plurality of gestures has been performed by the requesting device 100 (Block 601). For example, the providing device 110 may be configured to identify the device gesture as a spin, a hold, or a tap, and the providing device 110 may generate device gesture data that identifies the device gesture as the particular one of the spin, the hold, or the tap (Block 602). In particular, the providing device 110 may include a sensor that identifies movement and/or orientation of the requesting device 100 while proximately located to the providing device 110.

[0057] After the providing device 110 generates the device gesture data, the providing device 110 may process the device gesture data (Block 603). For example, processing the device gesture data may include determining that the device gesture has been identified as a spin (for example), and/or may include forwarding the device gesture data to a processor/controller (e.g., a controller within the providing device 110).

[0058] In response to the device gesture data, particular data among a plurality of data may be selected for transfer from the providing device 110 to the requesting device 100 (Block 604). For example, a particular one of the data 104 and the data 106 may be selected for transfer in response to the device gesture data. The data transfer method may also include initiating a data transfer from the providing device 110 to the requesting device 100 (e.g., through the short-range RF communication link 105 or through another link/channel) in response to the device gesture data (Block 605).

[0059] According to some embodiments, the requesting device 100 may transmit identification information to the providing device 110. The identification information may include, for example, information identifying the requesting device 100 (e.g., hardware information, software information, model number, etc.) and/or identifying the user of the requesting device. The identification information may

include authentication information, such as an identification number, an encryption key, a username, and/or a password. Different device gestures may trigger the transmission of different identification information. For example, spinning the requesting device 100 may result in the transmission of a different identification number/key than tilting the requesting device 100.

[0060] Referring again to FIG. 5, transmitting the device gesture data from the requesting device 100 to the providing device 110 may include transmitting identification information (See Block 502). Alternatively, referring again to FIG. 6, in some embodiments, the providing device 110 may generate the device gesture data (Block 602), and the requesting device 100 may separately transmit the identification information to the providing device 110. For example, the providing device 110 may generate the device gesture data in response to receiving the identification information from the requesting device 100.

[0061] Referring now to FIG. 7, a block diagram is provided illustrating the portable electronic device (e.g., a requesting device) 100, according to some embodiments of the present inventive concept. The requesting device 100 may be any of a variety of portable electronic devices. For example, the requesting device 100 may be a mobile terminal (e.g., a mobile telephone), a portable audio player, a portable video player, a camera, an electronic reading device, or a portable computer (e.g., a tablet computer, a netbook computer, or a laptop computer). Moreover, it will be understood that the portable electronic device 100 illustrated in FIG. 7 may be a providing device in some embodiments.

[0062] As illustrated in FIG. 7, the portable electronic device (e.g., a requesting device) 100 may include a keypad 712, a display 714, a transceiver 720, a memory 718, a sensor 711, a speaker 715, and a camera 713 that communicate with a controller 716. According to some embodiments, the camera 713 may be configured as a sensor for detecting device gestures performed on/with the requesting device 100 by a user. For example, the camera 713 may determine a direction (or an angle) that the requesting device 100 is facing/oriented (e.g., with respect to the providing device 110 or another reference point).

[0063] The controller 716 may include any low-power microprocessor and/or microcontroller used for portable electronic device applications. The controller 716 can include a signal processor. Additionally, or alternatively, a signal processor can be provided as a separate component of the requesting device 100.

[0064] The transceiver 720 may include a transmitter circuit 722 and a receiver circuit 724, which may cooperate to transmit and receive RF signals via an antenna 728. Although FIG. 7 illustrates that a portion of the antenna 728 extends beyond the housing of the requesting device 100, in some embodiments, the antenna 728 may not be visible to a user of the requesting device 100 and/or may not protrude from the housing of the requesting device 100. According to some embodiments, the transceiver 720 of the requesting device 100 may be configured to operate in any of the following bands: Advanced Mobile Phone Service (AMPS), ANSI-136, Global System for Mobile Communications (GSM), General Packet Radio Service (GPRS), enhanced data rates for GSM evolution (EDGE), Digital Communications Services (DCS), Personal Digital Cellular (PDC), Personal Communications Services (PCS), Code Division Multiple Access (CDMA), wideband-CDMA, CDMA2000, and/or Universal Mobile

Telecommunications System (UMTS) frequency bands. Other bands can also be used in embodiments according to the inventive concept. Also, some embodiments may be compatible with Long Term Evolution (LTE) and/or High Speed Packet Access (HSPA) standards. Additionally, or alternatively, in embodiments, the requesting device 100 may be configured to communicate using Global Positioning System (GPS) and/or Wireless Local Area Network (WLAN) frequency bands.

[0065] The memory 718 may be a general purpose memory that is used to store both program instructions for the controller 716, as well as data, such as audio data, video data, configuration data, and/or other data that may be accessed and/or used by the controller 716. The memory 718 may include a nonvolatile read/write memory, a read-only memory, and/or a volatile read/write memory. In particular, the memory 718 may include a read-only memory in which basic operating system instructions are stored, a non-volatile read/write memory in which re-usable data, such as configuration information, directory information, and other information may be stored, as well as a volatile read/write memory, in which short-term instructions and/or temporary data may be stored. In some embodiments, the memory 718 may include a removable nonvolatile memory card.

[0066] The requesting device 100 further includes a short-range RF communication module 730 that may be configured to operate in a peer-to-peer mode and/or in a read/write mode. Other modes of operation, such as card emulation mode, may be possible. The short-range RF communication module 730 is operatively coupled to the controller 716 and can operate under the control of the controller 716.

[0067] Still referring to FIG. 7, the sensor 711 may include one or more sensors that are configured to identify a device gesture performed by the requesting device 100. For example, the sensor 711 may include at least one of a motion sensor, a rotation sensor, a tap sensor, and a proximity sensor. In some embodiments, the motion sensor may be configured to identify shaking of the requesting device 100. The motion sensor may additionally, or alternatively, be configured to identify when the requesting device is held substantially still. In some embodiments, the rotation sensor may be configured to detect rotation (e.g., spinning or tilting) in one or more directions.

[0068] In some embodiments, the tap sensor and/or the proximity sensor may be configured to identify contact between the requesting device 100 and the providing device 110. According to some embodiments, the tap sensor may include a microphone that is configured to detect tapping/knocking on the requesting device 100 (e.g., to detect the sound of tapping/knocking on the requesting device 100 with a user's finger or with the providing device 110). Moreover, in some embodiments, the tap sensor may include a touch sensor that detects a touch (e.g., by a user's finger) on a portion (e.g., a touch screen of the display 714) of the requesting device 100.

[0069] Accordingly, referring still to FIG. 7, the requesting device 100 may be a portable electronic device 100 that includes a short-range RF wireless communication module 730 that is configured to receive at least one of the data 104 and the data 106 (illustrated in FIG. 1) from the proximately-located providing device 110 (e.g., through the short-range RF wireless communication link 105 or through another link/channel). The portable electronic device 100 may further include a sensor (e.g., the sensor 711 and/or the camera 713) that is configured to identify occurrence of one of a plurality

of device gestures that are made by movement and/or orientation of one of the providing device 110 and the portable electronic device 100 while proximately located to the other one of the providing device 110 and the portable electronic device 100. Moreover, the short-range RF wireless communication module 730 may be further configured to receive at least one of the data 104 and the data 106 in response to the portable electronic device 100 or the providing device 110 identifying a particular one of the plurality of device gestures.

[0070] According to some embodiments, the portable electronic device 100 and the providing device 110 may be different types of devices. For example, the portable electronic device 100 may be a battery-powered device, and the providing device 110 may not be battery-powered, but rather may receive power from an external source (e.g., from signals transmitted by the portable electronic device 100). Additionally, or alternatively, the portable electronic device 100 may have a display (e.g., the display 714) and/or a keypad (e.g., the keypad 712), whereas the providing device 110 may not have a display and/or a keypad. Moreover, in some embodiments, the providing device 110 may be an NFC tag that is configured to provide data/content (e.g., the data 104 and/or the data 106 illustrated in FIG. 1) to the portable electronic device 100, but that may not be configured to execute the data/content. For example, the providing device 110 may not be configured to play music or videos, or open a hyperlink, that it transfers to the portable electronic device 100 (which is configured to execute such data/content).

[0071] Alternatively, according to some embodiments, the portable electronic device 100 and the providing device 110 may be similar types of devices. For example, they may both be one of a mobile terminal, a portable audio player, a portable video player, a camera, an electronic reading device, or a portable computer.

[0072] In some embodiments, the portable electronic device 100 may be configured to selectively activate a portion of the portable electronic device 100 in response to detecting (e.g., via the sensor 711 and/or the camera 713) a particular device gesture among a plurality of device gestures. For example, the portable electronic device 100 may open a web browser or a multimedia application (e.g., music player or video player) in response to detecting a particular device gesture.

[0073] According to some embodiments, the portable electronic device 100 may be configured to transmit device gesture data (e.g., gesture data identifying a particular device gesture) to the providing device 110 in response to a sensor (e.g., the sensor 711 and/or the camera 713) detecting the particular device gesture.

[0074] Referring now to FIG. 8, a block diagram is provided illustrating an NFC module 830, according to some embodiments of the present inventive concept. For example, the short-range RF wireless communication module 730 illustrated in FIG. 7 may include the NFC module 830. Also, the short-range RF wireless communication link 105 illustrated in FIG. 1 may be an NFC link. As illustrated in FIG. 8, the NFC module 830 may include an antenna 836, a control circuit 834, and a memory 832. The antenna 836 may include a loop antenna that is tuned to transmit/receive electromagnetic signals at a frequency of about 13.56 MHz. The control circuit 834 controls operation of the NFC module 830, and can include a microprocessor or other control circuitry. The memory 832 can store data and/or settings used by the control circuit 834 in performing NFC communications. The control

circuit **834** can operate in response to instructions from the controller **716** of the requesting device **100** illustrated in FIG. 7. In particular, the controller **716** of the requesting device **100** can execute a communication Application Programming Interface (API) that controls operation of the NFC module **830** illustrated in FIG. 8. The communication API permits application programs executing on the requesting device **100** to query and exchange data with other NFC-enabled devices according to one or more of the NFC operational modes, such as read/write mode and peer-to-peer mode.

[0075] Referring now to FIGS. 9A-9C, block diagrams are provided illustrating the providing device **110**, according to some embodiments of the present inventive concept. As illustrated in FIG. 9A, the providing device **110** may include an identification module **902** and a short-range RF communication module **904**. The identification module **902** may be configured to process device gesture data as described with respect to the methods illustrated in FIGS. 2-6. Additionally, the short-range RF communication module **904** may be configured to communicate with the requesting device **100** through the short-range RF wireless communication link **105**, as described with respect to the methods illustrated in FIGS. 2-6. Although FIGS. 9A-9C indicate the providing device **110**, it will be understood that the modules illustrated therein may be included in the requesting device **100** in some embodiments.

[0076] As illustrated in FIG. 9B, the short-range RF communication module **904** may include an NFC module **994** in some embodiments. Accordingly, the providing device **110** may be an NFC tag **910**, and the short-range RF wireless communication link **105** may be an NFC link. According to some embodiments, the NFC module **994** may be configured to operate in a passive mode. In other words, the NFC module **994** may not have a separate power source, and may therefore operate using power derived from device gesture data signals, identification information signals, and/or other signals transmitted by the requesting device **100**.

[0077] As illustrated in FIG. 9C, the providing device **110** may additionally include a sensor module **906**. The sensor module **906** may be configured to identify a plurality of device gestures performed by the requesting device **100**. For example, the sensor module may include one or more of the sensors described with respect to the sensor **711** and/or the camera **713** illustrated in FIG. 7. Moreover, the identification module **902** may be configured to generate device gesture data in response to the sensor module **906** detecting a particular one of the device gestures.

[0078] Alternatively, according to some embodiments, the providing device **110** may not include the sensor module **906**, but rather device gestures performed by the requesting device **100** may be detected by the requesting device **100**. Accordingly, the identification module **902** may be configured to identify a particular device gesture among a plurality of device gestures in response to receiving device gesture data from the requesting device **100**.

[0079] FIGS. 10A-10C illustrate device gestures performed by the portable electronic device **100**, according to some embodiments of the present inventive concept. Although the portable electronic device **100** is illustrated as a requesting device, it will be understood that the device gestures illustrated in FIGS. 10A-10C may be performed by a providing device in some embodiments. As illustrated in FIG. 10A, the portable electronic device (e.g., a requesting device) **100** may perform a device gesture in the form of a rotation

101. The rotation **101** may be clockwise or counterclockwise. In one example, the rotation **101** may be a spin around the y-axis that is illustrated in FIG. 10A. In particular, the rotation **101** may include circling (e.g., spinning 360 degrees, or more, around) the y-axis one or more times, or partially circling (e.g., spinning fewer than 360 degrees around) the y-axis.

[0080] As illustrated in FIG. 10B, the requesting device **100** may perform a device gesture in the form of a tilt **102**. The tilt **102** may include rotating around the x-axis. For example, the tilt **102** may include rotating 45 degrees around the x-axis. Also, the tilt **102** may be a flip of the requesting device **100**. For example, the requesting device **100** may be flipped from right-side-up to up-side-down (e.g., the tilt **102** may include about 180 degrees of rotation), or vice versa.

[0081] In some embodiments, the rotation **101** and/or the tilt **102** of the requesting device **100** may be determined while proximately located to the providing device **110**. For example, the rotation **101** and/or the tilt **102** may be determined with respect to a portion (e.g., the display **714**) of the requesting device **100** that rotates and/or tilts (e.g., toward or away from the providing device **110**). In one example, the requesting device **100** may perform a device gesture in the form of the tilt **102** such that the tilt **102** orients the display **714** of the requesting device **100** in a direction facing the providing device **110**.

[0082] Moreover, the requesting device **100** may perform a device gesture in the form of a shake (e.g., a user may shake the requesting device **100**). For example, the sensor **711** may include one or more gyroscopes and/or accelerometers configured to detect a shake of the requesting device **100**. In particular, referring to FIGS. 7, 10A, and 10B, the sensor **711** may be configured to detect the shake by detecting motion of the requesting device **100** (e.g., by detecting motion along the x-axis, the y-axis, and/or an axis substantially perpendicular to the x-axis or the y-axis).

[0083] As illustrated in FIG. 10C, the requesting device **100** may perform a device gesture in the form of contact **103** with the requesting device **100**. For example, the contact **103** may be performed if the requesting device **100** taps one or more times against the providing device **110**. In another example, the contact **103** may be performed if a user of the requesting device taps/knocks a portion (e.g., a housing or the display **714**) of the requesting device **100** with a finger or a stylus.

[0084] The device gestures of rotation **101**, tilt **102**, and contact **103** illustrated in FIGS. 10A-10C may be detected by one or more sensors (e.g., the sensor **711** and/or the camera **713**) of the requesting device **100**. Additionally, or alternatively, in some embodiments, these and/or other device gestures may be detected by one or more external sensors (e.g., the sensor module **906** of the providing device **110**).

[0085] As described herein, device gestures performed by the requesting device **100** may trigger transfers from the providing device **110** of various data/content. For example, a providing device **110** associated with an entertainment system (e.g., a video game system, a computer, and/or a Television (TV)) may transfer different data/content to the requesting device **100** in response to different device gestures. In one example, spinning the requesting device **100** may result in a data/content transfer from the providing device **110** that starts a TV application (e.g., live TV) on the requesting device **100**. In a further example, tapping/knocking the requesting device **100** once (e.g., with a finger of the user) may result in a data/content transfer from the providing device **110** that starts a movie application on the requesting device **100**. In another

example, holding the requesting device **100** with the display **714** facing upward (e.g., facing away from the ground) may result in a data/content transfer from the providing device **110** that starts a music application on the requesting device **100**. Moreover, tapping/knocking the requesting device **100** on the providing device **110** multiple times may result in a data/content transfer from the providing device **110** that starts a web browser on the requesting device **100**. For example, the providing device **110** may transfer data/content (e.g., data **104** or data **106**) that includes a hyperlink and/or a command to open the web browser. In a further example, shaking the requesting device **100** may result in a data/content transfer from the providing device **110** that starts another application (e.g., a social networking application or a video game) on the requesting device **100**.

[0086] In another example, a providing device **110** associated with a news/information advertisement/kiosk may transfer different data/content to the requesting device **100** in response to different device gestures. For example, different categories of news/information may be provided in response to different device gestures. In one example, shaking the requesting device **100** may result in a data/content transfer from the providing device **110** that provides electronic access to a particular newspaper on the requesting device **100**. On the other hand, knocking/tapping the requesting device **100** may provide a different newspaper or a magazine. Moreover, flipping the requesting device **100** may provide other multimedia content (e.g., news/information podcasts and/or images).

[0087] Other examples of transferring data/content from the providing device **110** may include transferring different data/content (e.g., data **104** or data **106**) regarding a specific advertisement, a specific user manual, or a specific book in response to different device gestures. For example, tapping/knocking the providing device **110** with the requesting device **100** may transfer an audio sample of an advertised song to the requesting device **100**. In another example, holding the requesting device **100** (e.g., holding substantially still or holding with the display **714** facing in a given direction) may initiate a purchase/download of the full song. On the other hand, shaking the requesting device **100** may indicate a user's opinion of the song on a social networking website. Moreover, flipping the requesting device **100** may send a link to the data/content to a friend of the user. In a further example, tilting the requesting device **100** may open different chapters/sections of a document/multimedia application, whereas tapping/knocking the requesting device **100** multiple times may initiate a multimedia presentation regarding a particular chapter/section of the document/multimedia application.

[0088] In some embodiments, the providing device **110** may be personalizable/customizable. For example, a user may have a plurality of providing devices **110** (e.g., a plurality of NFC tags **910**) in the user's home. By personalizing/customizing the NFC tags **910**, the user may use the same gesture (e.g., a shake of the requesting device **100**) at different ones of the NFC tags **910** to transfer different data/content from the NFC tags **910**. For example, an NFC tag **910** in the user's kitchen may provide electronic access to a newspaper in response to a shake, a particular radio channel in response to a spin, an e-mail application in response to a knock/tap, and a shopping list and/or refrigerator-contents information in response to a flip. In contrast, a different NFC tag **910** near the user's TV may provide different data/content (e.g., TV shows, movies, video games, etc.) in response to a shake, a spin, a knock/tap, and a flip. Accordingly, different NFC tags

910 in different locations may provide different data/content in response to device gestures. Additionally, in some embodiments, a user of the NFC tags **910** may personalize/customize (e.g., using a website or software application) the particular device gestures (e.g., spin, tilt, etc.) recognized and/or the particular data/content (e.g., TV shows, music, etc.) provided by one or more of the NFC tags **910**.

[0089] It will be understood that, in some embodiments, the portable electronic device **100** performing the device gesture may be either a providing device or a requesting device. For example, if the portable electronic device **100** is a providing device, then performing a particular device gesture on the portable electronic device **100** may transfer corresponding data from the portable electronic device **100** to a proximately-located electronic device (e.g., transfer data to initiate a movie or a website on a nearby TV). Alternatively, if the portable electronic device **100** is a requesting device, then performing a particular device gesture on the portable electronic device **100** may request a transfer of data to the portable electronic device **100**. Moreover, the request may include device gesture data (e.g., data indicating movement or orientation of the portable electronic device **100**), or the request could be based on the device gesture data (i.e., the device gesture data may be pre-processed in the portable electronic device **100**).

[0090] Many different embodiments have been disclosed herein, in connection with the above description and the drawings. It will be understood that it would be unduly repetitious and obfuscating to literally describe and illustrate every combination and subcombination of these embodiments. Accordingly, the present specification, including the drawings, shall be construed to constitute a complete written description of all combinations and subcombinations of the embodiments described herein, and of the manner and process of making and using them, and shall support claims to any such combination or subcombination.

[0091] In the drawings and specification, there have been disclosed various embodiments and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation.

What is claimed is:

1. A data transfer method comprising:

processing device gesture data at a providing device in response to a gesture made by movement or orientation of one of the providing device and the requesting device while proximately located to the other one of the providing device and the requesting device, wherein the device gesture data indicates the movement or orientation; and

initiating a data transfer from the providing device to the requesting device in response to the gesture indicated by the device gesture data.

2. The method of claim 1, wherein the device gesture data is transmitted through a near field communication (NFC) link.

3. The method of claim 2, wherein the providing device comprises an NFC tag, and the data transfer is performed from the NFC tag.

4. The method of claim 2, wherein the providing device comprises a portable electronic device, and the data transfer is performed from the portable electronic device.

5. The method of claim 1:

wherein the providing device is configured to transfer first and second data; and

wherein the method further comprises selecting one of the first and second data and transferring the selected data from the providing device to the requesting device in response to the gesture identified from the device gesture data.

6. The method of claim 5:

wherein the one of the requesting device and the providing device making the gesture is configured to identify first and second device gestures; and

wherein the method further comprises identifying which of the first and second device gestures has been performed by the one of the requesting device and the providing device.

7. The method of claim 6, wherein selecting one of the first and second data to transfer from the providing device to the requesting device comprises transferring the first data and preventing transfer of the second data in response to identifying the first device gesture.

8. The method of claim 6, wherein selecting one of the first and second data to transfer from the providing device to the requesting device comprises transferring the second data and preventing transfer of the first data in response to identifying the second device gesture.

9. The method of claim 6:

wherein the requesting device is configured to identify which of the first and second device gestures has been performed by the requesting device;

wherein the device gesture data indicates which of the first and second device gestures has been performed by the requesting device; and

wherein the device gesture data is transmitted by the requesting device to the providing device.

10. The method of claim 6:

wherein the providing device is configured to identify which of the first and second device gestures has been performed by the providing device;

wherein the device gesture data indicates which of the first and second device gestures has been performed by the providing device; and

wherein the device gesture data is generated by the providing device.

11. The method of claim 1, further comprising transmitting identification information from the requesting device to the providing device.

12. A portable electronic device comprising:

a short-range radio frequency (RF) wireless communication module configured to exchange at least one of first and second data with a proximately-located electronic device; and

a sensor configured to identify occurrence of one of first and second device gestures that are made by movement or orientation of the portable electronic device while proximately located to the proximately-located electronic device, the short-range RF wireless communication module being further configured to exchange the at least one of the first and second data in response to the

portable electronic device identifying a respective one of the first and second device gestures.

13. The portable electronic device of claim 12:

wherein the short-range RF wireless communication module comprises a near field communication (NFC) module; and

wherein the proximately-located electronic device comprises an NFC tag.

14. The portable electronic device of claim 12, wherein the portable electronic device and the proximately-located electronic device comprise different types of devices.

15. The portable electronic device of claim 14:

wherein the portable electronic device comprises at least one of a mobile terminal, an electronic reading device, a music player, and a video player;

wherein the proximately-located electronic device comprises a near field communication (NFC) tag; and

wherein the portable electronic device is configured to selectively activate the at least one of the mobile terminal, the electronic reading device, the music player, and the video player in response to determining that a corresponding device gesture has occurred.

16. The portable electronic device of claim 12:

wherein the sensor is further configured to detect the first and second device gestures; and

wherein the portable electronic device further comprises a transceiver configured to transmit device gesture data identifying one of the first and second device gestures to the proximately-located electronic device in response to the sensor detecting the one of the first and second device gestures.

17. The portable electronic device of claim 16, wherein the sensor comprises at least one of a motion sensor, a rotation sensor, a tap sensor, and a proximity sensor.

18. A short-range radio frequency (RF) wireless communication providing device comprising:

an identification module configured to process device gesture data; and

a short-range RF wireless communication module configured to initiate a transfer of one of first and second data to a proximately-located requesting device in response to the device gesture data identifying one of first and second device gestures that are made by movement or orientation of one of the providing device and the requesting device while proximately located to the other one of the providing device and the requesting device.

19. The providing device of claim 18:

wherein the providing device comprises an NFC tag.

20. The providing device of claim 18, further comprising:

a sensor module configured to detect the one of the first and second device gestures made by the providing device, wherein the identification module is configured to generate the device gesture data in response to the sensor module detecting the one of the first and second device gestures.

* * * * *