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(54) METHOD AND NETWORK FOR SHARING SENSOR DATA AMONG MOBILE TERMINALS

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(57) **ABSTRACT**

The present disclosure discloses a method for sharing sensor data among mobile terminals, which includes that: when any mobile terminal in the network for sharing sensor data needs sensor data not owned by itself, the mobile terminal sends a request message to a mobile terminal owning the sensor data needed by the mobile terminal according to routing table information and a sensor resource list which are currently stored in the mobile terminal itself; and the mobile terminal which receives the request message returns the sensor data needed to the mobile terminal which sends the request message according to the received request message. The present disclosure further discloses a network for sharing sensor data among mobile terminals. Sharing of sensor data among multiple mobile terminals can be realized by adopting the method and the network provided by the present disclosure.

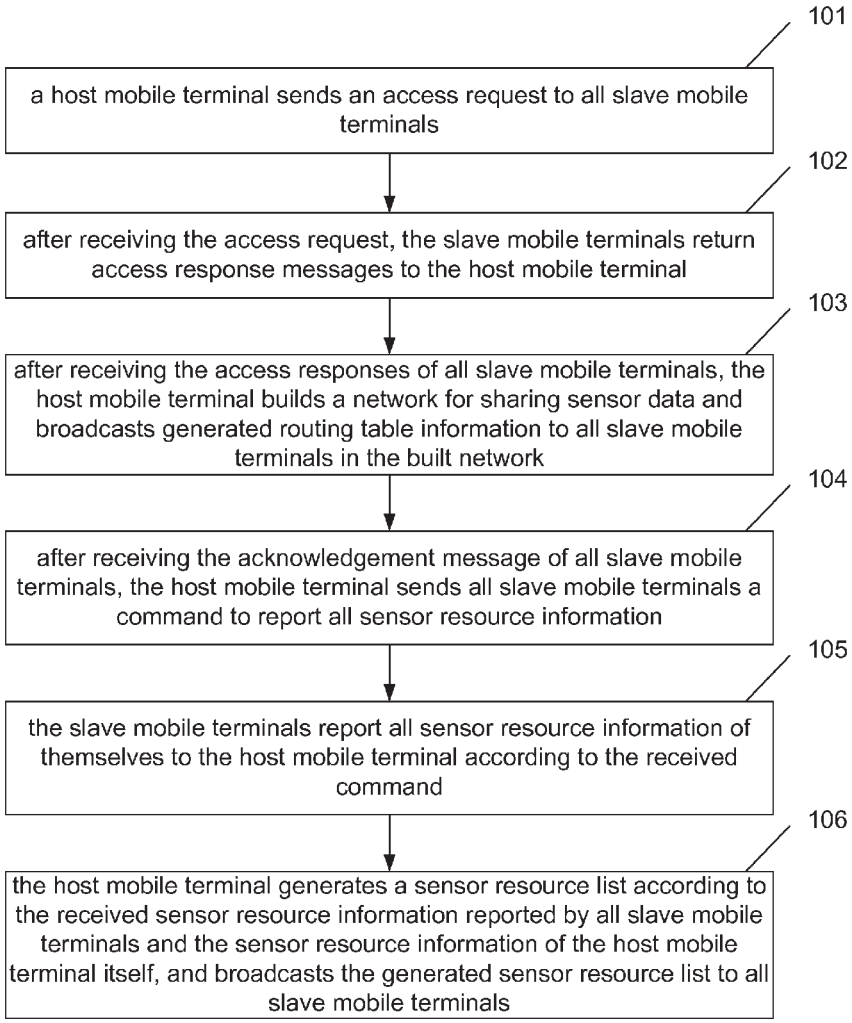


Fig 1

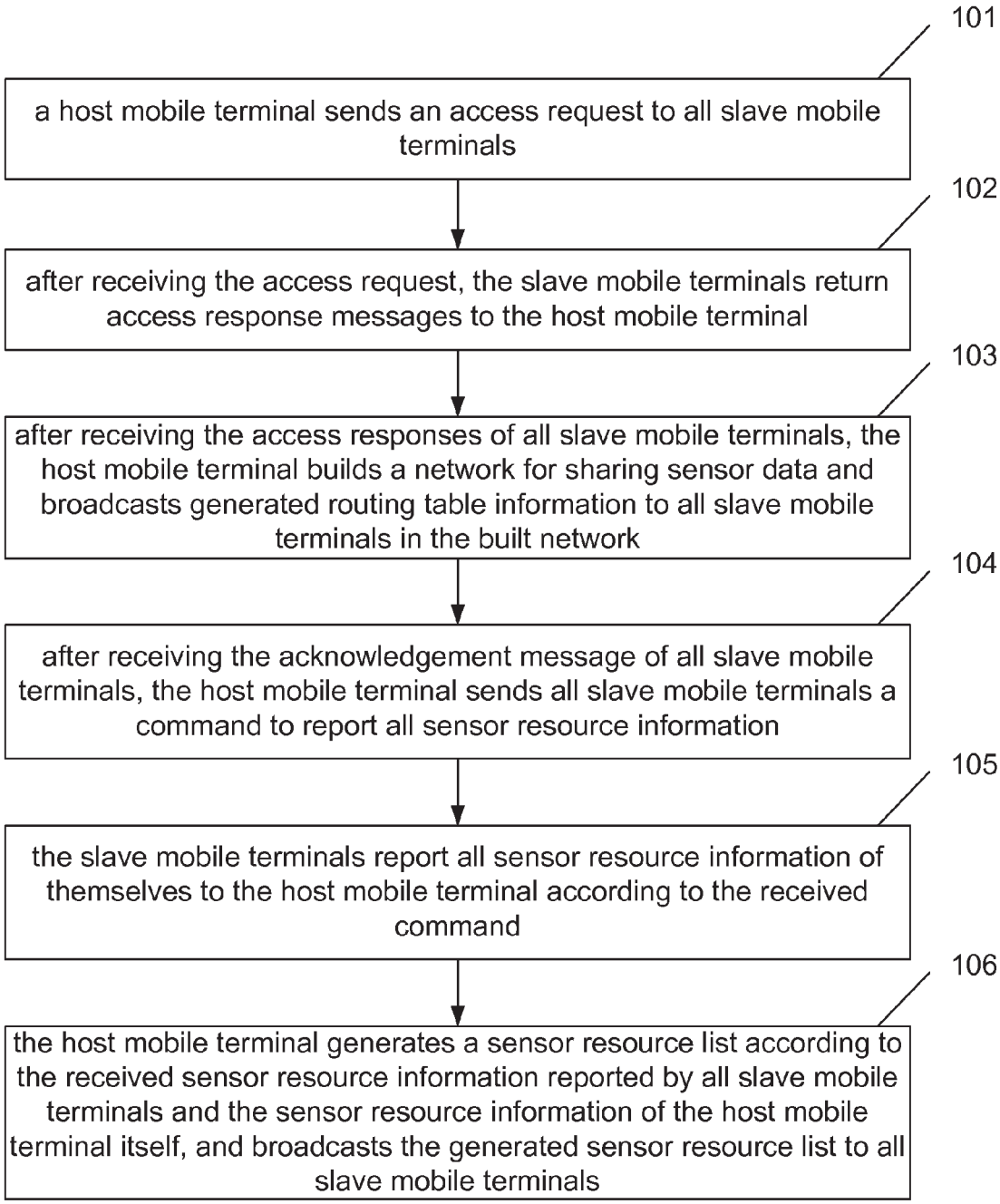

101
a host mobile terminal sends an access request to all slave mobile terminals
102
after receiving the access request, the slave mobile terminals return access response messages to the host mobile terminal
103
after receiving the access responses of all slave mobile terminals, the host mobile terminal builds a network for sharing sensor data and broadcasts generated routing table information to all slave mobile terminals in the built network
104
after receiving the acknowledgement message of all slave mobile terminals, the host mobile terminal sends all slave mobile terminals a command to report all sensor resource information
105
the slave mobile terminals report all sensor resource information of themselves to the host mobile terminal according to the received command
106
the host mobile terminal generates a sensor resource list according to the received sensor resource information reported by all slave mobile terminals and the sensor resource information of the host mobile terminal itself, and broadcasts the generated sensor resource list to all slave mobile terminals

Fig 2

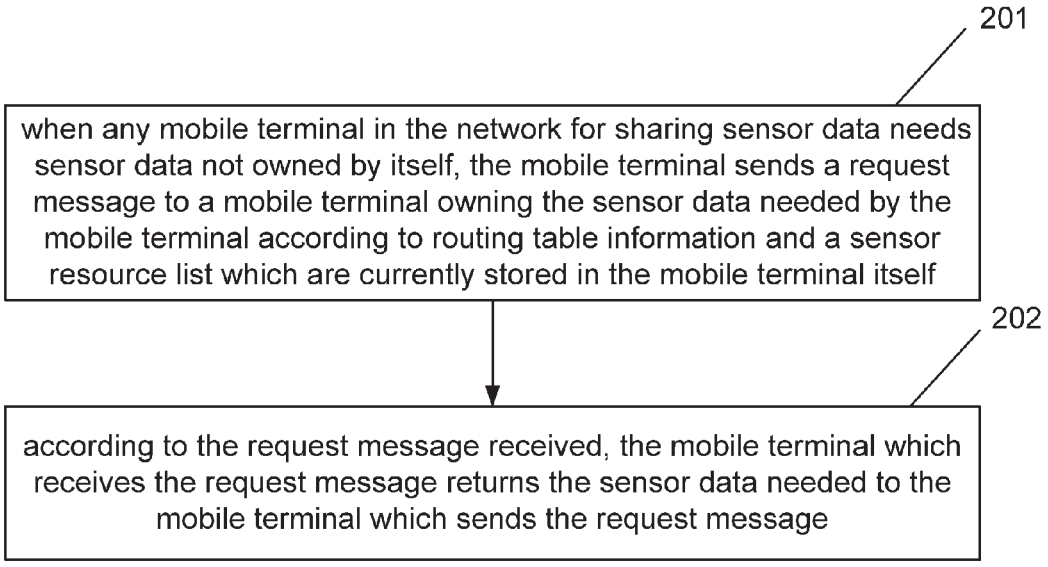

201
when any mobile terminal in the network for sharing sensor data needs sensor data not owned by itself, the mobile terminal sends a request message to a mobile terminal owning the sensor data needed by the mobile terminal according to routing table information and a sensor resource list which are currently stored in the mobile terminal itself
202
according to the request message received, the mobile terminal which receives the request message returns the sensor data needed to the mobile terminal which sends the request message

Fig 3

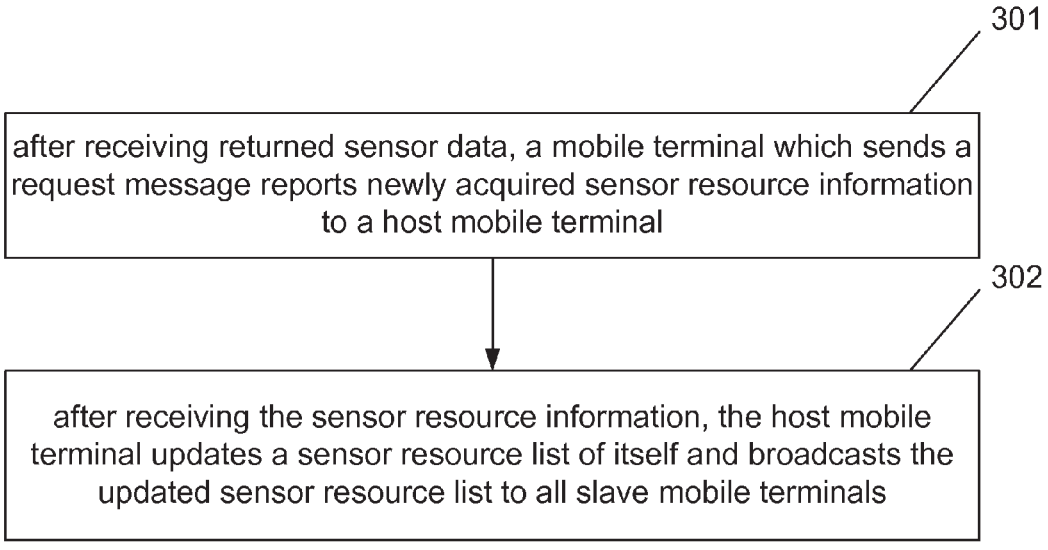

301
after receiving returned sensor data, a mobile terminal which sends a request message reports newly acquired sensor resource information to a host mobile terminal
302
after receiving the sensor resource information, the host mobile terminal updates a sensor resource list of itself and broadcasts the updated sensor resource list to all slave mobile terminals

Fig 4

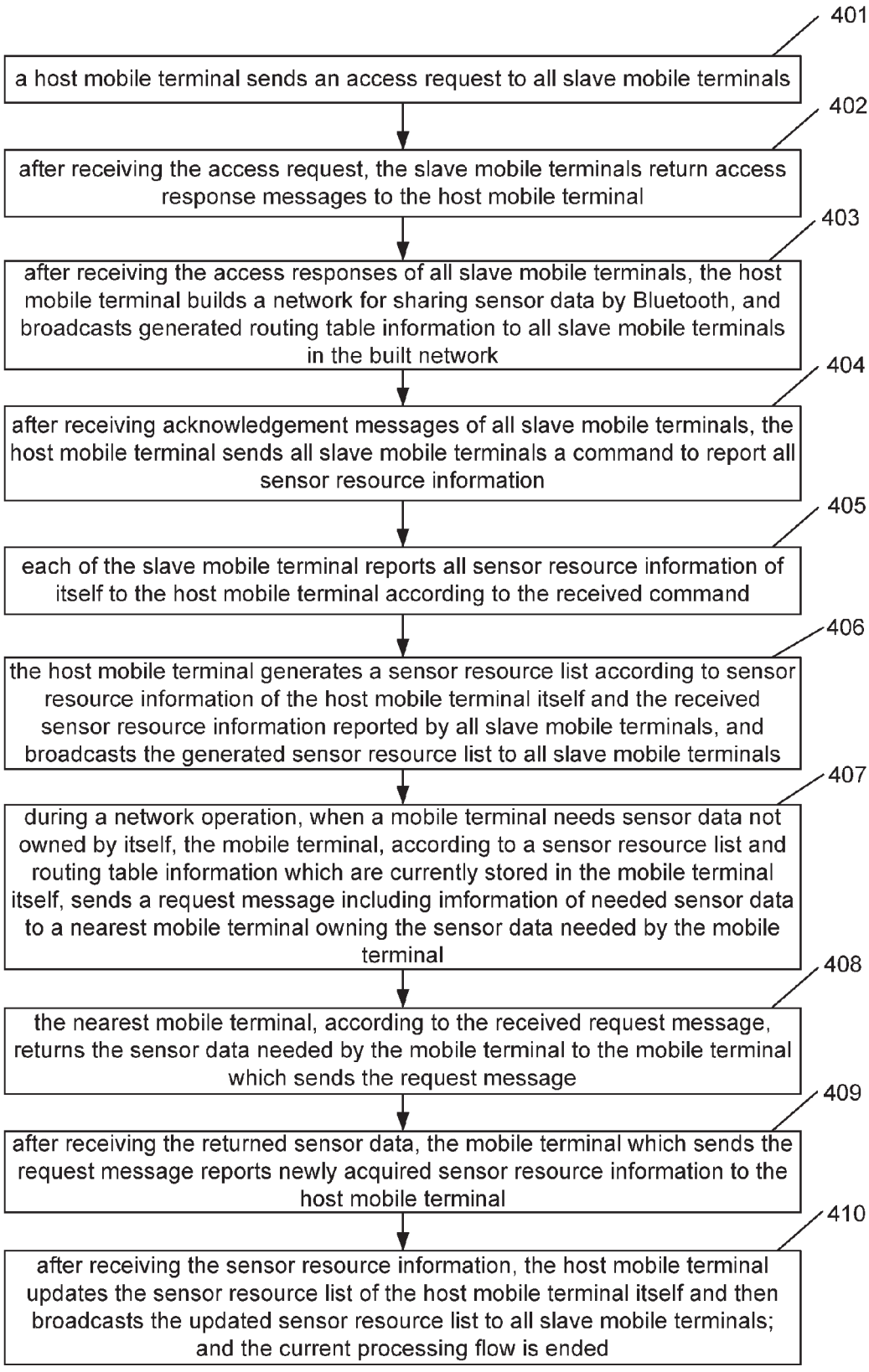

401
a host mobile terminal sends an access request to all slave mobile terminals
402
after receiving the access request, the slave mobile terminals return access response messages to the host mobile terminal
403
after receiving the access responses of all slave mobile terminals, the host mobile terminal builds a network for sharing sensor data by Bluetooth, and broadcasts generated routing table information to all slave mobile terminals in the built network
404
after receiving acknowledgement messages of all slave mobile terminals, the host mobile terminal sends all slave mobile terminals a command to report all sensor resource information
405
each of the slave mobile terminal reports all sensor resource information of itself to the host mobile terminal according to the received command
406
the host mobile terminal generates a sensor resource list according to sensor resource information of the host mobile terminal itself and the received sensor resource information reported by all slave mobile terminals, and broadcasts the generated sensor resource list to all slave mobile terminals
407
during a network operation, when a mobile terminal needs sensor data not owned by itself, the mobile terminal, according to a sensor resource list and routing table information which are currently stored in the mobile terminal itself, sends a request message including imformation of needed sensor data to a nearest mobile terminal owning the sensor data needed by the mobile terminal
408
the nearest mobile terminal, according to the received request message, returns the sensor data needed by the mobile terminal to the mobile terminal which sends the request message
409
after receiving the returned sensor data, the mobile terminal which sends the request message reports newly acquired sensor resource information to the host mobile terminal
410
after receiving the sensor resource information, the host mobile terminal updates the sensor resource list of the host mobile terminal itself and then broadcasts the updated sensor resource list to all slave mobile terminals; and the current processing flow is ended

Fig 5

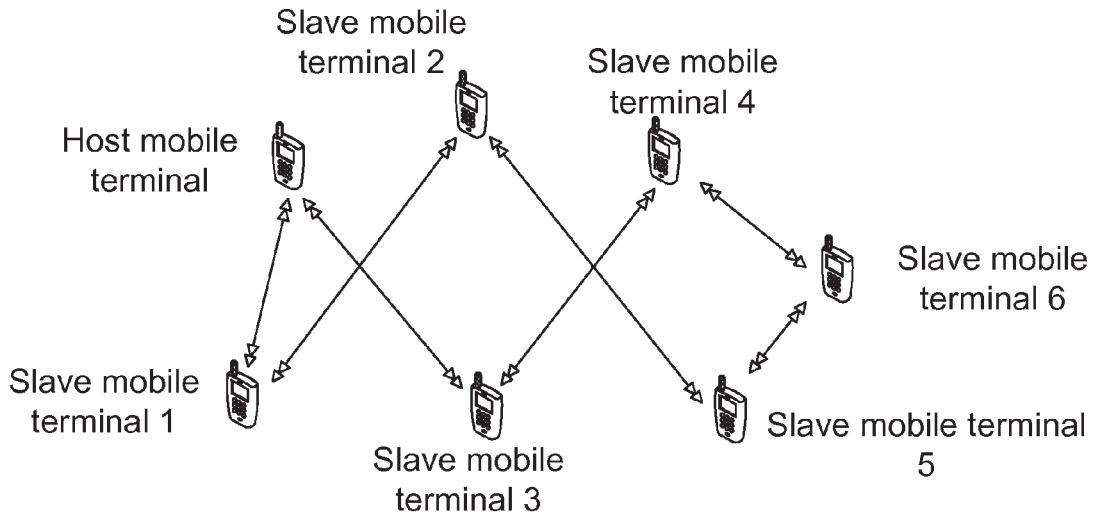
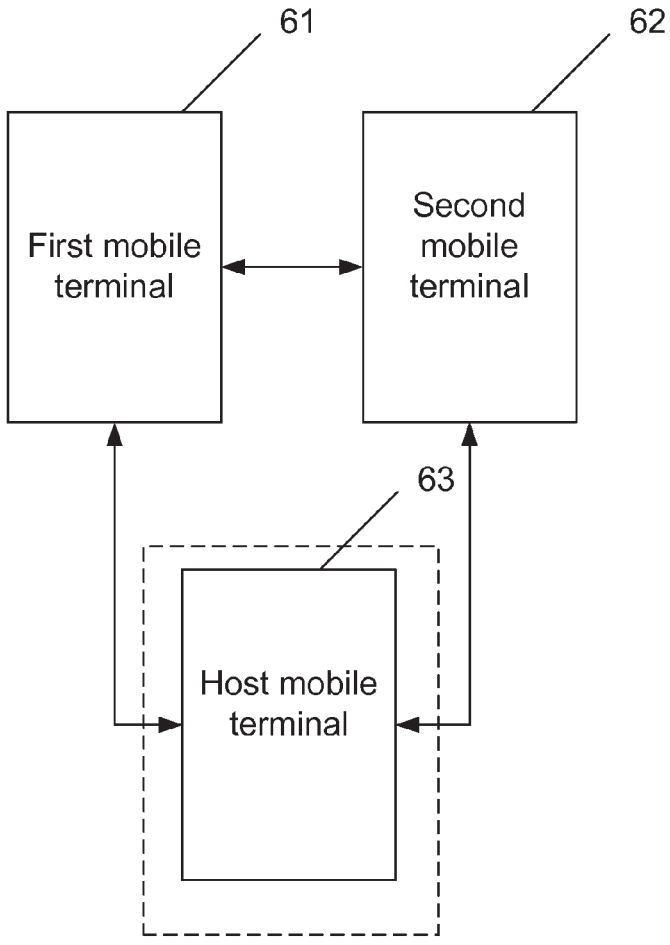

Slave mobile terminal 2
Slave mobile terminal 4
Host mobile terminal
Slave mobile terminal 6
Slave mobile terminal 1
Slave mobile terminal 5
Slave mobile terminal 3

Fig 6


61
62
First mobile terminal
Second mobile terminal
63
Host mobile terminal

METHOD AND NETWORK FOR SHARING SENSOR DATA AMONG MOBILE TERMINALS

TECHNICAL FIELD

[0001] The present disclosure relates to a data sharing technology of a mobile terminal, and in particular to a method and a network for sharing sensor data among mobile terminals.

BACKGROUND

[0002] With a development of a radio communication technology, particularly a widespread application of a mobile terminal (such as a cell phone and the like) in life and work, people have a higher demand on internal needs. Generally, people expect that a mobile terminal has powerful functions, high intelligence, more humanized and strong applicability.

[0003] At present, some sensors such as an acceleration sensor, a temperature sensor, a magnetic field sensor, an optical sensor, etc., are generally integrated in a more popular smart phone such as an Android mobile phone, an Apple mobile phone, a Windows mobile phone and the like. A mobile terminal based on these peripheral sensor devices are more convenient to control, have a more comprehensive application and can meet a high demand of people on mobile terminals.

[0004] However, the application of these peripheral sensor devices can only be embodied on a single mobile terminal at present and can not realize sharing among a plurality of mobile terminals; in other words, sensor data of these peripheral sensors can only be used on a mobile terminal (for example, a cell phone) to which the peripheral sensors belong, and can not be used on other mobile terminals, that is, the sensor data can not be shared among a plurality of mobile terminals.

SUMMARY

[0005] In view of the problem above, the main purpose of the present disclosure is to provide a method and a network for sharing sensor data among mobile terminals, so that sensor data can be shared among a plurality of mobile terminals.

[0006] In order to realize the purpose above, the technical solution of the present disclosure is realized as follows.

[0007] The present disclosure provides a method for sharing sensor data among mobile terminals, wherein the mobile terminal build a network for sharing sensor data in advance, the method further includes that:

[0008] when any mobile terminal in the network for sharing sensor data needs sensor data not owned by itself, the mobile terminal sends a request message to a mobile terminal owning the sensor data needed by the mobile terminal according to routing table information and a sensor resource list which are currently stored in the mobile terminal itself; and

[0009] according to the request message received, the mobile terminal which receives the request returns the sensor data needed to the mobile terminal which sends the request message.

[0010] In the solution above, a mobile terminal initiating an access request may be taken as a host mobile terminal while a mobile terminal receiving the access request may be taken as a slave mobile terminal;

[0011] that a mobile terminal builds a network for sharing sensor data may include that:

[0012] the host mobile terminal sends an access request to all slave mobile terminals;

[0013] and the slave mobile terminals return access response messages to the host mobile terminal after receiving the access request;

[0014] the host mobile terminal builds a network for sharing sensor data according to the access response messages returned by the slave mobile terminals and generates routing table information, and meanwhile broadcasts the generated routing table information to all slave mobile terminals in the built network;

[0015] the host mobile terminal sends all slave mobile terminals a command to report all sensor resource information; after receiving the command, the slave mobile terminals report all sensor resource information of themselves to the host mobile terminal;

[0016] according to sensor resource information of the host mobile terminal itself and the received sensor resource information reported by all slave mobile terminals, the host mobile terminal generates a sensor resource list and broadcasts the sensor resource list to all slave mobile terminals.

[0017] In the solution above, that any mobile terminal which needs sensor data not owned by itself sends a request message to a mobile terminal owning the sensor data needed by the mobile terminal may include that:

[0018] the mobile terminal which sends the request message sends the request message to a nearest mobile terminal which receives the request message to request the nearest mobile terminal to return requested sensor data;

[0019] when sensor data of the nearest mobile terminal which receives the request message is unusable, the mobile terminal which sends the request message finds a second nearest mobile terminal according to the routing table information and sends a request message to the second nearest mobile terminal found out, by such analogy, until finds out a mobile terminal which can respond to a request message from the mobile terminal which sends the request message.

[0020] In the solution above, a distance between the mobile terminal which sends the request message and the mobile terminal which receives the request message may be determined by time needed by an information interaction between the mobile terminals.

[0021] In the solution above, the method may further include that:

[0022] when the mobile terminal which sends the request message does not need sensor data acquired from the mobile terminal which receives the request message, and other mobile terminals do not share the sensor data acquired by the mobile terminal which sends the request message from the mobile terminal which receives the request message, the sensor data acquired by the mobile terminal which sends the request from the mobile terminal which receives the request message is deleted and deleted sensor resource information is reported to the host mobile terminal;

[0023] the host mobile terminal updates the sensor resource list of itself and broadcasts an updated sensor resource list to all slave mobile terminals.

[0024] In the solution above, when the mobile terminal which sends the request message is taken as a slave mobile terminal, the method may further include that:

[0025] after receiving the returned sensor data, the mobile terminal which sends the request message reports newly acquired sensor resource information to the host mobile terminal;

[0026] the host mobile terminal updates the sensor resource list of itself and broadcasts the updated sensor resource list to all slave mobile terminals.

[0027] In the solution above, when the mobile terminal which sends the request message is taken as a host mobile terminal, the method may further include that:

[0028] the host mobile terminal updates the sensor resource list of itself according to newly acquired sensor resource information, and broadcasts the updated sensor resource list to all slave mobile terminals.

[0029] In the solution above, the method may further include that:

[0030] the host mobile terminal broadcasts a network removal message to all slave mobile terminals;

[0031] after determining there is no service to be processed, slave mobile terminals which receive the network removal message return removal confirmation messages to the host mobile terminal;

[0032] the host mobile terminal removes the network after receiving removal confirmation messages returned by all slave mobile terminals and determining completion of service processing of the host mobile terminal itself; and

[0033] each mobile terminal deletes routing table information and a sensor resource list stored in the each mobile terminal.

[0034] The present disclosure further provides a network for sharing sensor data among mobile terminals, which includes more than one first mobile terminal and more than one second mobile terminal, wherein

[0035] the first mobile terminal is configured, according to routing table information and a sensor resource list which are currently stored in the first mobile terminal itself, to send a request message to the second mobile terminal; and

[0036] the second mobile terminal is configured, after receiving the request message sent by the first mobile terminal, to return needed sensor data to the first mobile terminal according to the request message received.

[0037] In the solution above, all the first mobile terminals and all the second mobile terminals are slave mobile terminals, the network may further include:

[0038] a host mobile terminal configured to send an access request to the slave mobile terminals; after receiving an access response from the slave mobile terminals, to build a network for sharing sensor data and broadcast generated routing table information to the slave mobile terminals;

[0039] the first mobile terminal is further configured, after receiving the access request, to return an access response message to the host mobile terminal and receive the routing table information broadcasted by the host mobile terminal; after receiving the routing table information, to return an acknowledgement message to the host mobile terminal; and

[0040] the second mobile terminal is further configured, after receiving the access request, to return an access response message to the host mobile terminal and receive the routing table information broadcasted by the host mobile terminal; after receiving the routing table information, to return an acknowledgement message to the host mobile terminal.

[0041] In the solution above, the host mobile terminal may be further configured, after receiving the acknowledgement message from the slave mobile terminals, to send the slave mobile terminals a command to report all sensor resource information, and receive all sensor resource information reported by the slave mobile terminals; after receiving all sensor resource information reported by the slave mobile terminals, to generate a sensor resource list and broadcast the sensor resource list to the slave mobile terminals;

[0042] the first mobile terminal is further configured to receive the command to report all sensor resource information from the host mobile terminal; after receiving the command, to report all sensor resource information of itself to the host mobile terminal; and further to receive the sensor resource list broadcasted by the host mobile terminal; and

[0043] the second mobile terminal is further configured to receive the command to report all sensor resource information from the host mobile terminal; after receiving the command, to report all sensor resource information of itself to the host mobile terminal; and further to receive the sensor resource list broadcasted by the host mobile terminal.

[0044] In the solution above, the host mobile terminal may be configured to receive newly acquired, and/or deleted sensor resource information reported by the first mobile terminal; after receiving the sensor resource information, to update the sensor resource list of itself and then broadcasting the updated sensor resource list to all slave mobile terminals;

[0045] the first mobile terminal is further configured to report newly acquired, and/or deleted sensor resource information to the host mobile terminal and receive the updated sensor resource list broadcasted by the host mobile terminal; and

[0046] the second mobile terminal is further configured to receive the updated sensor resource list broadcasted by the host mobile terminal.

[0047] In the method and the network for sharing sensor data among mobile terminals provided by the present disclosure, when any mobile terminal in the network for sharing sensor data needs sensor data not owned by itself, the mobile terminal sends a request message to a mobile terminal owning the sensor data needed by the mobile terminal according to routing table information and a sensor resource list which are currently stored in the mobile terminal itself; and the mobile terminal which receives the request message returns the sensor data needed to the mobile terminal which sends the request message according to the received request message. In this way, sharing of sensor data among a plurality of mobile terminals can be realized.

[0048] In addition, a host mobile terminal is set in the entire network for sharing sensor data among mobile terminals; any slave mobile terminal, after receiving sensor data of other mobile terminals, reports newly added sensor resource information to the host mobile terminal; and the host mobile terminal updates a sensor resource list according to the reported newly added sensor resource information and broadcasts the updated sensor resource list to all slave mobile terminals; in this way, the mobile terminal can send a request message to a nearest mobile terminal owning the sensor data needed by the mobile terminal according to routing table information and the updated sensor resource list, such that the mobile terminal can quickly acquire the needed sensor data.

BRIEF DESCRIPTION OF THE DRAWINGS

[0049] FIG. **1** shows a flowchart of a method for building by mobile terminals a network for sharing sensor data according to the disclosure;

[0050] FIG. **2** shows a flowchart of a method for sharing sensor data among mobile terminals according to the disclosure;

[0051] FIG. **3** shows a flowchart of a method after a mobile terminal receives returned sensor data according to the disclosure;

[0052] FIG. **4** shows a flowchart of a method for sharing sensor data among mobile terminals according to one embodiment of the disclosure;

[0053] FIG. **5** shows a topological diagram of a network built according to one embodiment of the disclosure; and

[0054] FIG. **6** shows a structure diagram of a network for sharing sensor data among mobile terminals according to the disclosure.

DETAILED DESCRIPTION

[0055] The basic idea of the present disclosure is that: when any mobile terminal in the network for sharing sensor data needs sensor data not owned by itself, the mobile terminal sends a request message to a mobile terminal owning the sensor data needed by the mobile terminal according to routing table information and a sensor resource list which are currently stored in the mobile terminal itself; and the mobile terminal which receives the request message returns the sensor data needed to the mobile terminal which sends the request message according to the request message received

[0056] For example, in a small community such as a skyscraper, two mobile terminals both of which have an acceleration sensor function or a temperature sensor application function can measure a height difference between different floors according to a gravity acceleration value or a temperature difference value. Mobile terminals with different sensors can realize sharing of sensor data through a network, thus applications based on these sensors can play a role in more extensive fields. In this way, a plurality of mobile terminals with the same sensor application can share different sensor data, thus totally different experience is brought to users.

[0057] The present disclosure will be further illustrated in detail in combination with the accompanying drawings and specific embodiments hereinafter.

[0058] A method for sharing sensor data among mobile terminals realized according to the disclosure includes a process of building a network for sharing sensor data, and the method for building a network is as shown in FIG. **1**, which includes the following steps.

[0059] Step **101**: a host mobile terminal sends an access request to all slave mobile terminals;

[0060] wherein, a mobile terminal which initiates an access request, generates routing table information, updates a sensor resource list, broadcasts a sensor resource list and routing table information is called a host mobile terminal; and a mobile terminal which receives an access request, reports its own sensor resource information, receives a sensor resource list and routing table information is called a slave mobile terminal;

[0061] here, the host mobile terminal can be any one mobile terminal; the host mobile terminal initiates an access request, and a mobile terminal which receives the access request is called the slave mobile terminal; in a network, there is only one host mobile terminal, however, there may be a plurality of slave mobile terminals;

[0062] before the host mobile terminal sends an access request to all slave mobile terminals, all mobile terminals perform information interaction to determine the host mobile terminal and the number of the accessed slave mobile terminals; generally, during information interaction, one mobile terminal can randomly select a mobile terminal as a host mobile terminal and sends an election message including the selected host mobile terminal to other mobile terminals; after receiving the election message, each of the other mobile terminals send an election approved message to the mobile terminal; after receiving the election approved message, the mobile terminal sends the selected host mobile terminal a message that the latter mobile terminal is selected as the host mobile terminal; after receiving the message that the latter mobile terminal is selected as the host mobile terminal, the host mobile terminal sends a message of access or not to all mobile terminals participating the information interaction; after receiving the message of access or not, the mobile terminals return access confirmation messages or not-access confirmation messages to the host mobile terminal, then the host mobile terminal confirms the number of the accessed slave mobile terminals according to the returned messages; and, after determining the number of the accessed slave mobile terminals, the host mobile terminal sends an access request to all accessed slave mobile terminals.

[0063] Step **102**: after receiving the access request, the slave mobile terminals return access response messages to the host mobile terminal;

[0064] here, the host mobile terminal determines distances between the host mobile terminal itself and the respective slave mobile terminals according to duration of access response time returned by the respective slave mobile terminals; similarly, message interaction are performed between the respective slave mobile terminals, and distances between the respective slave mobile terminals are determined according to time intervals of interaction; generally, one slave mobile terminal, after sending information to another slave mobile terminal, records a timestamp of sending information, and one slave mobile terminal, after receiving a response from another slave mobile terminal, also records a timestamp of receiving response; accordingly, the slave mobile terminal sending information confirms the time interval of interaction;

[0065] the access response message includes a distance between each of the slave mobile terminals and another one of the slave mobile terminals.

[0066] Step **103**: after receiving the access responses of all slave mobile terminals, the host mobile terminal builds a network for sharing sensor data and broadcasts generated routing table information to all slave mobile terminals in the built network;

[0067] here, after receiving the access responses of the slave mobile terminals, the host mobile terminal builds a network for sharing sensor data according to distances between the host mobile terminal itself and the respective slave mobile terminals and distances between the respective slave mobile terminals, in combination with a rule that a mobile terminal can only be connected with another two mobile terminals and a shortest-route match algorithm; wherein, one mobile terminal can only be connected with another two mobile terminals, such that connection and the maintenance of the network is more convenient; in an actual application, one mobile terminal can also be connected with a plurality of mobile terminals;

[0068] a network for sharing sensor data can be built by way of a radio network or a wired network; when a wired network is used, a corresponding standard of the wired network is applied, for example, if a Public Switched Telephone

Network (PSTN) is used, a related standard of the PSTN is applied; if a Next Generation Network (NGN) is used, a related standard of the NGN is applied; here, the wired network can be various wired networks; when a radio network is used, a corresponding standard of the radio network is applied, for example, if a Wireless Local Area Network (WLAN) is used, a related 802.1x standard of the WLAN is applied; if a Bluetooth is used, a related standard of the Bluetooth is applied; if a Worldwide Interoperability for Microwave Access (WiMax) is used, a related standard of the WiMax is applied; if a 3rd-Generation (3G) mobile network is used, a related standard of the 3G mobile network is applied; here, the radio network can be various radio networks;

[0069] the routing table information includes: connection information of a mobile terminal and a weight value of a connection route, wherein the longer the distance of the connection route is, the larger the weight value of the connection route is; the host mobile terminal determines the weight value of the connection route according to the length of the distance of the connection route; wherein the longer the distance of the connection route is, the larger the weight value of the connection route is;

[0070] after receiving the broadcasted routing table information, the slave mobile terminal returns an acknowledgement message to the host mobile terminal.

[0071] Step **104**: after receiving the acknowledgement message of all slave mobile terminals, the host mobile terminal sends all slave mobile terminals a command to report all sensor resource information.

[0072] Step **105**: the slave mobile terminals report all sensor resource information of themselves to the host mobile terminal according to the received command.

[0073] Step **106**: the host mobile terminal generates a sensor resource list according to the received sensor resource information reported by all slave mobile terminals and the sensor resource information of the host mobile terminal itself, and broadcasts the generated sensor resource list to all slave mobile terminals;

[0074] after receiving the broadcasted sensor resource list, the slave mobile terminal returns an acknowledgement message of having received the sensor resource list to the host mobile terminal; thus, the processes of building the network for sharing sensor data and broadcasting sensor resource list are finished.

[0075] A method for sharing sensor data among mobile terminals realized by the disclosure is as shown in FIG. **2**, the method includes the following steps.

[0076] Step **201**: when any mobile terminal in the network for sharing sensor data needs sensor data not owned by itself, the mobile terminal sends a request message to a mobile terminal owning the sensor data needed by the mobile terminal according to routing table information and a sensor resource list which are currently stored in the mobile terminal itself;

[0077] here, the mobile terminal can be a smart mobile terminal; the sensor resource list includes: sensor resource information of all mobile terminals; the routing table information includes: connection information of the mobile terminal and a weight value of connection route, wherein the longer the distance of the connection route is, the larger the weight value of connection route is;

[0078] the request message includes: the sensor data needed by the mobile terminal, wherein there can be more than one needed sensor data;

[0079] generally, the mobile terminal first sends a request message including information of the needed sensor data to a nearest mobile terminal owning the sensor data needed by the mobile terminal, to obtain the requested sensor data quickly; wherein the nearest mobile terminal refers to the mobile terminal with the smallest weight value of connection route.

[0080] Step **202**: according to the request message received, the mobile terminal which receives the request message returns the sensor data needed to the mobile terminal which sends the request message.

[0081] A method after a mobile terminal which sends a request message receives returned sensor data according to the disclosure is as shown in FIG. **3**, the method further includes the following steps.

[0082] Step **301**: after receiving returned sensor data, a mobile terminal which sends a request message reports newly acquired sensor resource information to a host mobile terminal; and

[0083] Step **302**: after receiving the sensor resource information, the host mobile terminal updates a sensor resource list of itself and broadcasts the updated sensor resource list to all slave mobile terminals.

[0084] The mobile terminal which sends the request message can be a host mobile terminal or a slave mobile terminal; and the mobile terminal which receives the request message can be a host mobile terminal or a slave mobile terminal; in other words, the host mobile terminal and the slave mobile terminal is neither master nor slave in respect of information reception and transmission. Of course, if the mobile terminal which sends the request message is a host mobile terminal, only Step **302** needs to be executed but it is not necessary to report the newly acquired sensor resource information.

[0085] During a network operation, if there is a slave mobile terminal applying for network quit, then the slave mobile terminal sends a request message of network quit to the host mobile terminal; after the host mobile terminal receives the request message, Step **101** to Step **106** are executed again to complete building of a network and broadcasting of a sensor resource list; at the moment, the mobile terminal which applies for network quit does not participate in the whole process.

[0086] If the host mobile terminal applies for network quit, an authority of the host mobile terminal is transferred to one slave mobile terminal first, then the host mobile terminal quits from the network; the host mobile terminal and all slave mobile terminals can elect a slave mobile terminal as the mobile terminal to be transferred through information interaction; specifically, the host mobile terminal can find a nearest slave mobile terminal from routing table information as a new host mobile terminal and broadcasts it to all slave mobile terminals; after receiving the broadcast, the slave mobile terminals return acknowledgement messages to the host mobile terminal, so as to determine the slave mobile terminal to be transferred.

[0087] If the host mobile terminal initiates a request of network removal, the host mobile terminal broadcasts a message of network removal to all slave mobile terminals; after determining no service processing, the slave mobile terminals return removal confirmation messages to the host mobile terminal; the host mobile terminal removes the network after receiving the removal confirmation messages returned by all

slave mobile terminals and determining the completion of service processing of the host mobile terminal itself; after the network is removed, each mobile terminal deletes routing table information and a sensor resource list stored in the each mobile terminal.

[0088] During a network operation, if a mobile terminal has a failure, there are mainly three conditions as follows:

[0089] (1) the failed mobile terminal is a host mobile terminal. When some slave mobile terminal finds that the host mobile terminal has a failure during information transmission, after a period of time, when determining that the host mobile terminal is still in a failure state, the slave mobile terminal selects a slave mobile terminal as a new host mobile terminal according to routing table information by using a shortest-route match algorithm; Step **101** to Step **106** are executed again to complete rebuilding of a network and broadcasting of a sensor resource list; at the moment, the previous host mobile terminal does not participate in the whole process;

[0090] here, since there is regular information interaction between the host mobile terminal and the slave mobile terminal, the slave mobile terminal can learn whether the host mobile terminal is in a failure state; in addition, there is information interaction between slave mobile terminals; a slave mobile terminal, which first knows that the host mobile terminal is in a failure state, notifies other slave mobile terminals after learning that the host mobile terminal is in a failure state, and selects a slave mobile terminal as a new host mobile terminal, then other slave mobile terminals do not execute an operation of a new host mobile terminal selection after receiving the notification;

[0091] (2) when the failed mobile terminal is a slave mobile terminal, after the host mobile terminal determines that there is a slave mobile terminal having a failure through information interaction, the host mobile terminal modifies routing table information according to a shortest-route match algorithm and broadcasts the modified routing table information to all slave mobile terminals; at the moment, the slave mobile terminal having a failure does not participate in the whole process; and

[0092] (3) if there are more than two mobile terminals having a failure, then it is considered that network connection fails and network rebuilding is needed.

[0093] The present disclosure is further illustrated in detail by taking building of a network for sharing sensor data by Bluetooth for example hereinafter; as shown in FIG. **4**, the method includes the following steps:

[0094] Step **401**: a host mobile terminal sends an access request to all slave mobile terminals;

[0095] here, since a network for sharing sensor data is built by Bluetooth, the total number of mobile terminals does not exceed 7 according to a standard of a Bluetooth network;

[0096] Step **402**: after receiving the access request, the slave mobile terminals return access response messages to the host mobile terminal;

[0097] here, before returning an access response message, each slave mobile terminal needs to acquire distances between the each slave mobile terminal itself and other respective slave mobile terminals respectively through a time interval of interaction; wherein the access response message includes the distances between each slave mobile terminal and other slave mobile terminals;

[0098] Step **403**: after receiving the access responses of all slave mobile terminals, the host mobile terminal builds a network for sharing sensor data by Bluetooth, and broadcasts generated routing table information to all slave mobile terminals in the built network; then Step **404** is executed;

[0099] here, after receiving the access responses of the slave mobile terminals, the host mobile terminal builds the network for sharing sensor data by Bluetooth according to distances between the host mobile terminal itself and the respective slave mobile terminals and distances between the respective slave mobile terminals in combination with a rule that one mobile terminal can only be connected with another two mobile terminals and a shortest-route match algorithm; a topology of the built network is as shown in FIG. **5**, wherein the network topology includes seven mobile terminals, including one host mobile terminal and six slave mobile terminals;

[0100] Step **404**: after receiving acknowledgement messages of all slave mobile terminals, the host mobile terminal sends all slave mobile terminals a command to report all sensor resource information;

[0101] here, all slave mobile terminals refer to the six slave mobile terminals as shown in the FIG. **5**;

[0102] Step **405**: each of the slave mobile terminal reports all sensor resource information of itself to the host mobile terminal according to the received command;

[0103] Step **406**: the host mobile terminal generates a sensor resource list according to sensor resource information of the host mobile terminal itself and the received sensor resource information reported by all slave mobile terminals, and broadcasts the generated sensor resource list to all slave mobile terminals; then Step **407** is executed;

[0104] Step **407**: during a network operation, when a mobile terminal needs sensor data not owned by itself, the mobile terminal, according to a sensor resource list and routing table information which are currently stored in the mobile terminal itself, sends a request message including information of needed sensor data to a nearest mobile terminal owning the sensor data needed by the mobile terminal;

[0105] Step **408**: the nearest mobile terminal, according to the received request message, returns the sensor data needed by the mobile terminal to the mobile terminal which sends the request message;

[0106] here, when the sensor data of the nearest mobile terminal is unusable, the mobile terminal which sends the request message finds a second nearest mobile terminal according to the routing table information and sends a request message including information of needed sensor data to the found second nearest mobile terminal, by such analogy, until available sensor data is obtained; wherein, if the mobile terminal which sends the request message does not obtain sensor data returned by the mobile terminal which receives the request message during a period of time, it is considered that the sensor data of the mobile terminal which sends the request message is unusable, wherein a length of the time can be pre-determined in the entire network;

[0107] Step **409**: after receiving the returned sensor data, the mobile terminal which sends the request message reports newly acquired sensor resource information to the host mobile terminal;

[0108] Step **410**: after receiving the sensor resource information, the host mobile terminal updates the sensor resource list of the host mobile terminal itself and then broadcasts the updated sensor resource list to all slave mobile terminals; and the current processing flow is ended;

[0109] here, when the slave mobile terminal or the host mobile terminal needs sensor data not owned by the slave mobile terminal itself or the host mobile terminal itself, the slave mobile terminal or the host mobile terminal can send a request message to a nearest mobile terminal owning the sensor data needed by the slave mobile terminal or the host mobile terminal, according to the updated sensor resource list and the routing table information.

[0110] For example, in the FIG. **5**, a slave mobile terminal **4** acquires temperature sensor data from a slave mobile terminal **3** and then reports newly added temperature sensor resource information to a host mobile terminal; accordingly, the host mobile terminal updates the sensor resource list of itself and broadcasts the updated sensor resource list to all slave mobile terminals; a slave mobile terminal **5**, according to the updated sensor resource list and routing table information, acquires the temperature sensor data from the slave mobile terminal **4** and then broadcasts the newly added temperature sensor resource information to the host mobile terminal; accordingly, the host mobile terminal updates the sensor resource list of itself again and broadcasts the updated sensor resource list to all slave mobile terminals; at the moment, if a slave mobile terminal **2** further needs the temperature sensor data, the slave mobile terminal **2** can send a request message to the nearest slave mobile terminal **5** preferentially according to the sensor resource list updated again and the routing table information.

[0111] When a mobile terminal which sends a request message does not need some sensor data acquired from a mobile terminal which receives the request message, and other mobile terminals do not share the sensor data acquired by the mobile terminal which sends the request message from the mobile terminal which receives the request message, the mobile terminal which sends the request message deletes the sensor data and reports deleted sensor resource information to the host mobile terminal; and the host mobile terminal updates the sensor resource list of itself after receiving the deleted sensor resource information and broadcasts the updated sensor resource list to all slave mobile terminals. For the example above, if the slave mobile terminal **4** does not need the temperature sensor data, the slave mobile terminal **4** examines whether the slave mobile terminal **5** needs the temperature sensor data, if yes, the slave mobile terminal **4** continues to transmit the temperature sensor data to the slave mobile terminal **5**; otherwise, the slave mobile terminal **4** deletes the temperature sensor data and reports deleted sensor resource information to the host mobile terminal.

[0112] It can be determined, according to an application condition of a sensor of a mobile terminal which sends a request message, whether the mobile terminal which sends the request message needs the sensor data; after determining that the mobile terminal which sends the request message does not need some sensor data acquired from a mobile terminal which receives the request message, the mobile terminal which sends the request message sends a message whether the corresponding sensor data is needed to other mobile terminals which share the sensor data acquired by the mobile terminal which sends the request message from the mobile terminal which receives the request message; after receiving the message whether the corresponding sensor data is needed, the other mobile terminals return messages of needing or not needing to the mobile terminal which sends the request message, and the mobile terminal which sends the request message determines whether to delete the sensor data according to content of the messages.

[0113] Based on the method above, the present disclosure further provides a network for sharing sensor data among mobile terminals, wherein the network includes: more than one first mobile terminal **61** and more than one second mobile terminal **62**, in which,

[0114] the first mobile terminal **61** is configured, according to routing table information and a sensor resource list which are currently stored in the first mobile terminal itself, to send a request message to the second mobile terminal **62**; and

[0115] the second mobile terminal **62** is configured, after receiving the request message sent by the first mobile terminal **61**, to return needed sensor data to the first mobile terminal **61** according to the received request message.

[0116] Here, it should be noted that, the second mobile terminal **62** can be a nearest mobile terminal owning the sensor data needed by the first mobile terminal **61**.

[0117] Wherein, all the first mobile terminals **61** and all the second mobile terminals **62** are called slave mobile terminals, wherein there can be more than one slave mobile terminal; the network further includes:

[0118] a host mobile terminal **63** configured to receive newly acquired, and/or deleted sensor resource information reported by the first mobile terminal **61**; after receiving the sensor resource information, to update the sensor resource list of itself and then broadcasting the updated sensor resource list to all slave mobile terminals;

[0119] the first mobile terminal **61** is further configured to report newly acquired, and/or deleted sensor resource information to the host mobile terminal **63** and receive the updated sensor resource list broadcasted by the host mobile terminal **63**; and

[0120] the second mobile terminal **62** is further configured to receive the updated sensor resource list broadcasted by the host mobile terminal **63**.

[0121] The host mobile terminal **63** is further configured to send an access request to the slave mobile terminal; after receiving an access response from the slave mobile terminals, to build a network for sharing sensor data and broadcast generated routing table information to the slave mobile terminals;

[0122] the first mobile terminal **61** is further configured, after receiving the access request, to return an access response message to the host mobile terminal **63** and receive the routing table information broadcasted by the host mobile terminal **63**; after receiving the routing table information, to return an acknowledgement message to the host mobile terminal **63**; and

[0123] the second mobile terminal **62** is further configured, after receiving the access request, to return an access response message to the host mobile terminal **63** and receive the routing table information broadcasted by the host mobile terminal **63**; after receiving the routing table information, to return an acknowledgement message to the host mobile terminal **63**.

[0124] The host mobile terminal **63** is further configured, after receiving the acknowledgement message from the slave mobile terminals, to send the slave mobile terminals a command to report all sensor resource information, and receive all sensor resource information reported by the slave mobile terminals; after receiving all sensor resource information reported by the slave mobile terminals, to generate a sensor resource list and broadcast the sensor resource list to the slave mobile terminals;

[0125] the first mobile terminal **61** is further configured to receive the command to report all sensor resource information from the host mobile terminal **63**; after receiving the command, to report all sensor resource information of itself to the host mobile terminal **63**; and further to receive the sensor resource list broadcasted by the host mobile terminal **63**; and

[0126] the second mobile terminal **62** is further configured to receive the command to report all sensor resource information from the host mobile terminal **63**; after receiving the command, to report all sensor resource information of itself to the host mobile terminal **63**; and further to receive the sensor resource list broadcasted by the host mobile terminal **63**.

[0127] The host mobile terminal **63** is further configured to broadcast a network removal message to the slave mobile terminals and delete the routing table information of the host mobile terminal **63** and the sensor resource list after determining the network removal;

[0128] the first mobile terminal **61** is further configured to receive the network removal message broadcasted by the host mobile terminal **63** and delete the routing table information and the sensor resource list of itself after determining the network removal; and

[0129] the second mobile terminal **62** is further configured to receive the network removal message broadcasted by the host mobile terminal **63** and delete the routing table information and the sensor resource list of itself after determining the network removal.

[0130] The host mobile terminal **63** sends an access request, broadcasts a message of network removal, broadcasts routing table information and broadcasts a sensor resource list to all slave mobile terminals.

[0131] The above are only the preferred embodiments of the disclosure and are not intended to limit the scope of protection of the present disclosure. Any modification, equivalent substitute and improvement made within the spirit and principle of the present disclosure are deemed to fall within the scope of protection of the present disclosure.

1. A method for sharing sensor data among mobile terminals, comprising:

building by a mobile terminal a network for sharing sensor data in advance; and further comprising:

when any mobile terminal in the network for sharing sensor data needs sensor data not owned by itself, sending a request message by the mobile terminal to a mobile terminal owning the sensor data needed by the mobile terminal according to routing table information and a sensor resource list which are currently stored in the mobile terminal itself;

according to the request message received, returning, by the mobile terminal which receives the request message, the sensor data needed to the mobile terminal which sends the request message.

2. The method according to claim **1**, wherein a mobile terminal initiating an access request is taken as a host mobile terminal while a mobile terminal receiving the access request is taken as a slave mobile terminal;

the building by a mobile terminal a network for sharing sensor comprises:

sending an access request by the host mobile terminal to all slave mobile terminals, and returning access response messages by the slave mobile terminals to the host mobile terminal after receiving the access request;

building a network for sharing sensor data by the host mobile terminal according to the access response messages returned by the slave mobile terminals and generating routing table information, and meanwhile broadcasting the information to all slave mobile terminals in the network built;

sending, by the host mobile terminal, all slave mobile terminals a command to report all sensor resource information; after receiving the command, reporting all sensor resource information of themselves by the slave mobile terminals to the host mobile terminal;

according to sensor resource information of the host mobile terminal itself and received sensor resource information reported by all slave mobile terminals, generating a sensor resource list and broadcasting the sensor resource list to all slave mobile terminals by the host mobile terminal.

3. The method according to claim **1**, wherein the sending a request message by any mobile terminal which needs sensor data not owned by itself to a mobile terminal owning the sensor data needed by the mobile terminal comprises:

sending the request message by the mobile terminal which sends the request message to a nearest mobile terminal which receives the request message to request the nearest mobile terminal to return requested sensor data;

when sensor data of the nearest mobile terminal which receives the request message is unusable, finding a second nearest mobile terminal by the mobile terminal which sends the request message according to the routing table information and sending a request message to the second nearest mobile terminal found out, by such analogy, until finding out a mobile terminal which can respond to a request message from the mobile terminal which sends the request message.

4. The method according to claim **3**, wherein a distance between the mobile terminal which sends the request message and the mobile terminal which receives the request message is determined by time needed by an information interaction between the mobile terminals.

5. The method according to claim **1**, further comprising:

when the mobile terminal which sends the request message does not need sensor data acquired from the mobile terminal which receives the request message, and other mobile terminals do not share the sensor data acquired by the mobile terminal which sends the request message from the mobile terminal which receives the request message, deleting the sensor data acquired by the mobile terminal which sends the request message from the mobile terminal which receives the request message and reporting deleted sensor resource information to the host mobile terminal;

updating, by the host mobile terminal, the sensor resource list of itself and broadcasting an updated sensor resource list to all slave mobile terminals.

6. The method according to claim **1**, further comprising:

when the mobile terminal which sends the request message is taken as a slave mobile terminal, reporting newly acquired sensor resource information to the host mobile terminal by the mobile terminal which sends the request message after receiving the sensor data returned;

updating, by the host mobile terminal, the sensor resource list of itself and broadcasting the updated sensor resource list to all slave mobile terminals.

7. The method according to claim **1**, further comprising:

when the mobile terminal which sends the request message is taken as a host mobile terminal, updating, by the host mobile

terminal, the sensor resource list of itself according to newly acquired sensor resource information, and broadcasting the updated sensor resource list to all slave mobile terminals by the host mobile terminal.

8. The method according to claim **1**, further comprising:

broadcasting a network removal message by a host mobile terminal to all slave mobile terminals;

returning removal confirmation messages to the host mobile terminal by slave mobile terminals which receive the network removal message after determining there is no service to be processed;

removing the network by the host mobile terminal after receiving removal confirmation messages returned by all slave mobile terminals and determining completion of service processing of the host mobile terminal itself; and

deleting, by each mobile terminal, routing table information and a sensor resource list stored in the each mobile terminal.

9. A network for sharing sensor data among mobile terminals, comprising more than one first mobile terminal and more than one second mobile terminal, wherein

the first mobile terminal is configured, according to routing table information and a sensor resource list which are currently stored in the first mobile terminal itself, to send a request message to the second mobile terminal; and

the second mobile terminal is configured, after receiving the request message sent by the first mobile terminal, to return needed sensor data to the first mobile terminal according to the request message received.

10. The network according to claim **9**, wherein all the first mobile terminals and all the second mobile terminals are slave mobile terminals, the network further comprising:

a host mobile terminal configured to send an access request to the slave mobile terminals; after receiving an access response from the slave mobile terminals, to build a network for sharing sensor data and broadcast generated routing table information to the slave mobile terminals;

the first mobile terminal is further configured, after receiving the access request, to return an access response message to the host mobile terminal and receive the routing table information broadcasted by the host mobile terminal; after receiving the routing table information, to return an acknowledgement message to the host mobile terminal; and

the second mobile terminal is further configured, after receiving the access request, to return an access response message to the host mobile terminal and receive the routing table information broadcasted by the host mobile terminal; after receiving the routing table information, to return an acknowledgement message to the host mobile terminal.

11. The network according to claim **10**, wherein

the host mobile terminal is further configured, after receiving the acknowledgement message from the slave mobile terminals, to send the slave mobile terminals a command to report all sensor resource information, and receive all sensor resource information reported by the slave mobile terminals; after receiving all sensor resource information reported by the slave mobile terminals, to generate a sensor resource list and broadcast the sensor resource list to the slave mobile terminals;

the first mobile terminal is further configured to receive the command to report all sensor resource information from the host mobile terminal; after receiving the command, to report all sensor resource information of itself to the host mobile terminal; and further to receive the sensor resource list broadcasted by the host mobile terminal; and

the second mobile terminal is further configured to receive the command to report all sensor resource information from the host mobile terminal; after receiving the command, to report all sensor resource information of itself to the host mobile terminal; and further to receive the sensor resource list broadcasted by the host mobile terminal.

12. The network according to claim **10**, wherein

the host mobile terminal is configured to receive newly acquired, and/or deleted sensor resource information reported by the first mobile terminal; after receiving the sensor resource information, to update the sensor resource list of itself and then broadcast the updated sensor resource list to all slave mobile terminals;

the first mobile terminal is further configured to report newly acquired, and/or deleted sensor resource information to the host mobile terminal and receive the updated sensor resource list broadcasted by the host mobile terminal; and

the second mobile terminal is further configured to receive the updated sensor resource list broadcasted by the host mobile terminal.

13. The method according to claim **2**, wherein the sending a request message by any mobile terminal which needs sensor data not owned by itself to a mobile terminal owning the sensor data needed by the mobile terminal comprises:

sending the request message by the mobile terminal which sends the request message to a nearest mobile terminal which receives the request message to request the nearest mobile terminal to return requested sensor data;

when sensor data of the nearest mobile terminal which receives the request message is unusable, finding a second nearest mobile terminal by the mobile terminal which sends the request message according to the routing table information and sending a request message to the second nearest mobile terminal found out, by such analogy, until finding out a mobile terminal which can respond to a request message from the mobile terminal which sends the request message.

14. The method according to claim **13**, wherein a distance between the mobile terminal which sends the request message and the mobile terminal which receives the request message is determined by time needed by an information interaction between the mobile terminals.

15. The method according to claim **2**, further comprising:

when the mobile terminal which sends the request message does not need sensor data acquired from the mobile terminal which receives the request message, and other mobile terminals do not share the sensor data acquired by the mobile terminal which sends the request message from the mobile terminal which receives the request message, deleting the sensor data acquired by the mobile terminal which sends the request message from the mobile terminal which receives the request message and reporting deleted sensor resource information to the host mobile terminal;

updating, by the host mobile terminal, the sensor resource list of itself and broadcasting an updated sensor resource list to all slave mobile terminals.

16. The method according to claim **2**, further comprising:

when the mobile terminal which sends the request message is taken as a slave mobile terminal, reporting newly acquired sensor resource information to the host mobile terminal by the mobile terminal which sends the request message after receiving the sensor data returned;

updating, by the host mobile terminal, the sensor resource list of itself and broadcasting the updated sensor resource list to all slave mobile terminals.

17. The method according to claim **2**, further comprising:

when the mobile terminal which sends the request message is taken as a host mobile terminal, updating, by the host mobile terminal, the sensor resource list of itself according to newly acquired sensor resource information, and broadcasting the updated sensor resource list to all slave mobile terminals by the host mobile terminal.

18. The method according to claim **2**, further comprising:

broadcasting a network removal message by a host mobile terminal to all slave mobile terminals;

returning removal confirmation messages to the host mobile terminal by slave mobile terminals which receive the network removal message after determining there is no service to be processed;

removing the network by the host mobile terminal after receiving removal confirmation messages returned by all slave mobile terminals and determining completion of service processing of the host mobile terminal itself; and

deleting, by each mobile terminal, routing table information and a sensor resource list stored in the each mobile terminal.

19. The network according to claim **11**, wherein

the host mobile terminal is configured to receive newly acquired, and/or deleted sensor resource information reported by the first mobile terminal; after receiving the sensor resource information, to update the sensor resource list of itself and then broadcast the updated sensor resource list to all slave mobile terminals;

the first mobile terminal is further configured to report newly acquired, and/or deleted sensor resource information to the host mobile terminal and receive the updated sensor resource list broadcasted by the host mobile terminal; and

the second mobile terminal is further configured to receive the updated sensor resource list broadcasted by the host mobile terminal.

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