Title: MOBILE COMMUNICATION DEVICE AND SYSTEM

Abstract: -14- ABSTRACT The present invention describes a mobile communication device (10) comprising a processor (16) and a display (18) and a near-field communication device (12) respectively coupled to the processor (16). The near-field 5 communication device (12) is arranged to receive respective identification information from a predefined plurality of transmission tags (22), said tags being comprised by respective objects (20) having different appearances. The processor (16) is arranged to identify a transmission tag (22) from the identification information received by the by the near-field communication device (12), and, upon identifying one of said identifiers, to generate, on said display (18), pictorial information (34) relating to one of said objects (20) in accordance with predefined game rules relating to the collection of said objects (20). The present invention further describes a system comprising such a mobile communication device (10) and such objects (20).

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MOBILE COMMUNICATION DEVICE AND SYSTEM

The present invention relates to a mobile communication device comprising a processor; and a display and a near-field communication device respectively coupled to the processor.

The present invention further relates to a system comprising such a mobile communication device and a plurality of transmission tags.

Near-field communication (NFC) technology such as radio frequency identification (RF-ID) technology has become commonplace in the consumer market. Although originally primarily developed for the protection and identification of products in business environments such as warehouses and shops, NFC communication technology has now become available in domestic products, where new application domains such as entertainment are being explored. An example of an RF-ID based game can be found on the Internet; see: www.hyper-dash.com, which is a token collection game using a hand-held controller comprising an RF-ID reader. The tokens comprise RF-ID transmitters, with the object of the game being to collect the tokens for physical exercise. The hand-held controller is configured to generate audible instructions for the collection of the next token after a token collection.

NFC functionality can also be found in mobile communication devices such as cell phones. For example, the Nokia 6131 NFC™ comprises a NFC device. US patent application No. 2007/0167224 A1 discloses a bounty hunter game using such types of cell phones. In this game, participants attempt to earn awards or items, or to have awards or items taken away from other game contestants by transmitting information from electronic data storage elements such as RFID tags to a central server. The tags may be carried by the participants or placed in the vicinity of locations associated with the participants.
of the game. A player may be excluded from the game by another player sending his RFID tag information to the central server.

Hence, there exists a consumer market for NFC gaming applications on mobile communication devices.

The present invention seeks to provide a mobile communication device comprising a processor; and a display and a near-field communication device respectively coupled to the processor that enables new gaming applications on such a device.

The present invention further seeks to provide a system comprising such a device.

According to an aspect of the present invention, there is provided a mobile communication device comprising a processor; and a display and a near-field communication device respectively coupled to the processor, the near-field communication device being arranged to receive respective identification information from a predefined plurality of transmission tags, said tags being comprised by respective objects having different appearances; the processor being arranged to identify a transmission tag from the identification information received by the near-field communication device, and, upon identifying one of said identifiers, generate, on said display, a pictorial representation relating to one of said objects in accordance with predefined game rules relating to the collection of said objects.

The present invention has been based on the realization that an object collection game can be improved by implementation on a mobile communication device because the display of the device can be driven by the processor to provide pictorial information to the player, thus adding an additional dimension to the object collection game.

This pictorial information may take several forms. For instance, the pictorial representation is a representation of the appearance of the next object to be collected.
In an alternative embodiment, the pictorial information is a representation of the appearance of the collected object.

In yet another embodiment, the pictorial information corresponds to a physical activity required for collecting the next object.

In even yet another embodiment, the pictorial information corresponds to a geographical direction for collecting the next object. To this end, the mobile communication device may comprise hardware for implementing position location techniques, with the locations of the objects defined on the mobile communication device in the form of way points for said hardware.

Different types of pictorial information may be combined, e.g. by displaying them sequentially or together in different parts of a screen area, which may be in the form of a split screen. The processor may be arranged to generate the pictorial information from image data stored in a library. The processor may have access to an application programming interface (API) for this purpose.

Preferably, the predefined game rules belong to a set of different predefined game rules belonging to different collection games, and wherein the mobile communication device is adapted to display said different collection games for user selection. This allows the user to play a plethora of different games using the same objects, thus adding further value to the objection collection experience. The user may select the game of interest via a keypad of the mobile communication device, via a touch screen, via scroll buttons and so on.

In an embodiment, the processor has a clock for timing the collection of the respective objects. This provides an additional dimension to such a collection game because an additional competitive element is added. For instance, the processor may be arranged to time the collection of all objects, said pictorial information comprising the duration of said collection on the display. Alternatively, the processor is arranged to terminate the game upon expiry of a predefined time limit, said pictorial information comprising the total number of collected objects within said time limit.
The mobile communication device of the present invention may be made available in a system further comprising a plurality of objects having different appearances, each object comprising a transmission tag for transmitting object identification information to the near field communication device. Alternatively, the objects may be made available separately for use with a mobile communication device of the present invention.

An existing mobile phone comprising a NFC communication device may be converted into a mobile phone of the present invention by a computer program product for, when installed on a processor of such a mobile communication device, identifying a transmission tag from its transmitted identification information received by the near-field communication device, and, upon identifying one of said identifiers, generate, on said display, pictorial information relating to the detection of a signal of tag associated with a next object in accordance with predefined game rules relating to the collection of said objects. Such a computer program product may be further arranged to generate timing information in accordance with said game rules.

Embodiments of the invention are described in more detail and by way of non-limiting examples with reference to the accompanying drawings, wherein:

Fig. 1 depicts a system in accordance with an embodiment of the present invention;

Fig. 2 depicts an aspect of a mobile communication device in accordance with an embodiment of the present invention; and

Fig. 3 shows another aspect of a mobile communication device in accordance with an embodiment of the present invention.

It should be understood that the Figures are merely schematic and are not drawn to scale. It should also be understood that the same reference numerals are used throughout the Figures to indicate the same or similar parts.
Fig. 1 schematically depicts a system according to an embodiment of the present invention. The system, an object collection game, comprises a plurality of collectable objects 20 that each comprises a transmission tag 22. The game may comprise any number of objects 20. Each transmission tag 22 typically comprises unique identification information that allows the identification of the object associated with that tag by a tag reader. The objects 20 typically have different appearances to allow them to be recognized by the player of the object collection game. A non-limiting example of such different appearances is the differently shaped objects 20 as shown in Fig. 1. Alternatively, different appearances may be established by differently colored objects, differently sized objects, differently labeled objects and combinations thereof. Other ways of establishing different appearances will be apparent to the skilled practitioner. A transmission tag 22 may be laminated in between separate layers of an object 20. A suitable transmission tag may the Mifare RFID tags marketed by the applicant. It will be appreciated that other tags are equally feasible and may be integrated into an object 20 in any suitable way.

The collection game further comprises a mobile communication device 10, which may be a mobile phone, a digital personal assistant, an e-mail management device such as a Blackberry™, and so on, comprises an antenna 14 coupled to a near-field communication (NFC) device 12. In an embodiment, the NFC device 12 is a RF-ID tag reader for receiving identification information from active RFID tags 22, i.e. tags that continuously transmit their information. In a preferred alternative embodiment, the NFC device 12 is a RFID tag transceiver for inducing a transmission from a passive RFID tag 22. In such an arrangement, the NFC device 12 transmits an electromagnetic field, which induces the transmission of the identification information by the RFID tag 22 when the tag is placed inside this field. This has the advantage that the tags 22 do not require a permanent power supply. Other suitable implementations of the NFC device 12 are also feasible.

The NFC device 12 is arranged to provide identification information received from a tag to a processor 16, which is arranged to decode this
information and compare the decoded information with object identification information stored in its memory to associate the decoded information with one of the objects 20. Upon detection of the collected object 20, the processor is further arranged to generate pictorial information on a display 18 in accordance with the rules of the game to be played. This pictorial information may be an acknowledgement of the collection of the object 20. Preferably, the pictorial information provides the user with instructions regarding the collection of a next object 20. This information is typically generated in accordance with the rules of the game implemented on the processor 16, e.g. in the form of instructions in its instruction memory.

The processor 16 may provide the display 18 with the pictorial information by accessing a pictorial information library through an API (not shown), with the library address being derived from the most recently collected object 20 in accordance with the rules of the game implemented on the processor 16.

Alternatively, the pictorial information may be retrieved from the tag 22 by the NFC device 12 and forwarded to the processor 16.

The processor 16 may further be arranged to generate an audible signal on a loudspeaker (not shown) of the mobile communications device 10 each time an object 20 is collected. The processor 16 may further be arranged to time the collection of the objects 20 by the player of the game, i.e. the user of the mobile communications device 10, and to provide pictorial information about said timing. For instance, the duration of the collection of all objects 20 may be displayed on the display 18, or the number of objects 20 collected in a predefined time period, i.e. during a predefined duration of the game, may be displayed. The objects 20 collected during said time period may be individually displayed on the display 18.

In an embodiment, the objects 20 have an identical appearance, but are to be associated with further objects having different appearances. The object 20 may for instance have an adhesive portion for adhering itself to such a further object. For instance, each object 20 may be a laminated paper card comprising a tag 22 with unique identification information in between the laminations and an adhesive strip for adhering the card to a further object.
The mobile communication device 10 may further comprise a camera for taking a picture of the object 20 adhered to the further object, with the pictorial information being generated by the processor 16 from this picture. The pictorial information may be stored in the aforementioned library and associated with the unique information received from the tag 22 by the NFC device 12. Such association information may be stored in any suitable way, e.g. in the form of a look-up table. After all further objects have been registered in this way, the collection game may be played with the further objects, using objects 20 that have an identical appearance but are distinguishable by the unique identification information stored in the tags 22. In an alternative embodiment, the player of the game must remember the different further objects, with the pictorial information generated by the processor only providing instructions relating to the order in which the objects 20 should be collected. In this embodiment, the mobile communications device 10 does not require a camera because pictorial information about the further object is not required.

At this point, it is emphasized that the specific game rules are not crucial to the present invention. In fact, the mobile communications device 10 may comprise a plurality of object collection games that have different collection rules, with an individual collection game being selectable by the user of the mobile communications device 10. Such a selection may be made in any suitable way. For instance, the selection options may be displayed on the display 18, with the user being able to select the game of interest accordingly.

A number of non-limiting examples of such collection games is given below. In some embodiments, one of the objects 20 is labeled as a base station, which is an object that needs collecting more than once, and should for instance be collected every time another object 20 has been collected.

**Game 1 (with return to base station)**

In this game, a base station object 20 and nine other objects 20 numbered 1-9 are available. The purpose of the game is to collect the numbers 1-9 in
ascending or descending order, with having to return to (i.e. collect) the base station after collection of each numbered object 20. The quickest time wins.

**Game 2: (no return to base station)**

As game 1, but without having to return to the base station object.

**Game 3: 1-10 (random base station)**

As game 1, but the objects 20 numbered 1-9 may be collected in a random way. The random order is generated by the processor 16, and depicted in the form of pictorial information on the display 18.

**Game 4: 1-10 (random, no base station)**

As game 3, but without having to return to the base station object.

**Game 5: Colours/shapes (base station)**

In this game, a number of objects having a different shape and/or color as well as a base station object are present. The object of the game is to collect the differently colored and/or shaped objects in a random way returning to base station after tagging each shape. The quickest time wins. The random order is generated by the processor 16, and depicted in the form of pictorial information on the display 18.

**Game 6: 2 minute time-challenge**

As game 5, but now the object is to collect as many different color/shape objects as possible in a predefined time period, e.g. 2 minutes, returning to the base station after tagging each object. The most objects collected wins.

**Game 7: Memory challenge:** Place the objects 20 such that their distinguishing features are no longer visible, e.g. by placing object cards upside down. Collect the objects in a random way returning to base station after tagging each object.
The quickest time wins. The random order is generated by the processor 16, and depicted in the form of pictorial information on the display 18.

It will be appreciated that many other game variants can be easily thought of.

In an embodiment, the mobile communication device 10 comprises a set of predefined physical activities in pictorial form for the user to perform. The mobile communication device 10 may be arranged to randomize a physical activity to be performed as part of the challenge to collect the next object 20. For example, the player could be shown an image of a person on all four limbs instructing the player to crawl to the next object 20, an image of a hopping person instructing the player to hop to the next object 20, an image of a frog instructing the player to frog leap to the next object 20 and so on.

The objects 20 may carry educational information, e.g. animal pictures or words.

The collection game of the present invention may be played in a multiplayer environment, with each player carrying a mobile communication device 10 of the present invention. To this end, the system of the present invention further comprises a central server (not shown) for communicating with each mobile communication device 10 in the game. The server is arranged to register each object 20 collected by a player, after which the object 20 is made unavailable for further collection by other players. This may be done by the server no longer accepting registration information of the collection of the same object, or by sending collection exclusion information to all mobile communication devices 10, such that the processors 16 no longer allow the registration of such objects 20. After all objects 20 have been collected, the player who collected the most objects 20, or the objects 20 having the largest accumulated value in case each object has an individual value, is the winner of the game.

Fig. 2 shows an example of pictorial information generated on a mobile communication device 10 of the present invention. The mobile communication device 10, in this case is a Nokia 6131 NFC™ extended with a computer.
program product of the present invention. An object 20, here a laminated paper card is labeled with a unique identifier, here the number 4, to make the object 20 have an appearance different to the other objects 20 that form a part of the game. Upon tagging the object 20, the display 18 displays information 30 informing the player of the successful collection of the object 20, and provides an instruction 32 concerning the next object 20 to be collected, together with a pictorial representation 34 of the object to be collected.

Fig. 3 shows another example of pictorial information generated on a mobile communication device 10 of the present invention, which again is a Nokia 6131 NFC™ extended with a computer program product of the present invention. The display 18 informs the player that a collection game has started, and provides the player with an instruction 32 concerning the first object 20 to be collected, together with a pictorial representation 34 of the object to be collected.

It should be noted that the above-mentioned embodiments illustrate rather than limit the invention, and that those skilled in the art will be able to design many alternative embodiments without departing from the scope of the appended claims. In the claims, any reference signs placed between parentheses shall not be construed as limiting the claim. The word "comprising" does not exclude the presence of elements or steps other than those listed in a claim. The word "a" or "an" preceding an element does not exclude the presence of a plurality of such elements. The invention can be implemented by means of hardware comprising several distinct elements. In the device claim enumerating several means, several of these means can be embodied by one and the same item of hardware. The mere fact that certain measures are recited in mutually different dependent claims does not indicate that a combination of these measures cannot be used to advantage.
CLAIMS

1. A mobile communication device (10) comprising:
   a processor (16); and
   a display (18) and a near-field communication device (12) respectively coupled to the processor (16), the near-field communication device (12) being arranged to receive respective identification information from a predefined plurality of transmission tags (22), said tags being comprised by respective objects (20) having different appearances;
   the processor (16) being arranged to identify a transmission tag (22) from the identification information received by the near-field communication device (12), and, upon identifying one of said identifiers, generate, on said display (18), pictorial information (34) relating to one of said objects (20) in accordance with predefined game rules relating to the collection of said objects (20).

2. A mobile communication device (10) according to claim 1, wherein the pictorial information (34) is a representation of the appearance of the next object (20) to be collected.

3. A mobile communication device (10) according to claim 1, wherein the pictorial information (34) is a representation of the appearance of the collected object (20).

4. A mobile communication device (10) according to claim 1, wherein the pictorial information (34) corresponds to a physical activity required for collecting the next object (20).

5. A mobile communication device (10) according to claim 1, wherein the pictorial information (34) corresponds to a geographical direction for collecting the next object (20).
6. A mobile communication device (10) according to any of claims 1-5, wherein the processor (16) is arranged to generate the pictorial information (34) from image data stored in a library.

7. A mobile communication device (10) according to any of claims 1-6, wherein the predefined game rules belong to a set of different predefined game rules belonging to different collection games, and wherein the mobile communication device (10) is adapted to display said different collection games for user selection.

8. A mobile communication device (10) according to any of claims 1-7, wherein the processor (16) has a clock for timing the collection of the respective objects (20).

9. A mobile communication device (10) according to claim 8, wherein the processor (16) is arranged to determine the total object collection time, said pictorial information (34) comprising the duration of said collection on the display (18).

10. A mobile communication device (10) according to claim 8, wherein the processor (16) is arranged to terminate the game upon expiry of a predefined time limit, said pictorial information (34) comprising the total number of collected objects (20) within said time limit.

11. A system comprising a mobile communication device (10) according to any of claims 1-10 and a plurality of distinguishable objects (20), each object comprising a transmission tag (22) for transmitting unique object identification information to the near field communication device (12).
12. A system according to claim 11, wherein the system comprises a plurality of mobile communication devices (10) according to any of claims 1-10 and a server for communicating object collection information with said mobile communication devices (10).

13. A computer program product for, when installed on a processor (16) of a mobile communication device (10) comprising a display (18) and a near-field communication device respectively coupled to the processor (16), the near-field communication device (12) being arranged to receive respective identification information from a predefined plurality of transmission tags (22), said tags being comprised by respective objects (20) having different appearances:

identifying a transmission tag (22) from its transmitted identification information received by the near-field communication device (12), and, upon identifying one of said identifiers, generating, on said display (18), pictorial information (34) relating to one of said objects (20) in accordance with predefined game rules relating to the collection of said objects (20).

14. A computer program product according to claim 13, further arranged to generate timing information in accordance with said game rules.

15. A plurality of objects (20) having different appearances or for attaching to further objects having different appearances, each object (20) comprising a transmission tag (22) for transmitting object identification information to the near-field communication device (12) of the mobile communication device (10) according to any of claims 1-10.
A. CLASSIFICATION OF SUBJECT MATTER

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

B. RELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H04M

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

Electronic database consulted during the international search (name of database and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<td>pages 9-37, figures 1,5,8,9</td>
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