ABSTRACT

METHOD FOR ESTABLISHING STATELESS COMMUNICATION BETWEEN TWO OR MORE DEVICES

Disclosed is a method and system for establishing communication between a mobile device and an electronic device through a server. In one implementation, the electronic device detects the mobile device, when the mobile device is placed on the electronic device. The electronic device further displays a color image on a display unit associated with the electronic device. Further the mobile device captures the color image by using an image capturing unit. Thereafter, the electronic device and the mobile device transmit a first trigger signal and a second trigger signal to the server respectively. Upon receiving, the server transmits a first identification token and a second identification token to the electronic device and the mobile device respectively. The first identification token and the second identification token facilitate to establish the communication between the mobile device and the electronic device through the server.

To be published with Figure 3

CLAIMS:

1. A method for facilitating communication between an electronic device and a mobile device through a server, the method comprising:

receiving a first trigger signal from the electronic device and a second trigger signal from the mobile device, wherein the first trigger signal comprises color data generated by the electronic device and wherein the second trigger signal comprises RGB data captured by the mobile device;

matching the first trigger signal with the second trigger signal in order to validate an intended communication between the electronic device and the mobile device;

generating a first identification token for the electronic device and a second identification token for the mobile device after matching the first trigger signal with the second trigger signal;

transmitting the first identification token to the electronic device and the second identification token to the mobile device; and

facilitating the communication between the electronic device and the mobile device based on the first identification token and the second identification token, wherein the receiving, the matching, the generating, the transmitting and the facilitating are performed by a processor using programmed instructions stored in a memory.

2. A system 102 for facilitating communication between an electronic device 104 (a) and a mobile device 104 (b), the system 102 comprising:

a processor 202; and

a memory 206 coupled to the processor 202, wherein the processor 202 is capable of executing a plurality of modules stored in the memory 206, and wherein the plurality of modules comprising:

a trigger receiving module 212 configured to receive a first trigger signal from the electronic device and a second trigger signal from the mobile device, wherein the first trigger signal comprises color data generated by the electronic device and wherein the second trigger signal comprises RGB data captured by the mobile device;

a matching module 214 configured to match the first trigger signal with the second trigger signal to validate an intended communication between the electronic device and the mobile device;

a token generation module 216 configured to generate a first identification token for the electronic device and a second identification token for the mobile device after matching, the first trigger signal with the second trigger signal; and

a transmission module 218 configured to:

transmit the first identification token to the electronic device and the second identification token to the mobile device; and

facilitate the communication between the electronic device and the mobile device based on the first identification token and the second identification token.

3. The system of claim 2, further comprising an image generation module configured to generate a color image to be displayed on the electronic device 104 (a).

4. A non transitory computer program product having embodied thereon a computer program for facilitating communication between an electronic device and a mobile device through a server, the computer program product storing instructions, the instructions comprising instructions for:

receiving a first trigger signal from the electronic device and a second trigger signal from the mobile device, wherein the first trigger signal comprises color data generated by the electronic device and wherein the second trigger signal comprises RGB data captured by the mobile device;

matching the first trigger signal with the second trigger signal to validate an intended communication between the electronic device and the mobile device;

generating a first identification token for the electronic device and a second identification token for the mobile device after matching the first trigger signal with the second trigger signal;

transmitting the first identification token to the electronic device and the second identification token to the mobile device respectively; and

facilitating the communication between the electronic device and the mobile device based on the first identification token and the second identification token.

5. A method for establishing communication of an electronic device with a mobile device through a server, the method comprising:

detecting the mobile device when the mobile device is placed on the electronic device;

displaying a color image on a display unit of the electronic device subsequent to the detection of the mobile device;

transmitting a first trigger signal to the server, wherein the first trigger signal comprises color data of the generated color image; and

receiving a first identification token from the server to facilitate the establishing of the communication with the mobile device, wherein the detecting, the displaying, the transmitting and the receiving are performed by a processor using programmed instructions stored in a memory.

6. The method of claim 5, wherein the mobile device is detected by using at least one of a blob detection mechanism and flash of the mobile device.

7. The method of claims 1 or 5, wherein the first trigger signal further comprises an identification number of the electronic device, a time stamp of the first trigger signal and location information of the electronic device.

8. The method of claims 1 or 5, wherein the first identification token comprises the identification number of the mobile device.

9. An electronic device 104 (a) for establishing communication with a mobile device 104 (b) through a server 102, the electronic device 104 (a) comprising:

a processor 302; and

a memory 306 coupled to the processor 302, wherein the processor 302 is capable of executing a plurality of modules stored in the memory 306, and wherein the plurality of modules comprising:

a detection module 312 configured to detect the mobile device when the mobile device is placed on the electronic device;

a display module 314 configured to display a color image on a display unit of the electronic device in response to the detection module;

a transmitting module 316 configured to transmit a first trigger signal to the server, wherein the first trigger signal transmitted comprises color data of the color image; and

a reception module 318 configured to receive a first identification token from the server to facilitate the establishing of the communication with the mobile device.

10. The electronic device of claim 9, wherein the display module 314 is further coupled to an image generation module, and wherein the image generation module is configured to generate the color image.

11. A non transitory computer program product having embodied thereon a computer program for establishing communication of an electronic device with a mobile device through a server, the computer program product storing instructions, the instructions comprising instructions for:

detecting the mobile device when the mobile device is placed on the electronic device;

displaying a color image on a display unit of the communication device subsequent to the detecting the mobile device;

transmitting a first trigger signal to the server, wherein the first trigger signal comprises color data of the color image; and

receiving a first identification token from the server to facilitate the establishing of the communication with the mobile device.

12. A method for establishing communication of a mobile device with an electronic device through a server, the method comprising:

stabilizing accelerometer data of the mobile device when the mobile device is placed on the electronic device;

capturing RGB data associated with a color image generated by the electronic device subsequent to the stabilizing of the accelerometer data;

transmitting a second trigger signal to the server, wherein the second trigger signal comprises the RGB data captured; and

receiving a second identification token from the server to facilitate the establishing of the communication with the electronic device, wherein the stabilizing, the capturing, the transmitting, and the receiving are performed by a processor using programmed instructions stored in a memory.

13. The method of claims 1, 5 or 12, wherein the communication of the mobile device with the electronic device through the server is stateless communication or pair-less communication.

14. The method of claim 12, wherein the mobile device is stabilized by along at least one axis.

15. The method of claims 1 or 12, wherein the second trigger signal further comprises an identification number of the mobile device, a time stamp of the second trigger signal and location information of the mobile device.

16. The method of claims 1 or 12, wherein the second identification token comprises the identification number of the electronic device.

17. A mobile device 104 (b) for establishing communication with an electronic device 104 (a) through a server 102, the mobile device comprising:

a processor 402; and

a memory 406 coupled to the processor 402, wherein the processor 402 is capable of executing a plurality of modules stored in the memory 406, and wherein the plurality of module comprising:

a stabilization module 412 configured to stabilize accelerometer data of the mobile device when the mobile device is placed on the electronic device;

a sensing module 414 configured to capture RGB data associated with a color image generated by the electronic device subsequent to the stabilizing of the accelerometer data;

a transmission module 416 configured to transmit a second trigger signal to the server, wherein the second trigger signal comprises the RGB data; and

a receiving module 418 configured to receive a second identification token from the server to facilitate the establishing of the communication with the electronic device.

18. A non transitory computer program product having embodied thereon a computer program for establishing communication of a mobile device with an electronic device through a server, the computer program product storing instructions, the instructions comprising instructions for:

stabilizing accelerometer data of the mobile device when the mobile device is placed on the electronic device;

capturing RGB data associated with a color image generated by the electronic device subsequent to the stabilizing of the accelerometer data; and

transmitting a second trigger signal to the server, wherein the second trigger signal comprises the RGB data; and

receiving a second identification token from the server to facilitate the establishing of the communication with the electronic device.

Dated 12th Day of August, 2013

Deepak Pawar
IN-PA-2052
Agent for Applicant

TECHNICAL FIELD

[001] The present subject matter described herein, in general, relates to a method for establishing wireless communication between two devices, and more particularly the method for establishing a stateless communication between the two devices.

BACKGROUND

[002] Traditionally, mobile devices include short-range radio interfaces that are adapted to enable communication with communication devices using communication protocols. The examples of the mobile devices and the communication devices may comprise a multi-touch table, a kiosk, a mobile phone, a tablet or the like. For example, the commonly used communication protocol for short-range wireless communications may include Bluetooth® and Near Field Communication (NFC).

[003] In order to facilitate the communication, the communication protocols used today requires explicit pairing between the mobile devices and the communication devices. The process of pairing involves the two devices to know each other by way of exchanging security credentials. Therefore, the existing methods require the pairing between two devices which once established can be used for multiple sessions and hence is not stateless in nature.

[004] In order to establish stateless communication, an accelerometer based peer identification and data transfer methods is being used in the existing art. However, the existing accelerometer based peer identification methods requires a physical trigger and accelerometer data from the two communication devices in order to establish the stateless communication.

SUMMARY

[005] Before the present methods, are described, it is to be understood that this application is not limited to the particular systems, and methodologies described, as there can be multiple possible embodiments which are not expressly illustrated in the present disclosures. It is also to be understood that the terminology used in the description is for the purpose of describing the particular versions or embodiments only, and is not intended to limit the scope of the present application. This summary is provided to introduce aspects related to methods for establishing communication between an electronic device and a mobile device

through a server and the aspects are further described below in the detailed description. This summary is not intended to identify essential features of the claimed subject matter nor is it intended for use in determining or limiting the scope of the claimed subject matter.

[006] In one implementation, a system for facilitating communication between an electronic device and a mobile device is disclosed. The system comprises a processor and a memory coupled to the processor for executing a plurality of modules present in the memory. The plurality of modules comprises a trigger receiving module, a matching module, a token generation module and a transmission module. The trigger receiving module may be configured to receive a first trigger signal from the electronic device and a second trigger signal from the mobile device. In one aspect, the first trigger signal may comprise color data generated by the electronic device whereas the second trigger signal may comprise RGB data captured by the mobile device. The matching module may be configured to match the first trigger signal with the second trigger signal in order to validate an intended communication between the electronic device and the mobile device. The token generation module may be configured to generate a first identification token for the electronic device and a second identification token for the mobile device subsequent to the matching of the first trigger signal with the second trigger signal. The transmission module may be configured to transmit the first identification token to the electronic device and the second identification token to the mobile device. The transmission module may be further configured to facilitate the communication between the electronic device and the mobile device based on the first identification token and the second identification token.

[007] In another implementation, a method for facilitating communication between an electronic device and a mobile device through a server is disclosed. In one aspect, a first trigger signal from the electronic device and a second trigger signal from the mobile device may be received. In one aspect, the first trigger signal may comprise color data generated by the electronic device whereas the second trigger signal may comprise RGB data captured by the mobile device. The first trigger signal may be then matched with the second trigger signal in order to validate an intended communication between the electronic device and the mobile device. Upon matching the first trigger signal with the second trigger signal, a first identification token for the electronic device and a second identification token for the mobile device may be generated. After generating the first identification token and the second

identification token, the first identification token may be then transmitted to the electronic device and the second identification token may be transmitted to the mobile device for facilitating the communication between the electronic device and the mobile device through the server. In one aspect, the method may be performed by a processor using programmed instructions stored in a memory. In one aspect, the computer program product storing instructions for facilitating the communication between the electronic device and the mobile device through the server may be implemented similarly as aforementioned.

[008] In yet another implementation, an electronic device for establishing communication with a mobile device through a server is disclosed. The electronic device may comprise a processor and a memory coupled to the processor for executing a plurality of modules present in the memory. The plurality of modules may further comprise a detection module, a display module, a transmitting module and a reception module. The detection module may be configured to detect the mobile device when the mobile device is placed on the electronic device. Further the display module may be configured to display a color image on a display unit of the electronic device. Further a transmitting module may be configured to transmit a first trigger signal to the server. In one aspect the first trigger signal may comprise color data associated to the color image. Further the reception module may be configured to receive a first identification token from the server in order to establish the communication with the mobile device.

[009] In yet another implementation, a method for establishing communication of an electronic device with a mobile device through a server is disclosed. In one aspect, the mobile device may be detected when the mobile device is placed on the electronic device. Subsequent to detection of the mobile device, a color image may be displayed on a display unit of the electronic device. Further a first trigger signal may be transmitted to the server. In one aspect, the first trigger signal may comprise color data associated to the color image. Further a first identification token may be received from the server in order to establish the communication with the mobile device. In one aspect, the method for establishing the communication of the electronic device with the mobile device through the server may be performed by a processor using programmed instructions stored in a memory. In one aspect, the computer program product storing instructions for establishing the communication of the electronic device with the mobile device through the server may be implemented similarly as aforementioned.

[0010] In yet another implementation, a mobile device for establishing communication with an electronic device through a server is disclosed. The mobile device may comprise a processor and a memory coupled to the processor for executing a plurality of modules present in the memory. The plurality of modules may further comprise a stabilization module, a sensing module, a transmission module and a receiving module. The stabilization module may be configured to stabilize accelerometer data of the mobile device. In one aspect, the mobile device may be stabilized when the mobile device is placed on the electronic device. Subsequent to the stabilizing of the accelerometer data, the sensing module may be configured to capture RGB data associated with a color image generated by the electronic device. Further the transmission module may be configured to transmit a second trigger signal to the server. In one aspect, the second trigger signal may comprise the RGB data. Further the receiving module may be configured to receive a second identification token from the server in order to establish the communication with the electronic device.

[0011] In yet another implementation, a method for establishing communication of a mobile device with an electronic device through a server is disclosed. In one aspect, accelerometer data of the mobile device may be stabilized when the mobile device is placed on the electronic device. Subsequent to the stabilizing of the accelerometer data, RGB data associated with a color image generated by the electronic device may be captured. Further a second trigger signal may be transmitted to the server. In one aspect, the second trigger signal may comprise the RGB data. Further a second identification token may be received from the server in order to establish the communication with the electronic device. In one aspect, the method for establishing the communication of the mobile device with the electronic device through the server may be performed by a processor using programmed instructions stored in a memory. In one aspect, the computer program product storing instructions for establishing the communication of the mobile device with the electronic device through the server may be implemented similarly as aforementioned.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The foregoing detailed description of embodiments is better understood when read in conjunction with the appended drawings. For the purpose of illustrating the invention, there is shown in the present document example constructions of the invention; however, the

invention is not limited to the specific methods and apparatus disclosed in the document and the drawings.

[0013] The detailed description is described with reference to the accompanying figures. In the figures, the left-most digit(s) of a reference number identifies the figure in which the reference number first appears. The same numbers are used throughout the drawings to refer like features and components.

[0014] Figure 1 illustrates a network implementation illustrating communication between an electronic device and a mobile device through a server, in accordance with an embodiment of the present subject matter.

[0015] Figure 2 (a) illustrates the server, in accordance with an embodiment of the present subject matter.

[0016] Figure 2 (b) illustrates the electronic device, in accordance with an embodiment of the present subject matter.

[0017] Figure 2 (c) illustrates the mobile device, in accordance with an embodiment of the present subject matter.

[0018] Figure 3 illustrates a method for establishing the communication between the electronic device and the mobile device through the server, in accordance with an embodiment of the present subject matter.

[0019] Figure 4 (a) illustrates a method for facilitating the communication between the electronic device and the mobile device through the server, in accordance with an embodiment of the present subject matter.

[0020] Figure 4 (b) illustrates a method for establishing the communication of the electronic device with the mobile device through the server, in accordance with an embodiment of the present subject matter.

[0021] Figure 4 (c) illustrates a method for establishing the communication of the mobile device with the electronic device through the server, in accordance with an embodiment of the present subject matter.

DETAILED DESCRIPTION

[0022] Systems and methods for establishing a communication between an electronic device and a mobile device through a server are described. In one aspect, the communication may be established by at least one of Radio-frequency identification (RFID™), near field communication (NFC), Bluetooth™, WI-Fi™ and a cellular data network. In one aspect, the electronic device may be at least one of a multi-touch table, a kiosk and an automatic teller machine (ATM). In one aspect, the mobile device may be at least one of a Smartphone, a personal digital assistant (PDA), a laptop and a palmtop. In one aspect, the communication between the electronic device and the mobile device may be a stateless communication and hence may not require explicit pairing between the electronic device and the mobile device.

[0023] In order to establish the communication between the electronic device and the mobile device, a user of the mobile device may initiate an application installed on the mobile device. The application on initiation may enable the mobile device to communicate with the server. As soon as the user places the mobile device on a display unit of the electronic device, the mobile device may be adapted to stabilize accelerometer data associated with the mobile device. Upon placing the mobile device on the electronic device, the electronic device may detect an object placed on its display unit and further differentiates it from regular touch input. On detecting the object as the mobile device, the electronic device may be further adapted to display a color image on a display unit of the electronic device. In one aspect, the electronic device may display a sequence of colors at different time instants. The sequence of colors and the timestamp associated with each color of the sequence of colors may be transmitted to the server by the mobile device and the electronic device. In one aspect, the sequence of colors to be displayed on the display unit may be randomly chosen or may be preconfigured in the electronic device.

[0024] In one implementation, the mobile device may be detected by using at least one of a blob detection mechanism and flash of the mobile device. Further on detecting the mobile device on the display unit, the electronic device may transmit a first trigger signal to the server. In one aspect, the first trigger signal may comprise an identification number of the electronic device, a time stamp of the first trigger signal and location information of the electronic device.

[0025] Based on the stabilization of the accelerometer data and the color image displayed, the mobile device may be further adapted to capture RGB data associated to the color image displayed on the display unit. In one aspect, the RGB data may be captured by an image capturing unit such as camera embedded with the mobile device. Upon capturing the RGB data, the mobile device may further transmit a second trigger signal comprising the RGB data to the server. In one aspect, the second trigger signal may further comprise an identification number of the mobile device, a time stamp of the second trigger signal and location information of the mobile device.

[0026] After receiving the first trigger signal and the second trigger signal, the server may match the first trigger signal with the second trigger signal in order to validate an intended communication between the electronic device and the mobile device. After matching the first trigger signal with the second trigger signal, the server may be further adapted to generate a first identification token for the electronic device and a second identification token for the mobile device. In order to facilitate the communication between the electronic device and the mobile device, the server may transmit the first identification token to the electronic device and the second identification token to the mobile device. In one aspect, the first identification token may comprise the identification number of the mobile device whereas the second identification token may comprise the identification number of the electronic device.

[0027] The electronic device and the mobile device may be then adapted to receive the first identification token and the second identification token respectively from the server in order to establish the communication amongst them. Upon receiving the first identification token and the second identification token, the electronic device and the mobile device may establish the communication that may be used for one time data exchange. In one aspect, the stateless communication may be established as long as the mobile device is placed on the electronic device.

[0028] While aspects of described system and method for establishing the communication between the electronic device and the mobile device through the server may be implemented in any number of different computing systems, environments, and/or configurations, the embodiments are described in the context of the following exemplary system.

[0029] Referring now to Figure 1, a network implementation 100 of a system 102, hereinafter referred as a server 102 facilitating communication between an electronic device 104 (a) and a mobile device 104 (b) is illustrated, in accordance with an embodiment of the present subject matter. In one embodiment, the electronic device 104 (a) may detect the mobile device 104 (b) when the mobile device 104 (b) is placed on a display unit of the electronic device 104 (a). As soon as the mobile device 104 (b) is placed on the display unit of the electronic device 104 (a), the mobile device may be adapted to stabilize accelerometer data associated with the mobile device.

[0030] Upon detecting the mobile device 104 (b), the electronic device 104 (a) may further display a color image on the display unit of the electronic device 104 (a). In one aspect, the display unit may be a touch screen having a plurality of sensors. Subsequent to display of the color image, the electronic device 104 (a) may further transmit a first trigger signal to the server 102. Subsequent to the stabilizing of the accelerometer data and on the color image displayed on the display unit, the mobile device 104 (b) may further be adapted to capture RGB data associated with the color image generated by the electronic device 104 (a). The mobile device 104 (b) may further transmit a second trigger signal to the server 102 comprising the RGB data.

[0031] Upon receiving the first trigger signal from the electronic device 104 (a) and the second trigger signal the mobile device 104 (b), the server 102 may further match the first *trigger signal with the second trigger signal in order to validate an intended communication* between the electronic device 104 (a) and the mobile device 104 (b). After matching the first trigger signal with the second trigger signal, the server 102 may further generate a first identification token for the electronic device 104 (a) and a second identification token for the mobile device 104 (b). Upon generating the first identification token and the second identification token, the server 102 may further transmit the first identification token to the electronic device 104 (a) and the second identification token to the mobile device 104 (b). In one aspect, the first identification token and the second identification token may facilitate the communication between the electronic device 104 (a) and the mobile device 104 (b).

[0032] In one embodiment, the first identification token and the second identification token may then be received by the electronic device 104 (a) and the mobile device 104 (b)

respectively. Upon receiving the first identification token and the second identification token, the communication between the electronic device 104 (a) and the mobile device 104 (b) may be established.

[0033] The present subject matter is explained considering that the server 102 may be implemented in a variety of computing systems, such as a laptop computer, a desktop computer, a notebook, a workstation, a mainframe computer, a server, a network server, and the like. It will be understood that the server 102 may be accessed by the electronic device 104 (a) and multiple users through one or more user devices 104-1, 104-2...104-N, collectively referred to as the mobile device 104 (b) hereinafter, or applications residing on the mobile device 104 (b). Examples of the electronic device 104 (a) may include, but are not limited to, a multi-touch table, a kiosk, an automatic teller machine (ATM). On the other hand, the mobile device 104 (b) may include, but are not limited to, a portable computer, a personal digital assistant, a handheld device, and a workstation. The mobile device 104 (b) are communicatively coupled to the server 102 through a network 106.

[0034] In one implementation, the network 106 may be a wireless network, a wired network or a combination thereof. The network 106 can be implemented as one of the different types of networks, such as intranet, local area network (LAN), wide area network (WAN), the internet, and the like. The network 106 may either be a dedicated network or a shared network. The shared network represents an association of the different types of networks that use a variety of protocols, for example, Hypertext Transfer Protocol (HTTP), Transmission Control Protocol/Internet Protocol (TCP/IP), Wireless Application Protocol (WAP), and the like, to communicate with one another. Further the network 106 may include a variety of network devices, including routers, bridges, servers, computing devices, storage devices, and the like.

[0035] Referring now to Figure 2 (a), the server 102 is illustrated in accordance with an embodiment of the present subject matter. In one embodiment, the server 102 may include a processor 202, an input/output (I/O) interface 204, and a memory 206. The processor 202 may be implemented as one or more microprocessors, microcomputers, microcontrollers, digital signal processors, central processing units, state machines, logic circuitries, and/or any devices that manipulate signals based on operational instructions. Among other capabilities,

the processor 202 is configured to fetch and execute computer-readable instructions stored in the memory 206.

[0036] The I/O interface 204 may include a variety of software and hardware interfaces, for example, a web interface, a graphical user interface, and the like. The I/O interface 204 may allow the server 102 to interact with an electronic device 104 (a) and a user directly or through the mobile device 104 (b). Further, the I/O interface 204 may enable the server 102 to communicate with other computing devices, such as web servers and external data servers (not shown). The I/O interface 204 can facilitate multiple communications within a wide variety of networks and protocol types, including wired networks, for example, LAN, cable, etc., and wireless networks, such as WLAN, cellular, or satellite. The I/O interface 204 may include one or more ports for connecting a number of devices to one another or to another server.

[0037] The memory 206 may include any computer-readable medium and computer program product known in the art including, for example, volatile memory, such as static random access memory (SRAM) and dynamic random access memory (DRAM), and/or non-volatile memory, such as read only memory (ROM), erasable programmable ROM, flash memories, hard disks, optical disks, and magnetic tapes. The memory 206 may include modules 208 and data 210.

[0038] The modules 208 include routines, programs, objects, components, data structures, etc., which perform particular tasks or implement particular abstract data types. In one implementation, the modules 208 may include a trigger receiving module 212, a matching module 214, a token generation module 216, a transmission module 218 and other modules 220. The other modules 220 may include programs or coded instructions that supplement applications and functions of the server 102.

[0039] The data 210, amongst other things, serves as a repository for storing data processed, received, and generated by one or more of the modules 208. The data 210 may also include a system database 222, and other data 130. The other data 130 may include data generated as a result of the execution of one or more modules in the other modules 220.

[0040] Referring now to Figure 2 (b), the electronic device 104 (a) is illustrated in accordance with an embodiment of the present subject matter. In one embodiment, the

electronic device 104 (a) may include a processor 302, an input/output (I/O) interface 304, and a memory 306. The processor 302 may be implemented as one or more microprocessors, microcomputers, microcontrollers, digital signal processors, central processing units, state machines, logic circuitries, and/or any devices that manipulate signals based on operational instructions. Among other capabilities, the processor 302 is configured to fetch and execute computer-readable instructions stored in the memory 306.

[0041] The I/O interface 304 may include a variety of software and hardware interfaces, for example, a web interface, a graphical user interface, and the like. The I/O interface 304 may allow the electronic device 104 (a) to interact with a server 102 and a user directly or through the mobile device 104 (b). Further, the I/O interface 304 may enable the electronic device 104 (a) to communicate with other computing devices, such as web servers and external data servers (not shown). The I/O interface 304 can facilitate multiple communications within a wide variety of networks and protocol types, including wired networks, for example, LAN, cable, etc., and wireless networks, such as WLAN, cellular, or satellite. The I/O interface 304 may include one or more ports for connecting a number of devices to one another or to another server.

[0042] The memory 306 may include any computer-readable medium and computer program product known in the art including, for example, volatile memory, such as static random access memory (SRAM) and dynamic random access memory (DRAM), and/or non-volatile memory, such as read only memory (ROM), erasable programmable ROM, flash memories, hard disks, optical disks, and magnetic tapes. The memory 306 may include modules 308 and data 310.

[0043] The modules 308 include routines, programs, objects, components, data structures, etc., which perform particular tasks or implement particular abstract data types. In one implementation, the modules 308 may include a detection module 312, a display module 314, a transmitting module 316, a reception module 318 and other modules 320. The other modules 320 may include programs or coded instructions that supplement applications and functions of the electronic device 104 (a).

[0044] The data 310, amongst other things, serves as a repository for storing data processed, received, and generated by one or more of the modules 308. The data 310 may also

include a first database 322, and other data 230. The other data 230 may include data generated as a result of the execution of one or more modules in the other modules 320.

[0045] Referring now to Figure 2 (c), the mobile device 104 (b) is illustrated in accordance with an embodiment of the present subject matter. In one embodiment, the mobile device 104 (b) may include a processor 402, an input/output (I/O) interface 404, and a memory 406. The processor 402 may be implemented as one or more microprocessors, microcomputers, microcontrollers, digital signal processors, central processing units, state machines, logic circuitries, and/or any devices that manipulate signals based on operational instructions. Among other capabilities, the processor 402 is configured to fetch and execute computer-readable instructions stored in the memory 406.

[0046] The I/O interface 404 may include a variety of software and hardware interfaces, for example, a web interface, a graphical user interface, and the like. The I/O interface 404 may allow a user directly or through the mobile device 104 (b) to interact with a server 102 and the electronic device 104 (a). Further, the I/O interface 404 may enable the mobile device 104 (b) to communicate with other computing devices, such as web servers and external data servers (not shown). The I/O interface 404 can facilitate multiple communications within a wide variety of networks and protocol types, including wired networks, for example, LAN, cable, etc., and wireless networks, such as WLAN, cellular, or satellite. The I/O interface 404 may include one or more ports for connecting a number of devices to one another or to another server.

[0047] The memory 406 may include any computer-readable medium and computer program product known in the art including, for example, volatile memory, such as static random access memory (SRAM) and dynamic random access memory (DRAM), and/or non-volatile memory, such as read only memory (ROM), erasable programmable ROM, flash memories, hard disks, optical disks, and magnetic tapes. The memory 406 may include modules 408 and data 410.

[0048] The modules 408 include routines, programs, objects, components, data structures, etc., which perform particular tasks or implement particular abstract data types. In one implementation, the modules 408 may include a stabilization module 412, a sensing module 414, a transmission module 416, a receiving module 418 and other modules 420. The

other modules 420 may include programs or coded instructions that supplement applications and functions of the mobile device 104 (b).

[0049] The data 410, amongst other things, serves as a repository for storing data processed, received, and generated by one or more of the modules 408. The data 410 may also include a second database 422, and other data 330. The other data 330 may include data generated as a result of the execution of one or more modules in the other modules 420.

[0050] The working of the server 102, the electronic device 104 (a) and the mobile device 104 (b) may be explained in detail in Figures 3, Figure 4 (a), Figure 4 (b) and Figure 4 (c) explained below.

[0051] Referring to Figure 3, a detailed working of components involved for establishing the communication between the electronic device 104 (a) and the mobile device 104 (b) through the server 102 is illustrated, in accordance with an embodiment of the present subject matter. In one implementation, the communication may be a one-time stateless communication established by at least one of Radio-frequency identification (RFID™), near field communication (NFC), Bluetooth™, WI-Fi™ and a cellular data network. In one aspect, the electronic device 104 (a) may be at least one of a multi-touch table, a kiosk and an automatic teller machine (ATM). In one aspect, the mobile device 104 (b) may be at least one of a Smartphone, a personal digital assistant (PDA), a laptop and a palmtop.

[0052] In an exemplary embodiment of the invention, a user of the mobile device 104 (b), may initiate an application installed on the mobile device 104 (b). As soon as the user places the mobile device 104 (b) on a display unit of the electronic device 104 (a), the stabilization module 412 may be configured to stabilize accelerometer data of the mobile device 104 (b). In one aspect, the communication may be initiated when the mobile device 104 (b) is placed on the electronic device 104 (a) causing the accelerometer data of the mobile device 104 (b) to become stable along at least one axis.

[0053] On the other hand, the detection module 312 may be configured to detect an object placed on the display unit. The detection module 312 may further be configured to differentiate the object from regular touch input. In one aspect, the detection module 312 may detect the object as the mobile device 104 (b) by using at least one of a blob detection mechanism and flash of the mobile device 104 (b). In one aspect, the blob detection

mechanism may enable the electronic device 104 (a) to detect the mobile device 104 (b) that has been kept on the display unit as an object that is distinct than the normal touch input received on the electronic device 104 (a). The blob detection mechanism may further enable the electronic device 104 (a) to display a color image on the display unit of the electronic device 104 (a). In another aspect, when the electronic device 104 (a) is unable to detect the object as the mobile device 104 (b) and does not display the color image, the mobile device 104 (b) after a predefined time out may employ the flash to generate the blob on the display unit of the electronic device 104 (a). The blob will be detected by the electronic device 104 (a). Further a start time may be recorded when the flash is turned on and a stop time can be recorded when the flash is turned off. In one aspect, the start time and the stop time may be communicated to the server 102 for synchronization and detection of the peer device for communication.

[0054] Upon detecting the mobile device 104 (b), the display module 314 may be configured to display the color image on the display unit of the electronic device 104 (a). In one aspect, the display module may be coupled to an image generation module. The image generation module may further be configured to generate the color image. The color image may be associated to the mobile device 104 (b). In another aspect, the color image may be generated by the server 102. In order to generate the color image, the server 102 may have a preconfigured list of a RGB Hexadecimal (Hex) codes that are configured as a part of the server 102. In one aspect, the server 102 may also be adapted to randomly generate the RGB Hex Code. In one embodiment, the electronic device 104 (a) may display a sequence of colors at different time instants. The sequence of colors and the timestamp associated with each color of the sequence of colors may be transmitted to the server 102 by the mobile device 104 (b) and the electronic device 104 (a). In one aspect, the sequence of colors to be displayed on the display unit may be randomly chosen or may be preconfigured in the electronic device 104 (a).

[0055] After displaying the color image, the transmitting module 316 may further configured to transmit a first trigger signal to the server 102. In one aspect the first trigger signal may comprise color data associated to the color image, an identification number of the electronic device 104 (a), a time stamp of the second trigger signal and location information of the electronic device 104 (a). The color data associated to the color image may comprise a

representation of additive color mixing having a value associated to three different colors i.e. Red, Green and Blue.

[0056] Based on the stabilization of the accelerometer data and the color image displayed on the electronic device 104 (a), the sensing module 414 may be configured to capture RGB data associated with the color image generated by the electronic device 104 (a). The RGB data may comprise the representation of additive color mixing having the value associated to three different colors i.e. Red, Green and Blue. In one aspect, the RGB data may be captured by an image capturing unit such as camera embedded with the mobile device 104 (b). After capturing the RGB data, the transmission module 416 may be configured to transmit a second trigger signal comprising the RGB data to the server 102. In one aspect, the second trigger signal may further comprise an identification number of the mobile device 104 (b), a time stamp of the second trigger signal and location information of the mobile device 104 (b).

[0057] The first trigger signal and the second trigger signal may then be received by the trigger receiving module 212. Upon receiving the first trigger signal and the second trigger signal, the matching module 214 may be configured to match the first trigger signal with the second trigger signal in order to validate the intended communication between the electronic device 104 (a) and the mobile device 104 (b). In one aspect, the matching module 214 may be configured to match the color data, the identification number of the electronic device 104 (a), a time stamp of the first trigger signal and location information of the electronic device 104 (a) with the RGB data, the identification number of the mobile device 104 (b), a time stamp of the second trigger signal and location information of the mobile device 104 (b). After matching the first trigger signal with the second trigger signal, the token generation module 216 may be configured to generate a first identification token for the electronic device 104 (a) and a second identification token for the mobile device 104 (b).

[0058] In order to facilitate the communication between the electronic device 104 (a) and the mobile device 104 (b), the transmission module 218 may be configured to transmit the first identification token to the electronic device 104 (a) and the second identification token to the mobile device 104 (b). In one aspect, the first identification token may comprise the identification number of the mobile device 104 (b). On the other hand, the second

identification token may comprise the identification number of the electronic device 104 (a). Thereafter the first identification token and the second identification token may be received by the electronic device 104 (a) and the mobile device 104 (b) respectively. In one aspect, the first identification token may be received by the reception module 318 whereas the second identification token may be received by the receiving module 418.

[0059] The electronic device 104 (a) and the mobile device 104 (b) may then be adapted to receive the first identification token and the second identification token respectively from the server 102 in order to establish the communication amongst them. Upon receiving the first identification token and the second identification token, the electronic device 104 (a) and the mobile device 104 (b) may determine the corresponding device based on the identification number and hence establish the communication that may be used for one time data exchange. In one aspect, the communication may be established as long as the mobile device 104 (b) is placed on the electronic device 104 (a) but once the mobile device 104 (b) is displaced from the display unit of the electronic device 104 (a), the communication may be terminated between the mobile device 104 (b) and the electronic device 104 (a). Further the electronic device 104 (a) may initiate the disconnection when it detects that the mobile device 104 (b) has been displaced from the display unit. In one aspect, the communication may get terminated, as soon as the mobile device 104 (b) is destabilized along the at least one axis.

[0060] In one embodiment of the invention, the server 102 may further facilitate to establish the communication between two mobile devices placed on the electronic device 104 (a). In one aspect, the mobile device 104 (b)-1 and the mobile device 104 (b)-2 are placed on the display unit of the electronic device 104 (a). As soon as the mobile device 104 (b)-1 and the mobile device 104 (b)-2 are placed on the electronic device 104 (a), the electronic device 104 (a) may be adapted to detect two objects as the two mobile devices. Further the electronic device 104 (a) may further be adapted to generate two color images for the device mobile 104 (b)-1 and the mobile device 104 (b)-2. In one aspect, the two color images may be distinct to each other and having distinct image properties. Subsequent to the generation of the two color images, the electronic device 104 (a) may be configured to transmit first trigger signals to the server 102 corresponding to each of the mobile device 104 (b)-1 and the mobile device 104 (b)-2.

[0061] The mobile device 104 (b)-1 and the mobile device 104(b)-2 may further be adapted to transmit a second trigger signal to the server 102. In one aspect, the second trigger signal may comprise the RGB data associated to the color image, identification number of the mobile device and the location information of the mobile device. In one aspect, each of the two mobile devices may transmit the second trigger signal individually to the server 102. The second trigger signals transmitted by each of the two mobile devices may be received by the server 102. In one aspect, the server 102 may further be adapted to match the first trigger signals and the second trigger signals in order to facilitate the intended communication between the two mobile devices.

[0062] Referring now to Figure 4 (a), a method 500 for establishing communication between a mobile device and an electronic device through a server is shown, in accordance with an embodiment of the present subject matter. The method 500 may be described in the general context of computer executable instructions. Generally, computer executable instructions can include routines, programs, objects, components, data structures, procedures, modules, functions, etc., that perform particular functions or implement particular abstract data types.

[0063] The order in which the method 500 is described is not intended to be construed as a limitation, and any number of the described method blocks can be combined in any order to implement the method 500 or alternate methods. Additionally, individual blocks may be deleted from the method 500 without departing from the spirit and scope of the subject matter described herein. Furthermore, the method can be implemented in any suitable hardware, software, firmware, or combination thereof. However, for ease of explanation, in the embodiments described below, the method 500 may be considered to be implemented in the above described server 102.

[0064] At block 502, a first trigger signal from the electronic device and a second trigger signal from the mobile device may be received. In one implementation, the first trigger signal and the second trigger signal may be received by the trigger receiving module 212.

[0065] At block 504, the first trigger signal may be matched with the second trigger signal. In one implementation, the first trigger signal is matched with the second trigger signal by the matching module 214.

[0066] At block 506, a first identification token for the electronic device and a second identification token for the mobile device may be generated. In one implementation, the first identification token and the second identification token may be generated by the token generation module 216.

[0067] At block 508, the first identification token and the second identification token may be respectively transmitted to the electronic device and the mobile device. In one implementation, the first identification token and the second identification token may be transmitted by the transmission module 218.

[0068] At block 510, the communication between the electronic device and the mobile device may be facilitated. In one implementation, the electronic device and the mobile device may be facilitated by the transmission module 218.

[0069] Referring now to Figure 4 (b), a method 600 for establishing communication with an electronic device through a server is shown, in accordance with an embodiment of the present subject matter. The method 600 may be described in the general context of computer executable instructions. Generally, computer executable instructions can include routines, programs, objects, components, data structures, procedures, modules, functions, etc., that perform particular functions or implement particular abstract data types.

[0070] The order in which the method 600 is described is not intended to be construed as a limitation, and any number of the described method blocks can be combined in any order to implement the method 600 or alternate methods. Additionally, individual blocks may be deleted from the method 600 without departing from the spirit and scope of the subject matter described herein. Furthermore, the method can be implemented in any suitable hardware, software, firmware, or combination thereof. However, for ease of explanation, in the embodiments described below, the method 500 may be considered to be implemented in the above described electronic device 104 (a).

[0071] At block 602, when the mobile device is placed on the electronic device, the mobile device may be detected. In one implementation, the mobile device may be detected by the detection module 312.

[0072] At block 604, a color image on a display unit of the electronic device may be displayed. In one implementation, the color image may be displayed by the display module 314.

[0073] At block 606, a first trigger signal may be transmitted to the server. In one implementation, the first trigger signal may be transmitted by the transmitting module 316.

[0074] At block 608, a first identification token from the server may be received to establish the communication with the mobile device. In one implementation, the first identification token may be received by the reception module 318.

[0075] Referring now to Figure 4 (c), a method 700 for establishing communication of a mobile device with an electronic device through a server is shown, in accordance with an embodiment of the present subject matter. The method 700 may be described in the general context of computer executable instructions. Generally, computer executable instructions can include routines, programs, objects, components, data structures, procedures, modules, functions, etc., that perform particular functions or implement particular abstract data types.

[0076] The order in which the method 700 is described is not intended to be construed as a limitation, and any number of the described method blocks can be combined in any order to implement the method 700 or alternate methods. Additionally, individual blocks may be deleted from the method 700 without departing from the spirit and scope of the subject matter described herein. Furthermore, the method can be implemented in any suitable hardware, software, firmware, or combination thereof. However, for ease of explanation, in the embodiments described below, the method 700 may be considered to be implemented in the above described mobile device 104 (b).

[0077] At block 702, when the mobile device is placed on the electronic device, accelerometer data of the mobile device may be stabilized. In one implementation, the mobile device may be stabilized by the stabilization module 412.

[0078] At block 704, RGB data associated with a color image may be captured. In one implementation, the RGB data may be captured by the sensing module 414.

[0079] At block 706, a second trigger signal to the server may be transmitted. In one implementation, the second trigger signal may be transmitted by the transmission module 416.

[0080] At block 708, a second identification token may be received from the server to establish the communication with the electronic device. In one implementation, the second identification token may be received by the receiving module 418.

[0081] Exemplary embodiments discussed above may provide certain advantages. Though not required to practice aspects of the disclosure, these advantages may include a method for facilitating the stateless communication between the two or more devices. The stateless communication may be established between the two devices through a server for a one time session. This methodology of establishing the stateless communication facilitates the user to establish the communication without explicit pairing of the two devices.

[0082] Although implementations for methods and systems for establishing communication between the mobile device and the electronic device through the server have been described in language specific to structural features and/or methods, it is to be understood that the appended claims are not necessarily limited to the specific features or methods described. Rather, the specific features and methods are disclosed as examples of implementations for establishing the communication.

CLAIMS:

1. A method for facilitating communication between an electronic device and a mobile device through a server, the method comprising:

receiving a first trigger signal from the electronic device and a second trigger signal from the mobile device, wherein the first trigger signal comprises color data generated by the electronic device and wherein the second trigger signal comprises RGB data captured by the mobile device;

matching the first trigger signal with the second trigger signal in order to validate an intended communication between the electronic device and the mobile device;

generating a first identification token for the electronic device and a second identification token for the mobile device after matching the first trigger signal with the second trigger signal;

transmitting the first identification token to the electronic device and the second identification token to the mobile device; and

facilitating the communication between the electronic device and the mobile device based on the first identification token and the second identification token, wherein the receiving, the matching, the generating, the transmitting and the facilitating are performed by a processor using programmed instructions stored in a memory.

2. A system 102 for facilitating communication between an electronic device 104 (a) and a mobile device 104 (b), the system 102 comprising:

a processor 202; and

a memory 206 coupled to the processor 202, wherein the processor 202 is capable of executing a plurality of modules stored in the memory 206, and wherein the plurality of modules comprising:

a trigger receiving module 212 configured to receive a first trigger signal from the electronic device and a second trigger signal from the mobile device, wherein the first trigger signal comprises color data generated by the electronic device and wherein the second trigger signal comprises RGB data captured by the mobile device;

a matching module 214 configured to match the first trigger signal with the second trigger signal to validate an intended communication between the electronic device and the mobile device;

a token generation module 216 configured to generate a first identification token for the electronic device and a second identification token for the mobile device after matching, the first trigger signal with the second trigger signal; and

a transmission module 218 configured to:

transmit the first identification token to the electronic device and the second identification token to the mobile device; and

facilitate the communication between the electronic device and the mobile device based on the first identification token and the second identification token.

3. The system of claim 2, further comprising an image generation module configured to generate a color image to be displayed on the electronic device 104 (a).

4. A non transitory computer program product having embodied thereon a computer program for facilitating communication between an electronic device and a mobile device through a server, the computer program product storing instructions, the instructions comprising instructions for:

receiving a first trigger signal from the electronic device and a second trigger signal from the mobile device, wherein the first trigger signal comprises color data generated by the electronic device and wherein the second trigger signal comprises RGB data captured by the mobile device;

matching the first trigger signal with the second trigger signal to validate an intended communication between the electronic device and the mobile device;

generating a first identification token for the electronic device and a second identification token for the mobile device after matching the first trigger signal with the second trigger signal;

transmitting the first identification token to the electronic device and the second identification token to the mobile device respectively; and

facilitating the communication between the electronic device and the mobile device based on the first identification token and the second identification token.

5. A method for establishing communication of an electronic device with a mobile device through a server, the method comprising:

detecting the mobile device when the mobile device is placed on the electronic device;

displaying a color image on a display unit of the electronic device subsequent to the detection of the mobile device;

transmitting a first trigger signal to the server, wherein the first trigger signal comprises color data of the generated color image; and

receiving a first identification token from the server to facilitate the establishing of the communication with the mobile device, wherein the detecting, the displaying, the transmitting and the receiving are performed by a processor using programmed instructions stored in a memory.

6. The method of claim 5, wherein the mobile device is detected by using at least one of a blob detection mechanism and flash of the mobile device.

7. The method of claims 1 or 5, wherein the first trigger signal further comprises an identification number of the electronic device, a time stamp of the first trigger signal and location information of the electronic device.

8. The method of claims 1 or 5, wherein the first identification token comprises the identification number of the mobile device.

9. An electronic device 104 (a) for establishing communication with a mobile device 104 (b) through a server 102, the electronic device 104 (a) comprising:

a processor 302; and

a memory 306 coupled to the processor 302, wherein the processor 302 is capable of executing a plurality of modules stored in the memory 306, and wherein the plurality of modules comprising:

a detection module 312 configured to detect the mobile device when the mobile device is placed on the electronic device;

a display module 314 configured to display a color image on a display unit of the electronic device in response to the detection module;

a transmitting module 316 configured to transmit a first trigger signal to the server, wherein the first trigger signal transmitted comprises color data of the color image; and

a reception module 318 configured to receive a first identification token from the server to facilitate the establishing of the communication with the mobile device.

10. The electronic device of claim 9, wherein the display module 314 is further coupled to an image generation module, and wherein the image generation module is configured to generate the color image.

11. A non transitory computer program product having embodied thereon a computer program for establishing communication of an electronic device with a mobile device through a server, the computer program product storing instructions, the instructions comprising instructions for:

detecting the mobile device when the mobile device is placed on the electronic device;

displaying a color image on a display unit of the communication device subsequent to the detecting the mobile device;

transmitting a first trigger signal to the server, wherein the first trigger signal comprises color data of the color image; and

receiving a first identification token from the server to facilitate the establishing of the communication with the mobile device.

12. A method for establishing communication of a mobile device with an electronic device through a server, the method comprising:

stabilizing accelerometer data of the mobile device when the mobile device is placed on the electronic device;

capturing RGB data associated with a color image generated by the electronic device subsequent to the stabilizing of the accelerometer data;

transmitting a second trigger signal to the server, wherein the second trigger signal comprises the RGB data captured; and

receiving a second identification token from the server to facilitate the establishing of the communication with the electronic device, wherein the stabilizing, the capturing, the transmitting, and the receiving are performed by a processor using programmed instructions stored in a memory.

13. The method of claims 1, 5 or 12, wherein the communication of the mobile device with the electronic device through the server is stateless communication or pair-less communication.

14. The method of claim 12, wherein the mobile device is stabilized by along at least one axis.

15. The method of claims 1 or 12, wherein the second trigger signal further comprises an identification number of the mobile device, a time stamp of the second trigger signal and location information of the mobile device.

16. The method of claims 1 or 12, wherein the second identification token comprises the identification number of the electronic device.

17. A mobile device 104 (b) for establishing communication with an electronic device 104 (a) through a server 102, the mobile device comprising:

a processor 402; and

a memory 406 coupled to the processor 402, wherein the processor 402 is capable of executing a plurality of modules stored in the memory 406, and wherein the plurality of module comprising:

a stabilization module 412 configured to stabilize accelerometer data of the mobile device when the mobile device is placed on the electronic device;

a sensing module 414 configured to capture RGB data associated with a color image generated by the electronic device subsequent to the stabilizing of the accelerometer data;

a transmission module 416 configured to transmit a second trigger signal to the server, wherein the second trigger signal comprises the RGB data; and

a receiving module 418 configured to receive a second identification token from the server to facilitate the establishing of the communication with the electronic device.

18. A non transitory computer program product having embodied thereon a computer program for establishing communication of a mobile device with an electronic device through a server, the computer program product storing instructions, the instructions comprising instructions for:

stabilizing accelerometer data of the mobile device when the mobile device is placed on the electronic device;

capturing RGB data associated with a color image generated by the electronic device subsequent to the stabilizing of the accelerometer data; and

transmitting a second trigger signal to the server, wherein the second trigger signal comprises the RGB data; and

receiving a second identification token from the server to facilitate the establishing of the communication with the electronic device.

Dated 12th Day of August, 2013

Deepak Pawar
IN-PA-2052
Agent for Applicant