Integrated Mobile Device Using Intelligent Hand(s) As User Interface

A. DESCRIPTION :

A1. FIELD OF THE INVENTION

This **Invention** relates to state-of-the-art electronic mobile devices that may include, but is not limited to smart phones or e-readers or tablet computers. More particularly this Inventions relates to intelligent user interface using the movements and gestures of the human hands in the three dimensions space to perform tasks or specific functions on the mobile device, functions such as messaging, surfing internet, playing computer games, accessing social network content and so forth.

This Invention, to a certain extent, is also related to the smart electronic display device that is connected to the mobile device by cables or through wireless technology. Specifically it refers to smart display devices such as head-mounted display, Smart TV and so forth.

In short, this Invention relates to total integration of several dedicated smart electronic devices. Specifically this Invention demonstrates the integration of smart display device, intelligent user-interface device, hands free device and the state-of-the-art electronic mobile device.

A2. BACKGROUND OF THE INVENTION

In the modern days living, people just cannot live without electronic mobile devices such as smart phones, e-readers, tablet computers and so on, be it for their work or businesses or social interactions or entertainment. People are increasingly spending more time and money on their mobile devices.

There are many factors the user would consider when choosing a mobile device. Apart from factors such as price, brand, design, and the mobile device applications, the most important aspect is still the total user experience or the user's satisfaction level while using the mobile device. The total user experience encompasses many areas, from what content is available to the presentation of images on the screen to the user interface. The user interface is one of the most critical areas in the total user experience because if one has difficulty operating the mobile device, one will not have a great total user experience. This Invention intends to bring the current total user experience on mobile devices to the next level.

A3. PRIOR ART

The technology and software of mobile devices have advanced significantly in recent years. In fact, most if not all of today's electronic mobile devices adopt multi-touch screen user interface. The multi-touch screen user interface allows the user to perform specific functions by touching the screen with the fingertips in different ways to perform specific functions such as stretching with two fingers to zoom in.

The drawback of a multi-touch screen device is that the user will need to either place the mobile device on a usually even surface or to hold the device on the palm, while using the fingers of another hand to interact with the device by making the specific touches on screen to perform the required functions. Any attempt to use a single hand to concurrently hold and operate a mobile device will run the risk of dropping the mobile device.

In real life, a lot of time the user could be in a situation whereby it is almost impossible to operate a touch screen device. In situations such as when standing on a crowded bus with one hand holding the hand reel, or while eating with one of the hands holding the food, or carrying a briefcase while walking, or pushing a baby tram or trolley in the mall, or cycling in the park, and so forth. In short, once a hand is occupied with a specific task, it is no longer possible to operate a mobile device properly.

To overcome the above problem, a new intelligent user interface is required to handle multi-touch screen on the mobile device.

A4. OBJECTS AND ADVANTAGES

The specific objects and advantages for this present Invention are that it:

a) Adds a new dimension to the way the user uses the mobile devices, with the introduction of intelligent user interface using the movements and gestures of human hand(s) in the three dimensions space to perform tasks such as messaging, surfing internet, making phone calls, accessing social network content and so forth.

b) Addresses the problem of not being able to use the mobile device in a situation whereby one of the hands is occupied. For example, when standing on a crowded bus with one hand holding the hand reel, while eating with one of the hands holding the food, carrying a briefcase while walking, pushing a baby tram or trolley in the mall, cycling in the park, and so forth.

c) Enhances the total user's experience of using mobile devices. The intelligent user interface using the movements and gestures of human hand(s) in the three dimensions space, shall allow the user to respond immediately to incoming messages or emails or alerts and so on. The level of user satisfactions shall increase as more tasks are done faster and more spontaneously. The user also will not be restricted by the size of the mobile device while executing the mobile device functions or applications.

A5 SUMMARY OF THE INVENTION

In the **Invention**, the overall concept of a mobile device is changed and the total user experience is brought to the next level. The mobile device is no longer just a device with different applications displayed on screen wherein the user interacts with the device by touching the screen or through limited sets of voice inputs.

In the Invention, a mobile device could be made up of several essential but separated (or

detached) components, working collectively as an integrated unit. Let's name the mobile device of the Invention as **Integrated Mobile Device**. The main part of Integrated Mobile Device is the intelligent user interface using the movements and gestures of human hand(s) in the three dimensions space to perform specific tasks such as messaging, surfing internet, making phone calls and so forth.

The various components of Integrated Mobile Device are summarized as follows :

(a) Component A – It consists of an accelerometer, a gyroscope, a processor and wired circuits or cables that tracks the hand/palm movements and finger gestures in the three dimensional space of the X-Y-Z axis. It channels the user inputs into Component B.

(b) Component B – It is a state-of-the-art electronic mobile device that has a special Emulation Software (or special built-in system) that takes the user inputs from Component A and translates them into specific triggering actions on the mobile device of Component B. It is linked up to all the other components, Components A, C and D.

(c) Component C – It is a Head-mounted display (or HMD) or a Smart-TV display or any type of smart display device, depending on the situation and the usage requirements. It is linked up to Component B. It could include a camera and video device to take pictures and capture videos.

(d) Component D - It is a hands-free set that uses wireless technology such as Bluetooth for phone conversation or to provide the user with the direct voice input and output.

A5.1 Working Mechanism of the Invention

The working mechanism of the Invention is examined and explained as follows.

In the Invention, Component B is the central main component and are connected to all the other components stated above. They are linked up by cables or through wireless technology such as Bluetooth.

The overall processing starts when the device of Component B is powered on. After the power- on, the operating system (OS) of the device is loaded and the various built-in functions and the third party applications, usually represented by the various graphic icons, are made available to the user. In the Invention, Component B could be a smart phone or e-reader or tablet computer and so on. For smart phone, the built-in functions allow the user to perform functions such as text messaging, making phone calls, playing musics, watching videos and etc. The device may also contain the third party applications or software that could be downloaded and installed to allow the user to perform the various real-time functions such as checking of real-time bus schedule, checking of live soccer scores and so on. In other words, the built-in functions and the third-party applications, collectively known as **Mobile Apps**, are ready for use when the device is powered on and the OS is loaded.

In the Invention, Component B shall contain an Emulation Software (or a built-in system) that would take the input from the user in Component A to trigger processing of the Mobile App. This will be elaborated in the paragraphs below, under Component A Details.

The device of Component B may have a visual display screen. But in the Invention, Component B is typically linked up with Component C and that allows the content of Component B be transmitted and viewed in the display screen of Component C. Component C shall encompass the various types of electronic displays such as Head-mounted display, Smart-TV display and so forth. In other words, Component C serves as a display device for Component B.

Component A is an essential component and it plays a crucial role in the overall working mechanism of the Invention. The user shall utilize the intelligent user interface of Component A to navigate and interact with the various Mobile Apps of Component B, as displayed in device of Component C.

For example, the user intends to send a text message. In the Invention, the user may use Component A to initiate the hand/palm movement in the 3 dimensional space. The hand/palm movement shall then trigger off corresponding pointer/cursor movement in the Component B. The user shall control the positioning of the hand/palm in the 3 dimensional space in such a way that the pointer/cursor of Component B is exactly pointing onto the Messages icon. The user then perform the required finger gesture by bending the finger in order to direct Component B to invoke the Messaging function through 'touching' of the Messages icon. The user may perform the same to invoke any Mobile Apps, represented by graphic icons such as Phone, Music, Calendar and etc.

In other words, in the Invention the user shall trigger the Mobile Apps through Component A instead of directly in Component B. The pre requisites for the above set-up are as follows :

a) Component A and Component B are linked up by cables or through wireless technology such as Bluetooth.
b) Component B and Component C are linked up by cables or through wireless technology such as Bluetooth.
c) Component B shall contain an Emulation Software (or a built-in system) that would take the input from the user in Component A to trigger processing of the Mobile Apps in Component B. In other words, the Emulation Software (or a built-in system) must be able to translate the movements of human hand/palm and gestures of fingers in the three dimensions space into specific actions or action events in Component B.

A5.1.1 Component A Details

Component A shall contain an accelerometer, a gyroscope, a processor and wired circuits or cables. The accelerometer shall track the hand or palm movement for the X, Y and Z axis in the three dimensional space. Component A is made up of a complete set of hand-worn or hand-mounted device. The wired circuitry in Component A allows the tracking of finger movements such as bending of a finger to emulate pressing of a soft keyboard key or emulate touching of an icon or a button in Component B. A gyroscope device could be used to help to track the orientation of the hand or the palm in the three dimensional space and feed the data into Component B.

In term of implementation, Component A can be a hand-worn item such as a hand glove (or a pair of hand gloves) that has all the essential electronic components and circuitry embedded within it. This is very handy because the user may put on and remove the glove(s) as and when desired. Another approach is Component A is made of item (or items) that can be mounted onto the hand/palm and fingers.

When the hand/palm moves in the 3 dimensional space, the vectors and coordinates of X-Y-Z axis are recorded by the Accelerometer, where X, Y and Z represent horizontal, vertical and depth axis. The 3 dimensional coordinates are then translated into corresponding position or specific coordinates in the 2 dimensional coordinates in Component B (as displayed on Component C). It is important that the coordinates of Component A in the 3 dimensional space is synchronized with the coordinates in the 2 dimensional space in Component B. For example, the Initial Coordinates or the Starting Position in the 2 dimensional space of Component B must be known or predefined such that the user could, from start, maneuver in the 3 dimensional space accordingly and reset to the Starting Position whenever required. The Starting Position may be at the middle of display screen in Component B (as displayed in Component C). The user may commence his movement or reset to the Starting Position in the 3 dimensional space by pressing of a button or showing of a special finger gesture of Component A.

The easiest way to understand the working mechanism and interaction between Component A and Component B is to look at how the two components function separately before putting them together as an integrated entity. First of all, let's look at how a typical multi-touch screen mobile device such as smart phone works. In the smart phone, the user will use his fingertips to perform specific gestures such as touch, swipe, stretch, pinch to invoke and perform the desired functions on the Mobile Apps. In the Invention, Component B shall inherit or adopt all or the equivalent functionality and working mechanism of a multi-touch screen mobile device.

To illustrate the working mechanism of Component A, one should imagine the user could perform the same hand movements and finger gestures (as stated in the above paragraph) on a virtual or imaginary (instead of actual) multi-touch screen mobile device. The existence of Component A is to enable the user to perform the hand and finger movements and gestures on a virtual or imaginary multi-touch screen mobile device. Component A shall capture the coordinates of hand/palm and the finger gestures as user inputs to be fed into Component B. The Emulation Software (or built-in system) of Component B shall then **translate or map the user inputs and emulate the specific gestures** such as touch, swipe, stretch, pinch to invoke and perform the specific functions on the Mobile Apps.

In the implementation, the translation of the user inputs and emulation of gestures in Component B could be carried out by one of two approaches below :

(a) Exact Emulation Approach – It emulates the hand/palm movements and finger gestures in the three dimensional space of Component A to almost the same hand/palm movements and finger gestures in the two dimensional space in Component B. The emulated behavior in Component B closely resembles the behavior of Component A. For example, a finger gesture of a 'Swipe' action in the three dimensional space is translated into the same finger gesture of a 'Swipe'

action in the two dimensional space.

(b) Translate and Emulate Approach – It translates or maps the hand/palm movements and finger gestures in the three dimensional space of Component A to some predefined sets of hands gestures in the two dimensional space in Component B. In other words, unlike the Approach (a), Exact Emulation Approach, it is not an exact reproduction of the hand gestures or behaviors. In fact, the Approach (b) is using a mapping method to trigger mobile device functions.

The Exact Emulation Approach is technically more difficult to implement because Component A must be very precise in term of tracking of the coordinates and the movements in the 3 dimensional space. The user also needs to have training and a lot of practice in order to operate on a virtual and imaginary mobile device properly.

The Translate and Emulate Approach is technically a lot easier to implement as long as the hand/palm/finger gestures are clearly defined and standardized in Component A and Component B. It will then be a straight forward translation/mapping and emulation. For example, bending forward of a finger in Component A is translated into touching of a soft keyboard key or invocation of an icon in Component B. Similarly, the gesture of 'folding and touching of all five fingers together' in Component A, can be translated/mapped into the emulation of 'Pinching with the fingertips' on the virtual multi-touch screen of Component B .

A5.1.2 Component B Details

Component B shall inherit or adopt all or the equivalent functionality and working mechanism of a multi-touch screen mobile device but it must include an additional Emulation Software (or the built-in system) that could translate the movements of the human hand/palm and the finger gestures in the three dimensions space of Component A into actions or responses in Component B.

To illustrate the working mechanism of Component B, let's observe how a typical multi-touch screen mobile device works. In the multi-touch screen environment, the user will use his fingertips to perform specific gestures such as touch, swipe, stretch, pinch to invoke and perform the desired functions on the Mobile Apps. From technical perspective, it means the application or the operating system of the mobile device will respond only upon sensing touches on the screen. Different touches and finger gestures trigger off different **Action Events**.

In the Integrated Mobile Device of the Invention, the user will not be touching the screen of the mobile device direct to trigger off any Action Events, therefore the action events must come from (or triggered by) the Emulation Software (or the built-in system) instead. The inputs to the Emulation Software that would trigger the Action Events therefore must come from Component A which is built to record the finger gestures and hand/palm movements in three dimensional space.

In term of Implementation, the Emulation Software (or the built-in system) could adopt two approaches, namely Exact Emulation Approach and Translate and Emulate Approach, as described in the section A5.1.1.

The user shall place the Component A and Component B very close to each other especially if wireless technology such as Bluetooth is used. For example, the user may keep Component B in a pocket or inside a handbag while Component A is worn in the hand(s).

A5.1.3 Component C Details

Component C could be a Head-mounted display or Smart-TV display or any type of smart display device depending on the situation and the usage requirements. For Head-mounted display, it is very convenient and it can be used almost in anywhere and at anytime. The Head-mounted display device is made up of a small display optic in front of one eye or each eye. The one for one eye is called monocular HMD whereas binocular HMD is for both eyes. Both types have their pros and cons depending on many factors such as the situation where the HMD will be used, the user adaptability with one or both eyes etc. In term of implementation, it could be detachable components that could be attached and fitted into existing glasses of the user.

In the case of Smart TV, the user may take advantage of the size of the display or the ability to perform multi tasking such as watching TV while sending messages or browsing the Internet concurrently.

A5.1.4 Component D Details

Component D is made up of a hands-free set that uses wireless technology such as Bluetooth for phone conversation or voice input and output. Especially useful for people whom the hands are usually occupied with work or the hands are always too dirty to handle mobile devices.

In the Invention, Component D shall work together with other components, Components A, B and C to enable the user to perform phone conversations without the need to retrieve the mobile device or touch the mobile device screen. For example, the user could now easily respond to recording messages of the customer service lines or the help desks or the hotlines or the machine operate lines of business organizations that usually need the user to first responds by keying the right option of selections, using numeric numbers on the phone key pads before the user is channeled to the right person for help.

B. DRAWINGS

B1. BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other features of the present Invention will be more readily apparent from the following detailed description and drawings of the illustrative embodiments of the Invention in which:

Drawing 1(a) depicts a diagram of functional structure of the Integrated Mobile Device. It depicts essential components or major functions of the system of the Invention.

Drawings 1(b) and 1(c) depict schematic diagrams of essential link-up and interaction of main components in the Integrated Mobile Device.

Drawing 2(a) to 2(f) provide simple illustrations of the Invention, specifically how various hand/palm movements and finger gestures in the 3-dimensional space are translated into specific user actions to trigger the various Mobile Apps.

B2. DETAILED DESCRIPTION OF THE DRAWINGS

Aspects, features and advantages of the present Invention will become better understood with regard to the following description in connection with the accompanying drawing(s). It should be apparent to those skilled in the art that the described drawings of the present Invention provided herein are illustrative only and not limiting, having been presented by way of example only. All features disclosed in this description may be replaced by alternative features serving the same or similar purpose, unless expressly stated otherwise. Therefore, numerous other drawings of the modifications thereof are contemplated as falling within the scope of the present Invention as defined herein and equivalents thereto. Hence, use of absolute terms, such as, for example, "will," "will not," "shall," "shall not," "must," and "must not," are not meant to limit the scope of the present Invention as the drawings disclosed herein are merely exemplary.

Drawing 1 (a) of Invention

Turning to Drawing 1(a), it depicts the functional structure of the Integrated Mobile Device. There are 4 major components labeled as Component A, Component B, Component C and Component D.

Component A offers intelligent user interface through capturing of hand/palm movements and finger gestures in the 3 dimensional space. Component A consists of an accelerometer, a gyroscope, a processor and wired circuits or cables. The data of Component A becomes the user inputs into Component B.

Component B plays a crucial role in the overall setup for the Integrated Mobile Device of the Invention. It is the main component that communicates with other components. It offers overall control, application processing, telecommunication, interactive response and so on. For example, Component B may invoke a Calendar function based on input from Component A.

Component C is an electronic display device such as a Head-mounted display (or HMD) or a Smart-TV display. It is linked up to Component B. It could include a camera and video device to take pictures and capture videos. .

Component D is a hands-free set that uses wireless technology such as Bluetooth for phone conversation or voice input and output. Component D is linked to Component B.

Drawings 1 (b) and 1(c) of Invention

Turning to Drawings 1(b) and 1(c), the drawings depict schematic diagrams of essential link-up and interaction of main components in the Integrated Mobile Device.

Drawing 1(b) shows that the Mobile Device or Central Processor takes the inputs from Intelligent Hand User-interface and translates them into specific triggering actions on the Mobile Device or Central Processor. For example, the user may move his hand/palm and use the finger gesture to trigger the Messaging function.

The drawing also shows the content of Mobile Device or Central Processor is transmitted and displayed on a Head-mounted device as represented by a pair of spectacles.

The drawing also shows the flow of voice and audio between Hands free device and Mobile Device or Central Processor. For example, the Hands free enables the user to pick up calls when there is an incoming calls for the Mobile Device if Hands free is linked up to Mobile Device.

Drawing 1(c) offers almost the same illustration as 1(b) except for a different type of display device. In the drawing, the display device is a Smart TV or LCD or LED Display. In the actual implementation, the setup of Drawing 1(c) is mainly for a stationary environment whereby there is a bigger display device available instead of head-mounted display device.

Drawings 2 (a) to 2 (f) of Invention – Basic Functions

Turning to Drawings 2(a) to 2(f), the drawings provide some basic illustrations of the Invention. It shows specifically how the user could perform basic functions on the mobile device through intelligent hand/palm movements and finger gestures in the 3 dimensional space.

Drawings 2 (a) to 2 (b) – Invoking a Messaging Function

Drawings 2(a) and 2(b) illustrate how the user could select a Messaging function from the 3 dimensional space and how the corresponding hand pointer/cursor movement in the mobile device's 2 dimensional space. Drawing 2(a) has two sections. The right section, in Figure (II), depicts the initial position of the user's palm/hand in the 3 dimensional space whereas the left section, in Figure (I), depicts the corresponding hand pointer/cursor position in the mobile device in the 2 dimensional space. Drawing 2(b) is a continuation of drawing 2(a). In Drawing 2(b), under Figure (II), it depicts that the user's palm/hand has shifted diagonally, in the X-Y axis, towards top-left of the X-Y axis. In line with the

palm/hand movement in Figure (II), the hand pointer/cursor in the mobile device's 2 dimensional space also moves correspondingly as shown in Figure (I). The hand pointer/cursor is thus pointing at the Messages icon. Figure (II) also shows subsequent action from the user whereby the user depresses the second finger by bending the finger downwards slightly. The user's action in Figure (II) results in a tap onto the Messages icon in Figure (I) which invokes the Messaging function of the mobile device.

Drawings 2 (c) to 2 (d) – Create Text Messages

Drawings 2(c) and 2(d) illustrate how the user could create a Text Message using intelligent hand/palm movements and finger gestures in the 3 dimensional space. In Drawing 2(c), under Figure (II), it depicts that the user's palm/hand has shifted downwards, in the X-Y axis, towards bottom of the X-Y axis. In line with the palm/hand movement in Figure (II), the hand pointer/cursor in the mobile device's 2 dimensional space also moves correspondingly as shown in Figure (I). The hand pointer/cursor is thus targeting at the specific keys of the keyboard. Figure (II) also shows subsequent action from the user whereby the user positions the fingers on the required key(s) and depresses the specific finger(s) by bending the finger(s) downwards slightly. The user's action in Figure (II) results in entering or keying in of the characters or words of text messages. In short, the user shall move the hand/palm and position his fingers to type the required characters as if he is hitting the soft keyboard of the virtual mobile device.

In Drawing 2(d), under Figure (II), it depicts the user's palm/hand has shifted upwards, in the X-Y axis, towards the middle left of the X-Y axis. In line with the palm/hand movement in Figure (II), the hand pointer/cursor in the mobile device's 2 dimensional space also moves correspondingly as shown in Figure (I). The hand pointer/cursor is thus positioned at the paragraph of text message entered by the user. Figure (II) also shows subsequent action from the user whereby the user positions the finger on the specific position of the paragraph of the text message and depresses the finger by bending the finger downwards and hold. The user's action in Figure (II) results in the pointer/cursor being positioned and stationary at a space between the words of the paragraph of the text message in Figure (I). In this case, it is between the words 'tennis' and 'this'. The user shall then proceed to key in the word 'session' as required by typing on the soft keyboard.

Drawings 2 (e) to 2 (f) – Finger Gestures to Zoom-in or Zoom-out of the Pictures

Drawings 2(e) and 2(f) illustrate how the user could zoom in and zoom out of the pictures or the screen content using intelligent hand/palm movements and finger gestures in the 3 dimensional space. In Drawing 2(e), under Figure (II), it depicts a special hand gesture of four fingers folding together and touching each others while the middle finger is pointing upwards. This specific hand gesture could be predefined and translated by the Emulation Software (or the built-in System) into specific hand gestures on the mobile device's 2 dimensional space. For example, the above hand gesture in the 3 dimensional space could be translated into 'Stretching' or zooming out or enlarging the screen content as shown in Figure (I) of Drawing 2(e).

In Drawing 2(f), under Figure (II), it depicts a special hand gesture of all five fingers folding together and touching each others. This specific hand gesture could be predefined and translated by the Emulation Software (or the built-in System) into 'Pinching' or zooming in or reducing the displayed content as shown in Figure (I) of Drawing 2(f).

C. CLAIMS :

1. A mobile device, that is comprising of four major integrated components linked up by cables or through wireless technology :

a) Component A – It consists of an accelerometer, a gyroscope, a processor and wired circuits or cables that tracks the hand/palm movements and finger gestures in the three dimensional space of the X-Y-Z axis. It channels the user inputs into Component B.

b) Component B – It is a state-of-the-art electronic mobile device that has a special Emulation Software (or special built-in system) that takes the user inputs from Component A and translates them into specific triggering actions on the mobile device of Component B. It is linked up to all the other components, Components A, C and D.

c) Component C – It is a Head-mounted display (or HMD) or a Smart-TV display or any type of smart display device, depending on the situation and the usage requirements. It is linked up to Component B. It could include a camera and video device to take pictures and capture videos.

d) Component D - It is a hands-free set that uses wireless technology such as Bluetooth for phone conversation or to provide the user with the direct voice input and output.

Component A is made up of a complete set of hand-worn or hand-mounted device that provides the inputs to Component B.

Component B is not limited to a smart phone or an e-reader or a tablet computer and so on.

Component C must be easily attached and detached for ease of use. For HMD, it can be a detachable component(s) that could be attached and fitted into existing glasses of the user.

2. The system of Invention as described in Claim 1, wherein Component A is a smart hand-worn or hand-mounted device that captures and tracks the coordinates, movements, vectors, velocities, accelerations and orientations of human hands and fingers. It also tracks and recognizes the finger gestures and behaviors.

3. The system of Invention as described in Claim 1, wherein Component B contains a special Emulation Software (or a special built-in system) that takes the user inputs of Component A to trigger processing of Mobile Apps or the mobile device functions in Component B. Component A captures the hand/palm movements and finger gestures in the three dimensional space and provides the data as inputs to the Emulation Software in Component B to be translated into the virtual finger gestures on the mobile device.

In term of implementation, the translation of the user inputs and emulation of gestures in Component B could be carried out by one of two approaches below :

(a) Exact Emulation Approach – It emulates the hand/palm movements and finger gestures in the three dimensional space of Component A to almost the same hand/palm movements and finger gestures in the two dimensional space in Component B. The emulated behavior in Component B closely resembles the

behavior of Component A. For example, a finger gesture of a 'Swipe' action in the three dimensional space is translated into the same finger gesture of a 'Swipe' action in the two dimensional space.

(b) Translate and Emulate Approach – It translates or maps the hand/palm movements and finger gestures in the three dimensional space of Component A to some predefined sets of hands gestures in the two dimensional space in Component B. In other words, unlike the Approach (a), Exact Emulation Approach, it is not an exact reproduction of the hand gestures or behaviors. In fact, the Approach (b) is using a mapping method to trigger mobile device functions.