

A wearable device and method to position the arm

[001] FIELD OF THE INVENTION:

[002] The present invention relates to the field of wearables. More specifically the invention relates to a wearable device capable of positioning at least one arm partially over an activated member.

[003] BACKGROUND OF THE INVENTION

[004] Wearables includes a wide range of devices such as fitness tracker, smartwatches, activity tracking devices etc. that are capable of displaying time and any other kind of information through various methods. One of the methods used in a wearable device such as analog-display wristwatch includes the positioning of at least one arm at a particular point. The arm could be an hour hand, a minute hand or a notification hand.

[005] The movement of the arm to position itself to a particular point can be visually grasped as an indication of a notification such as telephone call or message arrival or to set an alarm time or for tracking activity or as any other feedback to the user. Thus, in recent years, a trend has advanced of a multifunctional wearable device provided with a visual communication function and other functions.

[006] There are many existing wearable devices for example watches which provide for a mechanism to aid in positioning of the arm. However, in most of the existing arts, the positioning of the arm depends on the changing rotating speed of the arm and their rotation direction which does not provide for accurate positioning of the arm.

[007] Hence, a need exists for a wearable device which can provide for accurate positioning of the arm, thereby aid in displaying a wide range of notifications in the wearable device.

[008] SUMMARY OF THE INVENTION

[009] According to an embodiment, the present invention discloses a wearable device. The wearable device includes a surface having an element selected from a first conductive element, a first inductive element or combinations thereof; at least one arm associated with the surface; and an internal circuitry coupled to the surface. The internal circuitry includes a micro controller unit to transmit a threshold voltage to activate at least one of the element on the surface to provide an activated member, and a memory unit coupled to the micro controller. The memory unit is configured to store the threshold voltage corresponding to the activated member. The internal circuitry also includes at least one actuator to actuate the micro controller to transmit the threshold voltage.

[010] According to an embodiment, the present invention discloses a method to position the arm on a wearable device. The wearable device includes a surface comprising an element selected from a first conductive element, a first inductive element or combinations thereof; at least one arm associated with the surface; an internal circuitry coupled to the surface. The internal circuitry comprises of a micro controller unit to transmit a threshold voltage to activate at least one of the element on the surface to provide an activated member, a memory unit coupled to the micro controller; wherein the memory unit stores the threshold voltage corresponding to the activated member, and at least one actuator to actuate the micro controller to transmit the threshold voltage. The method includes the steps of receiving an actuation from the actuator by the microcontroller; transmitting the threshold voltage from the microcontroller to the element on the surface to provide the activated member; and positioning of the arm at least partially above the activated member.

[011] According to another embodiment of the present invention, the wearable device is a time display device. In yet another embodiment of the present invention, the time display device is an analog watch, wherein the at least one arm is in a first position to display time. In an embodiment of the present invention, the analog

watch further comprises a time keeper module to reevaluate time considering the delay when the at least one arm moves from a second position to a third position.

[012] The foregoing and other features of embodiments of the present invention will become more apparent from the following detailed description of embodiments when read in conjunction with the accompanying drawings. In the drawings, like reference numerals refer to like elements.

[013] BRIEF DESCRIPTION OF THE DRAWINGS

[014] Figure 1: illustrates a block diagram of the wearable device, in accordance with an embodiment of the invention.

[015] Figure 2: illustrates an exemplary wearable device with a surface comprising of a combination of inductive and conductive elements, in accordance with an embodiment of the invention.

[016] Figure 3a: illustrates an exemplary look up table stored in the memory unit of the wearable device with a notification type with their preconfigured threshold voltage value, in accordance with an embodiment of the invention.

[017] Figure 3b: illustrates an exemplary look up table stored in the memory unit of the wearable device with their preconfigured threshold voltage value and corresponding angle of arm, in accordance with an embodiment of the invention.

[018] Figure 4: illustrates a flow chart of the method to position the arm on the wearable device, in accordance with an embodiment of the invention.

[019] Figure 5a: illustrates an example of the wearable device having a dial with surface comprising of a conductive element and an arm at least partially on the surface, in accordance with an embodiment of the invention.

[020] Figure 5b: illustrates the positioning of the arm of the wearable device over the activated member, in accordance with an embodiment of the invention.

[021] Figure 6: illustrates an example of the wearable device comprising of a notification dial with of conductive elements, in accordance with an embodiment of the invention.

[022] Figure 7 illustrates a block diagram of the analog watch, in accordance with an embodiment of the invention

[023] DETAILED DESCRIPTION

[024] In the following detailed description, reference is made to the accompanying drawings that form a part hereof, and in which shown by way of illustration specific embodiments that may be practiced. These embodiments are described in sufficient detail to enable a person skilled in the art to practice the invention, and it is to be understood that other embodiments may be utilized and that logical, mechanical, and other changes may be made within the scope of the embodiments. Also, the words “comprising,” “having,” “containing,” and “including,” and other similar forms are intended to be equivalent in meaning and be open ended in that an item or items following any one of these words is not meant to be an exhaustive listing of such item or items, or meant to be limited to only the listed item or items. The singular forms “a,” “an,” and “the” include plural references unless the context clearly dictates otherwise. The following detailed description is, therefore, not be taken as limiting the scope of the invention, but instead the invention is to be defined by the appended claims.

[025] According to an embodiment, the present invention discloses a wearable device. The wearable device includes a surface comprising an element selected from a first conductive element, a first inductive element or combinations thereof; at least one arm (that may be) associated with the surface; an internal circuitry coupled to the surface. The internal circuitry comprises of a micro controller unit to transmit a threshold voltage to activate at least one of the element on the surface to provide an activated member, a memory unit coupled to the micro controller; wherein the memory unit is configured to store the threshold voltage corresponding

to the activated member, and at least one actuator to actuate the micro controller to transmit the threshold voltage.

[026] Figure 1: illustrates a block diagram of the wearable device, in accordance with an embodiment of the invention. The wearable device (100) includes a surface (102) comprising of an element (104) selected from a first conductive element, a first inductive element or combinations thereof. The wearable device (100) further includes at least one arm (106) associated with the surface (102). The wearable device (100) further includes an internal circuitry (108) coupled to either the surface (102). The internal circuitry (108) includes a micro-controller (110), memory unit (112) and at least one actuator (114).

[027] According to an embodiment of the present invention, the shape of surface (102) may be of any shape and area, non-limiting examples include circular, square, rectangular and the like. The surface is split up in different segments, wherein the segments includes elements selected from a first conductive element, a first inductive element or combinations thereof. In an embodiment of the present invention, the conductive elements (104) can be placed anywhere on the surface, with any number with different arrangements.

[028] According to an embodiment of the present invention, the arm (106) includes an hour hand, a minute hand, a second hand and a notification hand. In one embodiment of the present invention, the arms may move in any direction. In another embodiment, the length of arm may be 1cm, 2cm, 3cm etc. Typically, the arm or plurality of arms may be placed in different operation arrangement.

[029] According to another embodiment of the present invention, at least one arm independently moves at least partially over the activated member at a given time in a sequential manner. Sequential manner indicates that only one arm may be moved at a time, when the inductive or conductive element on the surface is activated. In yet another embodiment of the present invention, at least one arm moves at least partially over the activated member at a given time in a simultaneous manner. Simultaneous manner indicates one or more arms are moved

simultaneously or they converge simultaneously to reach the activated inductive/conductive element present on the surface.

[030] Figure 2 illustrates an exemplary wearable device (200) comprising of surface having a combination of inductive element (202) and a conductive (204) element along with a conductive arm (206) associated with the surface, in accordance with an embodiment of the invention.

[031] According to an embodiment of the present invention, the operation of the internal circuitry is controlled by a microcontroller. According to another embodiment of the present invention, based on the actuation received, the microcontroller transmits a threshold voltage to the surface. Generally during activation, any one of the conductive element or the inductive element is charged such that the conductive element or the inductive element turns from a first state to a second state. In one embodiment of the present invention, the first state may be an OFF state and the second state may be an ON state respectively. In another embodiment of the present invention, when the change of state is detected the arms move from the original position, shall stop above the activated member i.e the activated conductive element or inductive element.

[032] In another embodiment of the present invention, the wearable device further includes a memory unit which stores the threshold voltage values corresponding to every element on the surface. Figure 3a illustrates an exemplary look up table stored in the memory unit of the wearable device in accordance to an embodiment of the present invention. The lookup table may have preconfigured threshold voltage values associated with a conductive element or an inductive element. Figure 3b illustrates another embodiment of the present invention, wherein the memory unit may have a lookup table with the preconfigured threshold voltage value and corresponding angle of arm associated with a conductive element or an inductive element.

[033] According to an embodiment of the present invention, the wearable device is configured to receive inputs from at least one sensor device, for example an

electronic device, a mobile device. In yet another embodiment, the actuator is actuated when a notification comes in the sensor device for example a mobile device or from any other electronic device. In an example embodiment of the present invention, when the wearable is paired with the sensor device by means of a communication module present in the wearable device, and based on the information received from the sensor device, the actuator actuates the microcontroller. Non-limiting examples of the sensor device include mobile phone, fitness tracking devices or activity tracking device, a tablet, a laptop or a computer, a PDA or any other electronic device which can be paired with a smart wearable.

[034] Figure 4: illustrates a flow chart of the method to position the arm on a wearable device, in accordance with an embodiment of the invention. The method (400) to position the arm on a wearable device, wherein the wearable device comprises: a surface comprising an element selected from a first conductive element, a first inductive element or combinations thereof; at least one arm associated with the surface; an internal circuitry coupled to the surface; wherein the internal circuitry comprises of: a micro controller unit to transmit a threshold voltage to activate at least one of the element on the surface to provide an activated member, a memory unit coupled to the micro controller; wherein the memory unit stores the threshold voltage corresponding to the activated member, and at least one actuator to actuate the micro controller to transmit the threshold voltage. The method includes the steps of receiving an actuation from the actuator by the microcontroller (402); transmission of the threshold voltage from the microcontroller to the element on the surface to provide the activated member (404); and positioning of the arm fully or at least partially over the activated member (406).

[035] According to another embodiment of the present invention, the positioning of the arm fully or at least partially over the activated member further comprises indicating a notification. In yet another embodiment of the present invention, the notification is selected from, telephone call, message/mail arrival, alarm time,

activity tracking, calendar reminder, health related notifications, medicine reminder, other App push notifications etc. and combinations thereof.

[036] According to an embodiment of the present invention, the wearable device is a time display device. In yet another embodiment of the present invention, the time display device is an analog watch, wherein at least one arm is in first position to display time. Figure 5a illustrates an example of wearable device (500) having a dial with surface (502) comprising of conductive element (504) placed along the periphery of the surface dial and arm (506) associated with the surface. Figure 5a further illustrates an activated member (508) due to transmission of threshold voltage. Figure 5b illustrates the positioning of the arm (506) at least partially over the activated member (508), in accordance with an embodiment of the invention. In an embodiment of the invention, positioning of the arm over the activated member at 3'o clock position indicates arrival of message on mobile phone.

[037] In an embodiment of the present invention, the wearable device is an analog watch wherein the conductive elements are placed inside the notification dial of the analog watch. The conductive elements placed in notification dials are activated when a notification is received by the watch and due to the transmission of the corresponding voltage. For example, when an incoming call notification is received by the watch, a corresponding voltage is transmitted to one of the conductive element of the surface. Thereafter, the notification arm of the watch may move and position itself above the activated conductive element (with respect to the incoming call notification), indicating that there is an incoming call to the user.

[038] In an embodiment of the invention, the notification arm moves at least partially over the activated member i.e. the second position for a preset time and reverts to the first position at the end of the pre-set time. The time to remain over the activated element is preprogrammed for example for 5 or 10 seconds, the user can configure the preset time. After the preset time, the element turns from a second state to a first state. In one embodiment of the present invention, the second state

may be an ON state and the first state may be an OFF state respectively. In another embodiment of the present invention, when the change of state is detected, the notification arm regains its original position i.e. reverts back to its first position.

[039] Figure 6 is another example of a wearable device, wherein the wearable device is a smart watch. As depicted, the dial of the smart watch (600) comprises of a notification dial (602) comprising of conductive elements (604). Figure 6 further illustrates the notification arm (606) positioned over the activated conductive element (608).

[040] According to an embodiment of the present invention, the wearable device such as a smart watch or analog watch, further includes a time keeper module. Figure 7 illustrates a block diagram of the analog watch (700), in accordance with an embodiment of the invention. The analog watch (700) includes a surface (702) comprising of an element (704) selected from a first conductive element, a first inductive element or combinations thereof. The analog watch (700) further includes at least one arm (706) associated with the surface (702). The analog watch (700) further includes an internal circuitry (708) coupled to the surface (702). The internal circuitry (708) includes a micro-controller (710), memory unit (712) and at least one actuator (714). The analog watch (700) further includes a time keeper module (716) which is coupled to the arm (706).

[041] The time keeper module (716) is configured to measure and record the actual time, delay in time or any difference in time. The time keeper module further analyses the time (in milli second, second etc) taken by the arm to move from first position to second position. In an embodiment of the present invention, the arm includes an hour hand, a minute hand and a second hand. In an embodiment of the present invention, the first position may be the positioning of the hour hand and minute hand to display time. In an embodiment of the present invention, the second position may be the positioning of the hour hand, and minute hand, at least partially above the activated member to indicate a notification. In an embodiment of the present invention, each notification shall be shown for pre-set time, for example 5

seconds, 10 seconds. When the pre-set time elapses, the time keeper module reevaluates the current time after considering the delay in showing notifications and actuates the micro-motors connecting to arms of the watch to return to a third position. In an embodiment of the present invention, the third position may be positioning of the hour hand and minute hand to display reevaluated time. The reevaluated time may be the current time.

[042] The foregoing description of the preferred embodiment of the present invention has been presented for the purpose of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise form disclosed. Furthermore, all examples recited herein are principally intended expressly to be only for pedagogical purposes to aid the reader in understanding the principles of the present subject matter and are to be construed as being without limitation to such specifically recited examples and conditions. Many modifications and variations are possible in light of the above teachings.

Claims

[043] We claim:

- 1) A wearable device, comprising of:
 - a surface comprising an element selected from a first conductive element, a first inductive element or combinations thereof;
 - at least one arm associated with the surface;
 - an internal circuitry coupled to the surface, wherein the internal circuitry comprises of:
 - a micro controller unit to transmit a threshold voltage to activate at least one of the element on the surface to provide an activated member;
 - a memory unit coupled to the micro controller, wherein the memory unit is configured to store the threshold voltage corresponding to the activated member; and
 - at least one actuator to actuate the micro controller to transmit the threshold voltage.
- 2) The wearable device as of claim 1, wherein the at least one arm independently moves at least partially over the activated member at a given time in a sequential manner.
- 3) The wearable device as of claim 1, wherein the at least one arm moves at least partially over the activated member at a given time in a simultaneous manner.
- 4) The wearable device as of claim 1, wherein the memory unit further comprises a lookup table with a notification type and the threshold voltage value associated with the notification type.

- 5) The wearable device as of claim 1, wherein the wearable device is a time display device.
- 6) The wearable device as of claim 5, wherein the time display device is an analog watch, wherein the at least one arm is in first position to display time.
- 7) The wearable device as of claim 6, wherein the at least one arm moves at least partially over the activated member to a second position for a pre-set time and reverts to the first position to display time.
- 8) The wearable device as of claim 7, further comprises a time keeper module configured to reevaluate time considering a delay when the at least one arm moves from the second position to a third position.
- 9) A method to position at least one arm on a wearable device, wherein the wearable device comprises: a surface comprising an element selected from a first conductive element, a first inductive element or combinations thereof; at least one arm associated with the surface; an internal circuitry coupled to the surface, wherein the internal circuitry comprises of: a micro controller unit to transmit a threshold voltage to activate at least one of the element on the surface to provide an activated member; a memory unit coupled to the micro controller, wherein the memory unit stores the threshold voltage corresponding to the activated member; and at least one actuator to actuate the micro controller to transmit the threshold voltage, the method comprises the steps of:
 - receiving an actuation from the actuator by the microcontroller;

- transmission of the threshold voltage from the microcontroller to the element on the surface to provide the activated member;
 - positioning of the arm at least partially above the activated member.
- 10) The method as of claim 9, wherein the positioning of the arm above the activated member further comprises indicating a notification, wherein the notification is selected from, telephone call, message arrival, alarm time, activity tracking and combinations thereof.