

A wearable device to magnify a notification element

[001] FIELD OF THE INVENTION:

[002] The present invention relates to the field of a wearable. More specifically the invention relates to the wearable device to magnify a notification element.

[003] BACKGROUND OF THE INVENTION

5 **[004]** A number of notification elements such as day, date, and other activity related information may be present in a watch. Some of these notification elements are printed or placed on the dial of the watch. The size of printed elements is often of a very small font that, it is very difficult even for a user with a normal eyesight to read the notification.

10 **[005]** There are many existing wearable devices for example watches, which include magnifying devices to enlarge the content on the dial of the device. When the content to be notified to the user is more, then, the font used needs to be very small, which makes such content illegible to the viewer. However, most of the existing wearable devices can enlarge only a limited number of data elements
15 present in the notifications as they have a complex arrangement of data element and the magnifying element.

[006] Hence, a need exists for a wearable device with a magnifying functionality to enlarge and display a wide range of notification elements in the wearable device.

[007] SUMMARY OF THE INVENTION

20 **[008]** According to an embodiment, the present invention discloses a wearable device. The wearable device includes a case having at least one display disc to display at least one of a notification element; and a magnifying module operationally coupled to the at least one display disc. The magnifying module includes a magnifier coupled to the at least one display disc to visualize a view of
25 the notification element to a user. The magnifying module also includes a micro motor coupled to either the at least one display disc or the magnifier or a

combination thereof to control a position of the at least one display disc or the magnifier; and at least one actuator to actuate the micro motor to move the at least one display disc to a preconfigured position with respect to an actuation.

5 [009] According to another embodiment of the present invention, the wearable device further includes a controller module coupled to the micro motor to program an actuation sequence for the micro motor. In yet another embodiment of the present invention, the wearable device includes a communication module configured to receive an actuating signal from a paired electronic device, wherein the communication module is coupled to the controller module. In an embodiment
10 of the present invention, the notification element comprises at least one element selected from date, month, day, year, an alphanumeric character, a symbol, any indication or combinations thereof.

[010] According to an embodiment, the present invention discloses a method of enlarging a notification element on a wearable device, wherein the wearable device
15 comprises: a case comprising at least one display disc to display at least one of a notification element; a magnifying module operationally coupled to the at least one display disc, wherein the magnifying module comprises: a magnifier coupled to the at least one display disc to visualize a view of the notification element to a user; a micro motor coupled to either the at least one display disc, the magnifier or a
20 combination thereof to control a position of the at least one display disc or the magnifier; at least one actuator to actuate the micro motor to move the at least one display disc to a preconfigured position with respect to an actuation, a controller module coupled to the micro motor to program the actuation sequence for the micro motor. The method includes the steps of receiving an actuation from the controller
25 module; initiating the micro motor to rotate at least one of the display disc or the magnifier, and positioning the magnifier over at least a portion of the notification element in according to the actuation received.

[011] According to another embodiment of the present invention, the method further includes the step of rotating at least one of the display disc or the magnifier

in a sequential manner to position the magnifier above at least one of the notification elements in sequence. In yet another embodiment of the present invention, the method also includes the step of defining at least one task detail for at least one genre of actuation. In another embodiment of the present invention, the method includes the step of pairing the wearable device with an electronic device and further includes the step of receiving an actuation signal corresponding to an event in the electronic device.

[012] BRIEF DESCRIPTION OF THE DRAWINGS

[013] 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.

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

[015] Fig. 2: illustrates an exemplary wearable device with multiple display discs, in accordance with an embodiment of the invention.

[016] Fig. 3: illustrates an exemplary wearable device with multiple display discs displaying an enlarged display of the notification elements, in accordance with an embodiment of the invention.

[017] Fig. 4: illustrates another example of wearable device with single display disc, in accordance with an embodiment of the invention.

[018] Fig. 5: illustrates another example of wearable device with single display disc displaying enlarged display of the notification elements, in accordance with an embodiment of the invention.

[019] Fig. 6: illustrates an arrangement of the micro motors in the wearable device, in accordance with an embodiment of the invention.

[020] Fig. 7: illustrates flow chart of the method of enlarging a notification element on a wearable device, in accordance with an embodiment of the invention.

[021] DETAILED DESCRIPTION

5 [022] 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
10 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
15 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.

[023] According to an embodiment, the present invention discloses a wearable device. The wearable device including a case having at least one display disc to
20 display at least one of a notification element. The wearable device further includes a magnifying module operationally coupled to the at least one display disc. The magnifying module includes a magnifier coupled to the at least one display disc to visualize a view of the notification element to a user. The magnifying module also includes a micro motor coupled to either the at least one display disc, the magnifier
25 or a combination thereof to control a position of the at least one display disc or the magnifier; and at least one actuator to actuate the micro motor to move the at least one display disc to a preconfigured position with respect to an actuation.

[024] Fig. 1: illustrates a block diagram of the wearable device, in accordance with an embodiment of the invention. The wearable device (100) includes a case

(102) comprising at least one display disc (104) to display at least one of a notification element. The wearable device (100) further includes a magnifying module (106) operationally coupled to the display disc (104). The magnifying module (106) includes a micro motor (108) and a magnifier (110). The wearable device (100) further includes at least one actuator (112) to actuate the micro motor (108) to move the display disc (104) to a preconfigured position with respect to an actuation. In one embodiment of the present invention, the micro motor (108) aids to control the position of the display disc (104). Typically, the micro motor (108) is configured to move the display disc (104) from a first position to a second position, wherein the second position relates to the location of a notification element. In another embodiment of the present invention, a micro motor (108) of the magnifying module (106) is coupled to the magnifier (110) to control the position of the magnifier (110). In another embodiment of the present invention, the magnifier (110) enables to visualize a view of the notification element to a user. Typically, when the user actuates the trigger, the magnifier (110) is moved over the display disc (104) to visualize the notification element enlarged.

[025] According to an embodiment of the present invention, the wearable device (100) further includes a controller module (120) coupled to the micro motor (108) to program an actuation sequence for the micro motor (108). Typically, the operation of the magnifying module (106) is controlled by the controller module (120). For example, the controller module (120) includes a micro controller, which controls the operation of the micro motor (108). In accordance to the actuation received, the controller module (120) initiates the micro motor (108) to rotate the display disc (104) to a preconfigured location. In another embodiment of the present invention, the controller module (120) further includes a memory module configured to store the criteria for displaying the notification elements. The criteria may be threshold values, current values of the micro motor (108) or any other values related to the movement of display disc (104), magnifier (110) and notification element. According to an embodiment of the present invention, the

wearable device (100) is configured to receive notifications/inputs from an electronic device not limited to a sensor device or a mobile device.

5 **[026]** According to another embodiment of the present invention, the wearable device (100) further includes a communication module (122) configured to receive an actuating signal from a paired electronic device, wherein the communication module (122) is coupled to the controller module (120). Typically, when a notification happens in the paired electronic device, then the paired electronic device sends an actuating signal to the communication module (122) of the wearable device (100) to actuate the micro motor (108). Typically, here the
10 actuating signal from the paired electronic device acts as the actuator and the micro motor functions according to a predefined program corresponding to the actuating signal that is processed by the controller module (120). Non-limiting examples of the electronic device include mobile phone, fitness tracking devices or activity tracking device, a tablet, a laptop or a computer.

15 **[027]** In yet another embodiment of the present invention, the memory may have a lookup table with a notification type with their preconfigured threshold value (for example, no of steps the display disc should rotate). In an embodiment of the present invention, the notification elements are programmed and displayed on the dial, the position of the notification element is appropriately matched to the number
20 of steps in micro motor. According to another embodiment of the present invention, the notification element comprises at least one element selected from date, month, day, year, an alphanumeric character, a symbol, any indication or combinations thereof.

25 **[028]** According to an embodiment of the present invention, the wearable device is a smart watch or an analog watch. In one embodiment of the present invention, the smart watch includes the magnifying module with one display disc and a micro motor to control the position of the display disc. In another embodiment of the present invention, the smart watch includes two or more display disc and a magnifying module operationally coupled to each of the display disc. In yet another

embodiment of the present invention, the magnifier present in the magnifying module is placed on the circumference of the display disc or at an appropriate location to display the notification element on the display disc.

5 [029] According to an embodiment of the present invention, the case of the wearable device is transparent in the front face to exhibit the display disc. In yet another embodiment, the entire case of the wearable device is transparent.

[030] In an example embodiment, the smart watch includes at least one additional micro motor to control the hands of the smart watch. In another example embodiment, the smart watch includes only an hour hand and a minute hand controlled by the at least one additional micro motor. In another example embodiment, each of the hour hand and the minute hand are controlled by two separate micro motors. In another embodiment, the smart watch includes a second hand controlled by the same micro motor controlling the minute hand and the hour hand or the second hand may be controlled by an additional micro motor. In yet another embodiment of the present invention, the smart watch may include at least two actuators such as a primary crown and a secondary crown. The crowns of the watch are operated by means of a push or rotation. The primary crown is used to control the hands present including the hour hand, minute hand and the second hand. The secondary crown is used to control the display disc through the micro motor. In an example embodiment of the present invention, the micro motor is actuated by an external push on the secondary crown, wherein the secondary crown in turn enables the movement of the display disc to a preconfigured position for displaying at least one notification to the user such as date. The external push (on the secondary crown) may not be limited to single press, double press etc. Each actuation to the micro motor through the secondary crown is mapped to different notifications. The notification elements placed on the display disc include but are not limited to, date, day, sensor activity, alert, percentage, message, call/message notifications etc. In yet another embodiment of the present invention, additional information may be printed on the display dial, which are visible to naked eye only

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through the magnifier. Non-limiting examples of the additional information include incoming call alert or some sensor threshold alert and so on.

5 **[031]** In another embodiment of the present invention, the dial of the wearable may be illuminated by a light source. The transparent case is used to view the enlarged notifications to the user. When the actuator is triggered, the associated action is being performed by the micro motor to move the display disc to the preconfigured position and that portion of the dial is illuminated for a while to project the notification element. For example, the notification element may be projected for 10 to 15 seconds and the display disc returns to its earlier position.

10 Further, projected notification is captured by the transparent case and the user views the projected notification through the case. In an embodiment of the present invention, the transparent case accommodates different colored light sources, wherein the duration for which the different color display is programmed in the micro controller. Typically, for a particular notification element one particular

15 color may be used during the projection of the notification. In yet another embodiment of the present invention, the display disc may be transparent, hence displaying the elements printed on the dial.

20 **[032]** According to an embodiment of the present invention, the display disc is configured to rotate either in clockwise or counter-clockwise to reach the preconfigured position. In another embodiment of the present invention, the speed at which the display disc rotates to the preconfigured position is dependent on the rotation speed of the micro motor (rpm). For example, when the user wants to see the date, the user has to press the secondary crown once, meaning, the micro motor rotated, and in turn the display disc is rotated and the magnifier on the display disc

25 is placed above the date (one of the notification element). The magnifier enlarges the size of the date (printed on the dial) and displays the magnified date to the user. In an embodiment of the present invention, after displaying the magnified content, the display disc may return to a preconfigured position. In other words, the magnifier is small circular shaped lens, which is part of the display disc. The

30 display disc is rotated either in clockwise or counter clockwise direction by means

of one of the micro motor. The relevant rotation of the micro motor ensures the accurate positioning of the display disc. Further, the step angles of micro motor are also preprogrammed.

[033] Fig. 2 illustrates an exemplary wearable device (200) with multiple display discs, in accordance with an embodiment of the invention. As depicted in Fig. 2, there are four display discs such as a display disc (104a), a display disc (104b), a display disc (104c) and a display disc (104d). Each of these display discs is coupled to a magnifier such as, a magnifier (110a) coupled to the display disc (104a), a magnifier (110b) coupled to the display disc (104b), a magnifier (110c) coupled to the display disc (104c), a magnifier (110d) coupled to the display disc (104d). The plurality of display discs are arranged one over the other on top of a dial (114). The display disc (104a) includes date as a notification element (118a), the display disc (104b) includes day as a notification element (118b), the display disc (104c) includes month as a notification element (118c) and the display disc (104d) includes year as a notification element (118d). The wearable device (200) also includes two actuators – a first actuator (112a) and a second actuator (112b). The first actuator (112a) is configured to actuate the hour hand, minute hand and second hand (not shown in the figure), whereas the second actuator (112b) is configured to actuate the plurality of display discs (104a, 104b, 104c and 104d). In yet another embodiment of the present invention, the four display discs (104a, 104b, 104c and 104d) is programmable by means of the controller module, and further the controller module detects the minimum distance to the activated notification (for example, date). Typically, the plurality of magnifiers (110a, 110b, 110c and 110d) are lenses. In an embodiment, the shape of the lens may be circular, square or any other shape.

[034] Fig. 3 illustrates an exemplary wearable device (300) with multiple display disc's displaying enlarged display, in accordance with an embodiment of the invention. As depicted in the figure, the actuator (not shown in the figure) is actuated and the magnifiers (110a, 110b, 110c and 110d) are oriented to the respective positions on the display disc. The magnifier (110a) orients on the display

disc (104a) to the date notification element (118a), the magnifier (110b) orients on the display disc (104b) to the day notification element (118b), the magnifier (110c) orients on the display disc (104c) to the month notification element (118c) and the magnifier (110d) orients on the display disc (104d) to the year notification element (118d). The display disc (104a, 104b, 104c and 104d) are arranged on top of a dial (114).

[035] Fig. 4: illustrates another example of wearable device (400) with single display disc, in accordance with an embodiment of the invention. Here, the single display disc (104) illustrates different types of notification elements such as date notification element (118a), day notification element (118b), month notification element (118c) and year notification element (118d). The display disc (104) is arranged on top of a dial (114). The display disc (104) also includes a magnifier (110) coupled to a micro motor (not shown in the figure) and further orients the magnifier (110) when the actuator (not shown in the figure) actuates.

[036] Fig. 5: illustrates another example of wearable device (500) with single display disc displaying enlarged display, in accordance with an embodiment of the invention. Here the actuator (not shown in the figure) is actuated so that the micro motor (not shown in the figure) coupled to the display disc (104) is operated to orient the magnifier (110) to the corresponding notification element (118a) on the display disc (104). The change in orientation of the magnifier (110) is in accordance to the actuation mapped to the actuator (not shown in the figure). The display disc (104) is arranged on top of a dial (114).

[037] Fig. 6: illustrates an arrangement of micro motors (600), in accordance with an embodiment of the invention. Here a plurality of micro motors such as a micro motor (108a), a micro motor (108b), a micro motor (108c), a micro motor (108d) and a micro motor (108e) are arranged one over the other. The micro motor (108a) and the micro motor (108b) are for the two display discs (not shown in the figure) present in the wearable device, whereas the micro motor (108c), the micro motor (108d) and the micro motor (108e) illustrates the micro motors corresponding to

second hand, minute hand and hour hand respectively of the wearable device such as a watch.

[038] Fig. 7: illustrates a flow chart of the method of enlarging a notification element on a wearable device, in accordance with an embodiment of the invention.

5 The method (700) of enlarging a notification element on a wearable device, wherein the wearable device comprises: a case comprising at least one display disc to display at least one of a notification element; a magnifying module operationally coupled to the at least one display disc, wherein the magnifying module comprises: a magnifier coupled to the at least one display disc to visualize a view of the
10 notification element to a user; a micro motor coupled to either the at least one display disc, the magnifier or a combination thereof to control a position of the at least one display disc or the magnifier; at least one actuator to actuate the micro motor to move the at least one display disc to a preconfigured position with respect to an actuation, a controller module coupled to the micro motor to program the
15 actuation sequence for the micro motor. The method includes the step (702) of receiving an actuation from the controller module. The method also includes the step (704) of initiating the micro motor to rotate at least one of the display disc or the magnifier or combinations thereof. The method further includes the step (706) of positioning the magnifier over at least a portion of the notification element
20 according to the actuation received.

[039] According to another embodiment of the present invention, the method (700) further includes the step of rotating at least one of the display disc or the magnifier in a sequential manner to position the magnifier above at least one of the notification elements in sequence. In yet another embodiment of the present
25 invention, the method (700) also includes the step of defining at least one task detail for at least one genre of actuation. In another embodiment of the present invention, the method (700) further includes the step of pairing the wearable device with an electronic device and further includes the step of receiving an actuation signal corresponding to an event in the electronic device. Typically, the genre of
30 actuation includes for a single push/pull on the actuator, double push/pull on the

actuator or a series of push/pull on the actuator and so on and how these various actuations facilitates the operation of the display disc and the magnifying module to visualize the notification element.

[040] In an embodiment of the present invention, a single press on the actuator (secondary crown) may actuate the associated micro motor and in turn rotates the display disc and the display disc is programmed to stop at plurality of positions (other than its original position). For example, the user wants to know the date, day, month and year (4 notifications in this case), with a single press/rotation of the actuator (secondary crown). In another embodiment of the present invention, the user subsequently presses (2 times, 3 times, or 4 times) the secondary crown to position the display at least one disc accordingly, magnifying the other notification elements. In yet another embodiment of the present invention, the display disc may return to its original position every time after the operation (displaying the notification element through a magnifier). The original position may be any position on the display disc as defined by the controller module. In an embodiment of the invention, the original position may be a position in which no notification element printed. In yet another embodiment of the present invention, the at least one display disc may remain at a first position i.e. the position at which the notification element exist and may not return to its original position, and further, when another press of the actuator is detected, the micro motor is actuated to move the associated display disc from the first position to a second position, wherein the second position corresponds to a second notification element. In another embodiment of the present invention, the at least one display disc may be rotated to a plurality of positions such as for example a first position, a second position, a third position, a fourth position etc. in sequence to visualize a series of notification elements one after the other.

[041] In accordance to an embodiment of the present invention, the task details for various actuations are defined in the controller module of the wearable device. Typically, when the user actuates the actuator (secondary crown), the micro motor is actuated according to the program defined in the controller module to perform

at least one task according to a predefined task detail. The actuation may be achieved by pressing the actuator. The predefined task detail include duration of overall task (time taken to complete), time to remain in one position (may be first, second, third or fourth) time it takes to reach a first position to a second position and so on, type of rotation (clockwise or counter clockwise) to reach the next position, the order in which the positions (first-second, second to third, third to fourth, first to third, first to fourth, second to fourth, second to first, third to first, third to second, fourth to first, fourth to second, fourth to third and so on) to be covered. The order may vary with respect to number of notification elements configured in a watch. The task details are pre-programmed and are stored in the memory. In an embodiment, the user is allowed to configure above the various details for each of the task manually.

[042] In an example embodiment, when in accordance to an actuation the magnifier has to visualize four different notification elements then the display disc and the magnifier has to stop at four different positions and has to return to its original position after visualizing the notification elements. The example task parameter values are as follows, the overall time to complete the task (rotating the display disc) is 30 seconds, time to remain static in every position is 4 seconds (magnifying at least one notification element), time taken to move from first position to second position is 2 seconds, the display disc may move clockwise or counter clockwise to reach subject positions. The micro controller unit employs an algorithm for position approximation and effectively rotation of the micro motor and the associated display disc. Typically, the display disc is moved in particular fashion and magnifying all the notification elements (operated either by single press or multiple press of the secondary crown). In an embodiment of the invention, each press of actuator (secondary crown) is configured to display at least one notification element.

[043] 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.

[044] We claim:

- 1) A wearable device comprising:
 - a case (102) comprising at least one display disc (104) to display at least one of a notification element;
 - 5 a magnifying module (106) operationally coupled to the at least one display disc (104), wherein the magnifying module (106) comprises:
 - a magnifier (110) coupled to the at least one display disc (104) to visualize a view of the notification element to a user;
 - 10 a micro motor (108) coupled to the at least one display disc (104), the magnifier (110) or a combination thereof to control a position of the at least one display disc (104) or the magnifier (110);
 - 15 at least one actuator (112) to actuate the micro motor (108) to move the at least one display disc (104) to a preconfigured position with respect to an actuation.
- 2) The wearable device as of claim 1, further comprises a controller module (120) coupled to the micro motor (108) to program an actuation sequence for the micro motor (108).
- 20 3) The wearable device as of claim 2, further comprises a communication module (122) configured to receive an actuating signal from a paired electronic device, wherein the communication module (122) is coupled to the controller module (120).
- 25 4) The wearable device as of claim 1, wherein the notification element comprises at least one element selected from date, month, day, year, an alpha numeric character, a symbol, an indication or combinations thereof.
- 5) A method of enlarging a notification element on a wearable device, wherein the wearable device comprises: a case comprising at least one display disc

- to display at least one of a notification element; a magnifying module operationally coupled to the at least one display disc, wherein the magnifying module comprises: a magnifier coupled to the at least one display disc to visualize a view of the notification element to a user; a
5 micro motor coupled to either the at least one display disc, the magnifier or a combination thereof to control a position of the at least one display disc or the magnifier; at least one actuator to actuate the micro motor to move the at least one display disc to a preconfigured position with respect to an actuation, a controller module coupled to the micro motor to program the
10 actuation sequence for the micro motor, wherein the method includes the steps of:
- receiving an actuation from the controller module;
 - initiating the micro motor to rotate at least one of the display disc or the magnifier, and
15 positioning the magnifier over at least a portion of the notification element according to the actuation received.
- 6) The method as of claim 5, further comprises the step of rotating at least one of the display disc or the magnifier in a sequential manner to position the magnifier above at least one of the notification elements in sequence.
- 20 7) The method as of claim 5, further comprises the step of defining at least one task detail for at least one genre of actuation.
- 8) The method as of claim 5, further comprises the step of pairing the wearable device with an electronic device.
- 9) The method as of claim 8, further comprises step of receiving an actuation
25 signal corresponding to an event in the electronic device.