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TIME-BASED CLOCKFACE RESIZING

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ABSTRACT

A computing device (e.g., a cellular phone, a smartphone, a desktop computer, a laptop computer, a tablet computer, a portable gaming device, a watch, etc.) may display, via a display (which is usually rectangular in shape), a graphical element of an analog clock (which is usually circular in shape) that dynamically changes size and/or position at least in part based on the time of day. Rather than display the entirety of the clock, the computing device may size and resize the clock such that the display only displays a portion of the clock but at a larger scale, allowing for the radius of the clock to exceed approximately half of the shorter length of the display. Furthermore, to ensure that the clock still effectively indicates the time of day, the computing device may position and reposition the clock such that the display always displays the entirety of a minute hand and the entirety of an hour hand of the clock. In this way, the clock may occupy more of the display and appear more visually dynamic, thereby potentially improving the user experience of the computing device.

DESCRIPTION

FIG. 1 below is a conceptual diagram illustrating a computing device 100 that displays a clock that dynamically changes size and/or position at least in part based on the time of day. Computing device 100 may be any mobile or non-mobile computing device, such as a cellular phone, a smartphone, a desktop computer, a laptop computer, a tablet computer, a portable gaming device, a portable media player, an e-book reader, a watch (including a so-called smartwatch), a gaming controller, and/or the like. As shown in FIG. 1, computing device 100 may include a presence-sensitive display 102, one or more processors 104, and one or more storage devices 106. In general, computing device 100 may be rectangular in shape, where a first length (L1) of display 102 is shorter than a second length (L2) of display 102.

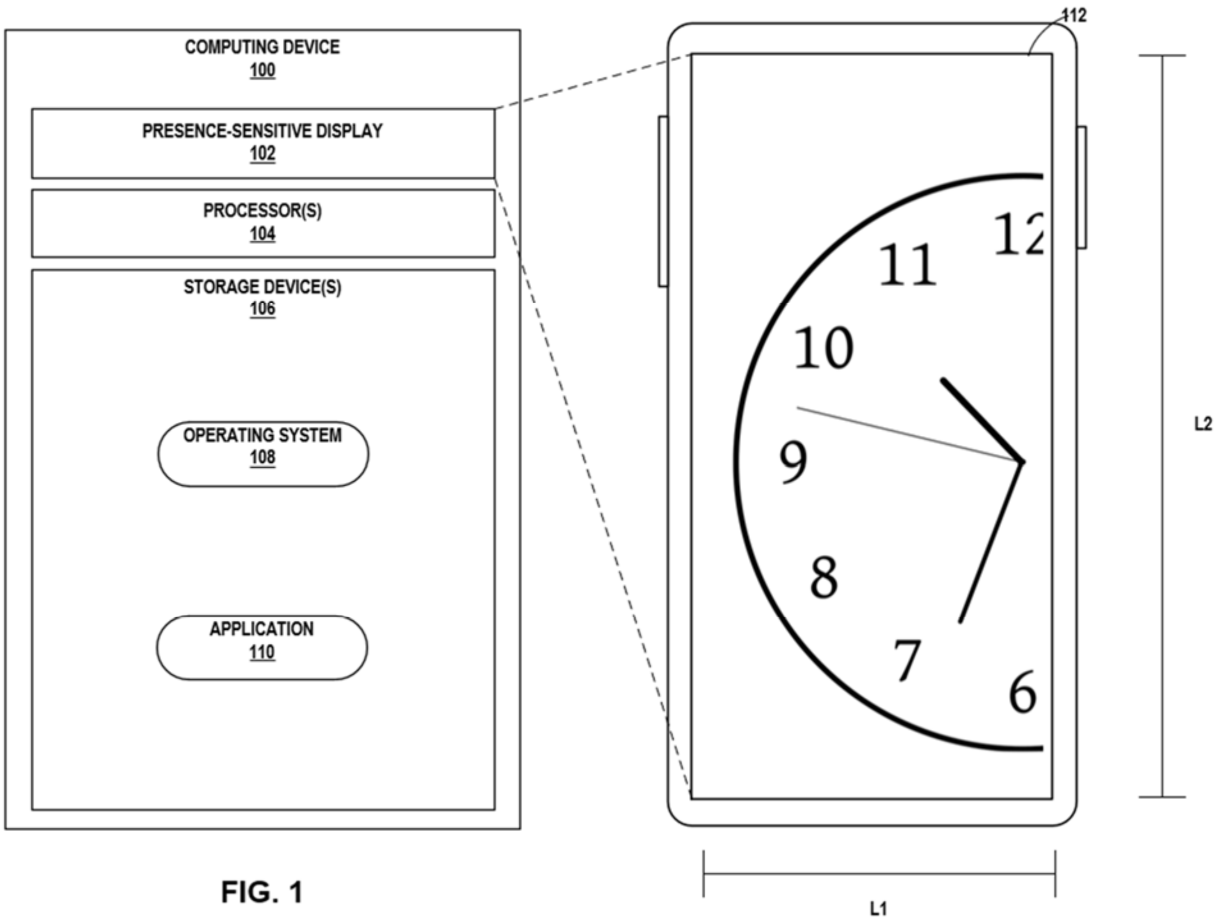

FIG. 1

Presence-sensitive display 102 of head unit 100 may be a presence-sensitive display that functions as an input device and as an output device. For example, presence-sensitive display 102 may function as an input device using a presence-sensitive input component, such as a resistive touchscreen, a surface acoustic wave touchscreen, a pressure-sensitive screen, an acoustic pulse recognition touchscreen, or another presence-sensitive display technology. Additionally, presence-sensitive display 102 may function as an output (e.g., display) device using any of one or more display components, such as a liquid crystal display (LCD), dot matrix display, light emitting diode (LED) display, active-matrix organic light-emitting diode (AMOLED) display, etc.

Processors 104 may implement functionality and/or execute instructions associated with computing device 100. Examples of processors 104 may include one or more of an application specific integrated circuit (ASIC), a field programmable gate array (FPGA), an application processor, a display controller, an auxiliary processor, a central processing unit (CPU), a graphics processing unit (GPU), one or more sensor hubs, and any other hardware configure to function as a processor, a processing unit, or a processing device. System application 102 may be operable by processors 104 to perform various actions, operations, or functions of computing device 100.

Storage devices 106 of computing device 100 may include one or more computer-readable storage media. For example, storage devices 106 may be configured for long-term, as well as short-term storage of information, such as instructions, data, or other information used by head unit 100. In some examples, storage devices 106 may include non-volatile storage elements. Examples of such non-volatile storage elements include magnetic hard discs, optical discs, solid state discs, etc. Examples of volatile memory devices include random-access memories (RAM), dynamic random-access memories (DRAM), static random-access memories (SRAM), etc.

As shown in FIG. 1, storage devices 106 may include an operating system 108 (“OS 108”) and an application 110. OS 108 and application 110 may each output instructions for displaying via display 102 one or more graphical elements (e.g., buttons, icons, pictures, text boxes, menus, thumbnails, scroll bars, hyperlinks, etc.). OS 108 and application may each modify graphical elements by, for example, rearranging, repositioning, resizing, replacing, removing, the graphical elements. Thus, although described here as being performed by OS 108, the techniques of this disclosure may be performed at least in part by application 110.

In general, OS 108 may output instructions for displaying via display 102 a graphical element of a clock 112 that indicates a time of day. Clock 112 may resemble an analog clock including a second hand 114, a minute hand 116, an hour hand 118, etc. Clock 112 may be sized and positioned such that the entirety of clock 112 is visible on display 102. Accordingly, a radius of clock 112 may be 50% or less of L1 of display 102. Displaying the entirety of clock 112 on display 102 may constrain the maximum size of clock 112, potentially causing clock 112 to be undesirably small and a considerable portion of display 102 to be unutilized. In addition, maintaining a size and position of clock 112 may render clock 112 less visually appealing to a user of computing device 100.

In accordance with techniques of this disclosure, OS 108 may output instructions for displaying clock 212A-212C (collectively, “clock 212”), shown in FIGS. 2A-2C, below, that dynamically changes size and/or position at least in part based on the time of day. Rather than display the entirety of clock 212, display 102 may display only a portion of clock 212 but at a larger scale, allowing for OS 108 to size and resize a radius of clock 212 beyond 50% of L1 of display 102. To ensure that clock 212 still effectively indicates the time of day to a user of computing device 100, OS 108 may position and reposition clock 212 such that display 102 always displays the entirety of a minute hand 216A-216C (collectively, “minute hand 216”) and the entirety of an hour hand 218A-218C (collectively, “hour hand 218”) of clock 212. OS 108 may optionally reposition clock 212 such that display 102 also always displays the entirety of a second hand 214A-214C (collectively, “second hand 214”). In this way, clock 212 may occupy more of display 102, and the appearance of clock 212 may be more visually appealing to a user of computing device 100, thereby potentially improving the user experience of computing device 100.

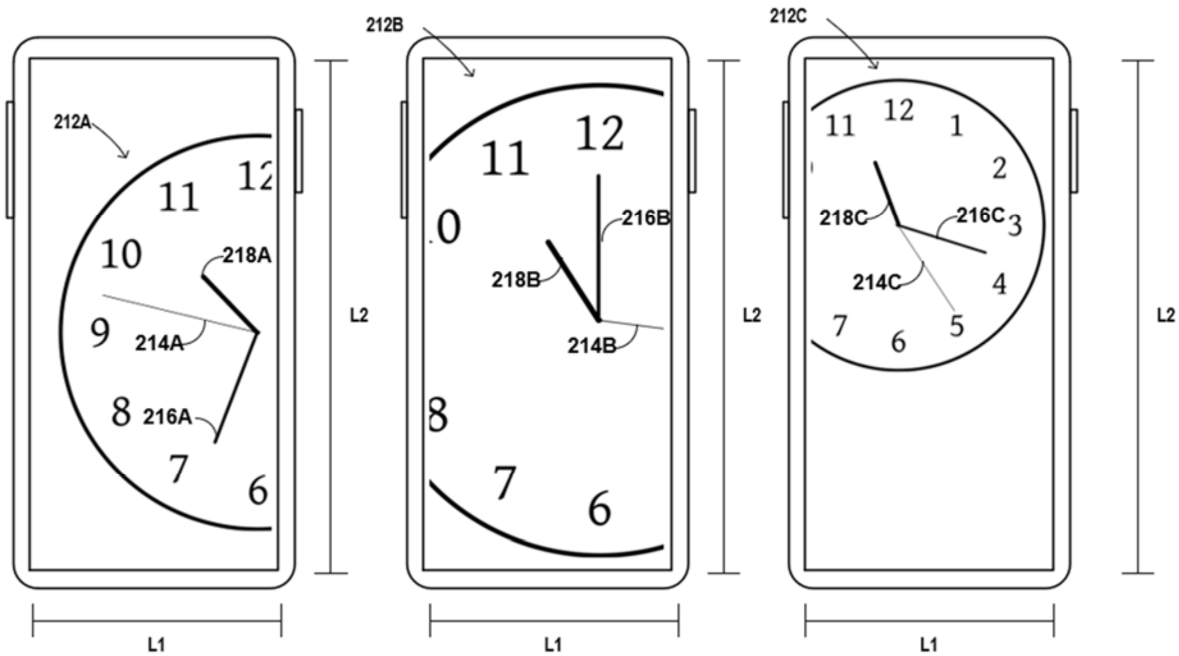

FIG. 2A **FIG. 2B** **FIG. 2C**

FIG. 2A is a conceptual diagram illustrating, for purposes of this disclosure, an initial size and position of clock 212, specifically clock 212A. OS 108 may size clock 212A such that only a portion of clock 212A is visible on display 102. For example, as shown in FIG. 2A, OS 108 may size clock 212A such that a radius of clock 212A is approximately 80% of L1 of computing device 100. Therefore, in this example, a diameter of clock 212A is approximately 160% of L1, resulting in display 102 not displaying the entirety of clock 212A. In some examples, OS 108 may randomly select the exact size of radius of clock 212A from a range of sizes (e.g., 50% of L1 to 150% of L1).

OS 108 may position clock 212A based on various factors, including, but not limited to, the positions of minute hand 216 and hour hand 218 relative to clock 212, both of which are a function of the time of day. For example, as shown in FIG. 2A, clock 212A indicates that the time of day is about 10:35 AM/PM. As the appearance of clock 212A corresponds to that of an analog clock, the positions of minute hand 216A and hour hand 218A are on a left side of clock 212A. Thus, OS 108 may output instructions for displaying clock 212A on a right side of computing device 100 (when oriented in the manner shown in FIG. 2A) to facilitate displaying the entirety of minute hand 216A and hour hand 218A. In some examples, OS 108 may randomly select the exact position of clock 212A while satisfying the constraint that display 102 always displays the entirety of minute hand 216A and the entirety of hour hand 218A (and optionally the entirety of second hand 214A).

FIG. 2B is a conceptual diagram illustrating a subsequent size and position of clock 212, specifically clock 212B. OS 108 may output instructions for the size and/or position of clock 212B to be different from the size and/or position of clock 212A. For example, as shown in FIG. 2B, a radius of clock 212B may be approximately 100% of L1, and a position of clock 212B may be substantially centered such that the positions of minute hand 216B and hour hand 218B (which correspond to a time of day of 11:00 AM/PM) are visible on display 102 while the entirely of second hand 214B is not visible on display 102. Although not shown in FIG. 2B, as time passes, second hand 214B may move such that at various instances the entirety of second hand 214B becomes fully visible on display 102. In some examples, OS 108 may gradually change the size and position of clock 212A to the size and/or position of clock 212B such that the change is basically imperceptible to a user of computing device 100. For example, between 10:35 AM/PM and 11:00 AM/PM, OS 108 may progressively (e.g., every second in small amounts) increase the size of clock 212A and move the position of clock 212A left until the size and position of clock 212A are the same as those of clock 212B. The progression may be according to a predetermined algorithm and in some cases may include some randomness (e.g., be based at least in part on randomly generated numeric values) such that the transition from the size and position of clock 212A to those of clock 212B is not completely predictable by a user of computing device 100.

FIG. 2C is a conceptual diagram illustrating, for purposes of this disclosure, a final size and position of clock 212, specifically clock 212C. As discussed with respect to FIG. 2B, OS 108 may output instructions for the size and/or position of clock 212C to be different from the size and/or position of clock 212B. For example, as shown in FIG. 2C, a radius of clock 212B may be approximately 60% of L1, and OS 108 may output instructions for displaying clock 212C on a left side of computing device to facilitate displaying the entirety of minute hand 216C and hour hand 218C (which correspond to a time of day of approximately 11:20 AM/PM). As described above, OS 108 may gradually change the size and position of clock 212B to the size and/or position of clock 212C such that the change is basically imperceptible to a user of computing device 100. For example, between 11:00 AM/PM and 11:20 AM/PM, OS 108 may progressively decrease the size of clock 212B and move the position of clock 212C left until the size and position of clock 212B are the same as those of clock 212C.

It is noted that the techniques of this disclosure may be combined with any other suitable technique or combination of techniques. As one example, the techniques of this disclosure may be combined with the techniques described in U.S. Patent Application Publication No. 2020/0379413A1. In another example, the techniques of this disclosure may be combined with the techniques described in U.S. Patent Application Publication No. 2015/0355830A1. In yet another example, the techniques of this disclosure may be combined with the techniques described in 2007/0214431A1.