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Triggering an Accessibility Mode on a Mobile Device Through User Input to a Fingerprint Sensor

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Abstract:

This publication describes techniques for triggering an accessibility mode (*e.g.*, one-handed mode) on a mobile device using a fingerprint sensor located on the back of the mobile device. In described techniques, a user provides input to the fingerprint sensor to trigger the accessibility mode, for example, by swiping the index finger of the user diagonally across the fingerprint sensor. Upon triggering the accessibility mode, one or more aspects of the graphical user interface of the display screen are resized and/or located to a position more accessible to the thumb of the user's hand that is holding the mobile device, enabling improved one-handed operation of the mobile device for the user.

Keywords:

one-handed mode, one-handed access, accessibility mode, accessible, mobile device, mobile phone, fingerprint sensor, graphic user interface, GUI, resize, move, trigger, gesture, input

Background:

Mobile phones are increasingly utilized as a primary means for displaying media content (*e.g.*, videos) and other entertainment content (*e.g.*, mobile gaming). As a result of this type of use, consumer demand for mobile phones with larger display screens has greatly increased in recent years. So much so, that the lines between what is a mobile phone and what is a tablet

computer has been blurred, resulting in a new class of devices frequently referred to as "phablet" devices (a portmanteau of the words "phone" and "tablet").

Many users prefer to, at least occasionally, operate their mobile phones in a one-handed mode. The user operates the mobile device with a thumb of the same hand used to hold the mobile device. For example, a user's thumb may be used to interact with the graphical user interface (GUI) of the mobile device.

By default, the GUI is scaled "full-screen." In one-handed mode on a mobile device with a large screen (*e.g.*, a phablet), it may be difficult for some users to touch certain graphical elements (*e.g.*, icons, buttons, search bars, on-screen keyboard keys, links, controls) on the display screen with their thumb, such as elements positioned on the distal side of the display screen. This is particularly true for users with smaller hands.

As a result of these physical limitations, some users avoid using their large screen mobile devices in one-handed mode. Other users may frequently need to adjust their grip on their mobile device as they operate the device in one-handed mode. For example, the user adjusts their grip on the mobile device to be able to provide input to the user interface of the device using their thumb or another finger. Such an adjustment to the one-handed grip of the mobile device may result in the mobile device slipping out of the user's hand.

Many mobile devices include settings supporting one-handed operation. For example, one manufacturer provides an accessibility mode that allows a user to trigger the mobile device to move the top portion of the GUI towards the bottom of the screen, enabling a user to more easily interact with GUI elements located at the top of the screen without repositioning their hand. In a second example, a second manufacturer provides an accessibility mode that allows a user to

provide input on the display screen that triggers the mobile device to adjust the display size and layout, resizing the GUI towards one of the lower corners of the screen of the mobile device.

It is desirable to enable an alternate method of triggering an accessibility mode (*e.g.*, one-handed mode) on a mobile device.

Description:

This publication describes techniques for triggering an accessibility mode on a mobile device using a fingerprint sensor. Specifically, the techniques allow a user to provide input via a fingerprint sensor located on the back of the mobile device, the input triggering the mobile device to adjust the display size and/or layout of the GUI, resulting in a resizing of the GUI towards one of the lower corners of the screen of the mobile device.

The term "mobile device," as used in this disclosure, refers to a portable device that has both computational and communication capabilities (*e.g.*, portable telecommunication device, wireless-communication device, mobile phone, smartphone, computing device, camera, tablet computer, laptop computer, smart watches, intelligent glasses, and so forth). The mobile device illustrated in FIG. 1 is a mobile phone.

FIG. 1 is a plan view of a mobile device (10) having a display screen (12), illustrating the display screen in a default full-screen mode. The display screen is located on a front side of the mobile device. The display screen displays a graphical user interface (GUI) that enables a user to interact with the mobile device. The mobile device includes a biometric sensor device (*e.g.*, a fingerprint sensor) for capturing a digital image of a fingerprint pattern. The fingerprint pattern may be utilized to authenticate a user of the mobile device. The fingerprint sensor (20) is located on the back side of the mobile device and is illustrated in broken lines.

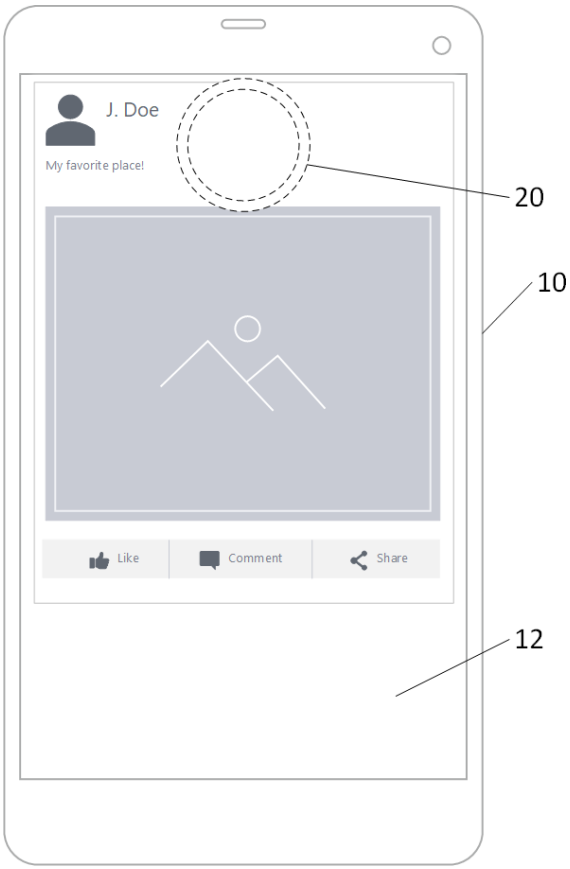

FIG. 1

The mobile device further includes a processor and a computer-readable medium (CRM). The CRM includes an accessibility manager application. The mobile device performs operations under the direction of the accessibility manager application to enable an accessibility mode (*e.g.*, one-handed operation mode) on the mobile device. For example, by resizing and/or relocating one or more aspects of the GUI displayed on the display screen.

The operations performed under direction of the accessibility manager application include receiving input from a user, determining an intent to switch to the accessibility mode, and, in response, switching to the accessibility mode. The operation of receiving input from a user can include the fingerprint sensor detecting input from a user. For example, detecting that the user has provided an input (*e.g.*, tap, double tap, swipe, short press, long press, and the like) to the fingerprint sensor while the mobile device is in an unlocked state. The operation of determining

an intent (trigger) to switch to the accessibility mode can include detecting a specific input from the user on the fingerprint sensor, such as a diagonal swipe gesture or other specific gesture. The operation of entering the accessibility mode can include resizing and/or relocating one or more aspects of the GUI displayed on the display screen. For example, resizing the user interface by fifty percent (50%) horizontally and vertically and moving the displayed user interface to a bottom corner of the display screen.

FIG. 2 illustrates a right-handed operation of the mobile device. The mobile device could alternatively, or additionally, be configured for a left-handed operation. A left-handed operation would be a mirror image of the right-handed operation illustrated in FIG. 2.

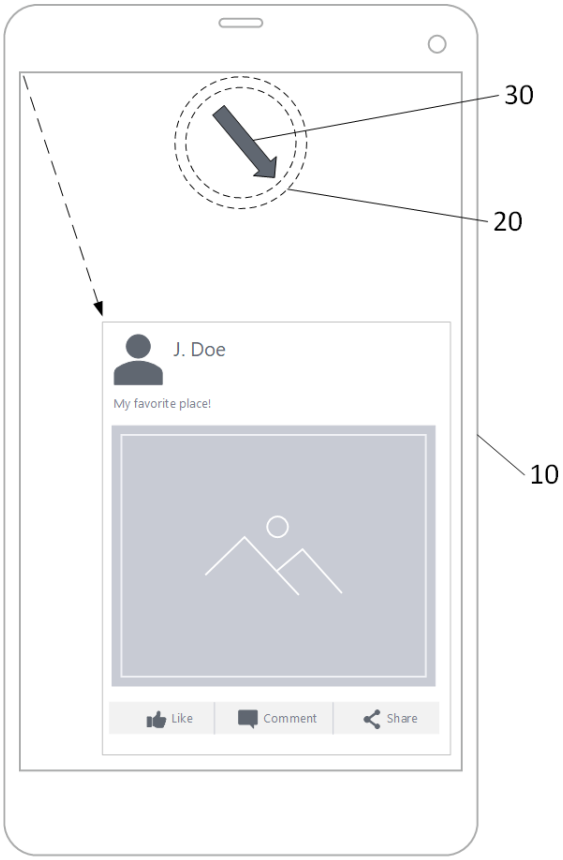

FIG. 2

In aspects, an input is made by a finger (*e.g.*, index finger) of the user swiping (as viewed from the view of FIG. 2) from the upper left portion of the fingerprint sensor to the bottom right

portion of the fingerprint sensor, as represented by direction arrow (30) in FIG. 2. In the aspect illustrated in FIG. 2, the mobile device has entered the accessibility mode and the entire screen has been resized to a position more convenient for the user. For example, towards the bottom right corner of the display screen when the mobile device is being held in the right hand of a user.

Input to the fingerprint sensor can move the display between a full-screen mode where the displayed user interface is larger and an accessibility mode where the displayed user interface is smaller. In the accessibility mode, one or more elements (ideally the entire screen) of the GUI are resized and/or located to a position more accessible to the user's thumb, resulting in improved one-handed operation of the mobile device for the user.

In aspects, after the user provides input to the GUI that triggers the mobile device to enter the accessibility mode, the user interface automatically switches out of the accessibility mode and back into the default full-screen mode. In other aspects, the user interface stays in the accessibility mode until the user provides a further input cancelling the accessibility mode. For example, where the user provides swipe input to the fingerprint sensor in an opposite direction.

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