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Switching Handedness of One-Handed Typing Operation of an On-Screen Keyboard

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Switching Handedness of One-Handed Typing Operation of an On-Screen Keyboard

Abstract:

This publication describes techniques for triggering changes to the display of an on-screen keyboard on a display screen of a mobile device, for example, a foldable mobile device or tablet. The foldable mobile device can be operated via the main display screen with two hands and the mobile device open flat. A user may desire to quickly switch handedness of an on-screen keyboard displayed on the display screen between left side and right side of the display screen. The techniques allow a user to provide input that triggers the mobile device to reposition the on-screen keyboard for one-handed typing operation on either side of the display screen of the mobile device. The user may utilize a summon command that corresponds to a gesture detected on the opposite side of the display screen to trigger repositioning of the on-screen keyboard. The user may utilize a pass command that corresponds to a gesture detected on the same side of the display screen to trigger repositioning of the on-screen keyboard. The user may adjust the height of the on-screen keyboard, adjust the width of the on-screen keyboard, or choose to duplicate the on-screen keyboard on both the left-hand side and the right-hand side of the mobile device.

Keywords:

one-handed typing, handedness, accessibility mode, mobile device, foldable, mobile phone, flat open, on-screen keyboard, graphical user interface, GUI, keyboard key, gesture, trigger, switch, swipe, dominant hand, summon command, pass command, duplicate

Background:

Users increasingly use mobile devices (*e.g.*, smartphones) as a primary means for displaying entertainment content. As a result of this type of use, consumer demand for mobile devices with larger display screens has greatly increased in recent years, resulting in a market for foldable mobile devices and tablets. Foldable mobile devices include a large foldable display screen configured to allow the device to fold in half for increased portability, while offering an option for a large display screen with the device open flat. The display screen may "fold in" on itself or "fold out." Tablet devices include a fixed large main display screen.

When a foldable display screen is operating in a large display mode with the mobile device open flat, by default, a graphical user interface (GUI) may be scaled "full-screen." In a full-screen configuration, graphical elements of the GUI, for example an on-screen keyboard, may scale to the width of the display screen. This configuration often requires a user to provide keyboard input with both hands. On a foldable mobile device, the on-screen keyboard may be displayed with a split middle, so that no keyboard keys are located at the center of the display screen. In this configuration, there is an increased cognitive load on the user due to the user shifting their gaze between both sides of the keyboard to provide input and the content input field. This may slow input speed. Additionally, users often operate a mobile device using their thumb(s) to provide input. User input provided at the edges of a display screen may be less accurate due to limitations of the range of motion of the thumb.

Many users prefer to, at least occasionally, operate their mobile devices in a one-handed mode. In 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 may use their thumb to interact with an on-screen keyboard of the mobile device. Due to variance in hand size, users may frequently need to

adjust their grip on their mobile device as they operate the device in one-handed mode to reach keyboard keys positioned higher or lower on the display screen and/or near the fold. Additionally, a user may prefer to switch quickly between dominant and non-dominant hands to operate their device in a one-handed mode.

It is desirable to provide customization of an on-screen keyboard displayed on a GUI of a foldable mobile device for one-handed operation to improve the input speed on the on-screen keyboard and create a better user experience.

Description:

This publication describes techniques for triggering changes to an on-screen keyboard displayed on a GUI of a foldable mobile device for one-handed operation. Specifically, the techniques allow a user to provide input via a gesture, the input triggering the mobile device to adjust the orientation of the on-screen keyboard for one-handed operation on a selected side of the display screen of the mobile device.

The term "mobile device," as used in this disclosure, refers to a portable device that has both computation and communication capabilities. A mobile device may be foldable with a foldable display screen that may operate in large display mode with the device open flat. The mobile device includes touch-capabilities on the display screen that can recognize input. The mobile device further includes a processor and computer-readable media (CRM). The CRM includes a gesture recognition application. The mobile device performs operations under the direction of the gesture recognition application to enable an accessibility mode (*e.g.*, switch the handedness of one-handed operation mode) on the mobile device. For example, the device may relocate one or more aspects of the on-screen keyboard displayed on the display screen.

The operations performed under the direction of the gesture recognition application include receiving input from a user, determining an intent to switch to the accessibility mode, and, in response, switching to the accessibility mode, resulting in the display screen switching the handedness of the on-screen keyboard. The operation of receiving input from a user can include a detected input from a user. For example, detecting that the user has provided an input (*e.g.*, double-tap gesture) to an edge of the display screen that may be associated with a summon command. The summon command can switch the handedness of the mobile device and reposition an on-screen keyboard to the side of the display screen that received the input. The operation of determining an intent to switch the handedness of the mobile device includes recognition of a specific input, like a double-tap gesture, along with consideration of which side of the display screen the on-screen keyboard is currently displayed. Figure 1 illustrates a summon command on a mobile device that switches the handedness of the on-screen keyboard from the left-hand side of the display screen to the right-hand side of the display screen.

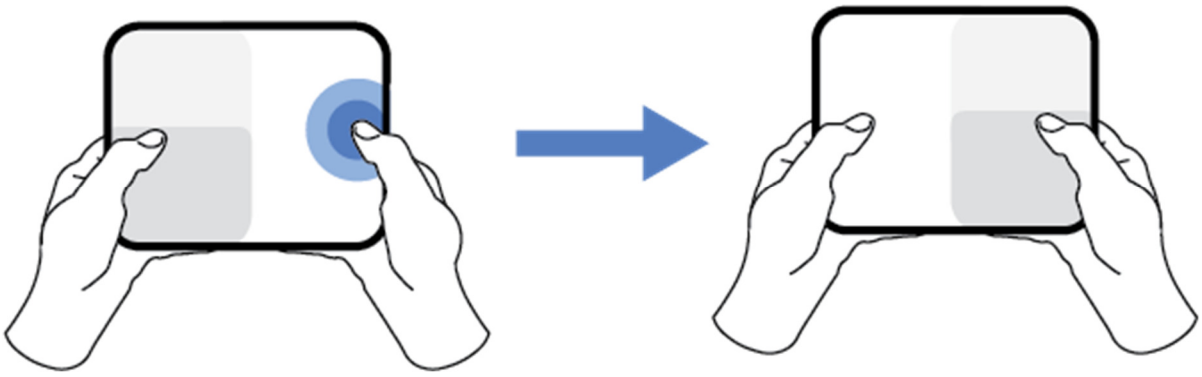

Figure 1

Figure 1 illustrates the on-screen keyboard as the darkest shaded area of the display. Since many users prefer to use their thumbs to provide input to display screens of mobile devices, the input graphics areas can be located in an area with adequate access for the left thumb in left-hand operation and for the right thumb in right-hand operation.

In another example, detected input from a user may be a finger swipe gesture that may be associated with a pass command. The pass command can switch the handedness of the mobile device and reposition the on-screen keyboard on the opposite side of the display screen that received the input. The operation of determining an intent to switch the handedness of the mobile device includes recognition of a specific input, like a swipe gesture, along with consideration of which side the on-screen keyboard is currently displayed. A swipe is a small, continuous line or arc gesture made on the display screen. Figure 2 illustrates a pass command on a mobile device that switches the handedness of an on-screen keyboard from the left-hand side to the right-hand side.

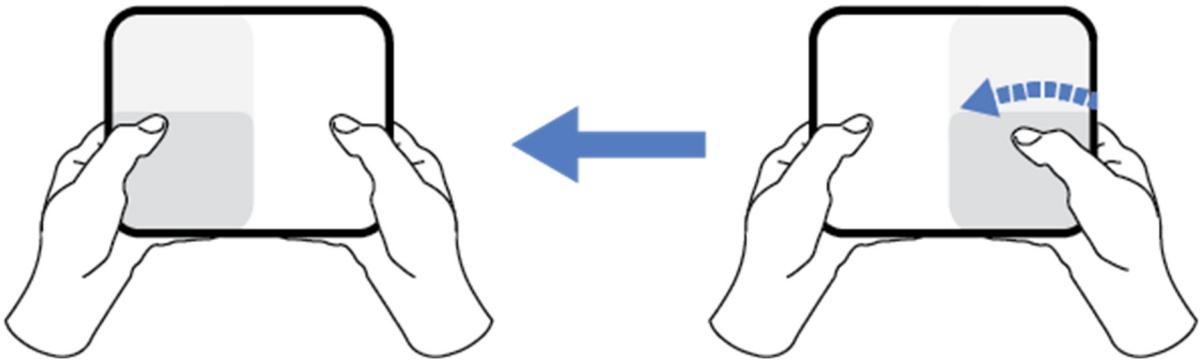

Figure 2

In aspects, a user makes an input using a finger (*e.g.*, thumb), as illustrated in Figure 1 and Figure 2. However, other inputs (*e.g.*, stylus touch-based input, tilt-gesture input, shake input, etc.) can provide input. For example, the user may tilt the device to the side she wants the keyboard to reposition to, and the tilt (tilt-gesture input) may be detected by sensors such as an accelerometer. The default configuration when a user expands their mobile device in an open flat configuration can be a one-handed on-screen keyboard positioned for single-thumb input.

The mobile device can offer additional customization in addition to handedness and can enable the user to adjust the height and/or the width of an on-screen keyboard. A user can click-

and-drag the on-screen keyboard or stretch the on-screen keyboard to a desired size. The mobile device can duplicate the on-screen keyboard for left-thumb and right-thumb operation. Duplicate on-screen keyboards can be desirable on foldable mobile devices with large display screens.

A mobile device can position its graphical elements of the GUI (*e.g.*, keyboard keys of an on-screen keyboard) according to a user's preference by learning previous input configurations (*e.g.*, left/right, keyboard height, keyboard width) over time. The mobile device can enable one-handed operation with the user's preferences as the default configuration when the mobile device is in an open flat orientation.

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