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Automatically Switching to a Rear-Facing, Wide-Angle Camera When Entering Rear Camera Selfie Mode on a Foldable Mobile Device

Abstract:

This publication describes techniques directed at automatically switching to a rear-facing, wide-angle camera when a user utilizes a “rear selfie mode” on a foldable mobile device (e.g., foldable smartphone). Rear selfie mode and similar modes allow users to take self-portrait photographs (“selfies”) using the rear-facing camera on a foldable mobile device. Foldable mobile devices may utilize a camera with a standard lens by default when the rear selfie mode is entered. Selfies have a limited field of view due to a short camera distance from the user, so a wide-angle camera is desirable when taking selfies. Switching to a wide-angle camera often takes the user several steps, causing a potential photo opportunity to be missed and may cause frustration for the user. If a foldable mobile device is configured to automatically switch to a wide-angle camera upon entering a rear selfie mode, users would be able to capture more subjects and objects without taking unneeded time switching to the wide-angle camera themselves.

Keywords:

Foldable phone, mobile phone, internal display, external display, inner display, outer display, photograph, portrait, selfie, wide-angle camera, ultra-wide camera, camera sensor

Background:

Self-portrait photographs (“selfies”) are a popular type of photograph that feature the photo-taker (user) and other subjects the user puts in the frame of the scene. Selfies are generally taken using a mobile computing device (“mobile device”) held in the hand of a user, limiting the field of view of the scene. This limitation also limits the number of individuals, and background objects that can be featured in a photo of the scene.

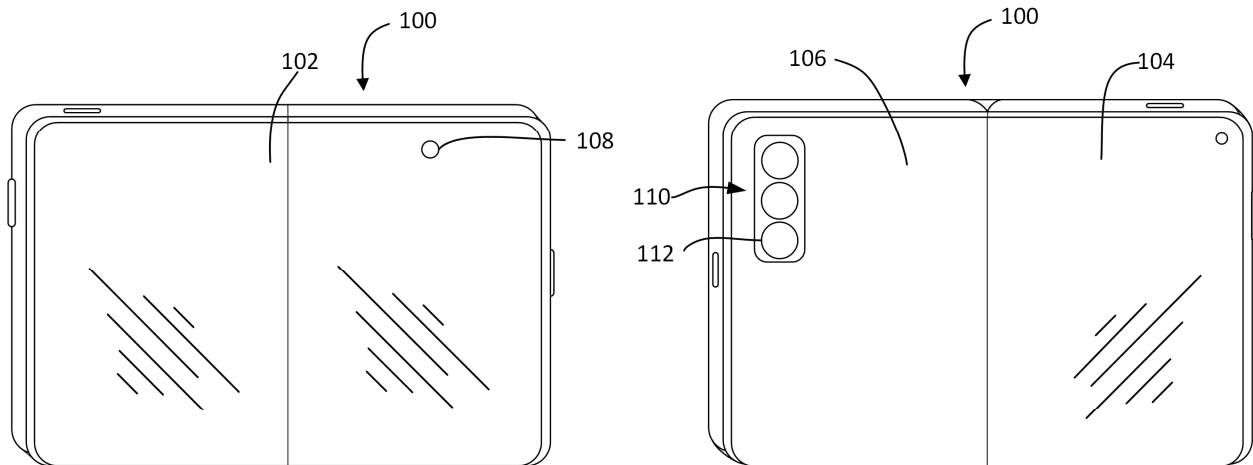
Foldable mobile devices typically have a first side that includes a front-facing camera with a standard lens, as well as a second side that may include multiple rear-facing cameras (e.g., a camera with a standard lens, a camera with a telephoto lens, a camera with a wide-angle lens (a “wide-angle camera”). Foldable mobile devices typically include an option (e.g., “rear selfie mode,” “rear camera selfie”) to take selfies using one of the rear-facing cameras while using the display on the outside to see a preview of the image to be taken. The rear selfie mode may allow the user to take a better selfie than they could using a front-facing camera; however, the foldable phone may utilize a camera with a standard lens by default when the rear selfie mode is entered. In such a case, if the user desires utilization of a rear-facing wide-angle camera of the foldable phone for the rear camera selfie, the user needs to make a selection on the user interface of the foldable phone to switch camera modes. The complexity of such an action can take the user some time and may involve several steps, potentially resulting in the user missing a photo opportunity.

Description:

This publication describes techniques directed at automatically switching to a rear-facing, wide-angle camera when a user selects a “rear selfie mode” on a foldable mobile device. A foldable mobile device, for example, a foldable smartphone or tablet (herein “foldable phone”), is

a computing device that includes at least one foldable display. While the foldable phone illustrated in FIG. 1-1 and FIG. 1-2 below is a foldable smartphone, other types of foldable mobile devices and computing devices with displays on opposite sides can also support the techniques and systems described in this publication.

Foldable phones may be utilized in folded, unfolded, and partially folded positions. The foldable phone 100 illustrated in FIG. 1-1 and FIG. 1-2 is illustrated in an unfolded position. The foldable phone 100 includes an internal foldable display 102 (inner display), an external display 104 (outer display), a cover 106, one or more front-facing cameras 108, and a camera cluster 110 of rear-facing cameras. The camera cluster 110 of rear-facing cameras includes a wide-angle camera 112.

**FIG. 1-1****FIG. 1-2**

The internal foldable display 102 may be utilized when the foldable phone 100 is in an unfolded or partially folded position. The internal foldable display 102 may be the primary display or the display most frequently used to perform functions and tasks by the user. The external display 104 may be utilized when the foldable phone is in the folded or unfolded position and may provide access to images and widgets (e.g., camera, a clock, caller ID information).

A foldable phone includes a processor, sensors (e.g., cameras), and a computer-readable medium (CRM) including device data (e.g., multimedia data, an operating system, applications). The device data may include a Rear Selfie Mode Manager for automatically switching to the rear-facing, wide-angle camera when a user selects a rear selfie mode. The Rear Selfie Mode Manager may be part of the operating system executing on the foldable phone. In other aspects, the Rear Selfie Mode Manager may be a separate component (e.g., an application) executing within an application environment or “framework” provided by the operating system.

The device data may include instructions that, responsive to execution by the processor, cause the processor to perform operations described within this document. The processor may perform operations under the direction of the Rear Selfie Mode Manager to, responsive to detecting that the foldable phone is in the rear selfie mode, automatically switch to the rear-facing, wide-angle camera. In doing so, a user, taking a selfie in the rear selfie mode, may have a larger frame to capture a scene.

In aspects, the operations include the Rear Selfie Mode Manager of the foldable phone receiving input from a user indicating the selection of the rear selfie mode. For example, the input received from the user to select the rear selfie mode may include the user pressing a physical button along the edge of the foldable phone. In other aspects, the user may provide input on a user interface, for example, by swiping across the display or pressing a toggle on the display (e.g., switching camera modes) to select the rear selfie mode. The Rear Selfie Mode Manager may start an inactivity timer upon receiving input from the user indicating the selection of the rear selfie mode and upon expiration of the inactivity timer, disable the rear selfie mode and/or time out the display.

The operations may further include, responsive to receiving input from the user indicating the selection of the rear selfie mode, the foldable phone enters the rear selfie mode. In entering rear selfie mode, the Rear Selfie Mode Manager may configure the foldable phone for the rear selfie mode. For example, by one or more of turning OFF the front facing camera, turning ON the wide-angle camera, turning OFF the internal foldable display, and turning ON the external display.

In aspects, the operations may include the foldable phone providing feedback to the user. Such feedback may include providing audio feedback, providing haptic feedback, providing a notification on a display of the device, or other feedback. In an aspect, the Rear Selfie Mode Manager triggers the display of a prompt on the internal foldable display directing the user to turn the foldable phone around so the external display and rear-facing wide-angle camera faces the user. In another aspect, the Rear Selfie Mode Manager turns OFF the internal foldable display and/or turns ON the external display when the foldable phone enters the rear selfie mode as a prompt for the user to turn the foldable phone around. For example, a user, switching to the rear selfie mode, might be notified that rear selfie mode has been activated through the internal foldable display turning OFF and the external display ON. This feedback would indicate to the user to turn the foldable phone around to view the external display and utilize the rear selfie mode.

The Rear Selfie Mode Manager may also receive input from the user indicating the deselection of the rear selfie mode. For example, the user may exit the rear selfie mode by pressing a toggle (e.g., switching camera modes), folding the foldable phone, powering OFF the foldable phone, or otherwise leaving the intermediary screen (e.g., exiting the camera application). Responsive to determining that the user has deselected rear selfie mode, the Rear Selfie Mode Manager may configure the foldable phone accordingly.

In an example scenario, Jacob is on a trip with his wife and their four children. Jacob has a foldable smartphone capable of a rear selfie mode. Attempting to take a selfie with his family in front of a scenic view, Jacob provides input on the internal folding display of the smartphone that opens a camera application, and then presses a toggle to switch to the rear selfie mode. Text appears on the internal display, prompting him to turn the smartphone around so the external display and rear-facing, wide-angle camera faces him and his family. Because rear selfie mode is active, the Rear Selfie Mode Manager automatically activates the rear-facing, wide-angle camera for use. Jacob can then take a selfie, ensuring every member of his family is in the frame and the scenic view is also visible. Using the external display, Jacob can exit the camera application and view his photos on the internal folding display.

References:

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