October 10, 2019

Classifying and Separating Messages, Alerts, and Notifications

Yameng Lee Thorp

Hideaki Matsui

Classifying and Separating Messages, Alerts, and Notifications

Abstract:

This publication describes techniques and apparatuses that allow a user to classify messages, alerts, and/or notifications based on their significance to the user and allow the user to separate them to be displayed in a first or a second part of a display screen of a smartphone. A machine-learned (ML) model aids the user by classifying and separating messages, alerts, and/or notifications of little or significant interest. By doing so, the user can better-manage their amount of time the user spends in front of the display screen of the smartphone and the user can utilize their smartphone more effectively.

Keywords:

Sort, segregate, classify, notification, message, alert, short message service, SMS, smartphone, mobile phone, mobile device, user equipment, tablet, personal digital assistant, PDA, motion, swipe, foldable display, foldable device, machine learning, ML, artificial intelligence, AI.

Background:

User equipment (UE) are a ubiquitous part of modern life, and their beneficial role in humanity is undeniable. Early UE were often standalone (not networked), lacked the modern user interface (UI), and offered a different user experience from the modern UE; a user experience in which the user was mainly engaged in a single activity. Also, users were often engineers, scientists, mathematicians, and other technical professionals, who often used UE to carry out specific work-related tasks.

In modern times, user interaction with UE has changed. UE are not just tools for technical professionals. Worldwide, over two billion people use a UE, such as a smartphone, daily. The smartphone's UI enables a user with ordinary technical skills to carry out complex tasks with relative ease. Figure 1 illustrates a smartphone that is networked and capable of offering the user an impressive user experience in a variety of tasks.

Figure 1

Figure 1 illustrates a user's smartphone. Assume the user has not used their smartphone in three hours. The smartphone routes incoming calls, alerts, and notifications directly to its history. As illustrated in Figure 1, in just three hours, the user's smartphone notified them on bank transactions, various social media posts, news, task reminders, notifications, and missed calls.

Due to extensive networking and more-sophisticated UI, the UE's user experience has increasingly become more aggressive. Extensive networking is one of the reasons the modern user

spends an alarming amount of time in front of a screen display, and not all of it is productive or healthy. Modern users are constantly using smartphones, using computers, watching television, and performing other activities that involve a UE with a screen display. The Pew Research Center has reported the following statistics on UE usage by Americans:

- 77% go online daily interacting on social networking sites;
- More than 25% report being online "almost constantly;" and
- 46% of adults report that they "could not live" without their smartphone.

The UE's constant output of phone calls, messages, alerts, and notifications from various sources, such as email accounts, social media accounts, application software, and an operating system of the UE (*e.g.*, battery level, signal strength) is increasingly influencing human behavior and social interaction. Self-disclosure and responsiveness are human psychological adaptations that enhance human survival because they build trust and increase cooperation. Nevertheless, by being constantly online, these valuable human psychological traits are starting to inhibit our ability to communicate and cooperate with family members, friends, coworkers, and other human beings. Similar to the human desire for sweet-tasting food, what was beneficial for our ancestors has become an obstacle for our well-being. Modern humans do not lack the willpower of our ancestors, but we constantly face triggers that our ancestors did not face.

Given that we understand one of the problems, it is desirable to have a technological solution that can help the user regain control of their user experience with the UE and still enjoy the benefits of modern technology.

Description:

This publication describes techniques and apparatuses for a user equipment (UE), such as a smartphone, that enable a user to classify and separate messages, notices, and/or alerts, collectively "notifications," from various sources, such as email accounts, social media accounts, application software, and an operating system (OS) of the UE (*e.g.*, battery level, signal strength, OS update). The UE may be foldable or non-foldable, as is illustrated in Figure 2A, Figure 2B, and Figure 2C.

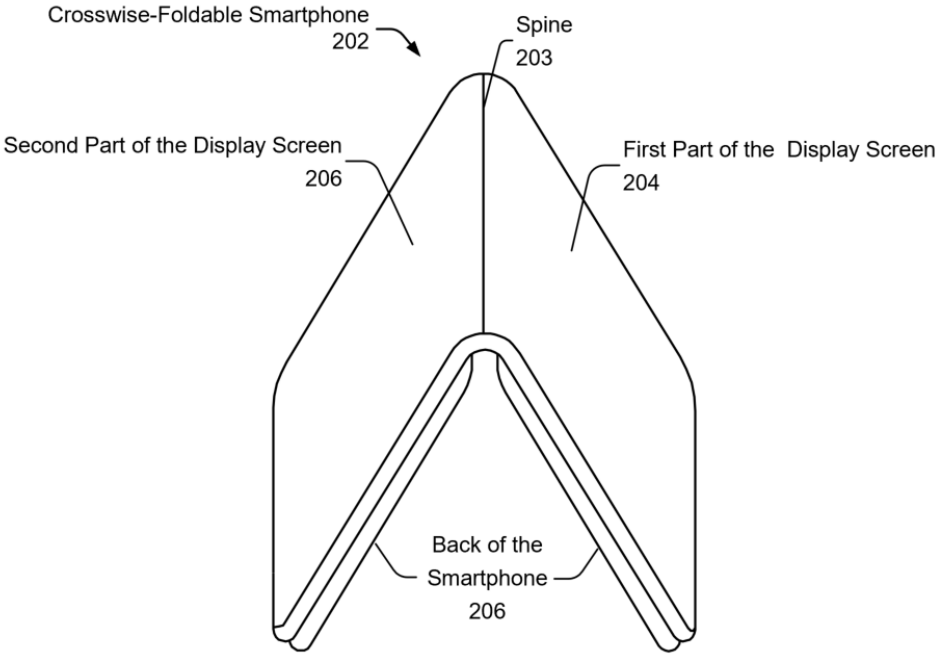

Figure 2A

Figure 2A illustrates a crosswise-foldable smartphone 202 (smartphone 202) that includes a first part of a display screen 204, a second part of the display screen 206, a spine 203 located between the first (204) and the second (206) part of the display screen of the smartphone 202, and a back of the smartphone 206. The spine 203 resembles a spine of a closed hardback book, and the smartphone 202 can display information on the first part (204), the second part (206), and the spine 203 of the display screen. A user may fold the smartphone 202 halfway (illustrated in Figure

2A) and still be able to view information on any part of the display screen (*e.g.*, 203, 204, and 206). Also, the user may completely fold down (not illustrated in Figure 2A) or fold up (not illustrated in Figure 2A) and still be able to view information on any part of the display screen (*e.g.*, 203, 204, and 206).

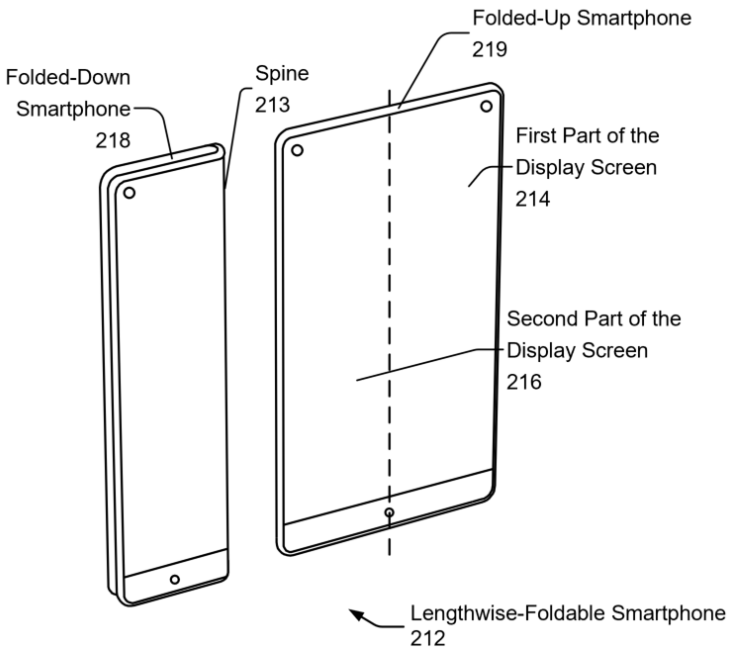

Figure 2B

Figure 2B illustrates a lengthwise-foldable smartphone 212 (smartphone 212) that includes a first part of a display screen 214, a second part of the display screen 216, a spine 213 located between the first (214) and the second (216) part of the display screen of the smartphone 212, and a back of the smartphone (not illustrated). The smartphone 212 can display information on the first part (214), the second part (216), and the spine 213 of the display screen. Similar to the example in Figure 2A, the user may fold halfway (not illustrated in Figure 2B), may fold down (218), or may fold up (219), the smartphone 212 and still be able to view information on any part of the display screen (*e.g.*, 213, 214, and 216).

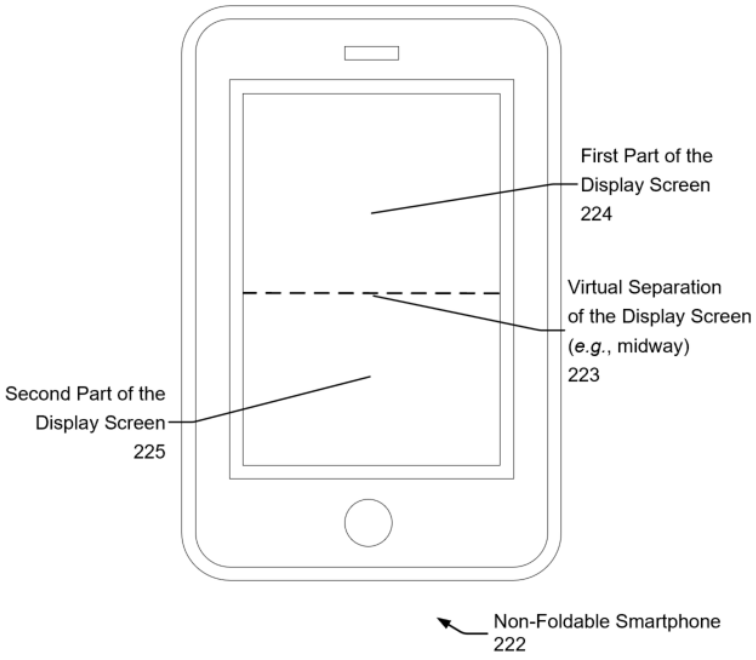

Figure 2C

Figure 2C illustrates a non-foldable smartphone 222 (smartphone 222). Although the smartphone 222 has one display screen and it is not foldable, the smartphone 222 can be considered as having a first part of the display screen 224, a second part of the display screen 225, and a virtual separation of the display screen 223 (*e.g.*, midway of the display screen). Note that the virtual separation of the display screen 223 is not visible to the user.

As the user receives notifications from various sources, they may find the notifications to be relevant (notification of significant interest) or irrelevant (notification of little interest). For example, when the user receives a social-media notification from a former college friend saying, "I am having coffee at *Café' X*," the user may find that notification to be irrelevant to their current life. In contrast, when the user receives a text message from their child saying, "I miss you!" the user finds that notification to be relevant to their current life.

Figure 3A illustrates a user utilizing a smartphone that folds similarly to the smartphone illustrated in Figure 2A (crosswise-foldable smartphone) and the user receiving a notification of little interest to the user.

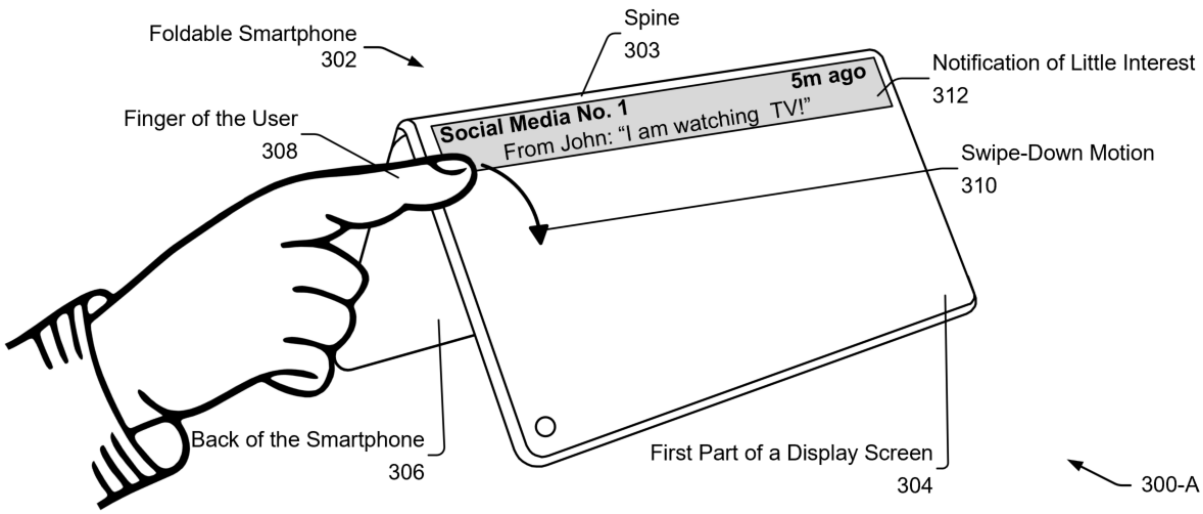

Figure 3A

Figure 3A is an example environment 300-A that illustrates a user receiving a notification of little interest 312 (notification 312) on a first part of a display screen 304 of a crosswise-foldable smartphone 302 (smartphone 302). As illustrated, the user has set their smartphone 302 on a surface (not illustrated) and receives the notification 312 near the top of the first part of the display screen 304 of the smartphone 302. Using their finger 308, the user swipes down (swipe-down motion 310) with the intent to avoid reading the notification 312. As a result, the notification 312 moves to the bottom (not illustrated) of the first part of the display screen 304 of the smartphone 302. Thus, the user classifies and separates the notification 312 to the bottom of the first part of the display screen 304 of smartphone 302 and eventually removes the notification 312 to avoid reading it, responding to it, or taking any other action.

Depending on a user's preference, once the user classifies and separates notifications (*e.g.*, notification 312) by swiping down (310), the permanent removal of the notifications may be

immediate, after ten seconds, after ten minutes, after 30 minutes, after one hour, at a specified time of day (*e.g.*, 1:00 AM), and so forth. Also, the user may choose to provide another input, such as shaking the smartphone 302, pressing and holding a "power" or "activate" button (not illustrated), or manually removing the classified and separated notifications, by tapping anywhere on the bottom of the first part of the display screen 304.

Figure 3B illustrates the user receiving a notification of significant interest to the user.

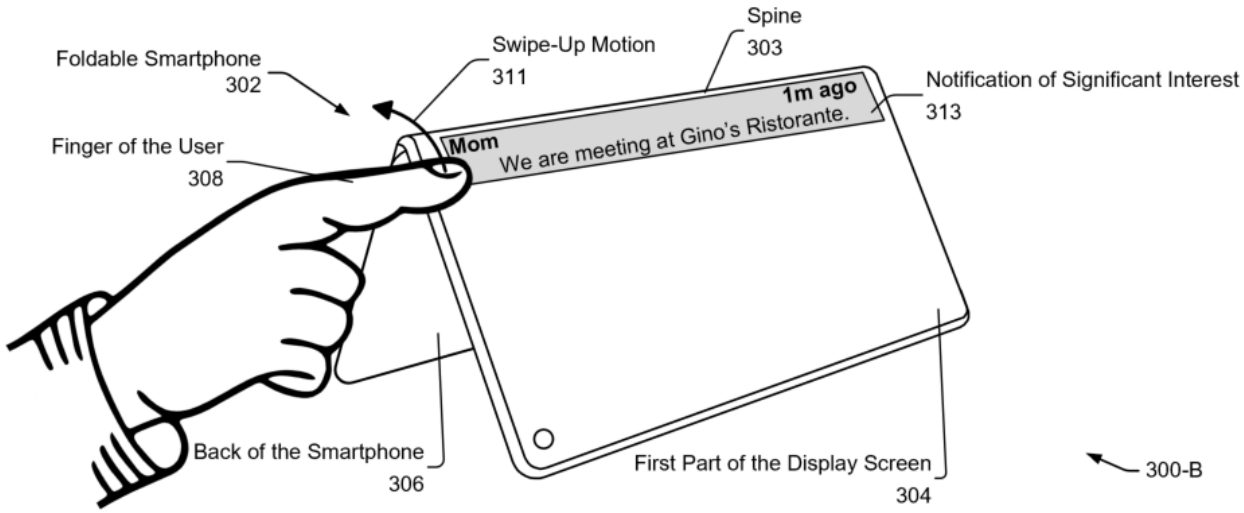

Figure 3B

Figure 3B is an example environment 300-B that illustrates the user receiving a notification of significant interest 313 (notification 313) on the first part of the display screen 304 of the foldable smartphone 302 (smartphone 302). Assume the user is currently in a meeting, and they receive a message from their mother (*e.g.*, notification 313). The message appears near the top of the first part of the display screen 304 of the smartphone 302. Using their finger 308, the user swipes up (swipe-up motion 311) the message with the intent to read or respond to the message later. As a result, the notification 313 moves to a second part of the display screen 305 (illustrated in Figure 3C) of the smartphone 302 and remains there for the user to read, respond, or take another action later.

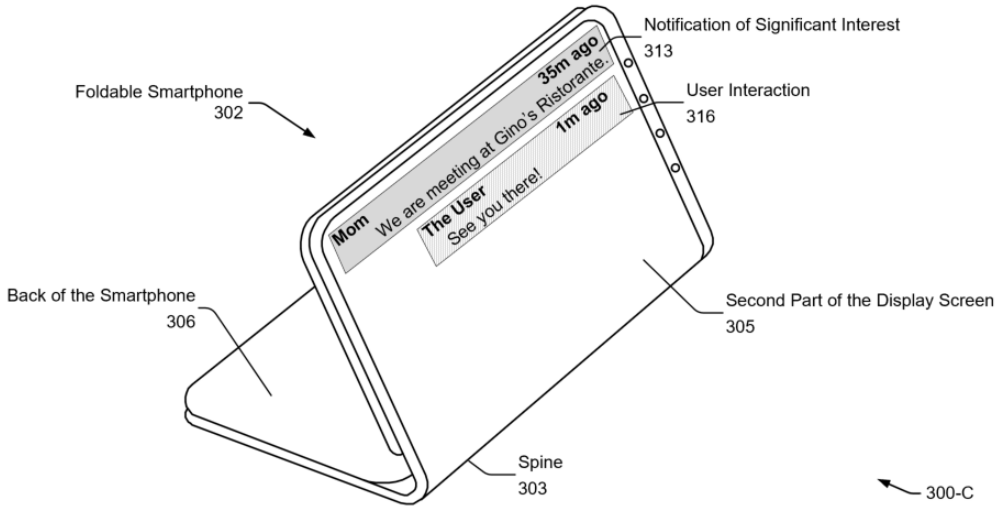

Figure 3C

Figure 3C is an example environment 300-C that illustrates the user reading, responding (*e.g.*, user interaction 316), or taking another action, to a previously classified and separated notification, such as the notification 313. Assume that 35 minutes have passed since the user received the message from their mother, saying "We are meeting at Gino's *Ristorante*." After that, the user may have chosen to completely fold down or fold up the smartphone 302, turn off the smartphone 302, kept the smartphone 302 turned on but facing the first part of the display screen 304, or kept the device turned on but facing the second part of the display screen 305. The message from their mother stays or is re-displayed on the second part of the display screen of the foldable smartphone 305 until the user takes further action. In the illustrated example of Figure 3C, the user reads the message and responds by saying "See you there!"

In the examples of Figure 3A, Figure 3B, and Figure 3C, the user initially receives a notification (*e.g.*, 312 and 313) near the top of the first part of the display screen 304 of the foldable smartphone 302. Nevertheless, when the user completely folds down (not illustrated) the foldable smartphone 302, the notification may appear at a spine of the display screen 303 that is located

between the first part (304) and the second part (305) of the display screen. In this aspect, the user may still swipe up or swipe down the notifications to classify and separate them.

As in the descriptions in Figure 3A, Figure 3B, and Figure 3B, a user that utilizes a non-foldable smartphone (Figure 2C) can classify and separate messages notifications by swiping up or down. Similarly, a user that utilizes a lengthwise-foldable smartphone (Figure 2B) can classify and separate notifications by swiping right or left. Therefore, regardless of the exact shape and size of a display screen of a smartphone, the described techniques and apparatuses can be used to classify notifications and separate them to a first part of the display screen or a second part of the display screen, as is illustrated in Figures 2A, 2B, 2C, 3A, 3B, and 3C.

In addition, the user may have control over which part of the display screen the notifications of little or significant interest are separated and displayed. For example, a first user may use the smartphone 302 by separating the notifications of little or significant interest as is described in Figure 3A, Figure 3B, and Figure 3C. Nevertheless, using a user setting, a second user may use the same smartphone 302 and separate the notifications of little interest (*e.g.*, 312) to the second part of the display screen 305, and the notifications of significant interest (*e.g.*, 313) to the first part of the display screen 304. Also, a smartphone (*e.g.*, Figures 2A, 2B, 2C, 3A, 3B, and 3C) may have "auto-rotate" capabilities based on the smartphone's display screen orientation. The described techniques and apparatuses work as intended because the smartphone may use accelerometers, magnetometers, gyroscopes, or other sensors, to keep track of the position of the smartphone, as well as its orientation to the user.

The previous descriptions relied on the user swiping a message, alert, and/or notification. The user, however, may separate the notification by instructing the smartphone by saying phrases, such as "Hey OS, move up," "Hey OS, move down," "Hey OS, move left," "Hey OS, move right,"

or other well-defined phrases. The smartphone may also incorporate a radar-based sensor array (*e.g.*, radar transceivers) or an optical-based sensor array (*e.g.*, cameras). Therefore, the user may instruct the smartphone on the classification and separation of the notification by using gestures, such as a hand wave, a nod, and other well-defined gestures that help the smartphone disambiguate the user intent.

A smartphone may incorporate a machine-learned (ML) model that aids the user by classifying and separating messages, alerts, and/or notifications of little or significant interest. The ML model may be a standard neural-network-based model with corresponding layers required for processing input features like fixed-side vectors, text embeddings, or variable-length sequences. The ML model may be a support vector machine, a recurrent neural network (RNN), a convolutional neural network (CNN), a dense neural network (DNN), heuristics, or a combination thereof. A user's previous classifications and separations of notifications from various sources, such as email accounts, social media accounts, application software, and the OS can be inputs to the ML model. Outputs of the ML model can be classifications and separations of current and future notifications. Referring to the example of Figure 3A, the ML model may classify as notifications of little importance and separate accordingly all notifications from *Social Media No. 1*, only notifications from *John*, only notifications that contain information of everyday life (*e.g.*, someone watching television, dining out, running errands), or any other combination based on the user's previous classifications of such notifications. Referring to the example of Figure 3B and Figure 3C, the ML model may classify as notifications of significant importance and separate accordingly all messages from the user's mother, the user's contact list, and any other combination based on the user's previous classification.

Further to the descriptions above, a user may be provided with controls allowing the user to make an election as to both if and when systems, programs, or features described herein may enable collection of user information (*e.g.*, information about a user's social network, social actions, social activities, profession, a user's preferences, or a user's current location), and if the user is sent content or communications from a server. In addition, certain data may be treated in one or more ways before it is stored or used, so that personally identifiable information is removed. For example, a user's identity may be treated so that no personally identifiable information can be determined for the user, or a user's geographic location may be generalized where location information is obtained (such as to a city, ZIP code, or state level), so that a particular location of a user cannot be determined. Thus, the user may have control over what information is collected about the user, how that information is used, and what information is provided to the user. The user may also choose to disable the use of the ML model from their smartphone and still use the rest of the techniques and apparatuses to classify and separate messages, alerts, and/or notifications, based on their significance to the user.

In conclusion, techniques and apparatuses that allow a user to classify messages, alerts, and/or notifications based on their significance to the user and allow the user to separate them to be displayed in a first or a second part of the display screen, can enhance user experience, decrease screen time, and enable the user to utilize their smartphone more effectively.

References:

[1] Patent Publication: US20180101297A1. Devices, Methods, and Graphical User Interfaces for Providing and Interacting with Notifications. Filing Date: December 7, 2017.

[2] Patent Publication: US20130076661A1. Display notifications on a dual screen device. Filing Date: February 2, 2012.

[3] Shaikh, Rezaullah. "Samsung Is Patenting a Mobile Phone with Multi-plane Display." Damzone, April 29, 2019. https://damzone.com/blog/samsung-is-patenting-a-mobile-phone-with-multi-plane-display.