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Exercise Mode for Mobile Devices

Michael DePasquale

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Abstract:

This publication describes methods and techniques for placing a mobile device (e.g., a smartphone, a tablet) in an Exercise Mode. The Exercise Mode is an On-Off device setting enabling users to focus on their exercises by temporarily suppressing incoming notifications (e.g., declining incoming phone calls, silencing text messages, ignoring alerts) when activated. In aspects, the Exercise Mode is activated either manually by a user or automatically by an Exercise Manager. The Exercise Manager is an algorithm (e.g., machine-learned algorithm) configured to analyze a plurality of signals generated by sensors (e.g., inertial sensors, location sensors, heart rate monitors) from one or more devices and determine if a user is exercising. The Exercise Manager can activate or deactivate the Exercise Mode based on its determination of whether a user is about to start (e.g., analyzing a calendar application and identifying activity entries indicating exercise), currently engaged in (e.g., analyzing signals produced by sensors relating to user activity), or ending an exercise. Further, the Exercise Manager can offer smart recommendations (e.g., proper nutrition and hydration) to a user.

Keywords:

Do-not-disturb (DND), airplane mode, quiet hours, mode shift, exercise mode, automated assistant, artificial intelligence (AI), notifications, alarms, calendar, mobile devices, personal devices, exercise device, wearables, exercise, activity, workout, inertial sensors

Background:

While exercising, mobile device users oftentimes do not want to be disturbed by, for example, incoming calls, text messages, and alerts. For instance, a user engaged in a high-intensity workout class may be annoyed by an incoming phone call interrupting a song playing through his mobile device. In another example, a user listening to a podcast while running may be frustrated by the ringing of text messages because it makes it difficult to hear the episode. In scenarios like these, users often desire not to be disturbed for a predetermined period of time. For example, a high-intensity workout class may start and end at scheduled times; a runner may consistently run at certain times of the day for routine durations.

Description:

This publication describes methods and techniques for placing a mobile device in an Exercise Mode. The Exercise Mode is an On-Off device setting enabling users to focus on their exercises by temporarily suppressing incoming notifications when activated. By so doing, the methods and techniques enhance the user experience during exercise.

While the example mobile device described in this publication is a smartphone, other types of mobile devices (e.g., tablets) may also support the methods and techniques described herein. A mobile device may include one or more processors, transceivers, an input/output device (e.g., a screen), sensors (e.g., heart rate monitor, a microphone, an accelerometer, a vibration sensor, a gyroscope, a global navigation satellite system (GNSS) receiver), and a computer-readable medium (CRM). The CRM may include any storage device (e.g., disk space) or suitable memory like random-access memory (RAM), static RAM (SRAM), dynamic RAM (DRAM), non-volatile RAM (NVRAM), read-only memory (ROM), or flash memory. The CRM may include device

data like user data, multimedia data, application(s) data, and/or an operating system of the mobile device. The device data are executable by the processor(s) to enable the methods and techniques described herein. The device data may include executable instructions of an Exercise Mode and an Exercise Manager.

The Exercise Mode is an On-Off device setting enabling users to focus on their exercises by temporarily suppressing incoming notifications, including declining incoming phone calls, silencing text messages, and ignoring alerts when activated. When activated, the Exercise Mode further enables the mobile device to automatically reply to phone calls and text messages with a predetermined message (e.g., a canned response), including a notification that the user is unavailable and, if known, when the user can be expected to be available again. A predetermined message may also provide information in a notification to an emergency contact of the activities and location of the user.

In an aspect, users can manually activate the Exercise Mode. The Exercise Mode is presented as a toggleable feature accessible to users through a graphical user interface having a graphical element. A user can activate or deactivate the Exercise Mode by toggling the graphical element to an On or Off position. Alternately, the user can activate or deactivate the Exercise Mode by providing a voice command to an intelligent virtual assistant. For example, a user can speak a command like “turn on Exercise Mode” to activate Exercise Mode. In another aspect, the Exercise Manager can automatically activate the Exercise Mode.

The Exercise Manager is an algorithm (e.g., machine-learned algorithm) configured to analyze a plurality of signals generated by sensors from one or more devices and determine if a user is exercising. In more detail, at least one sensor located on the mobile device or on any wirelessly connected device (e.g., a watch connected via Bluetooth to the mobile device) makes

measurements relating to the activity of a user and produces a corresponding electronic signal. For example, an inertial sensor on a wirelessly connected wearable device (e.g., a watch) can measure the movement of a swinging arm and produce a corresponding electronic signal. The connected device can then wirelessly transmit the signal to the Exercise Manager of the mobile device. Once the Exercise Manager receives at least one signal generated by one or more sensors, the Exercise Manager analyzes the signal(s) and determines if a user may be exercising. If the Exercise Manager determines that the user is exercising, then the Exercise Manager can activate the Exercise Mode. Furthermore, the Exercise Manager can deactivate the Exercise Mode if it determines the exercise has concluded.

Figure 1, below, illustrates the Exercise Manager receiving signals generated by more than one sensor from multiple devices to determine that a user is exercising.

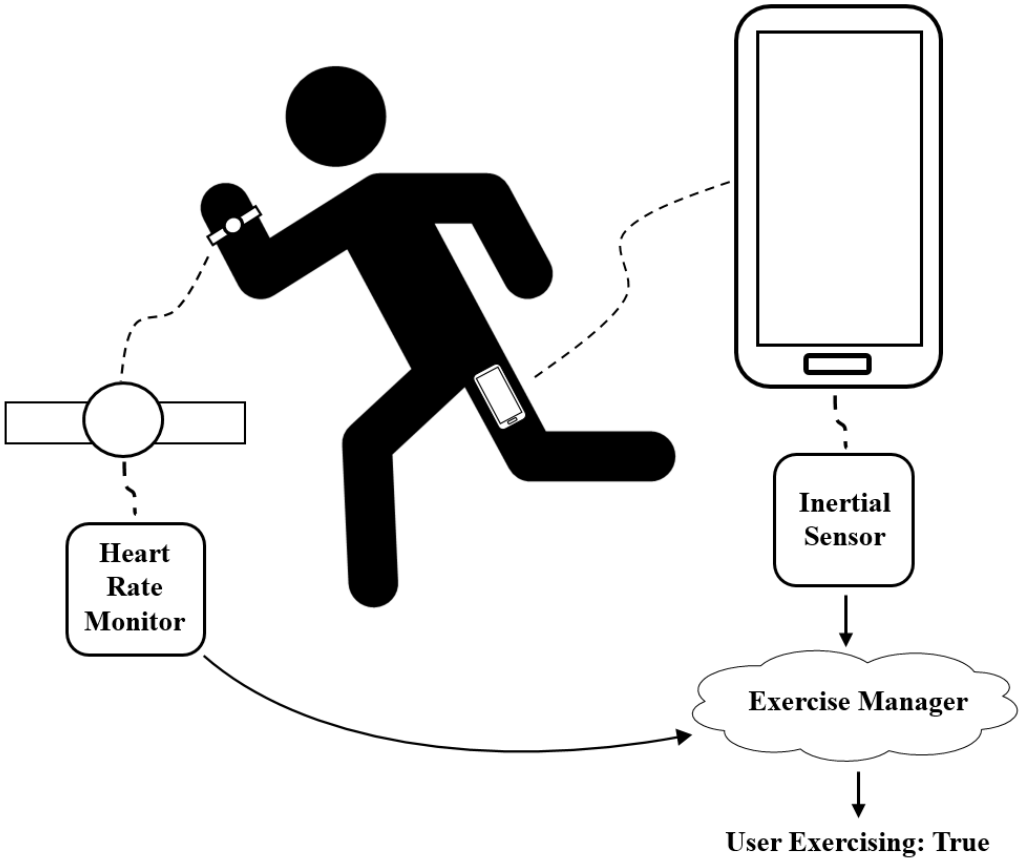

Figure 1

As illustrated, a user is running with a mobile device, specifically a smartphone, in his pocket. The smartphone includes an inertial sensor that measures the movement of the device initiated by the user. The inertial sensor further produces an electronic signal corresponding to the movement of the device. The Exercise Manager, stored in the CRM of the smartphone, then receives the electronic signal from the inertial sensor.

The user also has a watch on his wrist, which is wirelessly connected to the smartphone. The watch includes a heart rate monitor that measures and records the heart rate of the user. The heart rate monitor further produces an electronic signal relating to the heart rate of the user. The watch then transmits the electronic signal to the Exercise Manager on the smartphone. The Exercise Manager receives and analyzes the signals generated by the sensors from both devices to determine whether the user is exercising. After analyzing the signals, the Exercise Manager determines that the user is exercising and, as a result, activates the Exercise Mode.

It is significant to note that the Exercise Manager may utilize a sensor signal from only one device to determine whether a user is exercising. The plurality of signals generated by sensors from more than one device, as illustrated in Figure 1, may simply provide more data to enable the Exercise Manager to come to a hastier and/or more confident determination.

In addition to the above descriptions, the Exercise Manager can activate the Exercise Mode based on calendar or clock application entries. In an example, a user may sign up for a class at a gym using their mobile device, resulting in their personal calendar automatically synchronizing with the event. The Exercise Manager can identify such an event, and as a result, activate and deactivate the Exercise Mode for the scheduled duration. In another example, users can manually schedule workouts in their calendar or clock applications, labeling the event entries as, for example, “go for a run” or “workout.” The Exercise Manager can identify these manual entries as

being exercise-related, and as a result, activate and deactivate the Exercise Mode for the scheduled duration.

In addition, the Exercise Manager can activate the Exercise Mode via a synchronization from an application programming interface (API) from a home exercise device. The synchronization may occur before or during a workout. For example, a user can schedule classes on his home exercise bike and a custom API can synchronize the time and type of workout to the Exercise Manager on his mobile device prior to the workout. In another example, a user can begin exercising on a home exercise device, like a treadmill or elliptical, and a custom API can transmit data to the Exercise Manager such that the Exercise Manager can activate the Exercise Mode. Moreover, the data may include information relating to the duration of the exercise, and as a result, the Exercise Manager can deactivate the Exercise Mode at the anticipated end of the exercise.

Further to the above descriptions, the Exercise Manager can offer smart recommendations to a user. The smart recommendations can remind users of proper nutrition and hydration practices. For example, if a workout is scheduled in advance, the Exercise Manager can remind a user to drink ten ounces of water one hour before the workout. The Exercise Manager can also provide a curated list of music that can be customized for a workout playlist. After the Exercise Mode has been deactivated, which indicates an end of an exercise, the Exercise Manager can then remind the user to hydrate or stretch after strenuous physical activity.

Throughout this disclosure, examples are described where a mobile device may analyze physical metrics or qualities of a user, for example, the heart rate of a user. 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, and/or features described herein may enable collection of information (e.g., a user's heart rate), and if the user is sent content or communications from a

server. The mobile device can be configured to only use the information after the mobile device receives explicit permission from the user of the mobile device to use the data. For example, in situations where the mobile device measures the activity of a user, individual users may be provided with an opportunity to provide input to control whether programs or features of the mobile device can collect and make use of the data. Further, individual users may have constant control over what programs or applications can or cannot do with the information. In addition, information collected may be pre-treated in one or more ways before it is transferred, stored, or otherwise used so that personally identifiable information is removed. For example, physical metrics or qualities may be treated so that no personally identifiable information can be determined of the user. For example, a user's geographic location contained in stored items may be generalized where location information is obtained (e.g., to a city, ZIP code, or state level), such that a particular location of a user cannot be determined. Thus, the user may have control over whether information is collected about the user and the user's device, and how such information, if collected, may be used by the mobile device and/or a remote computing system.

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