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Receiving Messages on Wearable Devices in Configurable Power Saving Modes

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ABSTRACT

Users may routinely utilize several types of client devices. Wearable devices may include wireless connectivity such that messages such as SMS, CMAS, WME messages, or other messages may be received directly on the device, or by piggybacking off connectivity provided by a smartphone or other device. Due to the small size of a wearable device which limits battery capacity, such devices may have limited total operable time of a wearable device and may implement power saving modes. Techniques are described herein that enable messages to be received on wearable devices while also conserving battery life. Two power saving modes are implemented - a first limited mode where messages may be received; and a second, temporary mode where battery life is preserved for a preconfigured or adjustable amount of time. The wearable device is cycled through the first mode for a first amount of time to allow receipt of messages such as emergency alerts and is then placed in the second mode for the adjustable amount of time where no messages are pushed to the device.

KEYWORDS

- Wearable device
- Smartwatch
- Power saving mode
- Bluetooth
- Bluetooth low energy (BLE)
- Emergency Message
- Wireless emergency alert (WME)
- Discontinuous reception (DRX)
- Emergency alert
- Commercial mobile alert system (CMAS)
- Amber Alert / Levi’s Call

BACKGROUND

Users may routinely utilize several types of client devices. For example, smartwatches, fitness monitors, and other wearable devices are often utilized along with a smartphone, tablet, or laptop. Generally, wearable devices may include wireless connectivity such that messages may be received or sent either directly from the device, or by piggybacking off connectivity provided by a smartphone or other device. Short messaging service (SMS) messages (i.e., text messages), emergency service messages, wireless emergency alert (WME) messages, and commercial mobile alert system (CMAS) messages may be pushed to a wearable device from a mobile phone. As wearable devices are small in size, their battery capacity may be low, which places a limit on the total operable time and necessitates the use of power saving modes to extend usable lifetime. However, power saving modes that place limits on radio communications carried out by the device can affect ability to receive incoming messages.

Power saving modes on wearable devices may extend device operable time by minimizing active onboard components. For example, wireless radios may be placed into discontinuous reception (i.e., DRX) cycles whereby the radio is only active for a fraction of a particular period, e.g., every minute. Other battery enhancing modes may include limited-service modes where only a wireless radio is active, but other features such as lighting (e.g., of displays, status LEDs, etc.), active displays, and other features are powered down. In limited-service modes, devices may be forced into fully operational modes during every DRX cycle of the radio such that wireless emergency alerts (e.g., WME, Amber Alert, CMAS, etc.) are serviced in every cycle. This means that, to ensure wireless alerts are received, such wearable devices continue to draw power from the battery during each DRX cycle.

DESCRIPTION

Techniques are described herein that enable messages to be received on wearable devices while also conserving battery life. Two power saving modes are implemented - a first limited mode where messages may be received; and a second, temporary mode where battery life is preserved for a preconfigured or adjustable amount of time. The wearable device is cycled through the first mode for a first amount of time to allow receipt of messages such as emergency alerts and is then placed in the second mode for the adjustable amount of time where no messages are pushed to the device.

For example, wearable devices are generally paired with smartphones or other devices during a typical day, such that some features of the paired device are shared with the wearable device depending upon user interaction with the wearable device and/or the paired device. When a user stops interacting with the wearable device for a short amount of time, it is placed in the first, temporary mode. In this mode, some components are put into standby mode while limited wireless radio functionality is kept active. In this mode, wireless messages can be continually received by the wearable in response to typical DRX cycles or other paging cycles. The first, temporary mode is termed an “emergency service mode.” While in emergency service mode, the wearable device is fully capable of receiving, servicing, and presenting messages such as emergency alerts to the user.

The emergency service mode still drains battery life during each paging of a DRX cycle. A second “power save” mode is provided where further power savings are realized through deactivation of wireless radio and most other power-draining components. In the power save mode, the wearable device can perform basic functions such as observing a power save timer but does not exhaust significant power in doing so.

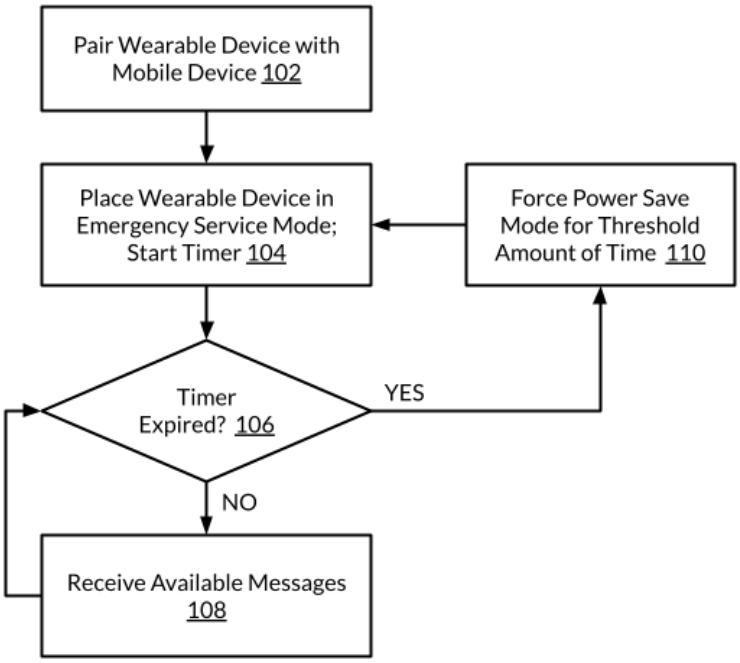

FIG. 1

FIG. 1 illustrates an example method to adjust wearable device modes to enable it to receive messages while saving power. As illustrated, the wearable device is first paired (102) with a mobile client device such as a smartphone. The pairing enables a trusted connection over local wireless connection such as WiFi or Bluetooth, including low energy consumption modes such as Bluetooth Low Energy.

Subsequent to pairing, the wearable device is placed (104) into the first, temporary power saving mode, termed the emergency service mode. While in emergency service mode, the wearable device has an active wireless connection to the paired mobile device and possibly, an active cellular data connection or WiFi connection. In this mode, mobile alerts may be received from the mobile device via the pairing connection and/or independently over the active WiFi or cellular data connection. While in the emergency service mode, the wearable device actively monitors and/or receives messages (108).

The emergency service mode is monitored for duration, and when a timer expires (106) signaling that the emergency service mode has been active for a particular amount of time (which can be adjustable), the wearable device is forced (110) into the second power saving mode. In the second power saving mode, wireless radios and other power-hungry components are placed into standby or are powered down. Thus, the second power saving mode has significantly lower energy usage than the first mode, but also limits the ability of the wearable device to receive wireless signals.

While in the second power saving mode, the wearable device observes a second timer for a second period of time. Similar to the first period of time, the second period of time can be adjusted to balance an amount of time capable of receiving messages such as emergency alerts and an amount of time during which power is conserved. After the second amount of time expires, the wearable device is placed (104) back into the first power saving mode and the timer is reset automatically.

This process may be repeated during a typical day, with the wearable device switching between different power saving modes while also periodically receiving messages such as emergency alerts. Depending upon the values chosen for the first and second timers, a user of the wearable device may not perceive any difference in the receipt of messages on the wearable device but may enjoy improved battery life for the wearable device.

CONCLUSION

Techniques are described herein that enable messages to be received on wearable devices while also conserving battery life. Two power saving modes are implemented - a first limited mode where messages may be received; and a second, temporary mode where battery life is preserved for a preconfigured or adjustable amount of time. The wearable device is cycled

through the first mode for a first amount of time to allow receipt of messages such as emergency alerts and is then placed in the second mode for the adjustable amount of time where no messages are pushed to the device.