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Mobile Auto Silent Mode App (Triggerinfence)

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Abstract

The usage of mobile devices such as smartphones and tablets has increased dramatically over the past years. Most of people carry at least one mobile device wherever they go. Mobile devices are becoming really important nowadays because they are usually the main tool for communications. However, sometimes the ringing sound of mobile devices can be a nuisance in certain circumstances such as during an important meeting or inside places that require silence such as library, cinema and prayer area. This problem occurs because most users forgot to switch their mobile device into silent mode. To address the problem, this paper presents a novel concept of automatically switching mobile devices into silent mode. This concept is developed based on the geo-fencing technique where a virtual fence will be created around a specific area. Whenever a mobile device crosses the virtual fence into the area, the device will be automatically switched into silent or vibrate mode. The device will be switched back to normal mode once it crosses the virtual fence to exit the area. This is done by utilizing the current location of the user based on the Global Positioning System (GPS) data provided through the device. The advantage of this application over other geofencing applications is that the geo-fence locations will be preloaded in the application, allowing applications with specific purpose and pre-determined locations to be developed

Keywords: Mobile Communication, Global Positioning System (GPS), Geo-fence, Location, Silent mode.

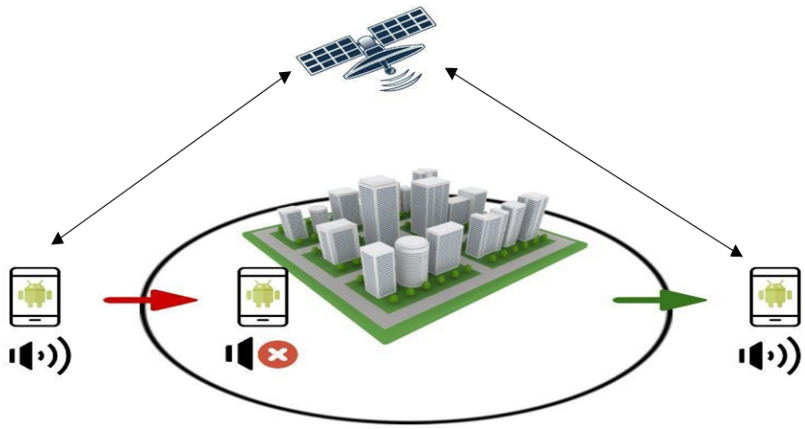
Introduction

Mobile device is usually defined as a small handheld computing device that has a main purpose of providing communication function over wireless networks. Two of the most popular mobile devices are smartphones and tablets. Mobile devices usage has increased substantially over the past years. The statistics shows that at the end of 2013, global smartphone penetration has reached 22% of world population where there are estimated 1.4

billion smartphones in use [1]. On average, there are 2 smartphones for every 9 people. These statistics are staggering, considering there are only 5% of global population using smartphone in 2009, an increase of 1.3 billion smartphones in four years' time. The usage of tablets is also on the rise, reaching 6% global penetration from when the devices first started to be widely available commercially back in 2011. Mobile devices are becoming a necessity and everyone is expected to carry at least one mobile device wherever they go. People mainly used mobile devices to communicate with each other, either through cellular voice telephony service or through usage of mobile data consumed by social media applications such as Facebook, Twitter, Instagram and WhatsApp. These services and applications needed notifications to attract user attention. For telephone service, the devices will ring so that the user knows someone is trying to call them, whereas for social media applications, notifications are usually done through some short audible sound. However these ringing and notification sound can be a nuisance in some situations such as during important meetings, watching movies in cinema, reading books in library or during religious prayer time. People are usually advised to either turn off their mobile devices or turn the silent or vibrate mode on whenever they are about to enter any places that require silence such as meeting room, cinema, library and prayer area. Nevertheless, there are still a lot of people who forgot to mute their devices, resulting in awkward situations when the devices make an audible sound whenever it is supposed to be silenced. To address this problem, this paper is proposing a novel concept of 'auto-silent' mode based on geofencing technique as shown in Figure 1. Pre-determined locations can be fixed and stored in a database. A virtual fence or boundary can then be created around those areas.

Whenever a mobile device which is equipped with an 'auto-silent' mode operation crosses the virtual fence into any area that have been stored in the database, the device will be automatically switched into silent or vibrate mode. This is done by utilizing the realtime location of the device, provided by the location data from the device's GPS chip. Although the proposed concept is applied on Android mobile operating system (OS) platform, it can be applied to any major OS platform for mobile devices such as iOS, Windows Phone and Blackberry [2].

Images



- A mobile auto silent mode system is typically a software-based system that automatically switches a mobile device's sound profile from a regular ringing mode to a silent mode based on specific user-defined conditions.

This system is typically implemented as an application running on the mobile device.

- **User Interface:** The user interacts with the system through a graphical user interface (GUI) on the mobile device. The GUI provides the user with the ability to configure the system's settings, such as the conditions under which the device should switch to silent mode.
- **Sensor Data:** The system continuously monitors the mobile device's sensors for changes in the environment, such as motion, location, or time of day. This sensor data is used to determine whether the device should switch to silent mode based on the user's settings.
- **Sound Profile Manager:** The sound profile manager is responsible for changing the mobile device's sound profile from a regular ringing mode to a silent mode. This manager receives signals from the sensor data and switches the sound profile based on the user's settings.
- **Notification Manager:** The notification manager is responsible for managing notifications on the mobile device. When the sound profile is switched to silent mode, the notification manager ensures that notifications are still displayed on the device, but without sound or vibration.
- **Connectivity Manager:** The connectivity manager is responsible for managing the device's connectivity, such as WiFi or cellular data.
- **Event Handler:** The event handler component is responsible for receiving and processing events triggered by the sensor data. When the system detects a change in the environment based on sensor data, the event handler triggers the appropriate actions, such as switching the sound profile to silent mode.
- **Scheduler:** The scheduler component allows the user to set up schedules for when the device should automatically switch to silent mode. For example, the user can define a schedule for the device to be in silent mode during working hours or during night-time. The scheduler component manages these schedules and triggers the appropriate actions at the specified times.
- **Permissions Manager:** The permissions manager component is responsible for managing the permissions required by the system to access sensor data, notifications, and other device settings. It ensures that the system has the necessary permissions to perform its functions properly while adhering to the mobile device's security and privacy policies.
- **Logging and Analytics:** The logging and analytics component captures and logs relevant system events, user interactions, and sensor data for analysis and troubleshooting purposes. It may also provide insights and analytics on system usage, user behavior, and performance, which can be used for further system improvements.
- **Settings and Preferences Manager:** The settings and preferences manager component allows the user to configure and customize various settings and preferences of the auto

silent mode system, such as the conditions for switching to silent mode, sound profile options, and other user preferences.

- These are some possible explanation that can be part of a mobile auto silent mode system architecture. The actual architecture may vary depending on the specific implementation and platform (e.g., Android, iOS) of the mobile device, as well as the features and functionalities offered by the system.

Techniques

There are several techniques that can be used in the implementation of a mobile auto silent mode system. Here are some commonly used techniques:

- **Sensor Data Processing:** The system may use various sensor data processing techniques to analyze and interpret data from different sensors, such as accelerometer, gyroscope, GPS, or ambient light sensors. For example, machine learning algorithms, such as decision trees or clustering algorithms, can be used to detect motion patterns or location changes that trigger the auto silent mode.
- **Rule-Based Systems:** Rule-based systems use a set of predefined rules to determine when the system should switch to silent mode. These rules can be based on conditions defined by the user, such as specific times of day, days of the week, or the device's location. Rule-based systems are relatively simple to implement and can be effective for basic auto silent mode functionality.
- **Event-Driven Programming:** The system can use event-driven programming techniques to handle events triggered by sensor data changes, user interactions, or system events. For example, when a sensor detects a change in the environment, an event can be triggered, and the system can respond accordingly by switching to silent mode or scheduling a silent mode change.
- **Time-Based Scheduling:** The system can use time-based scheduling techniques to automatically switch to silent mode based on predefined schedules set by the user. This can be done using timers or scheduling mechanisms provided by the mobile device's operating system.
- **User-Defined Settings:** The system can allow users to define their own settings and preferences for when the device should switch to silent mode. This can include a graphical user interface (GUI) where users can specify conditions, time frames, and other parameters based on their individual preferences.
- **Permissions Management:** The system may need to handle permissions required to access sensor data, notifications, and other device settings. This can involve using appropriate permission management techniques provided by the mobile device's operating system to ensure that the system has the necessary permissions to perform its functions securely and in compliance with the device's security and privacy policies.
- These are some of the techniques that can be used in the implementation of a mobile auto silent mode system. The specific techniques used may depend on the platform, programming language, and other requirements of the system

Conclusion

In this paper, the development of geo-fencing-based auto silent mode application has been presented. The application is developed for Android mobile platform using Android Studio SDK, but the concept can be easily applied to other mobile platform such as iOS, Windows Phone or Blackberry. This application is developed based on the geo-fencing technique where virtual fences will be created around specific areas. Whenever the mobile device crosses the virtual enclosed with fence into the area, the application will automatically mute or switch the device into silent/vibrate mode while also sending a notification to the device's notification bar to inform the user. When the device leaves the area and crosses the geo-fence, the application will switched the device back to normal mode. The accuracy of the location information can be improved by using Assisted GPS (AGPS) or other positioning techniques. The main advantage of this application over other geo-fencing applications is the geo-fence locations will be preloaded in the application. This concept allows applications with specific purpose to be developed. For example, an application with the location of all the mosque in the world can be developed, and whenever users enter any mosque, their devices will be automatically turned into silent/vibrate mode. This will solve the problem of ringing phone disturbing the concentration of congregation performing prayer in the mosque. Separate application for other places that require silence such as cinema, library and lecture halls can also be easily developed

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