

## Ibeacon Based Mobile Feature Management System

Smt. K. S. Sukrutha\*, Smt. V. Rajitha\*\*

**ABSTRACT:** It is unarguable that telecommunication is a fundamental requirement in present era. People carry their mobile phones to all the places where they go in order to help them to communicate and maintain contact owing to the fact that cell phone are cheap, fast and convenient means of communication. In this contemporary culture, people are more dependent on mobile phones to carry out their daily tasks. Hence it is impossible to prohibit the usage of mobile phones in public places completely. Moreover the people show less response, try to break or sometimes they completely ignore the conventional ways of enforcing prohibitions notices and hoarding for not to use the mobile phones. Thus it will be better to allow the use of mobile phones even in public places with some restrictions by controlling some of its features such as disabling camera, changing general mode to silent or vibration mode etc. This work is aimed at providing simplified management of prohibitions enforced in public places by developing a system which controls various mobile features. The purpose of this work is to come up with a unique solution of practically enforcing laws to restrain the usage of mobile phones in public places where actually the mobile phones are strictly restricted by controlling the mobile features automatically. The proposed iBeacon Based Mobile Feature Management System can recognize the prohibited areas and automatically controls the mobile by changing the profile even at the indoor. In this approach it is tried to digitalize the system by automatically disabling the features without any human interaction.

### Introduction:

Nowadays , mobile phone dependency have become so excess, that people carry along with them inspite of having awareness of prohibition at public places such as Hospitals, Museums, Seminars, Meetings, Educational Institutions, Petrol Bunks, Religious Places , Libraries, Research Centers, Zoological Gardens etc. People do not take it seriously though it is clearly mentioned by displaying through sign boards that , "KEEP YOUR MOBILE PHONE SILENT", "USAGE OF CAMERA IS RESTRICTED", "USAGE OF MOBILE PHONE IS PROHIBHITED", "SWITCH OFF YOUR MOBILE PHONES". Many times people forget to switch off their mobile phones or turn them to silent or vibrate mode which is not feasible every time though mobile phones are restricted at certain places. This enforces them to use the mobile phones in inappropriate situations. To avoid the consequences of this adverse effect of usage, our work aims at prohibition of mobile phones by controlling the features of mobile device automatically without any human interaction.

### Existing system:

At present, the conventional ways of enforcing prohibition, uses placards to communicate or to convey information such that the viewer may make right decisions based on the information displayed. Some of such signage are no photography, no loud ringtones etc. But public most often ignore these signs and take them as granted and the regulations are not respected.

### Proposed system:

In order to overcome the disadvantages of existing system our proposed system uses iBeacon Technology which is a small Bluetooth Low Energy(BLE) device. This device helps in controlling the features of mobile phones remotely to avoid the usage of phones in restricted areas automatically without any human intervention. The proposed system using iBeacon Technology can recognize the prohibited areas automatically and changes the profile or lock cameras automatically as per the

\* Assistant Professors of Computer Science, M.M.K & S.D.M Mahila Maha Vidyalaya, Krishnamurthy Puram, Mysuru, India, Mobile: +91- 99001924181, E-mail: sukruha@sdmmkmysore.in

\*\* Assistant Professors of Computer Science, M.M.K & S.D.M Mahila Maha Vidyalaya, Krishnamurthy Puram, Mysuru, India, Mobile: +91- 99025919072 E-mail: rajitha@sdmmkmysore.in2

location restrictions.

**Methodology:**

This section explains the technology used, architecture, data flow diagram and functioning of the system proposed.

**Technology:**

Our system uses Indoor Positioning Technology for tracking and controlling the features of activated mobiles in restricted areas. Though there are various technologies for indoor positioning such as Wi-Fi, Bluetooth, Ultra wideband radio and Zig-Bee none of this technology is accepted as standard for indoor positioning. Bluetooth 4.0 technology was released in June 2010. This technology is also known as "Bluetooth Smart" or "Bluetooth Low Energy" (BLE) which operates between 2004M Hz to 2485M Hz which is divided into different channels. This BLE comprises of 40 channels with 2M Hz spacing out of which 3 channels are dedicated for advertisement. The major advantages of using BLE technology is that it is of low cost, low power consumption, low complexity, low bandwidth technology and has high penetration in society.

iBeacon is the name for Apple's Technology standard which allows mobile apps (running on both iOS and Android devices) to listen signals from beacons in the physical world and react accordingly as shown in fig 1.



Fig. 1. BLE Communication

This technology understands the mobile position on a micro-local scale and deliver hyper-contextual content to users based on location. An iBeacon is a small Bluetooth Low Energy(BLE) device that can be powered by a coin cell battery or through an external power supply. An iBeacon device sends a packet in a specific data format as shown in fig 2.

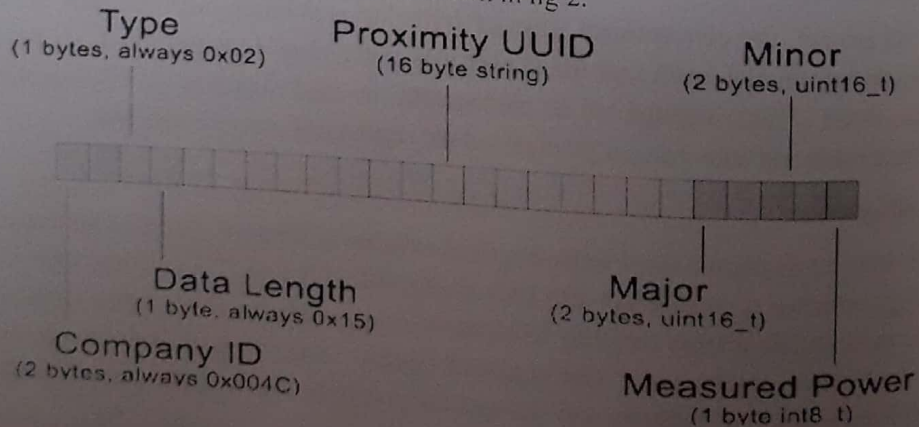


Fig.2. iBeacon Data Format

**How iBeacon Works?**

The iBeacon data format comprises of 25 bytes payload as in figure 2. The first 2 bytes is for Company ID followed by 1 byte for data length and type each. These four bytes are fixed and cannot be changed.

As mentioned in the above data format (Figure 2), an advertising packet consists of four main pieces of information.

**UUID:** UUID is a 16 byte string used to differentiate a large group of related beacons. These 16 bytes are for the proximity UUID which uniquely identifies the iBeacon.

**Major:** This is a 2 byte string used to distinguish a smaller subset of beacons within the larger group.

**Minor:** This is a 2 byte string meant to identify individual beacons.

**Measured Power:** This last byte is used to measure power which can be used to determine the proximity (distance) between the iBeacon and the device which receives the data and provides the strength of the signal exactly one meter from the device. This has to be calibrated and hardcoded in advance. Devices can then use this as a baseline to give a rough distance estimate.

With an iBeacon network, when a person carrying mobile phone comes within the proximity of the application identifies the iBeacon and communicates the relevant data UUID, Major, Minor and Measured Power which is used to trigger the required action. Thus an iBeacon technology provides a "digital extension" into the physical world.

### System Architecture

System architecture is a conceptual model that defines the structure, behavior and more views of the system as shown in Fig.3. The iBeacon device with the help of BLE technology identifies the users coming under the footage of the prohibited area and calculates the proximity distance between the users and the iBeacon. Based on how far or nearer the user is, the measured power is calculated as the device is exactly one meter from the iBeacon device. The iBeacon continuously transmits UUID at regular interval after identifying the user. After the identification The BLE technology scans the users in its range and sends the required parameters such as its UUID, major, minor and measured power to take necessary actions.

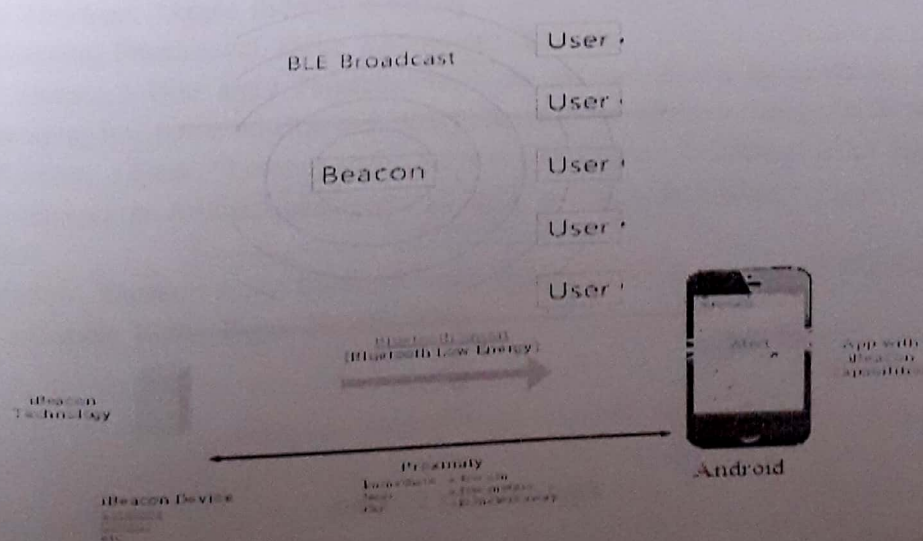


Fig. 3. System Architecture

**Data Flow Diagram:**

The below Data flow diagram (Fig.4.) explains how data flows within the system. In this approach initially the system lists all possible profiles available in the device and selects only those profiles that are to be disabled. Later the advertising is started with only the selected list of profiles in order to advertise UUID. Then with the help of BLE technology the user is scanned for the selected profiles and then compared with the predefined objective like disable camera, disable ring tone etc. If the profile is not in the specified objective or mode then the device is enforced to change its profile. This process of scanning is continued until all the selected profiles are compared and disabled for an identified device.

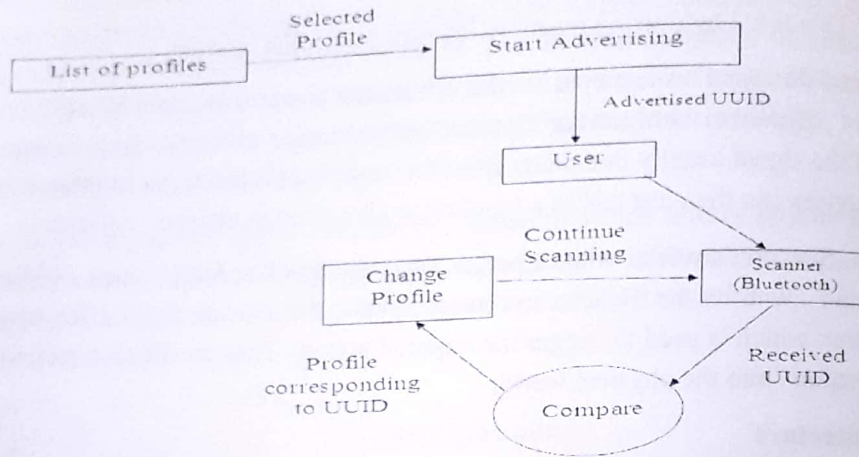


Fig.4. Data Flow Diagram

The various activities of the system can be shown with the help of following Activity Diagram:

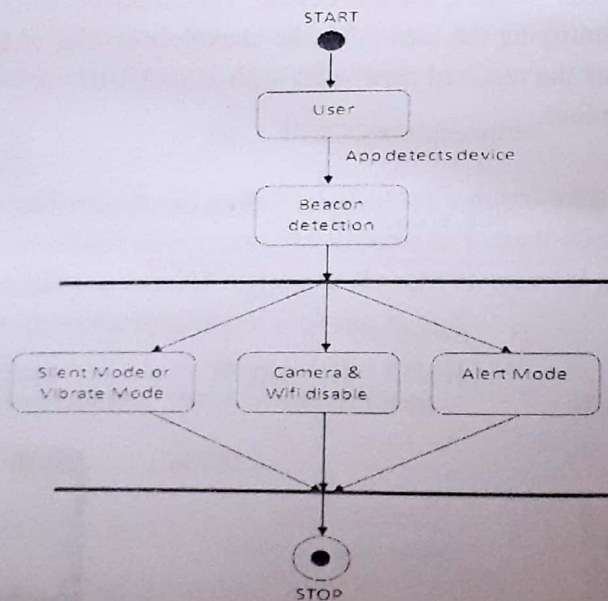


Fig.5.: Activity Diagram

**Advantages**

The proposed work can be implemented to disable the selected features of mobile devices at public places. As it is based on Bluetooth Low Energy (BLE) technology it consumes low energy and can last up to 3 years on a single coin cell battery. It is 60-80% cheaper than traditional Bluetooth. BLE is ideal for simple applications requiring small periodic transfers of data within limited area.

### Future work

Mobile Feature Management System can be implemented in any android or iOS based mobile devices and can also be used as location tracing intelligent software in future. This helps in reducing human intervention for various tasks such as sound profile switching etc. Smart phones can become much smarter with this application.

This technology can be enhanced to,

- ❖ Disable data connectivity and to automatically switch off the device.
- ❖ Prohibition can be enforced also on digital cameras and handycams.
- ❖ To switch the device to Airplane mode automatically.
- ❖ Whenever a mobile user enters into a silent zone, his/her calls can be diverted to other number specified.
- ❖ The proposed application can be made in-built by the mobile manufacturer.
- ❖ This approach maybe designed to be compatible with Windows and Linux based Operating Systems so that even the laptops and desktops can act as transmitters.

### Conclusion

This approach intends to provide a unique way of enforcing prohibitions by digitalizing the system where there is no human intervention. It includes the study of Bluetooth beacons and using them for an entirely different purpose. As it is a Bluetooth based application, it is wireless and also flexible in terms of cost. It reduces the human interaction and increases automation which is the demand of current world.

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