UNOBEAC: A Smart Technology with iBeacons

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Abstract—**The main purpose of this paper is to introduce an android application that helps in tracking the iBeacons. With the recent improvements on mobile devices, it has become more useful to people especially in terms of shopping and locating. The iBeacons are a new way to interact with hardware. An iBeacon is a Bluetooth Low Energy device that only sends a signal in a specific format. More and more people use a smart phone to communicate with each other. However, there is no communication between normal things such as bags or doors and smart phones. BLE is a technology which uses very low power, has high throughput, low latency, and a range of 100m. Combined with the low price, BLE gained popularity among researchers quickly for networking, localization, and many other applications. Through this paper, we propose that the users can connect their phone to multiple beacons via BLE by pairing and get the description as a means of communication .**

Keywords— **iBeacon. Localization, Bluetooth Low energy (BLE) devices, tracking**.

I. INTRODUCTION

Android is an open-source operating system that is used primarily in mobile devices, such as cell phones and tablets. It is a Linux kernel-based system that has been equipped with rich components that allows developers to create and run app that can performed both basic and advanced functions. Usage of mobile has become a vital part of day-to-day activities of people. We can refer current time as the era of androids.

The iBeacons are a new way to interact with the hardware. An iBeacon is a Bluetooth Low Energy device that only sends a signal in a specific format. They are like a lighthouse that sends light signals to boats. More and more people use a smart phone and they all communicate with each other(1). They use internet services and many application.

Also, with the new trend of wearable devices they use these new gadget to track activities like running. However, there is no communication between normal things such as bags or doors and smart phones. iBeacon has the potential to change that.

With the rapid increase in data and multimedia services, demand for positioning has increased especially in complex indoor environment which often needs to determine the location information of the mobile terminal(2). There is a lack of accuracy and robustness in current positioning system.

The key objective of this application is to track the ibeacons, provide the description of the items via BLE from ibeacons to phones with the range of 100m and it is capable of beeping the ibeacons with a click of button. The users can connect their phone to multiple beacons via BLE by pairing.

II. PROPOSED SYSTEM

A. Working

Our iBeacon system focus on three major sections of the system, i.e. Beacon device transmits the Bluetooth signals, detects these signals and shows the relevant description on the Bluetooth enabled smart phones. It is shown as below.
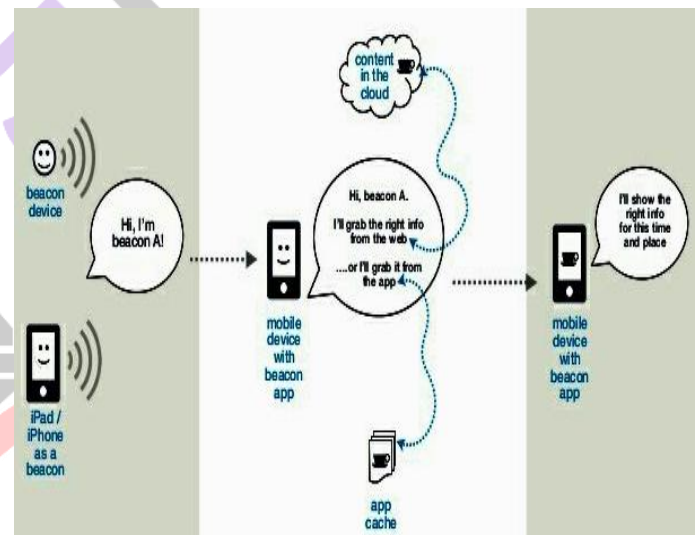

Fig. 1: System design

The Fig. 1 provides the general view of the functionality of the proposed system.

- Beacon device transmits the Bluetooth signal

The iBeacons can interact with hardware devices with the help of Bluetooth signals. The transmitted Bluetooth signals indicate the presence of iBeacons. Thus the iBeacons will be detected for the further activity.

- Beacon app detects the signal and reacts

The beacon app will receive the Bluetooth signal from the beacon device and thus detect the iBeacons. The app will react to the iBeacon by pairing with it and allows the admin to send the related description to the beacons.

- App shows the relevant content

As soon as the Bluetooth enabled smart phones enter the iBeacon region, the relevant descriptions will be directly send to those smart phones. Thus the content provided in the iBeacon will be directly sent to the user.

III. IMPLEMENTATION DETAILS

The implementation of any system can be best done by its system design. The complete module of our application is shown below:
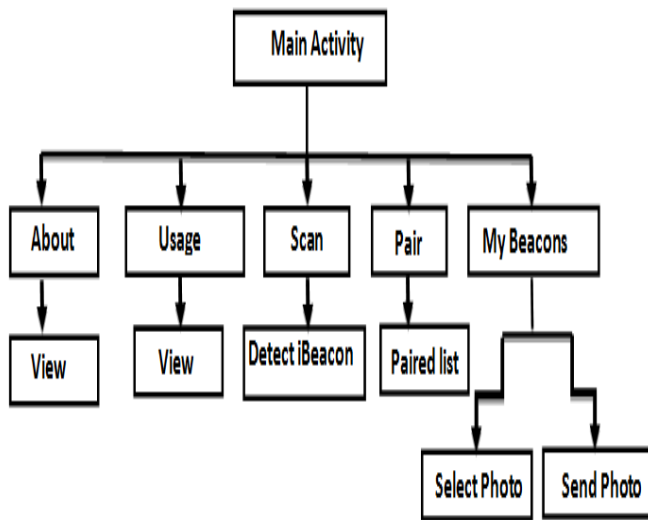

Fig. 2 : Complete Module

A. Scan

Scan option is used to scan the nearby iBeacons. The only way to interact with an iBeacon is to configure the values for UUID, Major and Minor ID. It gives the RSSI number i.e. Received Signal Strength Indicator to get the exact distance to the iBeacons from the smart phones in centimetres. Scan will also provide the UUID i.e. Universal Unique Identifier. E.g. All the stores will have the same UUID so that an app will know, it is a store from this retailer.

Fig. 3 shows the scanned iBeacon details. The Major and Minor number will provide the location of the iBeacons. Every iBeacons has its own Major value to identify each specific location. Minor number of the iBeacons will give the specific location of the individual iBeacons.

Fig. 3: Scan   Fig. 4: Pair

B. Pair

Pair option is used to pair with the Bluetooth devices and get the paired list. When the Bluetooth enabled smart phones come under the range of the iBeacons, the iBeacons will detect the Bluetooth devices.

Then the detected Bluetooth devices are pair with the iBeacons. The paired list can also be viewed. Fig. 4 indicates the Pair options and the Paired device list.

C. My Beacons

My Beacon option is used to send the description about the items. It has two sub options like select photo and send photo. The Fig. 5 indicates the Select Option for the photo. The Select Photo option can select the photo from the gallery or can take a new picture. Fig. 6 indicates the sending options for the photos. The Send Photo option will send the photo to the iBeacons. Then the iBeacons will send the photos with the description to the nearby Bluetooth devices. It has a range of 100m.

As soon as the user, come under the range of iBeacon, the user can get the information through the iBeacon. It can be information regarding the offers in the shopping malls or the description about the artifact in the museum or indoor location.
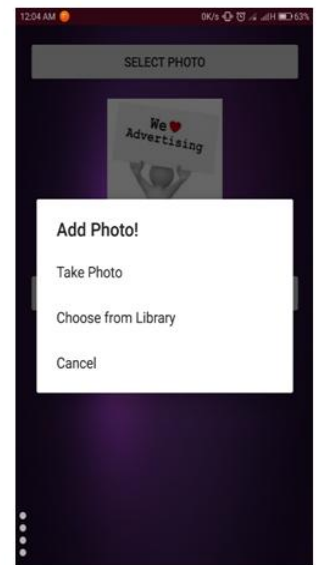

Fig. 5: Select Photo   Fig.6: Send Photo

IV. APPLICATIONS

- The Proximity marketing content delivery – The iBeacon technology can be used for displaying the specification of the products or the discounts available on the product in the stores, shopping malls etc.
- Restaurant – iBeacons can be used for display of food menu, special dishes and their cost.
- Locate your assets – The frequently missing items can be attached with the iBeacon and can be easily detected .
- Museum – This technology helps the visitors to get the history of the artifact on their phones.
- Gamification – In the games like treasure hunt, the

clues can be placed with the iBeacon technology.

- Indoor location WayFinding – In large buildings like museums and historical places, the indoor route can be found with this technology.

V. CONCLUSIONS

The iBeacon technology is not just a change of technology, it is a part of high redefinition of how we used to communicate with the customers and the visitors to provide the description related to the artifact , shopping offers, etc. In many fields, iBeacons have become a default way to provide description. The iBeacon technology can provide wide range of facilities to the user. The user can access the information by their mobile phones and can get the accurate data. In large crowded areas, the description of the items cannot be viewed easily. But iBeacon technology will provide the data to the mobile phones and can be viewed by all.

VI. FUTURE SCOPE

In future this application can be enhanced to support additional features like Making the application to support the voice feedback of the description. Multilingual description facility for globalized society.

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