

# NAVIGATION USING BEACON FOR BUILDING

Shruti adivarekar, Kalyani donthula, Bhavika salunkhe, Sandeep kamble

B.E.Computer Engineering , B.E.Computer Engineering , B.E.Computer Engineering , Assistant Professor  
Computer Engineering,  
Vidyalankar Institute of Technology, Mumbai, India

**Abstract :** Now a days, the technology keeps improving drastically, especially on smart phones or mobile devices. The customer's requirement will increase day by day. But it is time consuming. Also from which site online shopping is done it is not feasible to customer as distance wise. To overcome this problem we are going to develop "Navigation ions on mobile phone when they are pass through any building using Beacons for Building." The goal of this research is to implement mobile based indoor positioning with the beacon solution based on the Bluetooth Low Energy (BLE) technology. For estimating the locations based on localizations we use RSSI (Received Signal Strength Indicator). Compass is used for calculate the current location of mobile phone. Beacons provide accuracy in proximity and distance estimation. In our application customer saves their time because customer's gets notification.

**Keywords:** Beacons, RSSI, BLE, Android Application, Indoor Positioning, Compass

## I. INTRODUCTION

Bluetooth Low Energy (BLE) is an extension version of the Bluetooth standard in version 4.0. It enables the low-power, -cost and the short-range wireless communication. Beacon is an extended version of classical Bluetooth, and it reducing the power consumption and extending other features [6], [12].

Beacon is a BLE-based proximity sensing device, which allows a mobile device to detect its proximity. Every Beacon repeatedly transmits the short identification frames that are received by the mobile device to estimate the distance between the mobile device and beacon uses received signal strength indicator. Based on detection of proximity, beacons provide services on mobile device such as products details, description, coupons, route guidance [1], [2].

BLE protocol use 40 channels, each 2MHz wide, around the 2.4 GHz radio band are used to transmit messages. These channels are used for broadcasting advertisement messages. BLE beacons set transmission power from 0dBm to -40dBm. For power consumption they usually set transmission power less than 10Hz and -16dBm [4], [5], [6].

This application is running on android phones. While using this application customer saves their time because customer automatically gets notifications on mobile phone when they are nearer to range of beacon. Customer get notifications on mobile phone, they have to react on notification and get details about nearer place. This application can Navigate user to the location where he/she wants to go.[7], [8], [9], [11], [12].

## II. PROBLEMSTATEMENT

Now a days, the technology keeps improving drastically, especially on smart phones or mobile devices. The customer's requirement will increase day by day. Google Maps provides outdoor navigation, it doesn't provide Indoor Navigation. Sometimes in a building we don't know how to go the particular place. In an Education Institute it is difficult to find any classroom when the campus of the Institute is very large.

## III. . RELATED WORK

Current indoor positioning methods are mainly using Wi-Fi or Bluetooth technology. An extended compass is used for indoor positioning. This approach is proposed for indoor localization Bluetooth Low Energy [12].

### 3.1.PRE-PROCESS OF RSSI VALUE

The received RSSI are unstable even in a well-defined indoor scenario due to multipath fading. Figure 1 shows the received RSSI from mobile phone when beacon is 1 m away. As shown in the figure, RSSI varies vigorously from -61dB to -80dB [12].

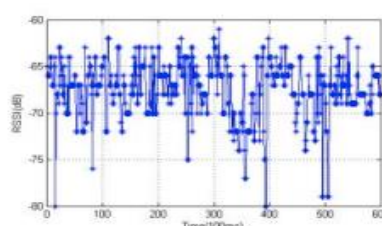


FIG 1. RSSI VALUES IN 1M DISTANCE

## IV. PROPOSEDSYSTEM

### 4.1. System Architecture

Our system architecture can be divided into three major components: Beacon device in the building, customer's mobile app and server side. These three components aggregate the navigation application at physical location.

### 4.2. Beacon Deployment

We choose beacon technology because it is lighter, cheaper and easier to deploy than other wireless technologies. Many mobile devices in the market already have the BLE interface. Beacon is small transmitter that sends Bluetooth signal packets following a strict format. The range of the signal is about 30 meters and low energy consumption it is estimated to be working normally for more than a year. We configured the frequency of the beacon in figure 2.

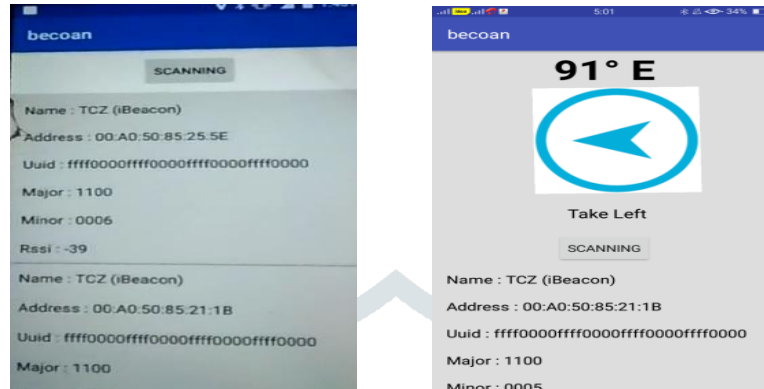


Fig 2. Listing of Beacon and Direction to the Beacon

### 4.3. Implementation

For the customer's side, our system provides them with a mobile app, which could be installed with registration in customer's mobile phones. When user is in range of beacons, it sends the signals to customer's mobile phone. Customers can react on notification.

## V. SYSTEM OVERFLOW

The actors of the use case diagram are the beacon, Bluetooth and the user. Beacon will send signal to the nearby device if the device is detected it will notify the device by sending a message.

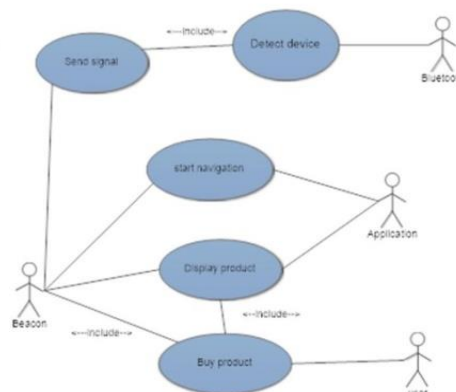


Fig 3: Use Case Diagram of the System

## VI. APPLICATION AND UNIQUE FEATURES

### A. Application

- Airport Check-In and Check-Out
- Stores
- Banks
- Museums
- Shopping Malls
- Home
- Railway Stations

### B. Unique Features

- The application is basically developed for easily shopping at physical location.
- Customer get notifications at physical location when they are in range of beacon and get various discounts and offers.

## VII. CONCLUSION

In this paper we have proposed, beacon device and bluetooth through which we a user can be navigated. The user can Gather digital up votes and down votes from visitors. You can integrate beacons with the mobile app in order to enable consumers to rate based on the facilities provided. In this user can easily go to the place in an building or in campus of the Institute.

Using this application user can his/her time. If new person comes in the campus or building they can use this app and can easily reach to the place where they want to go.

## VIII. ACKNOWLEDGMENT

We are thankful to all those who helped us throughout the course of writing this paper. Their valuable and insightful inputs and constructive criticisms have been of utmost importance.

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