Commercial Promotion and Indoor Mapping

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Abstract: In this paper we are presenting our work on the Indoor positioning of the users / Shopper using a Bluetooth network of low energy i.e. BLE (Bluetooth Low Energy) beacons deployed in large landmark our Main Objective is to determine which path is Shortest from User's Current Location to reach Destination Using RSSI reading from Multiple Beacon Which will Asynchronously get measured on standard Commercial Mobile Device. As new Comer, There may be the problem to find out a particular location from current location [1].

Keywords: BLE (Bluetooth Low Energy), Indoor Mapping, Beacons, Commercial promotion.

I. INTRODUCTION

Indoor Localization and Indoor Navigation have been Providing Services more than 10 years now it started in around 2005when even Smart Phone even not existed yet [2]. So much has been happened since that time example introduction of the i-phones and beacon Technology are Becoming milestones for the industry but the best is still to come. And the application areas of indoor position mapping technology is seems to be endless and there are various techniques which can be used.

And some of the technology includes the:
1. Techniques for Indoor Positioning without using GPS
2 Indoor Navigation using WIFI as a positioning Technology
3 Indoor Navigation& Indoor Positioning Using Bluetooth.
4 The Role of Hardware in indoor Positioning Projects
5 How to Configure And Install Beacon Correctly.

Along with above Technologies, there are some industries which are being Implemented efficiently and the industries Included as follows:
1 Location Based Services and Indoor Navigation in Railway Stations.
2. Beacon and Positioning Technology in Tourism
3. Mobile Shopping Solutions at Airports and Railway Stations-Two use cases.

We will shortly discuss the Beacons and its positioning technologies in tourism. There are various cases for indoor positioning in tourism.
1) Railway.
2) Airport.
3) Hotel.
4) Museums.
5) Holiday destination.

And each one has their own specific application area.
Example:

1) Railway: - As our railway operators are already providing us all the important and necessary information regarding Train Time their delays. They even efficiently provide information about platforms as well. But Indoor Mapping will help users in the more efficient way. This will mainly useful in large trains by providing individual suggestions concerning shopping, related food etc.. The best example of indoor mapping in Railways we can refer to the Swiss federal.

2) Airports: - Indoor positioning has much Application and there are various ways and various technologies are being introduced for the implementations. But Airport Area makes its better use. As we know Airport is the place with the more complex area as it covers large volume. For airports, there are similar rules as for railway stations. It is especially important to provide some good service during the journey: passengers get a message when their flight is delayed, when the gate changes, when there are waiting times at the check-in or when boarding starts. For implementation all these use-cases there are some technologies are available some of them are.

1) WI-FI: - Wi-Fi can be effectively used for the indoor position mapping. GPS (Global Positioning System) can be easily replaced by Wi-Fi inside the buildings because GPS generally not available for the indoors. Wi-Fi has many advantages in itself because most of the time Wi-Fi access points are already exists in many buildings since it becomes easier to install a Wi-Fi Positioning System (WPS).

2) BLUETOOTH: - During the last couple of years, there was a lot going on the Bluetooth market. This technology itself is not new, the functionality of Bluetooth has been well-known since the 1990s.

But this was possible only in recent years that the whole new application scenarios have occurred, originating from the energy saving Bluetooth version BLE (Bluetooth Low Energy, Bluetooth Smart). Since GPS does not work indoors, Bluetooth is a good alternative for indoor positioning and indoor navigation. Bluetooth beacons are able to send out signals, but they can't receive them. They are relatively cheap, it can run on button cells up to two years and have approx. the range of around 30 meters indoors. And an Accuracy is get up to one meter. On the one hand, they are used in client-based solutions, that is to say, positioning via an app on the smartphone itself. In this case, when Bluetooth is activated on the device the server based tracking solutions using beacons are got possible as well. For positioning in client-based applications, several beacons are required. They send out unique signals with which the app determines the position by means of fingerprinting. Based on beacons, it is possible to trigger an action, for example displaying a coupon or information on the smartphone.

II. LITERATURE SURVEY

[3] In this Paper, they proposed a system in which secure tracking and path visibility of objects and people using protocol. The path should be correct along with protecting the privacy of the current owner-partner and user because in this protocol have to travel from many layers so owner user partner should be hidden from each other. In this, for privacy protection from system and user, it ensures protocol should be non-repudiation. Tracking is done by using RFID in which Tags and Readers are used. Here they use RFID because RFID recognizes the multiple objects at a time. In this Paper the Network RFID System uses which make possible of object Identification between different distribution partners.   In this, the RFID tag can move forward And Backward in two different business entity and hence authenticity should check and track the tag along with path. It should be protected from non-repudiation property of the system.

Advantage: By using protocol this system, is secure, non-injection of fake tags and non-repudiation so tracking is secure.

Disadvantage: In this system tracking object should report many partners before it reaches to the user. In Object chain networked, the object might travel among business partners hence system become less secure. In this paper they used Global Positioning System (GPS) for location tracking of person or object. Nowadays, use of Global Positioning System is rapidly increases. GPS is integrated into a smartphone, computers, vehicles etc. In order to provide accurate tracking, GPS has a network of 24 satellites which are placed at 6 different 12 hours orbital paths spaced. Satellites transmit navigation data on two L-band frequency. There are five monitor station and four ground antennas placed around the world which constantly, check satellites' speed, position, and altitude. To determine the position of receiver each satellite produce radio signals that a receiver uses to determine the satellite's location as well as to calculate the between satellite and receiver. The receiver determines its position by locking on to the signals of at least three satellites. After that receiver can also calculate speed, distance between current location to the destination, time required to reach the destination etc. In order to obtain an accurate fix on a moving Object, GPS determines how long it takes a satellite signal to reach a receiver. GPS always tries to compare the satellite signal's pseudorandom number with the receiver's PNC to determine the signal's travel time.

Advantage: Global Positioning System (GPS) provides accurate location information of person or object.

Disadvantage: Sometimes because of the atmosphere signals can slow down, it can affect system performance.

III. PROPOSED SYSTEM

 [4] We have a system in which beacons are used for Indoor Mapping It is kind of Distributed System between different Mobile Devices and System Sever. The first one detects the User's Current Location and Communicate with System server. The System Server Stores all Localization Information and other services. This Stored information used for the Tracking Objects and Peoples. This Indoor Location system consists of 3 Main Elements.

1. An Infrastructure of beacon Landmark that sends localization information.
2. Service Install on Mobile Device that collects the information of landmark to determine its location.
3. The service running on a server system that receives a current location of the user and provides it navigation to reach the destination.

More especially the network of beacon landmark Consist of an embedded device with Bluetooth Low Energy Interface. Beacons are placed at different positions in such way that distance between them should be 10 to 100 meter from each other. In this we used beacon because it has low energy Consumption and more Flexible, Low Cost, More Accuracy than other devices such as GPS, RFID etc. when a user requests to navigation from current location to the destination it gives the shortest path to reach there. Each Beacon has its own Unique Identification Number Using Which Tracking and Navigating can be done by finding the shortest path. In this work it also shows concern with the users'. They enhanced the experience of the users while shopping not only this but this project also shows concern to the shopkeepers also. This thing will really do help to the shopkeeper to promote their shop into the users by showing their topmost offers onto the users phones and this will get possible by the beacons which are already present in the infrastructure.

IV. CONCLUSION

In this paper, we have presented our work on the indoor positioning of shoppers and for shopkeepers, by using standard mobile hardware and the typical array of BLE (Bluetooth Low Energy) beacons deployed in a normal retail store. As a case study, this is of interest to researchers and practitioners as it represents a commonly discussed use-case for indoor positioning (shopping), yet relatively little work has used live data from such environments using a BLE platform.

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