

Implementing Beacon Technology and GEO Location in Retail Store through Android

Anjali Raghav¹, Ashish Kumar Sinha², Asif Khan³

^{1, 2, 3}UG Student, Department of IT, IMS Engineering College, Ghaziabad, India

Puneet Varshney (Assistant Prof., IMS Engineering College, Ghaziabad, India)

Abstract

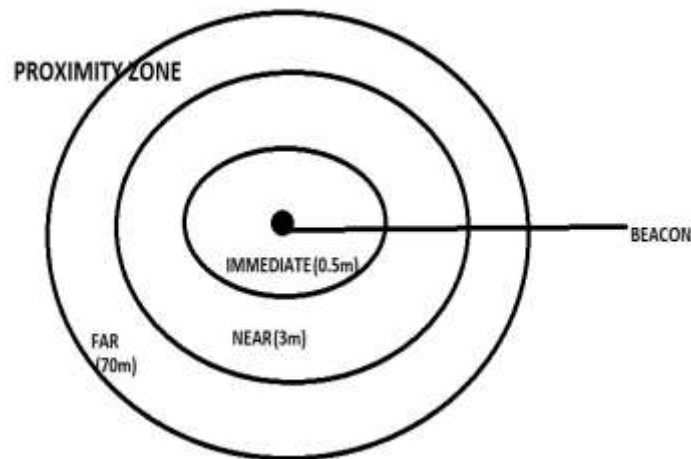
Due to the extensive adaptation of smartphones outdoor positioning by GPS has become an everyday commodity for many people. When it comes to indoor positioning things are different. Topology constraints in indoor environments are much more complex than those in outdoor environments. Many technologies and techniques have been used to solve this problem and as new technologies arrive these need to be evaluated. This papers aims to evaluate the Bluetooth Low Energy protocol, the way it works in indoor environments and explore the possibilities of improving the quality of the received signals so they can be used with smartphones. We conducted tests in a number of different indoor environments in order to identify the key attributes that affect the signals and suggest ways to improve them. Another technique is also used to improve indoor position, and is called GEO Location with the help of latitude and Longitude, it is still unclear if accurate indoor positioning can be achieved but further insights are shared and guidance for future implementation and research is given.

Key Words: Beacons, Improve proximity of retail store, beacons with android app, GEO Location, Latitude and Longitude

INTRODUCTION

Since becoming operational and available to civilians in the mid 1990's the Global Positioning System has become an everyday commodity. It is no wonder we have become accustomed to the luxury of accurate positioning when every smartphone provides us a link to this system. What happens though when positioning and navigation instructions are required indoors? GPS signals cannot overcome and penetrate inside buildings, they rely on Line of Sight (LOS) communication yet our need persists.

Many solutions have been implemented in attempts to meet this need, each with strong sides and weak sides. These solutions are based on a combination of signal communication hardware and algorithms for signal processing and positioning. As GPS positioning was the original it is not surprising to see that attempts have been made to bring GPS positioning indoors, Fluerau send GNSS transmitters in a repeater style setup to spread GPS signals indoors[5]. Technologies that are more commonly seen in indoor usage that have been used for indoor positioning are for example:



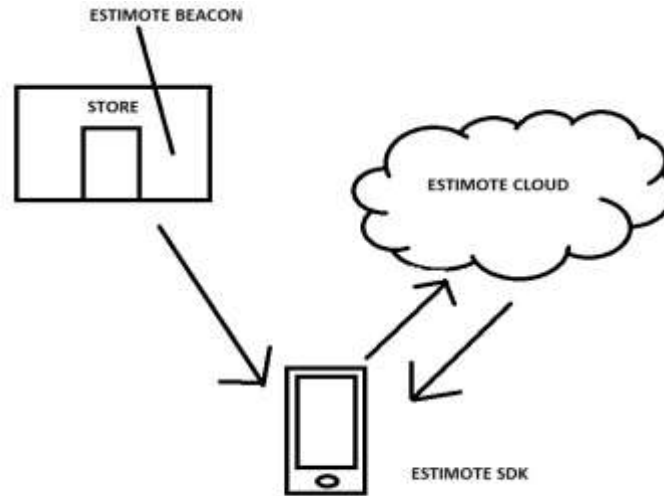
Proximity Zone of Beacon

Here, we are also going to deal with the GEO Location technique. With the geo location we are going to find out the basic longitude and latitude of a particular point. We have done this in order to make use of GPS inside the building. Although GPS does not penetrate inside the building but with the help of latitude and longitude we can access into the completion of work.

METHODOLOGY USED

Within the field of information systems there are two paradigms of research, behavioral research and design science research. While behavioral research seeks to build truth about an existing system (such as understanding the underlying phenomena that explains the usage of the system and try to make predictions), design science aims to explore a problem and build utility. Such a utility can be an artifact which can then be used to evaluate the problem and how the artifact addresses the problem.

In our study we made use of the design science paradigm to aid the field of software engineering and applied the build and evaluate model it describes. This was a good way for us to explore the problem to gain an understanding of the problem as we are trying to solve it. Design science goes well with the iterative mindset, which is often used in software engineering, as it also builds on a loop of build and evaluate. The key concept of design science is its iterative nature. The results are derived from the cycle of generating design alternatives and testing these alternatives. In this way design science is a search process to find a solution. Propagation models depend on the difference in a signal at one distance compared to at a further distance. In this regard it is important to note that the propagation model becomes dependent on the transmitted signal strength. Should your system rely on the signal strength for a distance calculation then your beacons should be set to the same strengths. Otherwise your system will need to adjust the propagation model based on knowing the signal strength of each beacon. Otherwise beacons at different distances could be read as being at the same distance.

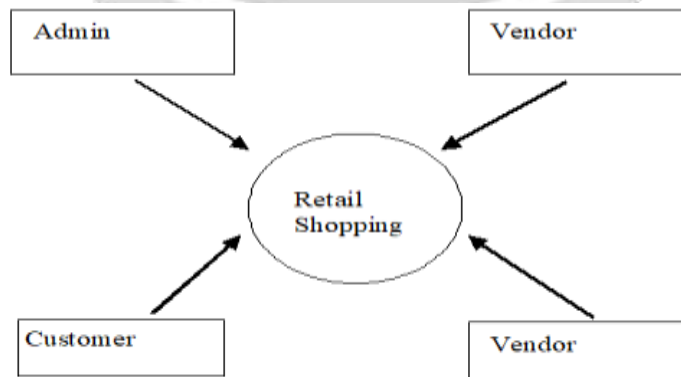


Working Design of Beacon

We carried out these iterations to produce an instantiation, a simple smartphone application that would let us do measurements of Bluetooth signals from the beacons on the basis of its range. By evaluating the usage of BLE beacons together with smartphones for possible indoor positioning systems. As such we were limited by the platforms and hardware we used. As an example we did not have direct control of the signal processing, rather we used the Android platforms SDK to do the BLE scanning for us. On the beacon side of things we used beacons developed by estimote which are very simple beacons that only broadcast their ID and have only two settings, their broadcast signal strength and broadcast interval.

On the other hand, when we look forward at GEO location technique the signal or the push notification is transferred on the basis of its given longitude and latitude. At different given or suggested point location different suggestions, offers and valuable information is provided. Here there is no requirement of measurement signal strength for this technique. As soon as the longitude and latitude matches, the suggested information is provide to the customer. And as per the given information and guidance the used to performs his task and take his decision. In terms of its signal it doesn't matter as everything is done on the basis of location and the calculation to find the distance between the different point location.

BLE devices does not report repeatedly during which is a condition necessary for localization during the scanning process. Therefore it is important to implement a mechanism which starts and stops scanning repeatedly in a given time interval.



CONCLUSIONS

In this paper we are going to improve the proximity of the retail shop with the help of BLE Beacons and with GEO location. This article is that prioritizing relationships with consumers is key to successful beacon as well as geo location application. It is clear now that indoor positioning is a difficult task. Topology constraints in indoor environments are much more complex than those in outdoor environments. The existing beacon-related literature has successfully started the conversation about the various opportunities and potentials for brands and advertisers to make the most of this technology. This study aimed to analyze these existing applications and present an overview of how marketers and advertisers can build beacons into their future strategic campaigns to increase the relevancy of communications in this digital age.

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