INDOOR MAPLOCALIZATION ANDWIFISIGNAL STRENGTH ANALYSIS USINGRSS FINGERPRINTING

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Abstract

"Knowing the Location" and "Determining the current Location" are essential for Indoor Localization techniques. GPS technology, is often used for getting the current location of the user. It cannot be used efficiently while performing getting indoors, because the losses occurred during the signal strength propagation. Wi-Fi technology which will be probably be used in all Smart Buildings, Public Places, Railway Station,Indoor localization algorithms have been surveyed and requirements which are essential for obtaining Mobile computing technology have been researched, and a context-based approach for a Smart Building. Using Wi-Fi technology to measure the Wi-Fi signal strength level which has got mobile computing structure is proposed.

Keywords: RSS Fingerprinting, Indoor Map module, WIFI Technology.

I. INTRODUCTION

Nowadays, Mobile phones has been used to obtain a good accuracy and signal strength with a variety of technologies it become a necessity for localization technology. The problem requires creating of map based floor plans of interiors, choosing the effective positioning technology and algorithms and deploying the appropriate positioning devices inside buildings. Most of the existing systems that offer indoor localization services use different wireless technologies like Bluetooth, Wi-Fi, signals of cellular towers and ZigBee. The methods using Wi-Fi are of more preferable because Wi-Fi networks are prevalent in most public buildings and its use doesn't require additional infrastructure and it allows determination of the location of each mobile device. WIFI have become a necessity choice for indoor map localization as the only existing and established infrastructure, to localize the mobile and stationary users indoors. However, since WIFI have been initially designed for wireless networking and not positioning, the localization task based on WIFI signals has several challenges. Only the RSS fingerprinting localization has recently provided great attention due to its accuracy and performance. It allows computation of an approximate probability distribution of error distance given a RSS fingerprint database based on received signal strength and its associated statistics. It also allows us to perform analysis of the internal structure of

location fingerprints. We employ the analysis of the internal structure to identify and eliminate unnecessary location fingerprints stored in the database, thereby saving on computation while performing location estimation. Our results depict illustrative evaluation of the approaches in the literature and guide to future improvement opportunities.

II. LITERATURE SURVEY

2.1. Performance Analysis of RSS Fingerprinting based Indoor Localization

Author: Ruofei Shen, Duowen Liu, Yutian Wen, Xinbing Wang
Year: 2017

Indoor localization has been an active research field for decades, where signal strength (RSS) fingerprinting based methodology is widely adopted and induces many important localization techniques, such as the recently proposed one building fingerprints database with crowd sourcing. While efforts have been dedicated to improve accuracy and efficiency of localization. Performance of the RSS fingerprinting based methodology itself is still unknown in a theoretical perspective. In this paper, it present a general probabilistic model to shed light on a fundamental.Concretely**,** it present the probability that a user can be localized in a region with certain size. It reveal the interaction among accuracy, reliability and the number of measurements in the localization process. Moreover, it present theoptimal fingerprints reporting strategy that can achieve the best localization accuracy with given reliability and the number of measurements, which provides a design guideline for the RSS fingerprinting based indoor localization system. Further, it analyze the influence of imperfect database information on the reliability of localization, and find that the impact of imperfect information is still under control with reasonable number of samplings when building the database.

2.2. Navigation for Indoor Location Based On QR Codes and Google Maps

Author: Dr S Ambareesh, Tejashwini D, Deeksha Reddy S, Sangeetha S

Year: 2016

QR codes is simple and efficient tool used in smartphones to obtain accurate indoor user location. As increasing number of geo-location services are exploiting the capabilities of smartphones, most of which incorporate GPS location. The smartphones compasses to direct the user to the destination. With the help of accelerometers, it will be possible to estimate the walking distances as an auxiliary information. An, idea in order to calculate the user position inside a building by using QR codes and Google maps. Navigation is the process or activity of accurately ascertaining one's position, planning and following the route to goal location. Mobile phones are devices merely used to communicate. Based on new techniques like GPS and sensors, compass and accelerometers that can determine the orientation of devices, location based applications coupled with augmented reality views are possible.

2.3. Modern WLAN Fingerprinting Indoor Positioning Methods and Deployment Challenges

Author: Ali Khalajmehrabadi, Student Member, IEEE, Nikolas Gatsis
Year : 2016

Wireless Local Area Networks (WLANs) have become a promising choice for indoor positioning as the only existing and established infrastructure, to localize the mobile and stationary users indoors. However, since WLANs have been initially designed for wireless networking and not positioning, the localization task based on WLAN signals has several challenges. Amongst the WLAN positioning methods, WLAN fingerprinting localization has recently garnered great attention due to its promising performance. WLAN fingerprinting faces several challenges and hence, in this paper,

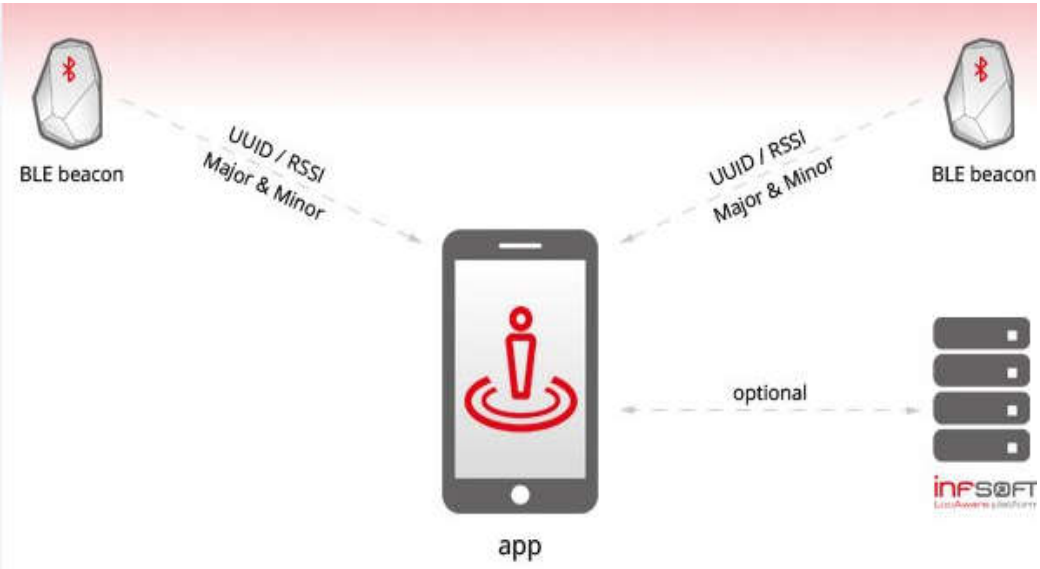
our goal is to overview these challenges and corresponding state-of-the-art solutions. This paper consists of three main parts: 1) Conventional localization schemes; 2) state-of-the-art approaches; and 3) practical deployment challenges. Since all proposed methods in the WLAN literature have been conducted and tested in different settings, the reported results are not readily comparable. So, it compare some of the representative localization schemes in a single real environment and assess their localization accuracy, positioning error statistics, and complexity. Our results depict illustrative evaluation of the approaches in the literature andguide to future improvement opportunities.

2.4. Location Fingerprint Analyses toward Efficient Indoor Positioning

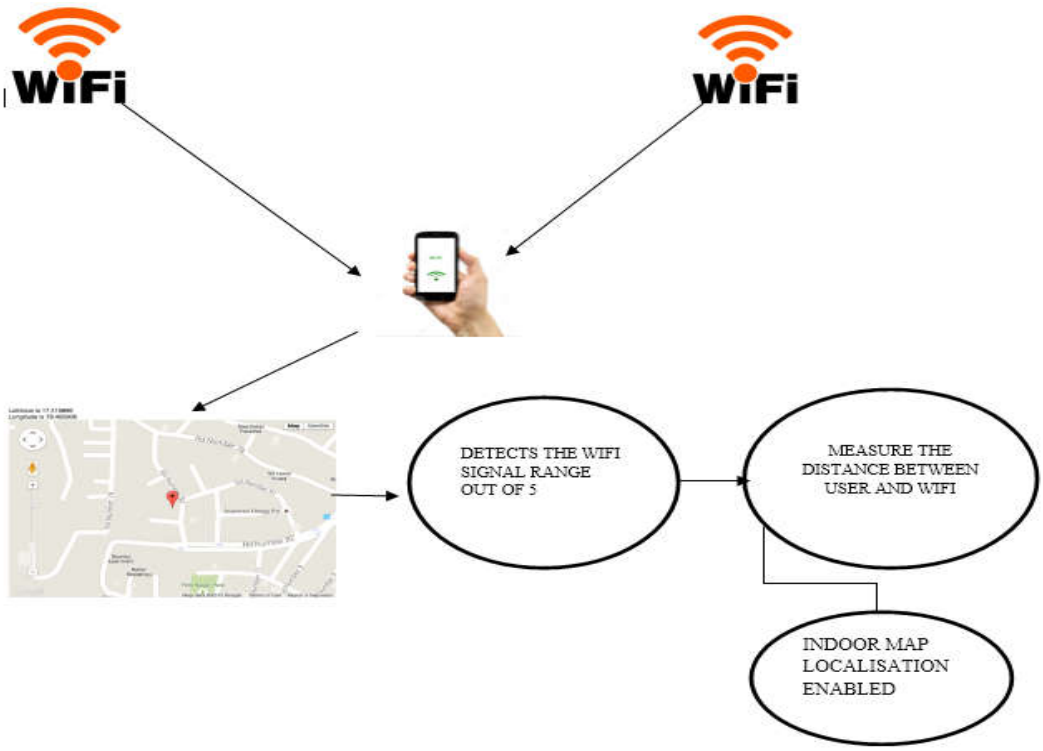
Author: Natta pong Swangmuang and Prashant Krishnamurthy

Year: 2014

Analytical models to evaluate and predict "precision" performance of indoor positioning systems based on location fingerprinting are lacking. Such models can be used to improve the design of positioning systems, for example by eliminating some fingerprints and reducing the size of the location fingerprint database. In this paper, we develop a new analytical model that employs proximity graphs for predicting performance of indoor positioning systems based on location fingerprinting. The model allows computation of an approximate probability distribution of error distance given a location fingerprint database based on received signal strength and its associated statistics. The performance results from the simulation and the analytical model are found to be congruent. This model also allows us to perform analysis of the internal structure of location fingerprints. We employ the analysis of the internal structure to identify and eliminate unnecessary location fingerprints stored in the database, thereby saving on computation while performing location estimation.



III. SYSTEM BLOCK DIAGRAM



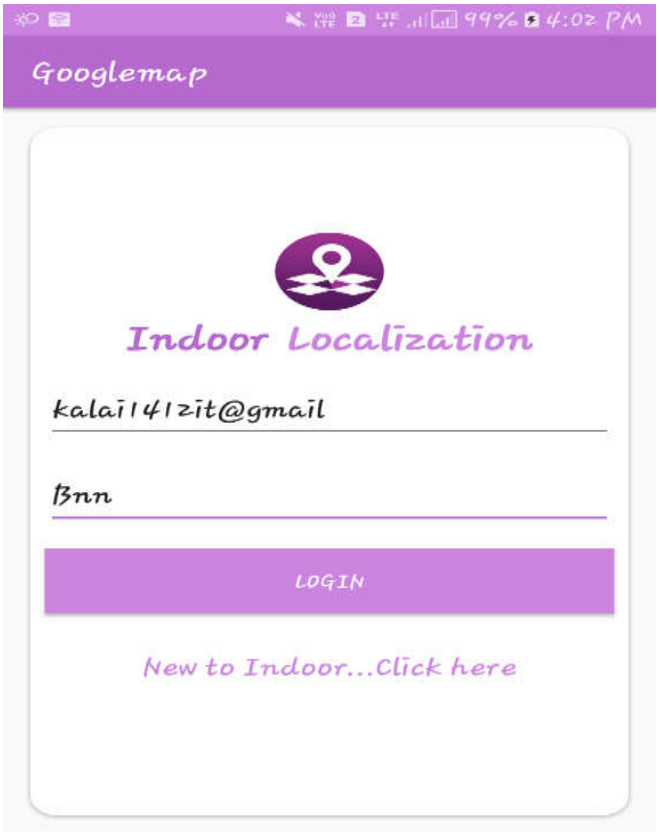
3.1. Proposed Block Diagram

IV TECHNIQUE USED

The technology which is used in indoor map localization is RSS technology which is used for information from Wi-Fi beacons deployed within buildings it to obtain a the indoor map of different locations (Technique called fingerprinting), and it will also estimate locations through the comparison between the current RSS measurements and the user with those stored in the indoor map localization. There are different attempts to obtain RSS technology based on indoor localization but without fingerprinting it shows an important loss of accuracy. Also, many fingerprinting-based localization systems make use of dedicated hardware for the collection of data in the training phase, while in the measurement phase, the actual mobile device used for localization. It have carried out tests to measure different received signal strengths. The technology Wi-Fi technology based on RSS offers the most reliable and accurate approach for indoor map localization in our smart building and public places, because of the important deployed infrastructure of Wi-Fi Access Points and also providing coverage distance in the whole building and public places for the user. The measurement of the signals strengths and practical implementation of our localization application, we have used smart phones running on Android.

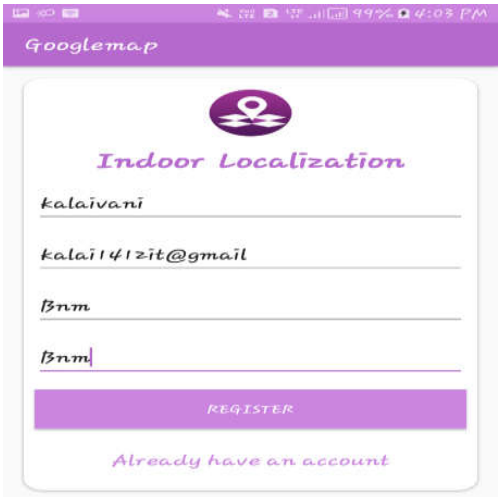
V RESULT

5.1. LOGIN MODULE



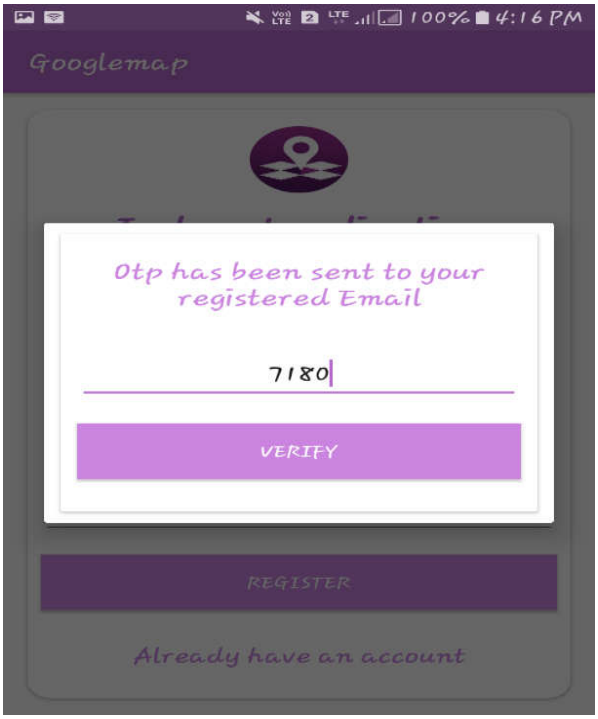
5.1. Login Module

5.2. REGISTER MODULE



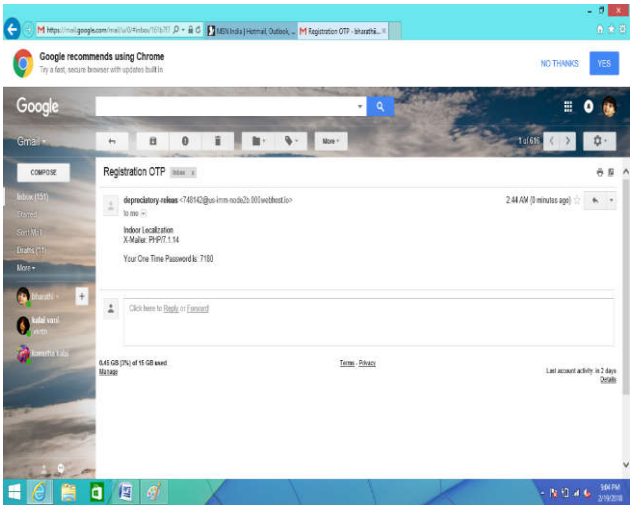
5.2. Register Module

5.3. SECURITY MODULE



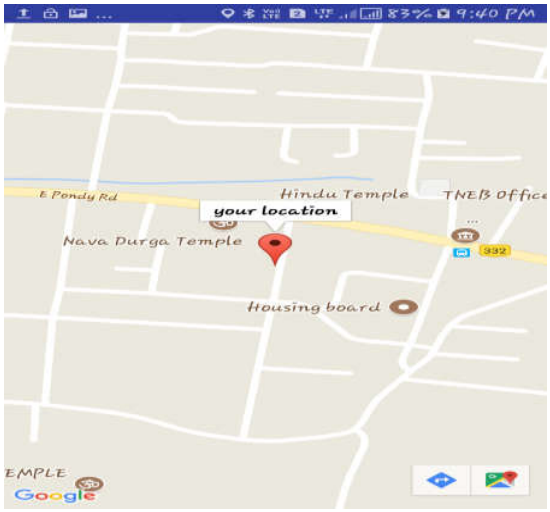
5.3. Security module

5.4. VERIFICATION MODULE



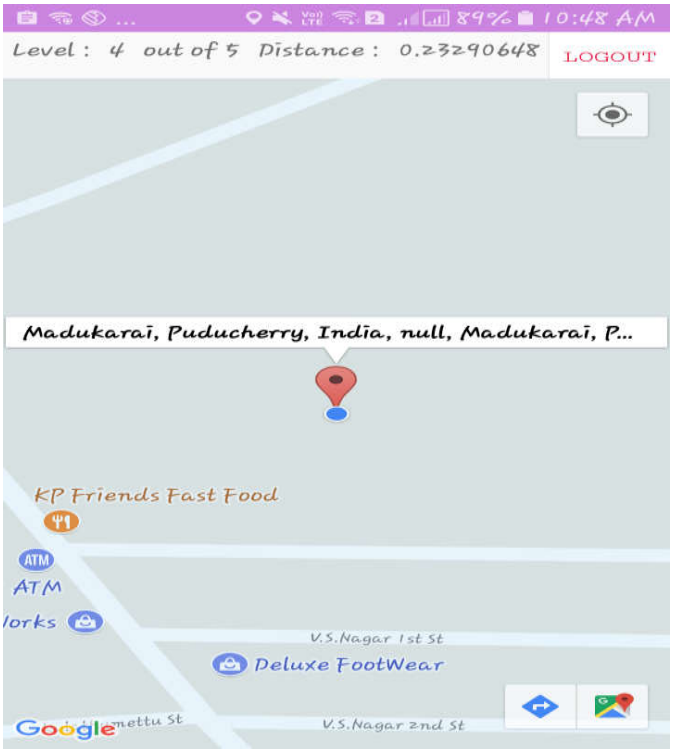
5.4. Verification module

5.5. GOOGLE MAP CURRENT LOCATION FETCHING MODULES



5.5. Google Map Current Location fetching Module

5.6. INDOOR MAP MODULE



5.6. Indoor map module

VI. CONCLUSION

In this paper, an indoor positioning systems using WLANs and location fingerprinting has been proposed. It also surveys the recent advances in wireless indoor localization techniques and system. There are different technological solutions for wireless indoor positioning and several tradeoffs among them are observed and surveyed. The plenty of approaches which exist to handle the indoor positioning system problem, current solutions can scope with the signal level that significant applications required. In short, requirements for different application environments that are accuracy, coverage, availability, and minimal costs for local installations. To achieve this error a good portion of research approaches is required to handle these error and challenges. Some of the future trends of wireless indoor positioning systems are as follows: (1) new indoor positioning and tracking estimation in 4G with the currently available position system, (2) need of cooperative with the mobile localization which will help mobile nodes among each other to determine their locations and signal strength (3) new innovative applications for mobile in which location information can be used to improve the quality of users experience and to add value to existing services offered by wireless providers.

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