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In Store Positioning Route Map for Grocery Chain

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Abstract: *The, Indoor Positioning and Navigation schemes have been a matter of intense learning and research must have become a blind spot with regard to Positioning and Navigation Software. Large grocery stores are nowadays used by millions of people for the gaining of an enlarging number of products. It is becoming increasingly difficult for the shop owner to guide all the time to the users for product position.*

Here we present an innovative system to get Positioning of the Product in Shoppe according to the user's list with the small Bluetooth beacon. It is used for finding the position of the product. By using Bluetooth beacon we can track the user based on Location Fingerprinting algorithm and gives the direction for the particular product in the Shoppe.

Key Words: Positioning and Navigation Software, Location Fingerprinting Algorithm, Bluetooth Beacon, Grocery Stores, Route Map.

1. INTRODUCTION

There has been a tremendous escalation of technology in nearly every part of daily living. Although there are silent significant function areas in which skill encroachment have not been implemented in a cost-effective and user-friendly manner. Searching and collecting every product in today's large grocery stores is quite a time to consume Since all customers do not have any knowledge about the internal structure of the store so they are not able to find the location of the product which they actually buy.

We introduce an in Store Positioning Route Map for Grocery Chain system using Bluetooth beacons. By using this user can find the position of the product according to user current position in the shop.

The main purpose of this project is to presents the design and implementation on the mobile device of a 2D positioning and navigation system for in-store grocery Chain based on the use of Bluetooth beacon technology and implemented using Java and Android, this implementation is adaptable to whatever indoor environment previously modeled and loaded. Location is implemented on beacons with distributed estimation which gives the current position of the user, and app recommends directions to the particular product mentioned in user's product list. It is helpful to get the product with less time.

2. EXISTING SYSTEM

In the existing system, the user has to search the product according to his list. He is not sure rather not having any idea about the position of the product that he actually needed. So the user has to search the product sequentially looking throughout the racks of the store which is quite time-consuming so we develop a system which overcomes all the issues.

3. RELATED WORK

An algorithm for connecting indoor positioning data with customer transaction[1] data with fingerprinting as a primary data collection technique, the comparison of the positioning and transaction data before and after critical store layout optimization decisions are given so as to identify which customer movement patterns generated with the highest sales.

A system for the acquisition of products in grocery stores with Intelligent Cart search[2] is rising portable method and automatic recognition technologies like RFID is a way to improve the quality of services provided by retailers and to augment the consumer value thus allow for saving time and money.

An overview of the existing wireless indoor positioning [3]over three typical location estimation schemes like triangulation, scene analysis, and proximity are analyzed. Here the location fingerprinting algorithm[1][3] is explained since it is used in most current system or solutions.

The physical layer information(PHY)[4] can be sufficient to place the WiFi devices to meter accuracies in indoor environments. The author uses the classification algorithm which is composed of two parts. First, PinLoc computes a micro-location based on WiFi SSIDs alone and shortlists the spots within this macro-location to get the position of the users.

Indoor localization system that uses angle estimation and decentralized computations[5] are explained. The system uses three rotating optical beacon signal generators that are built using commonly available off-the-shelf components. Wireless sensor nodes equipped with photo sensors determine their locations from the estimated angular separations between the optical sources. This system provides location estimates that are accurate within a few inches in indoor applications.

4. PROPOSED SYSTEM

We developed an in-store positioning route map system for a grocery chain in large grocery stores for guiding the user to get the positioning of the product from the current position of the user. The working of the system is as follows.

The Route maps indicate the positions and direction indications about the particular product for the user. Admin can add route maps for a particular shop. Admin can add route maps so that Positioning of the Product in Shoppe can be determined according to the user's list. The grocery shop should have a small Bluetooth beacon. Bluetooth beacon used for finding the position of the product.

The user can create the list of products. The app will be navigating the position of user list product according to user current position in the shop. It is the easy way to grocery shopping. Its time-saving process. By using Bluetooth beacon we can track the user based on Location Fingerprinting algorithm. Once we know the current position of the user, the app recommends directions to the particular product mentioned in user's product list. It is easy to maintain product stock at admin side. Wi-Fi Location Fingerprinting Signal strength is used to find the user's exact location.

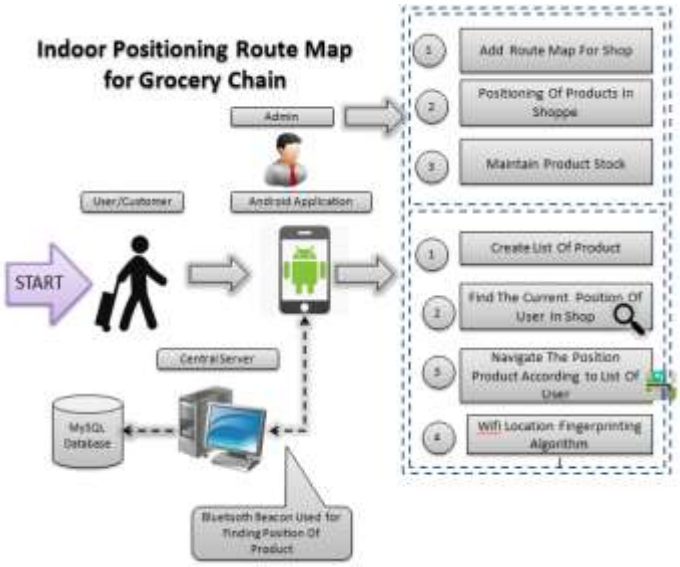

Fig 1: System Architecture

5. PROPOSED ALGORITHM

The fingerprinting technique is extensively utilized where line-of-sight signal proliferation is not distinctive. The minimum cost of the user hardware and the promising performance are its main advantages. Wi-Fi location fingerprinting consists of two phases: the off-line data training phase and the online positioning phase. The aim of the training phase is to build a fingerprint database. To generate the database in a conventional way, some reference points (RP) in the area of interest are selected. The algorithm works in following steps:

1. The RSS probability distributions of all APs (Access Points) at all RPs (Reference Points) need to be stored. The fingerprint of the i-th RPs can be defined as:

$$R_i = \begin{bmatrix} P_{A_1}(T_1) & P_{A_2}(T_1) & \cdots & P_{A_N}(T_1) \\ P_{A_1}(T_2) & P_{A_2}(T_2) & \cdots & P_{A_N}(T_2) \\ \vdots & \vdots & \vdots & \vdots \\ P_{A_1}(T_M) & P_{A_2}(T_M) & \cdots & P_{A_N}(T_M) \end{bmatrix}$$

Where An (n = 1⋯N) means the n-th AP; T means the measurement of RSS(Received Signal Strength). P is expressed as:

$$P_{A_n}(T_m) = \frac{C_{T_m}}{N_i}$$

Where N is the total number of training samples collected at the i-th RP; and C is the number of Tm appearing in the training data at the i-th RP.

1. The whole fingerprint database is expressed as:The whole fingerprint database is expressed as:

$$D = [R_1, R_2, \cdots, R_W]$$

where w is the total number of RPs in the area of coverage.

2. To speed up the computations, the signal strength distribution is typically divided into p bins. The fingerprint of the i-th RP also can be expressed as:

$$R_i = \begin{bmatrix} P_{A_1}(B_1) & P_{A_2}(B_1) & \cdots & P_{A_N}(B_1) \\ P_{A_1}(B_2) & P_{A_2}(B_2) & \cdots & P_{A_N}(B_2) \\ \vdots & \vdots & \vdots & \vdots \\ P_{A_1}(B_P) & P_{A_2}(B_P) & \cdots & P_{A_N}(B_P) \end{bmatrix}$$

1. respectively the possibility of the RSS dimensions inside the bin B intended for AP A at the i-th RP can be given as:

$$P_{A_n}(B_k) = \frac{C}{N_i}$$

Where C is the number of samples with the signal strength within B.

6. EXPERIMENTAL RESULTS

The shop owner or we can say that admin can add the categories of the products along with offers if any and set the Bluetooth beacon to the particular position in the shoppee. Using this app admin can maintain the product stock.

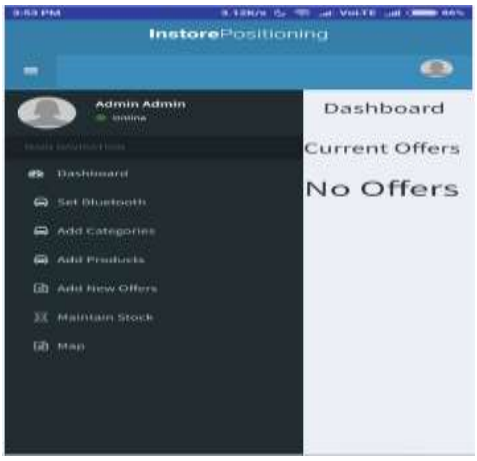

Fig 2: Admin Dashboard

With the help of this app user can create the product list. He can search the product by category.

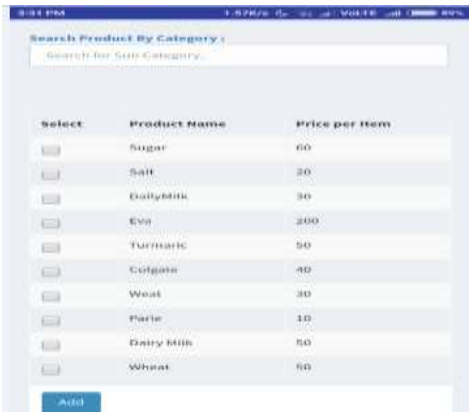

Fig 3: Product List

Users current position can be tracked and navigate the user to the shelf where the product is placed according to the list. The Green Sign indicate the current position of the user.

Fig 4: Map

User gets the position of the product According t the product list of the user.

Fig 5: Map According to the Product List

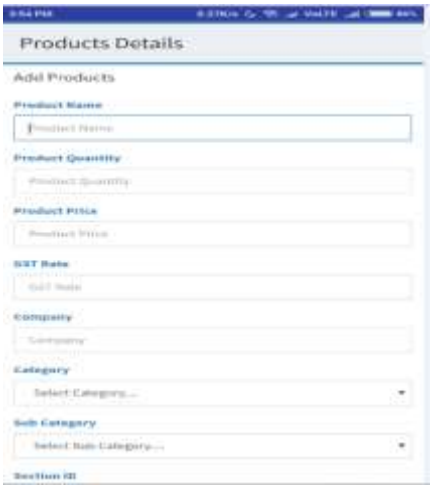

Fig 5: Map According to the Product List

Admin can add the new product with all the details shown in figure 5 so that it can be available for the customers.

7. CONCLUSIONS

Here we present a system In Store Positioning Route Map for Grocery Chain on the android phone. The user can use Bluetooth beacon for finding the position of the product. This App will be navigating the position of user list product according to user current position in the shop. It is a time-saving process and shown with directions of product from his current location.

One of the advantages of this system is that the whole system can be implemented in very less time and low cost.

REFERENCES

[1] Hyunwoo Hwangbo, Jonghyuk Kim,ZoonkyLee and Soyean Kim"Store layout optimization using indoor positioning system", International Journal of Distributed Sensor Networks 2017, Vol. 13(2) Ó The Author(s) 2017.

[2] Diana S. S. Santo,António M. J. Pereira"IntelligentCart: Architecture of an Innovative Syst em for the Acquisition of Products in Grocery Stores ",Innovation and knowledge Management in Twin Track E conomies: Challenges & Solutions.

[3] Hui Liu, Houshang Darabi, Pat Banerjee, Jing Liu"Survey of wireless indoor positioning techniques and systems", Environmental and Occupational Health Sciences Bio engineering.

[4] G. Wetzker and F. Jondral Institut fur Nachrichtentechnik, University at Karlsruhe "Maximum Likelihood Acquisition of Time and Frequency Shift in Land Mobile DS-CDMA Systems" IEEE 1998.

[5] Damian Bargiel and Sylvia Herrmann\'Multi-Temporal Land-Cover Classification of Agricultural Areas in Two European Regions with High Resolution Spotlight Terra SAR-X Data',Remote Sens. 2011, 3, 859-877; doi:10.3390/rs3050859 Remote.