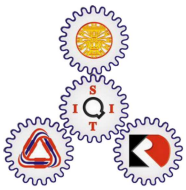

SCHOOL OF INFORMATION, COMPUTER AND COMMUNICATION TECHNOLOGY
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Mini-Project Report
In-Store Recommendation and Navigation Application

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Introduction

This mobile application will provide users with the relevant recommendation such as promotion, coupon, or trending feed to the customer. The relevancy of the information will be based on the customer's location inside the store. In addition, the application also provides a store directory which customers can use to assist them with navigation inside the store. It uses indoor positioning and other related services to yield better and more accurate positional data.

For example, if a customer is currently located near a shop in the dessert section of a department store, the application will let a customer know about the top-selling product, promotion, and coupons related to the dessert section.

Problem addressed

Our team aims to tackle problems with irrelevant advertisements or spam. We plan to develop an application that would provide real-time product information to the user based on their current location. Location-based marketing has proven to be effective across customer lifecycles - from the discovery of the product to the purchasing, customer retention and customer engagement.

Another problem to be addressed is the indoor navigation problem. The need of indoor navigation system in the large-scale department store

Importance of problem

Throughout the day, advertisers send out multiple advertisements in hopes of receiving higher sales and/or brand recognition. However, by doing so they make themselves susceptible to spamming people bringing out the negative effects of too much advertising. Using location-based marketing, marketers will be able to target specific customer segments with different types of information (products, promotion, and offers etc.) improving customer experiences towards advertisements.

Methods

Tools and Software

- Geotargeting: Based on the device's IP address which user needs to enable location tracking on their phone.
- Geofencing: Creation of store’s boundary used for proximity calculations.
- WiFi Fingerprinting: The use of WiFi access points (APs) installed across the store to help determine current user location inside the store, using RSSI value and number of APs count.
- Bluetooth Beacons: The use of bluetooth technology to predetermine the location of a device and send information to nearby devices.
- Cameras and video image processing: for tracking customer movement, location, and crowd density inside the store.
- Mobile phones: Used for collecting location and indoor positioning data, display information based on the current location inside the store, navigate them inside the store.

Data Collection

- Received Signal Strength Indicator (RSSI) measurements and the number of WiFi access points (APs) count to determine the location of the customer with the WiFi fingerprint database.
- In-store position and coordinates to calculate the path that customer needed to take in the store navigation system.
- Videos of customers inside the store for calculation of crowd density only.

Mockup/Prototype Design

Results & Discussion

Expected Outcome

The development of this application will lead to more interesting discoveries of understanding customer behavior. Customers can also use this application to gain more information about related promotions based on their position in the store as well as assist them with navigation within the stores. The data collected could be used to further segment customers into further niches which allows companies to design and make products that are more tailored to the customers which would be beneficial to both parties. In terms of data collection and analysis. By conducting research and development into this application, new areas of exploration into indoor LBS technologies could arise.

Stakeholders

Marketers/Advertisers: Marketers and advertisers would benefit greatly from this application as it would enable them to target specific audiences or audiences with higher potential to buy goods/services that the company provides. More importantly, this application allows companies to be able to have a better understanding of customer behavior in their stores. They would be able to better understand the effectiveness of their marketing campaigns as these advertisements can show instant results as the customers are in close proximity to the store fronts.

Consumers: Consumers using this application can feel more at ease about the types of advertisement they will be receiving. Advertisements would be more personalized and targeted towards each individual creating a sense of individual importance to the brand. It would also save time and money when purchasing goods and services as the application would provide not only product information but also promotional offers as well. Ultimately the aim of this application is to improve the user's shopping experience, making relevant information conveniently available in a timely manner.

Store Managers: Store Managers will have more information about customers' traffic, density, and peak hours. This information could be used to plan the store plan and launch promotion accordingly. Moreover, during this COVID-19 pandemic, they can also use this information to help them plan for social distancing protocol and apply COVID-19 prevention measures more effectively.

References

Kingatua, A. (2020, March 26). *Bluetooth Indoor Positioning and Tracking Solutions*. Retrieved April 3, 2022, from Medium: https://medium.com/supplyframe-hardware/bluetooth-indoor-positioning-and-asset-tracking-solutions-8c78cae0a03#:~:text=Bluetooth%20indoor%20positioning%20system%20(IPS,to%20their%20areas%20of%20interest.

Marketing Evolution. (2022). *What is Location-Based Marketing?* Retrieved from Marketing Evolution:https://www.marketingevolution.com/knowledge-center/topic/marketing-essentials/location-based-marketing#:~:text=Location%2Dbased%20marketing%20allows%20organizations,in%20their%20region%2C%20and%20more

Retscher, G., Bekenova, A., Fazliu, A., Hallett, M., Harvey, L., & Janssen, J. (2019). Dynamic Wi-Fi Reference Point Recognition along Public Transport Routes. *In LBS 2019; Adjunct Proceedings of the 15th International Conference on Location-Based Services / Gartner, Georg; Huang, Haosheng.* Wien. https://doi.org/10.34726/lbs2019.26