Iot Based Guidance And Assistive System For Supermarket Shopping

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Abstract: People spend lot of time in searching the product in the supermarket. Although there are many online shopping websites are available for the people, they prefer only the traditional way of shopping because it is very convenient to them. But the traditional way of shopping does not provide required information about the product to the customer. Thus, the proposed system shows the availability, price and location of the product in the departmental store through the mobile app using Internet of Things. The existing system focuses only on displaying the product details and discount available on that day through the smart phones. The main objective is to make the shopping quite easier and faster by showing the location of the product by means of an image so that anyone can easily identify the location. The details of the product such as price, quantity and description of the product are stored in database so that many people can access the data at the same time. Shopping Companion is the android app used for showing the product details. It is developed by using the software Android Studio. Each user can create their own account with unique username and password and search the product what they need. If the product is not available in the store then it will show the notification so that the customer can search for other product.

Index terms: Add to cart, Android app, app development, departmental store, IoT, bill generation

1 INTRODUCTION

Shopping become a day to day activity of many people. Even though there are many grocery stores available people prefer supermarkets because there all the items are available in one place and they can compare and buy the product which is satisfied to them. The main difficulty the people face is the time consumption. Nowadays, supermarkets came with smart cart for automatic billing but there is no solution for searching the product. The fundamental reason for development of the project is making a shopping experience quite easier and in a convenient manner. An android app have been developed to view the description of the product through their smart phones. Since everyone is having smartphones in their hand this method is very effective. Shopping companion is the app developed using android studio. The layout of the store is already stored in the database. When it is going to be implemented in larger area with more number of users, wireless modem can be used. The other advantage of this system is billing will be undergone automatically. Once they completed their shopping process, billing process will also be completed.

The customer can also update the product which they want to buy by adding it to the cart. The product that is added can also be deleted if they don’t want to buy. Thus after complete the shopping the final bill will be displayed. This helps in reducing supermarket overflow and it also reduce our valuable time. Thus the proposed system helps to make shopping quite faster and easier. Thus the customer can always take the best and shortest route to the checkout and put all needed items in their shopping cart along the way. The advanced features of the app may include to pre-order groceries and simply pick them up at the closest store.

2 RELATED WORKS

[1] IoT based interactive shopping is created where the customers can see the product details such as price, nutrients and expiry date of the product. This system uses RFID tag to extract the product details. Using wi-fi module the information is stored in the cloud. The customers can access the information in the cloud by using the android app.

[2] The Content Management System is used to store the location of the product. Digital signage is used for displaying advertisements and discount available on that day so that many customers would be attracted towards it. Thus the main aim is to locate the customers and shows the location of the desired product.

[3] Nowadays barcode is available in every product. The barcode is used to see the product details and for billing purpose. Once the barcode is scanned the product details will be displayed in LCD. The product is also added to the bill. After the customer en shopping the total bill will be displayed in LCD.

[4] This paper discussed about various Indoor Positioning system. IR based positioning system is used for predicting exact location but it is very expensive when it is implemented in large coverage area. The ultrasound positioning system increase the coverage area but noise sources may reduce the accuracy. RF waves can penetrate walls and human bodies but many hardware...
components are needed to install the system.

[5] The customer can see the location of the product through their smartphone. The QR code is used for billing purpose. Once the customer wants to buy the product they can scan the QR and select the quantity so that the product will be added. The bill can be paid through online by means of credit/debit cards. Only authenticated users can pay the bill through online which is a major disadvantage of this system.

[6] The wireless indoor localization produce accurate location. The strength of the signal that is transmitted from accessing point to client is measured and it is called RSSI. While increasing the number of access point the interference between the signals is increased. Eventhough this system is easiest to implement it does not provide good accuracy. The trilateration method is used to increase the accuracy. The 2D position of the object is measured from three different accessing point. The accuracy and power consumed for each method is measured.

[7] The store was divided into five segments and the movement of customers were analysed. The location of the customer is detected by using their MAC address. When the customers turn on the Wi-fi, the MAC address was detected. Once the location is detected then the movement of the customer was tracked. The relationship between sales and movement was analysed. The method is applied for personalized marketing.

[8] Pedestrian Dead Reckoning algorithm is used to measure the distance of the customer. This position estimation uses wifi adapter and map information of the indoor environment. From the available statistical data a probability map is derived to analyze the movement pattern of the customers.

3 PROPOSED SYSTEM

Nowadays, the major problem of customer is searching of product what they need. It consumes more time for searching the product. So, the shopping malls get lost of their income as when customers get lost. To overcome these problems started above and to improve existing system IOT based Guidance and Assistive System for Supermarket shopping was designed. The proposed system mainly focuses on displaying the location of the required product using an android application. The android application has been designed using Android Studio software. Java Programming Language has been used here. The details of the product such as price, quantity and location of the product are stored in the database. By using this database, multiple users can access the same information simultaneously because it is connected to internet of things. The generated bill will be automatically displayed in the serial monitor from developed mobile app via Bluetooth module HC-05.

3.1 BLOCK DIAGRAM

![Fig 1 Architecture of proposed system](image)

Almost everyone is having mobile phone in their hand. Therefore it becomes easier for the customer to become connected with IoT. The customers have to install the app before they enter into the mall. Once they enter into the mall they have to establish Bluetooth connection. Initially the customer has to sign up with username and password. Then they have to login within their username and password. If the username and password does not match then it will show the notification. Then they have to again signup to create a new login ID. Once they enter into their account they can search for the product that is needed. The searched

The Bluetooth module HC-05 is used for wireless communication. Bluetooth module covers a range of about 100m but it can accommodate only seven users at a time whereas a Wi-Fi can give access to more number of products. After customers trace the product if they want to buy the product then they can add it to the cart. The product that is added to the cart will be displayed in the mobile phone so that the customers can also see the list of products. There is also an option to remove the product that is added to the cart. The data that is displayed on the phone will be transmitted wirelessly to the computer through the Bluetooth module. Bluetooth is connected serially to the Arduino UNO and the data is then given to the computer. Arduino microcontroller is programmed by using the software Arduino IDE. The product details can also be deleted and updated using the mobile app by the administrator or owner of the shop. From the mobile app the bill will be transmitted to PC and displayed in serial monitor. It will replace the existing method of manual billing which results in long queue. It will reduce the time consumed for billing purpose and reduce the manual effort for bill calculation.

3.2 FLOW CHART

![Flow chart](image)
product details such as the price, availability and product descriptions will be displayed along with the location of the product. The location of the product will be shown by means of an image. If the searched product is not available then it will show the notification message. Then the customers have to search for another product. By using the image the customer can trace the product and if they want to buy it they can choose the option add to cart so that at the end of the shopping the customer can see the list of the product they want to buy. This app will also help the shopper to update the product details by using their account. This will greatly reduce the difficulty faced by both customer and shop keeper. This will be further modified with various technologies to identify the customers current location.

3.3 HC-05 BLUETOOTH MODULE WITH ARDUINO UNO

The connection between Arduino UNO and Bluetooth is shown in the figure. The transmitter and receiver pin of Bluetooth module is connected to the pins 2 and 3 of Arduino UNO. Thus the bluetooth transmits data from Smart phone via Bluetooth to the Arduino UNO and displays the bill on Serial Monitor of PC. Data is sent from the Smart phone using the android application shopping companion. The bill consists of product name, price of each product and total price at the end of shopping. The total price gets increased every time the product is add to cart. Once the customer end the shopping the final bill will get generated.

3.4 HC-05 DEFAULT SETTINGS

- Default BluetoothName: “HC-05”
- Default Password: 1234 or 0000
- Default Communication: Slave
- Data Mode Baud Rate: 9600
- Command Mode Baud Rate: 38400

4 SOFTWARE DESCRIPTION

4.1 ANDROID STUDIO

Android studio is the software used for app development. In android studio both JAVA and C++ is used as programming language. For android app development JAVA is mainly used. Android studio is open source and it supports both development and testing. Android provides a rich application framework that allows the user to produce the innovative apps in java language environment. Shopping companion is the app developed using android studio. It allows the shop owner to update the product details and customer to access the product details. The owner can add N number of products so that it is very convenient for other users.

4.2 JAVA

Java is an object-oriented programming language, which is class-based, concurrent and also for general purpose. JAVA is a platform independent language. It allows to run on any platform without the need for recompilation. It also enforces an object-oriented programming that can be used to create complete applications that may run on a single computer or be distributed among servers and clients in a network. It includes content management systems, BPM, application servers, databases and so on to cater to your specific or broad spectrum needs. It is very useful for developing app for a complete application that include complex process.

4.3 SQL

SQL is used as a database to store the details. It can also be used as a web database. In supermarket, there are wide varieties of items available. So the shop owner has to store all the information about the product. The details of the product such as name, quantity and expiry date are store in the form of text whereas the location is stored in the form of an image. It is more secure when compare to other database. It provides easy access to the data hat is stored. It is used for database related app development.

5 RESULTS AND DISCUSSIONS

In the main activity screen, have to choose the option as seller and shopper. When the username and password is correct but they wrongly choose the option as seller or shopper it will not authenticate. The shopper activity include adding the product details and update the database. The shopper can search the product they need and can add it to the cart. If the product is added to the cart it will be included in the bill.
This page shows the database stored in the mobile application which is viewed only by the shop owner. There is a remove option in each and every product which is used to delete the details about the product.

This page shows authentication page consists of username and password. The account can be created by users by using the sign up option and the sign in with username and password. In this page the customer can search the product details by searching the product they want to buy. It will show the availability of the product and location of product in the form of an image.

This page displays the generated bill which consists of the product name, cost of the product and the total price of the bill. The product that is added will be displayed in the monitor.
CONCLUSION
The developed mobile application helps to make shopping experience quite easier and also improves the supermarket overflow. It also consumes our valuable time and this method is cost effective. This application provides convenience to the customers. This system can provide an efficient way to identify the products and fast billing system. The advancement of mobile technology and the internet network has led to the development of different great apps. Connecting only seven devices is considered as the drawback of this project. This can be overcome by means of using Wi-Fi module.

REFERENCES