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IOT Based Smart Shopping Cart

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ABSTRACT: Reducing the time consumed while waiting in long queues during the checkout process in a supermarket is one of the core objectives in improving the shopping experience of customers. In this paper we propose the use of RFID embedded with the shopping cart to design a smart shopping system. All the shopping carts in the mall are coupled with RFID tags. People purchase different items and put them in trolley & go to billing counter for payments. At the billing counter the cashier prepare the bill using bar code reader. Aim of this task is to develop a system that can be used solve the above mentioned challenge. The system with RFID tags will be placed in all the trolleys. All the products in the mall will be equipped with RFID tags. When a person puts any products in the trolley, its code will be detected and the price of those products will be stored in memory, its name and cost will be displayed on LCD and will be sent to billing Counter by wireless modules. Also this whole information will be send through Ethernet module to internet. Also we use ESP method which is helpful to owner.

KEYWORDS: RFID, Wi-Fi Module, Android, LCD

I. INTRODUCTION

Shopping mall is a place where people get their daily necessities ranging from food products, clothing, electrical appliances etc. Sometimes customers have problems regarding the incomplete information about the product on sale and waste of unnecessary time at the billing counters. Continuous improvement is required in the traditional billing system to improve the quality of shopping experience to the customers [3]. Now day's numbers of large as well as small shopping malls has increased throughout the global due to increasing public demand & spending. At the time of festivals, special discounts, holidays, etc. there is a huge rush in shopping malls. The use barcode reading technique in such situations always results in waste time since customer has to wait till whole items get scanned. These advantages can be avoided by using IOT based intelligent trolley proposed in this paper [1]. This system uses RFID technique instead of barcode. Proposed system uses separate RFID reader for each trolley and RFID Tag for each product. When customer buys any product RFID reader reads the tag which is present on the product. The cost of product and the total bill of shopping items can be displayed on 16*2 LCD. IOT based intelligent trolley presented here is easy to use and does not requires the special training to customers. RFID technique has many advantages over barcode systems. RFID reader reads the tag from a distance of 300 feet whereas barcode can read the information at distance not greater than 15 feet. Also the barcode need one site of propagation. Reading frequency of barcode reads is only two tags whereas reading frequency of RFID is 40 tags [5]. So the use of RFID is more useful than traditional barcode reading technique. Here use of RFID is helpful for customer. Then what about owner? As each one of us is aware that single owner can have ownership of more than 2or3 malls or in each mall many sections are available, then how someone make control over it. Solution to above mentioned challenge is the use of ESP module. It will reduce the required hardware and also gives the real time information about commercial activity in all malls from any location. Using this system, customer will have the information about price of every item that are scanned in, total price of the item and also brief about the product. So use of this IOT based intelligent trolley for shopping malls is helpful for customer as well as owners [6].

In this era, of modernization, Internet of Things or IoT, different interactions among all physical materials have been assigned to real life situations. Each day materials are equipped with various computing functions and communicational functionalities, which allows materials every place for connecting. These updates had brought a very new spin in all the industries, finance department, and all environmental mechanisms, it had provoked great challenge in data managing, mobile wireless communication and Real-life decision making. In addition to that, inexistence of security and lack of interruption issues had already emerged to and very lightweight cryptographic methodologies came in very high amount of requirement to fix into smart IoT applications. There were always a lot IoT using application and devices which changed the whole technology revolution, for example, savvy homes, e-wellbeing frameworks, wearable

gadgets. In this journal-paper we proposed a modern smart secure market shopping system using the modern Radio Frequency-ID technology, which has not yet been very much observed previously. We had considered the security and protection issues identified with shopping frameworks as no past research had handled it properly. In such sort of frameworks, remote correspondences among the different servers, trucks, and things are defenceless against different assaults, a foe can meddle with all interchanges if no legitimate and security functional strategy is connected. Security problems likewise exist including similar framework the contender of any store may get simple access to the flow of items for budgetary procedure. Moreover, client inclinations can be gathered by effectively gathering the item data in customers' shopping baskets. Instinctively this brings the accompanying advantages.

II. RELATED WORK

Talking about the present scenario, the craze of shopping among the people increasing day by day. The consumer prefer shopping either online bases or mall bases .Currently, barcode system is in use, because shopkeeper has human power to handle the consumer by performing scanning and billing and also they are having employee's for security purpose. But the drawback of this is time management and also money spent on the individual employees. RFID technologies are widely spread and taking an important role in many projects due to its effective and fast response. RFID tag is basically used for the purpose of unique identification of the purchased product by using radio waves. These RFID offer more benefits over existing barcodes, which are still in use as they have major drawbacks like a direct line of sight operation and its scanning range is just from few inches to few feet. Barcode reader can read one product at a time. Barcode system runs on optical technology. Barcode requires considerable amount of human efforts. Not only this, barcode tags have constraints in its durability.

Moreover, the RFID tags are more durable and also they are able to read/write data which could even be encrypted. In addition, plenty of data like product detail, price, size, and other information can hold by these tags by assigning a unique identification number. With the help of RFID technology it makes it easier and simplifies the process of identification of product. The controller controls the shopping cart with an RFID Reader to scan each purchased product. Every new consumer will provide a unique RFID based membership card, which will hold information about the person. After finish purchasing, he or she could pay his or her final bill by deducting money from the membership card or even through the app. This concept satisfies the expectation of consumers whose basic demand is to ease the way of purchase. By regulating the RFID technology-based shopping cart one can bill the purchased product themselves without bothering the presence of workers in shopping malls or supermarket as the product information are available and display in the cart. This outcome of the project will facilitate the consumers but also the shopkeeper by eliminating the cashier and money spent on them.

III. METHODS

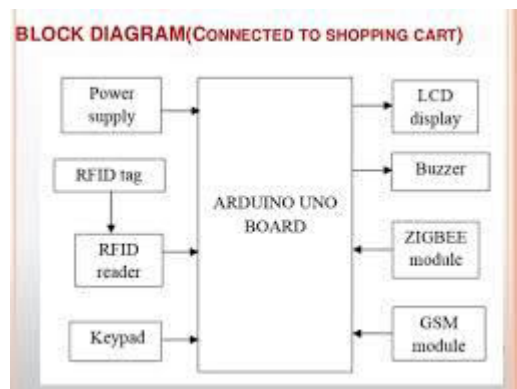


Fig1: block diagram

This is the block diagram representation of our project which is named as “IOT BASED SMART SHOPPING CART “SYSTEM. It consists of cart that is incorporated with RFID reader. As soon as the customer placed the product they want to buy into the cart, the RFID readers attach to the cart will search for RFID tag. As the reader detects the RFID tag present on the product. All the information of the product associated like name of the product, manufacturing, date, and price received from the tag shall be stored in the NODEMCU module. Here we are using NODEMCU module, as it has in-built WIFI mode, which play a role of information exchange between the cart and server where we are storing

the complete inventory list of the product present in shop. Then afterwards, the purchased product list is compared with the server data. If the customer wishes to remove any of the product, he or she just has to simply place the product again in front of the reader in the cart itself. After finish purchasing of product, total amount of bill is generated and display on 16*2 LCD of the cart and also at the billing section. When the customer goes to the billing section he has to only pay the amount. As the bill gets paid by the customer, he or she can exist the shopping store.

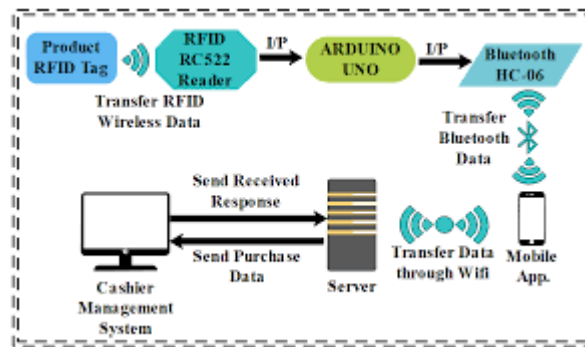


Fig2: work flow

Their intent to buy only one or two products results in, time consuming process. Moreover, it is inconvenient as people live in a busy life. Money and average time spent on each consumer is more, especially in over-crowded malls or supermarket. In the existing scenario, Barcode technology is used, which comes with a lots of limitation. By implementing this smart machine, it will minimizes human efforts and also automate the billing procedure. So, in our prototype we are using RFID technology for identification of the purchased product and it reduces the scanning time of the consumer. The main objective behind making this project is to improvise the shopping experience. This system will be more efficient as compared to all the other system used for inventory management.

Security

While security considerations are not new in the context of information technology, the attributes of many IoT implementations present new and unique security challenges. Addressing these challenges and ensuring security in IoT products and services must be a fundamental priority. Users need to trust that IoT devices and related data services are secure from vulnerabilities, especially as this technology become more pervasive and integrated into our daily lives. Poorly secured IoT devices and services can serve as potential entry points for cyber attack and expose user data to theft by leaving data streams inadequately protected. The interconnected nature of IoT devices means that every poorly secured device that is connected online potentially affects the security and resilience of the Internet globally. As a matter of principle, developers and users of IoT devices and systems have a collective obligation to ensure they do not expose users and the Internet itself to potential harm. Accordingly, a collaborative approach to security will be needed to develop effective and appropriate solutions to IoT security challenges that are well suited to the scale and complexity of the issues.

Privacy

The full potential of the Internet of Things depends on strategies that respect individual privacy choices across a broad spectrum of expectations. The data streams and user specificity afforded by IoT devices can unlock incredible and unique value to IoT users, but concerns about privacy and potential harms might hold back full adoption of the Internet of Things. This means that privacy rights and respect for user privacy expectations are integral to ensuring user trust and confidence in the Internet, connected devices, and related services. Indeed, the Internet of Things is redefining the debate about privacy issues, as many implementations can dramatically change the ways personal data is collected, analyzed, used, and protected. For example, IoT amplifies concerns about the potential for increased surveillance and tracking, difficulty in being able to opt out of certain data collection, and the strength of aggregating IoT data streams to paint detailed digital portraits of users.

Results



Fig3: An arduino based intelligent shopping

In the aforementioned paper, the intended system design for automation of the shopping process by merging different technologies like Arduino Uno, RFID, and Android mobile application. That can be divided into two major categories Electronic components and Software components. In Electronic Components, Arduino Uno operating as an intermediary microcontroller, which controls the RFID technology and Built, communication between RFID technology and software components like android mobile application through Bluetooth module. In software components, there is an android mobile application in which customers login to the proposed system by using different proposed methods that can secure customer privacy. Searching for the product in the shopping mall becomes easy because of the searching module based on product position allocation on the map. The proposed system prevents the customer to get an expired or undesired product by providing an android mobile application. Customer directly interacts with the product information. This information affects the preferences of the customer about the product and helps them to get the best quality product. Shopping products can be displayed in a current shopping list of the customer that helps the customer to maintain its shopping list according to need or budget. That also helps to remind the remaining products to purchase. Besides, there is a server as a data center of the supermarket, which also connected with the smart shopping cart.

IV. CONCLUSIONS

Thus with the help of the conclusion we can say that, the main objective involved is to implement a smart cart system with the help of RFID technology for improvising purchasing and product tracking. The plan is to employ the RFID related surveillance in the purchasing cart. In this system RFID card is utilized as entry for acquiring of commodities in the supermarket and malls. As the commodity put into the cart the price of the product appear and in a similar way the total amount will show. As a result of this it will boosts security performance and speed up the process of billing and purchasing of the product using RFID's technology for the reorganization of commodities in the interior of the cart. The principle point of framework is to give an innovation which is effectively adaptable, minimal effort oriented, and efficiently feasible for helping shopping of individual with the help of the more time will saved at the billing counter.

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