SMART SHOPPING SYSTEM USING IOT

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Abstract— In this paper, innovative concept of RFID Based Smart Shopping and Billing is introduced. The key idea here is to assist a person in shopping mall in terms to reduce time spent while purchasing a product. The main objective is to provide a low-cost, technology oriented, rugged system and easily scalable system for helping shopping in malls to consumers. Each shopping cart is designed with a Identification Device (ID) that holds microcontroller, RFID reader, LCD and RF module. Buying product information will be read through a RFID reader on cart, in the meantime information of that product will be stored into microcontroller attached to it and microcontroller data will be send to Billing System over RF module. The billing system will get the information of cart and microcontroller data. The consumers will be able to scan the stuffs themselves and the LCD screen on the shopping cart will keep updating product cost and total amount.

Keywords— **Embedded System, Microcontroller, RFID, RF module, IOT.**

I. INTRODUCTION

Mall and market is a big corner for customer to purchasing the daily requirement like branded food item, snacks, cloth materials, electric and electronic devices etc. Nowadays, a maximum numbers of shopping mall are available large as well as small in the world. In holidays and weekend time we can see a huge rush at mall. The public was demand & spending more time in shopping mall. After purchasing a long time, the customers waste of unnecessary time at the billing counter for billing the purchased item. Continuously improvement was compulsion in the common billing system to increase the quality of shopping experience to the customers. The invention of wireless technology with other communication techniques has been helping us in making electronics domain very popular. A modern futuristic product is the one that provides the comfort, convenience and efficiency in everyday life. Shopping is one of the interesting things and basic need for every human. At present no such embedded system is used in shopping. But this simple task cannot be easily perform because customer has to wait for billing procedure for longtime. The aim of this project is to utilize new updated technologies and overcome from the difficulties during shopping in consumer retail shop. Thus we are proposing the smart trolley system by using microcontroller as an updated technology.

The System comprises of a RFID based trolley which speaks with the billing counter remotely through RF Transmitter. Every trolley will comprise of an equivalent kind of equipment with one of a kind trolley address. The clients will be ready to filter the things by their very own and the LCD screen on the shopping basket will continue refreshing the aggregate. The billing counter can anytime of time ask about the current things present in the trolley. This will end up being very advantageous for the retail locations as more individuals will appreciate the shopping background and come all the more frequently to shop. The framework enables the store the executives to segment with a programmed update of the stock on each buy of an item. The Smart Shopping basket can possibly make the shopping experience increasingly agreeable, pleasurable and proficient for the client and the stock control simpler for the store the executives.

II. GOALS AND OBJECTIVES

- Enhance shopping experience of customers in shopping malls.
- Minimize shopping time.
- Reduce the checkout time while eliminating the time taken to wait in a queue.
- On dropping each product into the cart, the number of products and its total cost is displayed on to the LCD screen.
- Automatic billing as and when the products are dropped in the cart.
- Update entries in the central system upon each purchase of a product.
- Display the bill on the LCD screen as well as on users mobile.

III. LITERATURE SURVEY

[1] The proposed system makes the use of ultra high frequency (UHF) RFID technology in the smart shopping system, as UHF passive tags have a longer range, from 1 to 12 meters. Previous research on the design of smart shopping systems mainly focused on using low/high frequency RFID, which have inadequate ranges, and leave customers to manually scan items with a RFID scanner. In proposed system, each smart cart is equipped with a UHF RFID reader, a microcontroller, an LCD touch screen, a Zig-Bee adapter, and a weight sensor. The smart cart is able to automatically read the items put into a cart via the RFID reader. A micro controller is installed on the cart for data processing and a LCD touch screen is equipped as the user interface. In order for the smart cart to communicate with the server, they have chosen Zigbee technology as it is, low-power and inexpensive. We also have a weight scanner installed on the smart cart for weighting items. The weight scanner can also help do a security check, for example, if a malicious user peels off one items RFID tag and puts it into the cart, extra unaccounted weight will be added.

When a customer finishes shopping, they pay at the checkout point using the generated billing information on the smart cart. We also set a RFID reader before the exit door to check that all the items in the cart have been paid for.

[2] Hsin-Han Chiang et al, proposed a preliminary development of the smart shop-ping cart (SSC) that can be integrated into the smart mall system. With the use of radio-frequency identification (RFID) tags, the SSC can automatically detect the various products which are being added in the cart and show the related information on the user interface. Finally, the automatic billing service can be done by the SSC and the stored shopping data will be transmitted to the cloud server of shopping mall.

[3] Ala Al-Fuqaha et al, proposed the concept of the Internet of Things (IoT) with emphasis on enabling technologies, protocols and application issues. The IoT is enabled by the latest developments in RFID, smart sensors, communication technologies and Internet protocol. In this system an overview of some technical details that pertain to the IoT enabling technologies, protocols and applications is provided. Moreover, the relation between the IoT and other emerging technologies including big data analytics and cloud and fog computing is explored.

[4] This paper provides a non-exhaustive, rather earlier than recent, overview of contributions in the field of Radio Frequency Identification technology (RFID), and its use in several sectors. The multidisciplinary nature of this emerging technology requires skills from various engineering fields. Due to the growing use of RFID in various economic sectors, it seems essential to educate engineers, and technicians, to better master this technology. For this purpose, an RFID engineering technology curriculum may be established using different approaches. This paper discuss an approach to integrate RFID technology within usual engineering curriculums by stressing its link to usual disciplines such as industrial, electrical and computer engineering. A case of an RFID laboratory established at the University de Moncton (UdeM) is shown. An RFID-based automation of a flexible conveyor system application, carried out in this laboratory, is also described.

[5] In the last few years, SMS (Short Message Service) has made a big impact on the way we communicate. Instead of communicating over the phone using voice, people rather prefer SMS not only for messaging but also for information exchange. This paper proposes a method of building an extendable generic application which can be used to provide various types of information services using mobile SMS. Mobile users send required information through an SMS to a mobile gateway that forwards it to the generic application. Given the user-provided information, the generic application automatically generates an appropriate query.

IV. PROBLEM STATEMENT

In many of the shopping malls or stores barcode scanning system is used which is bit time consuming technology and also it can scan only two items in a second, so, by using RFID system we can save our time as we can scan up-to 40 tags in a second. So we are designing a microcontroller based smart shopping system using RFID.
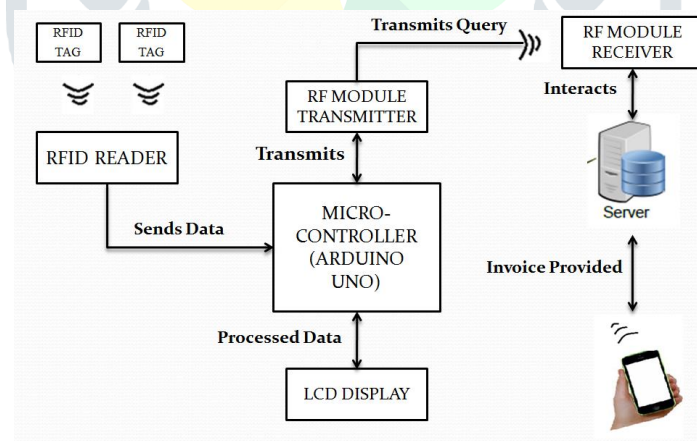
V.   SYSTEM ARCHITECTURE

Fig1. System Architecture

A consumer enters into a shopping center then he/she first takes a trolley. Each and every trolley is joined with a RFID reader per user. The framework work is the point at which the customer buys a thing, the customer must be examining the thing first with help of standardized tag are available in each item utilizing the RFID per user. At that point that acquired thing can be set into the trolley. While the client is examining the RF tag of the item, a cost of the buying item is taken and spared in the framework's memory. Information put away in framework's memory is contrasted and the query table. In the event that matches are discovered at that point cost, name of individual item gets showed on the LCD.

Each item has a RFID label which contains a Unique ID. These ID's are sustained in the database allocated to the comparing items. On the off chance that there should be a buy done, at that point that item can be dropped in the trolly where the RFID reader reads the tag. The data of the item is fetched and showed on the LCD screen. In the meantime billing data is too refreshed. Endless supply of the passageway, the path data is sent to the server alongside details of purchase. Server at that point stores them in the database. These means are rehashed until the finish of shopping catch is squeezed. Once the "Total" catch is squeezed there

is an alternative furnished to end the shopping with similar items or to erase a portion of the items from the truck. This passes by the client decision. Toward the finish of shopping, the client can straight away pay the bill and leave.
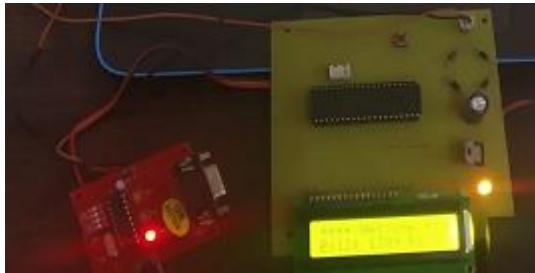
VI. RESULTS

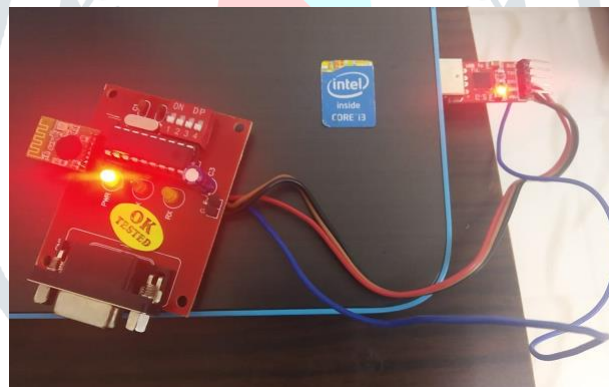Fig2. Transmitter end.

Fig3. Billing on LCD display.

Fig3. Receiver end

VII. CONCLUSION

Smart shopping cart creates an automated billing system in malls. By using the RFID and RF module, the product information are directly sent to billing system. So that customers no need to wait in a long queue. It is trustworthy, highly dependable and time efficiency. The designed smart shopping cart system will reduce the consumers time in the process of billing.

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