IOT BASED INTELLIGENT TROLLEY FOR SHOPPING MALL

Ms. Alfiya A. Bangi, Ms. Yogita S. Maske, Ms. Vrushali R. Khankal & Mr. Amol A. Kadam

[1]*Department of Electronics and Telecommunication Engineering, SVERI's College of Engineering, Pandharpur*

[2]*Department of Electronics and Telecommunication Engineering, SVERI's College of Engineering, Pandharpur*

[3]*Department of Electronics and Telecommunication Engineering, SVERI's College of Engineering, Pandharpur*

[4]*Department of Electronics and Telecommunication Engineering , SVERI's College of Engineering, Pandharpur*

[1]*aakadam@coe.sveri.ac.in,*

[2]*alfiyaabangi@coep.sveri.ac.in,*

[3]*yogitasmaske@coep.sveri.ac.in,*

[4]*vrushalirkhankal@coep.sveri.ac.in*

Abstract: *Now a day's people are getting too busy in their schedule but still they need to spend time on their basic need like purchasing goods and stuffs from shopping market. In shopping mall while shopping customers have to face some difficulties. In shopping malls, long queues for billing waste their time. Thus to reduce time consumption during shopping this system is introduced. In this trolley we use RFID tags on products and also RFID readers which are placed on trolley when customer's 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 LCD. After purchasing all products. At the end sending of product information from trolley to central billing unit through Wi-Fi module or GSM. At receiver side Wi-Fi or GSM is connected to billing PC.*

Keywords: **Shopping malls, RFID tag, RFID reader, ESP module, LCD display, IOT, ESP, and Trolley.**

1. Introduction

Now a day's numbers of large as well as small shopping malls has increased throughout the global due to increasing public demand. At the time of festivals, special discounts, holidays, etc. there is a huge rush in shopping malls. The use of barcode reading technique in such situation always results in waste time since customer has to wait till whole items get scanned. This disadvantage can be avoided by using this proposed paper.

In this paper we use RFID reader, RFID tags which is placed on item. The RFID antenna senses these items using multiple RFID tag reader and generates the bill automatically. The cost of product and total bill of items purchased can be displayed on LCD. After completion of purchasing the items the information of particular trolley will be send to billing counter through Wi-Fi. This system will save time of customers and manpower required in mall.

- **Advantages**:
  - Reduces scanning time.
  - Increases quality of service and efficiency.
  - Maintains history of purchased products.
  - User interactive system.
  - This smart cart has the capability to make shopping more relaxable, comfortable and
  - Systematic for the customers as well as making easier for the store management.

2. Literature Review

As per our knowledge only few papers were found in the literature for the automated shopping trolley for supermarket using RFID.

"The automated shopping trolley for supermarket billing system" implemented by Sainath (2014)[4], exploited barcode for billing of products, where customer scans the product using barcode technology. The bill will be forwarded to the central billing system where customer will pay them by showing unique id. The limitation of barcode scanning requires line of sight for scanning and it should be fixed within its boundary.

"Smart shopping trolley using RFID" by Nisha Ashok Somani (2012)[2], implemented smart way of shopping trolley with RFID and ZigBee by which bill is generated by scan of products in the reader and bill transmitted to central billing department by which bill can be paid at the counter which is a major difficulty for the customer

"The RFID Based Smart Shopping Cart Strategies(2015)[3]" by Ms. Rupali Sawant, Kripa Krishnan, Automatic reading of RFID tag from product. RFID can be placed inside the product No line of sight required to read RFID. RFID tags are not affected by such conditions. Long reading distance. RFID tag having READ & WRITE capability.

EktaMaini, JyotiSheltar, "Wireless Intelligent Billing Trolley for malls(2014)[1] proposed the system implementation WSN (Wireless Sensor network) using microcontroller as a technology. To implement the RFID (Radio Frequency Identification) in the shopping trolley in order to save the shopping time, to calculate the barcode in a material, calculating the total amount for the thing added in the purchasing trolley.

"Technology smart shopping cart using RFID and ZIGBE" by Komal Manchhirke, Priyanka Goche (2017)[5]designed "Digital Cart"using zigbee which aims to reduce and possibly eliminate the total waiting time of customers, lower the total manpower requirement and increase efficiency overall.

In the "The Development of Smart Shopping Cart with the Customer-Oriented Service" the author Hsin-Han Chiang, Wan-Ting You, Shu-Hsuan Lin, and Wei-Chih Shih implement a smart shopping card that can be detected automatically the item is added into the shopping trolley. From the searching of SSC the navigation the purchasing in the mall is efficiently supplied [2].

Ashmeet Kaur, Avni Garg, Abhishek Verma, Akshay Bansal, Arvinder Singh "ARDUINO BASED SMART CART" December [2013](6)In the present paper we aim to develop a system that will use RFID item level tagging to exploit the benefits of RFID as well as provide a system which being cost effective will see its implementation in small and large scale store.

In the "IoT applications on Secure Smart Shopping System" the author Ruinian Li, Tianyi Song, Nicholas Capurso, Jiguo Yu, Jason Couture, and Xiuzhen Cheng implement the idea using UHF RFID reader so every smart cart is equipped with UHF reader. This system consists of microcontroller, LCD, weight sensor, and zigbee technology. This system is implementing for the security and privacy issues for make the system practical. The final result, final billing can be done in the trolley. So the users don't wait in a queue for long time[8]

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3. Problem Statement

At the time of festivals and holidays there is huge rush in the mall and supermarket. Cutomers waste their time at billing counter while paying the cash to the casher. To overcome this drawback this technique is developed is based on RFID. This technique helps to casher as well as to customer.

4. Objective

1. To save time at billing counter**.**

2. This smart cart has the capability to make shopping more relaxable, comfortable and systematic for the customers .

3. It reduces the payoff given for workers.

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5. Methodology

It has 2 section Transmitter section & Receiver section. The costumer enters into the shopping mall she/he picked up a trolley for purchasing product. If customer want to purchase. Any product he/she put the product in the trolley. Using RFID Reader. As soon as the product falls in trolley the RFID tag which is present on each & every product, read by the RFID Reader. The RFID reader is connected to the Arduino processor's product is inserting in trolley, and then the name of product & cost of product is displayed on the LCD screen. As customer Add one by one product in trolley the cost get added to the total bill. If user wants to remove any product she/he can easily remove any product. From trolley, then LCD display the name of product & cost of product is removed from trolley after completion of shopping a key is pressed for indication of final billing of all product. Thus final billing information of all products is transmitted to billing counter through ESP module. ESP module is a Wi-Fi module which Transmit billing information to counter. Customers pay a bill at billing counter & leave from the mall.

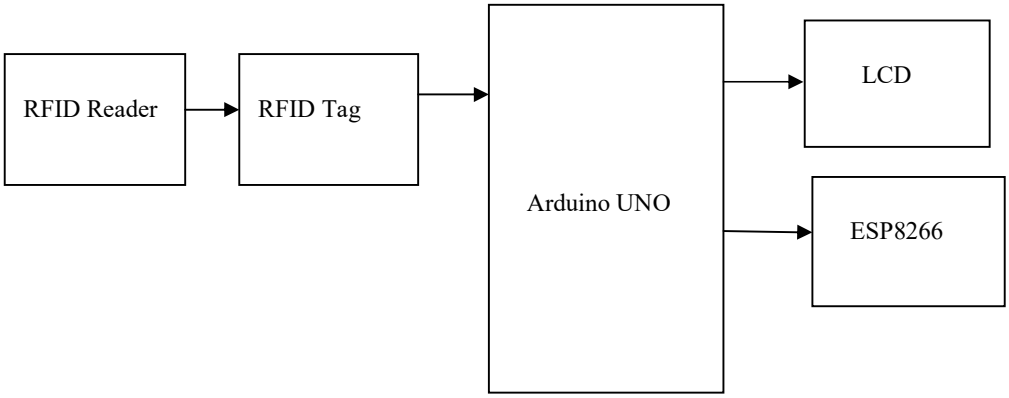

Figure1. Block diagram of transmitter side

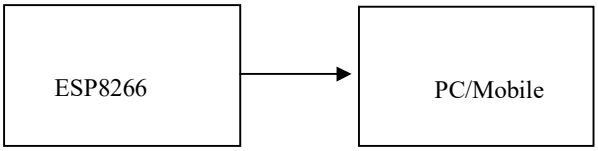

Figure2. Block diagram of Receiver side

6. Conclusion

This project simplifies the billing process makes it swift and increases the security using RFID technique. This will take the overall shopping experience to a different level. Automatic billing is done in trolley so it save the time of customer and reduce the rush at billing counter. It also reduce the man power.

7. Future Scope

Future scope is to use enhanced RFID readers that operate in high frequency which can read multiple RFID tags simultaneously for more number of products which are placed in cart and weight sensors will improve the security within cart by tallying the weight. Also, with the help of optical sensor, motor drivers, trolley will follow the customer which purchasing items in the mall and it maintains safe distance between customer and itself. Also use of IOT and software will help to convey the information with owner of mall..

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