

Development and Integration a Smart Trolley with Automatic Billing and Inventory Control System

CH. Brahmaiah and S. Shanthi

Abstract--- *In metro cities on public holidays we will see a huge rush at shopping malls. When there are big sales and discounts, that becomes even more. People buy a variety of items just a few days and place them in the trolley. After one will approach counter for billing purposes during the total purchase. The cashier prepares the bill by using the barcode reader which is a time-consuming operation. This results in long queues on the billing counters. This project introduces an idea to develop a system for solving the above problem in shopping malls. Both items in the mall should be labeled with RFID tags to achieve this and all trolleys should be equipped with a RFID reader and an LCD screen. When any product is put in the trolley, the tag will automatically be identified, the item name and cost will be shown on the LCD, adding the cost to the total bill. When we wish to remove the product from the trolley, you may take the product away and the quantity of that particular product is deducted from the total quantity and the same information is transferred to the central billing unit through Zigbee module. Therefore the payment can be handled in the trolley itself, saving the customers a lot of time.*

Keywords--- *RFID (Tags and Reader), Arduino, Zigbee (Transmitter and Receiver), LCD, Connecting Wires, Trolley.*

I. INTRODUCTION

When a person goes to an existing system shopping mall, he takes a trolley, and has to go to the billing counter after making a shopping. Barcode reader Bill is finished. Method is time-consuming. Through barcode technology each and every object must be scanned based on the location of the barcode label attached to that item. For short, it calls for line of sight. This needs more human work, as they need to manually check the mark. Barcode does not read long distance type. Barcode gets damage due to the environment etc. So our aim is to develop automated RFID based billing system. A RFID reader (Radio Frequency Identification Reader) is a tool used it to collect information from an RFID tag, used to track individual items. Radio waves are used to send tag data to a reader. Therefore, once the shopper inserts a product in the trolley, the RFID module is marked and shown on the LCD together with the size of the package. As the shopper keeps adding goods, the sensor detects all things, and so the price will rise appropriately. If the customer changes his / her mind and doesn't want any item attached to the trolley he / she will delete it and the extra price will immediately be removed. The shopper must press the button at the end of the shopping and, when pressed, adds all the product along with its price and gives the total amount payable. The shopkeeper will test the products purchased with the support of a master card at the exit for verification. This strategy is therefore an appropriate tool for use in places such as malls, this will help to reduce inventory and ultimately create a better retail experience for shoppers.

CH. Brahmaiah, Electronics and Communication Engineering, Saveetha School of Engineering, SIMATS, Chennai, Tamil Nadu.
E-mail: saibrahmaiah547@gmail.com

S. Shanthi, Electronics and Communication Engineering, Saveetha School of Engineering, SIMATS, Chennai, Tamil Nadu.
E-mail: shanthi.sse@saveetha.com

II. LITERATURE SURVEY

Komal Ambekar et al [1] Through this paper they aim to try to modify the billing process, create it quickly and improve security using RFID technique. The cart automatically measures the attribute and shows all the cost of the product inside it. It makes it easy for the buyer to understand the amount he or she has to pay while shopping and not at checkout. One can delete the item from the cart by just testing it because they will never want it. The suggested system is highly accurate, credible, dependable, and time-efficient. Wage rates provided to workers will be that, and cheating will be decreased. The system is also very time efficient.

Sandeep Jaiswal et al [2] This auto shopping trolley reduces consumer shopping time and also requires effort to move trolley. This project works on Arduino Mega microcontroller, RFID tag for product scanning, Bluetooth module used on the trolley will give the trolley directions, and DC Motors will drive the trolley and trolley at the specified rate, and LCD will display the billing. Therefore it operates at low cost, low power consumption.

Vatsala Vaibhavi et al[3] Buying a large number of wholesale-market products has become a scuffle. Users pick different items, and then they need to go to the payment register. The wholesale distributor prepares the bill at the billing counter using barcode reader which can take time. We are introducing a smart trolley to provide more secure shopping experience, which offers smart shopping as well as better stock control. It will consist of the RFID active reader passive tag program replacing the barcode, the smartphone device will be used for self-checkout, and the GSM module and the database will be used to control wholesale stock.

Ghatol Sonali Digambar et al[4] Shopping mall is nowadays a place where people get their daily needs. In mall it needs trolley for the purchase of number of items. Every time customers have to calculate these items and have to compare them to their pocket budget. Consumer has to wait for an invoice after this process. So to stop pain like trolley dragging, we are waiting in the billing queue to introduce a new concept called “SMART SHOPPING USING SMART TROLLEY”. We are using RFID tags in this device that will be on the label. Whenever the customer puts a product into the trolley it will be checked by the RFID reader and the quality and cost of the product will be shown on the LCD display. The cycle goes on like this. We will use Bluetooth module to transfer data to main computer.

Bansi Jani et al [5] Retail markets give customers a closer look at the products and a host of options. Yet customers get irritated at the end of the shopping when they go to big billing queue and wait for their turn to get bill. We came with this project and new techno allow shopping cart(trolley) to reduce customers waiting time and frustration, and get more comfort retail shopping. The project also employed software technologies such as Atmel Studio, PHP, Eagle, and Extreme Burner. In this system, a near field communication (NFC) tag will be assigned to each product, which consists of all the product information. Wireless techniques and an electronic tag were used to identify the product. NFC readers that are installed in all new smartphones will be used to access this information. This device would be installed on the trolley so that the bill can be produced quickly, using an Internet of Things (IoT) platform, based on the items put on the shopping cart.

Ashmeet Kaur et al [6] There has been rising demand for easy and convenient bill payment in supermarkets. This research investigates how to build an efficient and time-saving process for the retail world which will render

shopping experience impetuous, customer friendly and secure. In this paper we suggest a smart cart which can produce a bill from the cart itself. The customer must make the payment in no time via a rechargeable credit card that will help maintain the database and implement schemes and deals accordingly in the stores. The designed cart removes self-packaging effort, makes best use of cart storage space and includes theft control security mechanism. The smart cart uses RFID shopping and payment technology, and AVR microcontroller for peripheral interfacing and inventory management. The smart cart utilizes RFID shopping and payment systems, and the remote interfacing and product storage AVR microcontroller. Along with delighting consumers, this innovative plan will help the stores see their revenues rise.

Galande Jayshree et al [7]The goal is to develop a system that can be used to resolve the mentioned problem in shopping centres. Both trolleys will be installed with the system. It will be a RFID scan. All of the mall's items will be fitted with RFID tags. When a person puts certain items in the trolley, they sense their code and store the price of those goods in memory. The charges will be added to the total bill when we bring the goods on. So the charging must take place in the trolley itself. The name of the object and its expense are shown on the LCD. You can also disclose the name of the items and their expense use microphone. The final billing data will be transmitted to PC through wireless RF modules at the billing counter.

Vishwas B et al [8] This type of technology has found its applications in a variety of fields, from healthcare, construction, smart shopping, hospitality to transport and many more. Billing can be created from the shopping cart inside this device. A compartment is kept in which RFID tags / cards are attached to all items. The benefit of this project exceeds the creation of a smart world as inventory management in a particular field because inventory management becomes much simpler, so all the items can be read by the RFID reader instead of manually checked by the laborer. Buying information about commodity will be stored in the database. Both on the smartphone monitor and on the server will produce the billing. This device illustrates how RFID technology will make life easier and more safe and therefore beneficial in future. This system describes about IoT, concentrating its use in improving and securing the future shopping.

Although many activities are ongoing, there is scope for progress in this field. Techniques of artificial intelligence and machine learning are commonly used in all domains such as medical, day-to-day access systems, communication systems etc. [09-10] Using machine-learning techniques, the suggested work could be improvised.

III. CONCLUSION

The method uses the RFID method to generate an electronic bill of products bought. The safety is enhanced by utilizing this approach, and it is also regulated by monitoring trolley products and comparing them with billing objects. This has the efficient usage of ZIGBEE technology which will eliminate the waits in the mall via the smart trolley. And that will save the energy for the client.

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