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Intelligent Shopping Wheels

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Abstract: *In this day and ages, supermarkets and big super malls are equipped with shopping baskets and trolleys to ease our shopping. The main aim here is to assist the customer in the shopping markets is to reduce the time while standing in the queue in the billing section and man power of the malls. Our goal is to enhance an intelligent shopping wheel with smart shopping components to resolve the problem. In this project we are building up modules where the consumer has to scan the items through barcode scanner which they are willing to purchase. Since, the wholesome process of billing is automated hence it will decrease the possibility of human error substantially.*

Keywords: *Super markets, RFID Card, Shopping baskets, Queue, Microcontroller, Bluetooth, IR sensor, RFID Reader*

I. INTRODUCTION

As we all are upgrading and technology is playing a very vital role in day to daily life. To enhance, expand or upgrade our life style, Market & Modern Business globe use highly innovative technologies. The changeover from traditional marketing to virtual shopping is one of the best epitomes for that. Everyday business field is having new techniques to make customers life smooth and comfortable. In this fast and furious life one such new idea is “Intelligent Shopping Wheels”. We all have waited in a queue for payment in shopping malls and other places, it’s very tiring and exhausting even wasted our ample amount time in the billing section. So, “Intelligent Shopping Wheels” with an automatic billing system will not only reduce the time but also makes the process very smooth and flexible.

II. OBJECTIVE

- 1) The primary goal of this project is to reduce the length of the billing queue in major supermarkets by building an intelligent shopping wheel that employs barcode scanners to allow people to self-check out.
- 2) As the whole system is becoming smart, the requirement of manpower will decrease, thus benefiting the retailers. As the billing department may now be managed by this clever system, the cost-effectiveness is further increased.
- 3) The time efficiency will increase phenomenally since this system will eliminate the time taken in standing in queues of billing counter. Hence, more customers can be served in same time thus benefiting the retailers and customers as well.

III. LITERATURE SURVEY

According to this paper the smart trolley system is generally thought of as a fully automatic self-checkout system with a smartphone user interface that enables consumers to pay for products scanning, then adding to the trolley before leaving store. They integrated mobile robot into traditional trolley because mobile robot is the most flexible and movable robot. The smart trolley moves smoothly between one and three metres, but beyond that, the movement becomes unstable. ^[1]

The major goal of “A Novel Low Cost Intelligent Shopping Cart” according to article this paper is to create a high-tech, low cost, easily, scalable, and strong shopping assistance system. SCC, LDC, involuntary payment & UIDC are the four main components of the created system. Create low-cost shopping assistant that is intelligent. These supports consumers in locating and selecting items, as well as, informing them of any special offers on those goods as they walk about the shopping mall. It is inexpensive and affordable. ^[2]

In this article named “Automatic Human Guided Trolley with Smart Shopping System” its showing the portable robot is being leads by human where the trolley will be moving without pushing the smart trolleys by themselves. RFID technology & android application is used for the tracking location with via Bluetooth function. Somehow those customers have health problems about their nutrition’s of products they can detects the items. It is a bit expensive for installing in the supermarkets. ^[3]

The article of” Development of smart shopping carts with customer-oriented service” suggests that the face detection is the main feature for this Smart Shopping Cart that prefaces the user and based on their buying history which makes the appropriate recommendations.

The systems performance is designed in the part using the code programming and from laboratory scene. There are different features such as smart and automated billing technique that helps in saving time for the customer's. ^[4]

According to this paper, "Electronics Shopping Trolley for Shopping Mall Using Android" the main objective is to making the customer a very trustworthy, highly dependable and time efficiency for the customer. In this client are gives an online instalment or counter instalment to detect the grocery items. The technology they used in this electronic shopping is Microprocessor, Motherboard, RAM, and Hard Disk.

It is also mentioned some future scope in this paper, where the tracking or searching of any products, buzzer, announcement, and payments as like online banking, mbanking, e- wallets, PayPal etc. ^[5]

According to this paper "Human Friendly Smart Trolley with Automatic Billing System" the smart trolley with the use of raspberry pi was designed in such a way that it could automatically follow the user and keep moving maintaining certain distance from the user while shopping. As well as it will generate the bill of the product that is placed in it. ^[6]

According to the article "Internet of Things (IoT) based Smart Shopping Cart Using Radio Frequency Identification" is suggested that uses Bluetooth, Radio Frequency Identification (RFID) sensors, an Arduino microcontroller, and a mobile application. ZigBee is utilized to make the user's purchasing experience more effective by sending data to the databases on the back end. Manually, the user can remove the item from the cart, pay the charge, and return the item by pushing buttons. The information is then transmitted over ZigBee to the billing system. It offers the encryption key-based security techniques. The Supermarket management system, a web-based application, is also created to regulate the data manipulation procedure at the admin or cashier side. By offering an Android mobile application, the proposed solution guards against customers receiving a product that has expired or isn't what they wanted. ^[7]

According to this paper the primary goal of this research is to establish a centralized and automated invoicing system using RFID and ZigBee connection. Additionally, the system will recommend products based on user purchasing history from a centralized source. There will be a centrally controlled platform in place for online purchases and suggestions. The online recommendation and transaction systems will be consolidated. Moreover, there will be an RFID scanner for anti-theft purposes at the exit door. ZigBee is used for communication between retail carts and servers. For equipment that requires a battery, ZigBee enables a low-cost, low-power connection. So, it increases the battery life of equipment's. An RFID tag will be attached to every item at the store or shopping center. Each Cart will be equipped with an RFID reader and a ZigBee Trans receiver. The billing process will include an online payment option. ^[8]

According to the publication," Smart Shopping Cart" the entire procedure is handled using a smart phone in order to give easy convenience to customers.

A smart phone is also used to regulate movement. Arduino UNO is used to run the billing system. Before the departure door, we suggest the RFID readers this is read completely the goods or items in the smart basket & crisscross through the server whether everything is in a basket have been compensated for the items. When an untruthful consumer attempts without payment to leave the supermarkets, he would be unable to exist. ^[9]

According to this paper "Smart Trolley" The entire settlement is made to work from a smart phone, and the self-checkout system gives customers the ability to complete a transaction or payment from it inside the retail space. This is primarily made to be extremely effective and thoroughly integrated with the retailer's present system. ^[10]

IV. METHODOLOGY

As we gone through the concept across the "Intelligent shopping wheels", we discovered that in the past, the barcodes were utilized to overcome of burden in shopping malls.

Firstly the consumer needs to connect the trolley to his phone through the Bluetooth .These method will continuously monitor and collect all the data and information about the shopping done. And the data after being scanned by RFID reader module will be processed in the microcontroller and the door of the trolley will open once the product is inserted in trolley and is detected by the IR sensor the door of the will get close.

There is an anti-theft feature in the trolley. The red led glows throughout while shopping and once the shopping is completed and payment is acknowledged by the concerned person, the moment the payment is received the red led switch to green led indicating that the same.

There is one more additional property in the trolley that can locate the product being selected. It displays the location of the product in the mall that the consumer wants to search.

A. Block Diagram

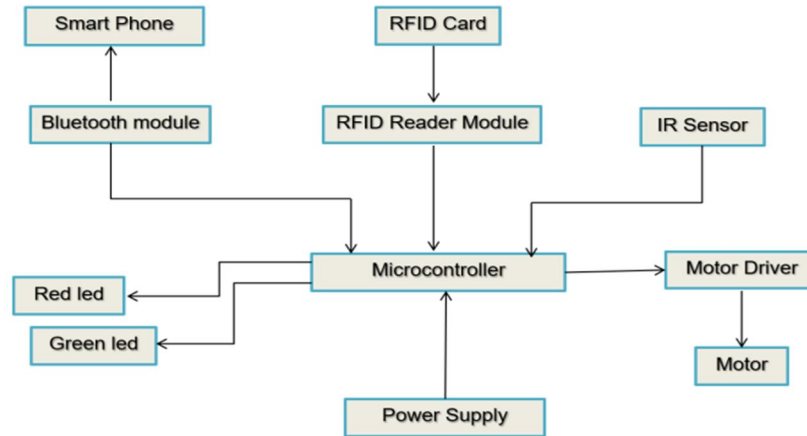


Fig 1. Block Diagram

B. Flow Chart

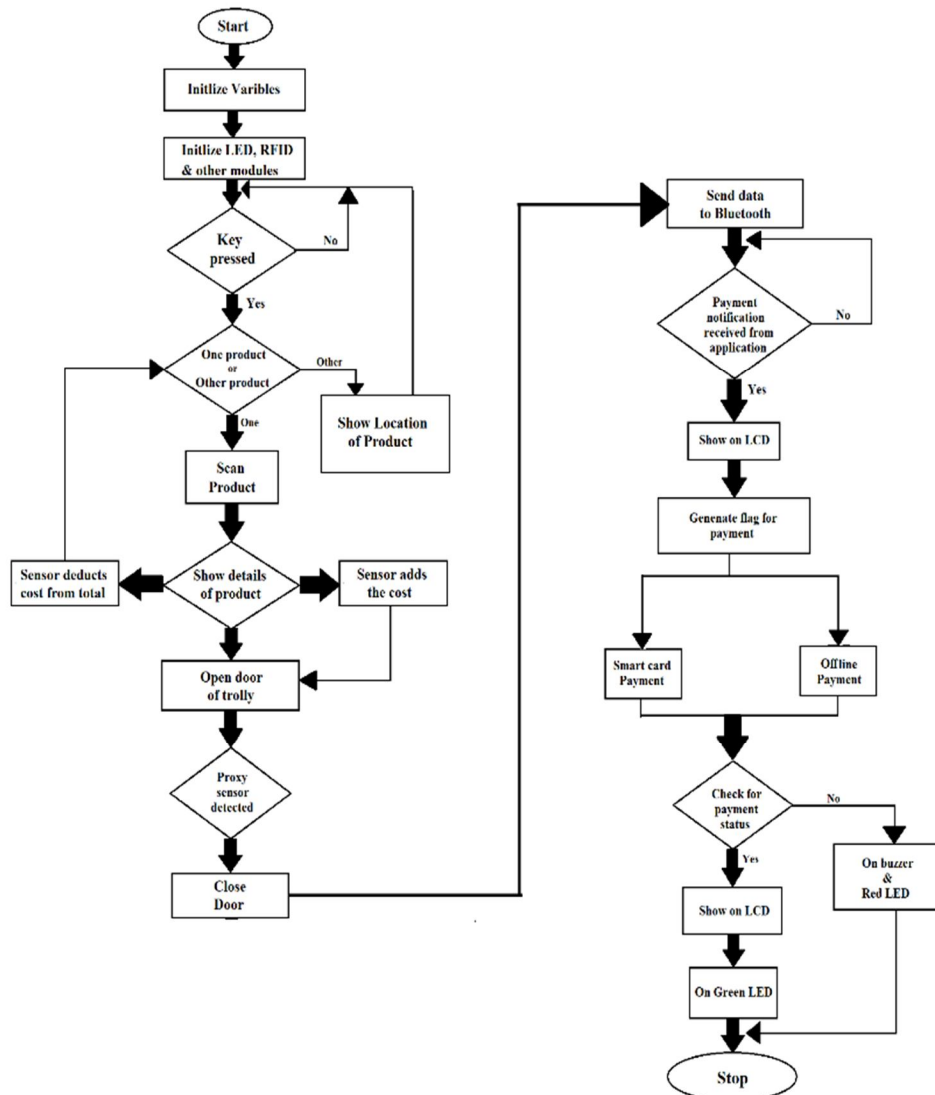


Fig 2. Flow Chart

V. COMPONENT & HARDWARE MODEL

Several components are used to develop hardware model.
Each components have specific feature and characteristics.

- 1) Microcontroller: ATMEGA16A
- 2) Bluetooth Module: HC05
- 3) IR sensor: HW201
- 4) RFID Card
- 5) RFID Reader Module: EM18 Reader Module
- 6) Motor Driver IC: L293D
- 7) DC Motor
- 8) LCD: 16*2 Display Module
- 9) Push Button
- 10) LED
- 11) Adapter

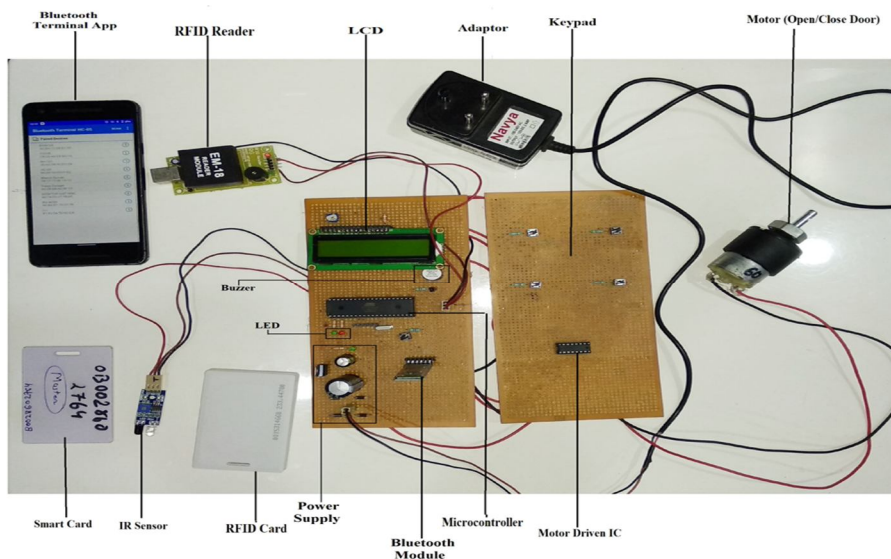


Fig 3. Hardware Model

VI. RESULTS



Fig 4. Opening of trolley door



Fig 5. Price of the product

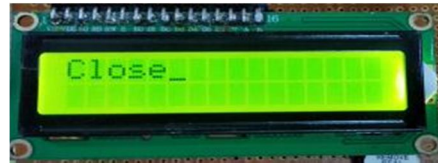


Fig 6. Closing of trolley door



Fig 7. Location of the product



Fig 8. Bill Payment



Fig 9. Payment Done

Anti-Theft System

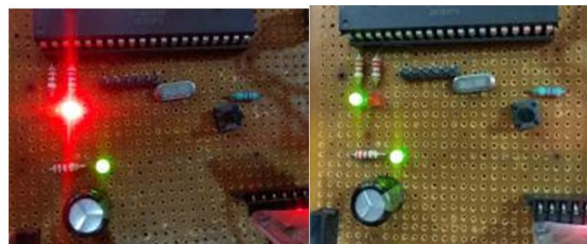


Fig 10. Payment Pending

Fig 11. Payment Done

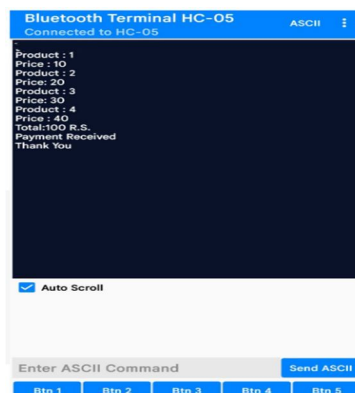


Fig 12. Bill in Mobile

VII. CONCLUSION

As we all are aware that, Supermarkets in the world is playing a major role when it comes for shopping and the supermarkets which exist in the market to simulate many things to compete with other supermarkets. So an “Intelligent Shopping Wheels” provides some major benefits to the supermarkets or mall as well as customers. In Intelligent Shopping Wheels System, now there is no need for the customers to wait in the queue and wait for his/her turn for the scanning of the product items. Especially during weekends or festivals season, there is not time wastage in waiting in the queue. The customer has to do only billing at the billing counter and only those customers can use the Intelligent Shopping Wheels who are having membership card where RFID Tag is inserted in it. So, supermarkets or hypermarkets use this concept as their business strategy to attract a greater number of customers. In this shopping wheels also consists of some multi functionality tasks such as it can detect the goods or items which are in offer beneficial so that customers can easily get it out.

VIII. FUTURE PERSPECTIVE

- 1) Line following Trolley
- 2) Charging while moving
- 3) Placement of trolley in proper place using card locking mechanism

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