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Survey Paper on Intelligent Motorized shopping cart with evolved Billing scheme

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Abstract

Shopping mall is a place where people buy their products for the daily purpose. There has been an emerging demand for quick and easy payment of bills in shopping malls. Quite often, when shopping in a supermarket shoppers are frustrated at locating the items on the shopping list and no assistance is available. To overcome these problems we have designed a smart trolley with a mobile application. This provides an app which helps the customers in finding the location of the product. It also provides a centralized and automated billing system using RFID. Each product of shopping mall, super markets will be provided with a RFID tag, to identify its type. Each shopping cart is implemented with a Product Identification Device (PID) that contains microcontroller, LCD, an RFID reader. Purchasing product information will be read through a RFID reader on shopping cart and it is displayed in LCD which is interfaced to the controller. At the billing counter, the total bill will be transferred to PC by Bluetooth module.

***Keywords**: - RFID Reader, RFID Tags, Central Billing System, LCD and Mobile app*

INTRODUCTION

Now a day's people are interested in shopping. Humans have always invented and developed technology to support their needs. In the present shopping malls, customers find various difficulties. Those difficulties are mentioned below. Many shoppers buy groceries on a budget. Most of the times, it is only at the end of purchase shoppers come to know that the

overall purchase total is greater than their budget. Then they need to spend more time in searching for their desired products and finally overall shopping process becomes more time consuming too. Due to this, several times shoppers couldn't buy all their desired products and miss out few items. Another major problem faced by users is that they have to wait in long queues for billing. Thus the proposed system overcomes all these drawbacks faced by shoppers in shopping malls. In the first step of this project, a mobile application is developed to make shopping process easy. This application is designed in such a way that it holds information about all the products available in the shopping mall with price. As soon as the shopper opens the app, list of items with price gets displayed. The customer goes through the items and will select the desired items. After selecting, this application sorts the selected items and displays them rack wise i.e. rack1 items first, rack2 items second and so on. Each item in Supermarket is tagged with a unique RFID label. Each shopping cart is designed or implemented with a Product Identification Device (PID) that contains micro controller, LCD, an RFID reader .RFID Reader recognizes the products put in the cart. As soon as each item is placed, various information like item name, price of the product are displayed in the LCD display placed in the cart. Along with this total sum is also displayed. The total bill amount will reach the bill counter immediately through Bluetooth technology. Then the user has to pay just the total amount and can walk away. Thus Item-level deployment of RFID technology allows for quick checkout aisles that scan all products at once and generates total automatically, eliminating different sectional counters and long queues, which are consistently reported as one of the most negative aspects of supermarket shopping.

LITERATURE SURVEY

In [1] The authors P.T. Sivagurunathan ,P. Seema, M. Shalini, R. Sindhu proposed the system to modify the traditional shopping method and customer has to purchase in smart way in shopping mall. Each and every product has to place a RFID barcode to scan the product with RFID reader. The smart trolley will consist of a RFID reader, LCD display and ZigBee transmitter. When customer if want to buy any product is insert in the trolley. It will scan and read the product and display the cost and the name of the product in LCD. The total cost of all the purchased products will be added to the final bill, in that final bill will be saved in the Arduino is will be act as a memory. These are all performed in the

transmitter side. In receiver side, it is wireless transmitting process. It is used to share the product information and final bill amount of the items are placed in the trolley will be transfer using a ZigBee transmitter to the billing system. It is used to save the customers' time and also customer doesn't wait a longtime and long queue. A new concept has been introduced which is the 'SMART SHOPPING TROLLEY'. This project is used to improve the security performance and also the speed. SMART SHOPPING TROLLEY can be done by simply attaching using RFID tags to the products and a RFID reader with a LCD display on the shopping trolley. In this system, customer will have to know the price of each and every item that is scanned in with help RFID and LCD, total price of the item will be displayed in LCD and also brief about the product. In this system will save time of customers and manpower required in mall. It is also used to reduce the employee work in the shopping mall.

In [2] the authors Mukund Wani, Neha Keswani, Snehal Neel , Smiley Chopade propsed a system and main objective is making a prototype which will be introduced in the trolley and also reduce the labors and eliminate time taken in malls by designing an Automatic Billing Trolley. This will work as when the individual will put any of the product in the trolley, its product code will be stored in the database of the controller, and then the bill i.e. the name of the item and the cost of the product will be displayed on the LCD, which uses a RFID reader, all the products are equipped with the RFID tags. So at the billing counter, the total bill data will be displayed on PC which will be transferred by the RF Trans receiver. And also the bill is sent to the mobile phone through the Bluetooth module. And Also we have added one billing method which is by the swiping the card. An improvement is required in the billing system to update the quality of shopping & experience to the customers. To overcome these problems stated above and to improve the existing system, we have designed a AUTOMATIC BILLING TROLLEY. This upgraded system will intend to assist shopping to the individual that will minimize their time spent in shopping. The automatic trolley contains Frequency Identification for product identification and it also has an LCD display that informs customers about product prices and the total bill. As soon as the object is dropped into or removed from the trolley, the IR Sensor & RFID Reader identifies the product and updates the bill.

In [3] the authors Anjali Peradath, Aanjali Purushothaman, Anjana Gopinath,

Anushree K. M. propsed a system describes about the designing of a trolley based on RFID reader for supermarket automation. An RFID reader with electronic hardware system is fitted with the trolley to make the purchase comfortable. Those items which are above the particular amount are fixed with the RFID card whose price is fixed into the reader. When item is shown in front of the reader, the amount of the item is added to the purchase bill, and is shown on the LCD display. The trolley is programmed in such a way that it will find the rack number displayed on the LCD. It also has the provision for removing the items from the trolley where the cost is removed from the total cost .Once the items are added, the cost is added up and when it crosses the certain limit, it gives an alarm signal to indicate that the customer budget has exceeded. All this information is send to a computer for billing update through wireless link called Zigbee network, which facilitate the billing system even faster and reduces time. The advent of newer techniques like RFID technology and wireless networks have makes the process of shopping at a faster pace, making it more efficient as well as making it more transparent .RFID tags are nothing but small transponders, communicates to a reader wirelessly by transmitting some identifier such as serial number .By constructions, they are the special type of wireless cards which carries built-in embedded chip and loop antenna. The chip represents a dual digit card number. The RFID reader circuits generates 125 KHz magnetic signal. RFID tags have been widely used to track items and label them in various shopping destinations like supermarkets. They are treated as advanced form of barcode. RFID and barcode are almost similar. They are both data connection technologies that mean it will automatically process the data. However they differ in many areas. RFID can be read without the line of sight, whereas barcode requires a line of sight to read. Barcode scanner requires a manual tracking, whereas RFID can be automatically tracked [4]. In case of barcode scanner, new information cannot be updated. Whereas in case of RFID, new information's can be overwritten

In [4] the authors Manikandan T, Mohammed Aejaz M.A, Nithin Krishna N.M, Mohan Kumar A.P, Manigandan R proposed a system, The main aim is to satisfy the customer and also reduce the time spent on the billing process which is to complete the billing process in the trolley rather than waiting in a queue even for one or two products. The customers have to add the products after a short scan in trolley and

when done the finalized amount will be displayed in the trolley. Customer could either pay their bill by their ATM cards or through pre-recharged customer card provided by the shop. We have ensured security for preventing theft and also facilitated for users who unknowingly drop their projects into trolley by cautioning them.

Our concept satiates the expectation of customers whose basic demand is to ease the way of purchase. By regulating the RFID based shopping cart, one could easily bill the products themselves without bothering the presence of workers in shop as details of product are readily available and displayed in the cart. This outcome of the project will not only facilitate the customers but also the shop owners by eliminating the cashiers and money spent on them.

In [5] the authors Vivek Vedpathak, Vishal Bafna, Sanjay Koul, Pranav Aitwadkar, Suvarna Pawar proposed a system where the smart cart is the new area of development for shopping purposes in the malls. This cart provides more comfort to customers. The portable unit will save the customers from the liability of strolling around with trolleys. This unit will allow the customers to view item information, its cost, variations, and usage simply by bringing the unit closer to the item. The handheld unit will comprise of a display, a keypad, a flash memory and an RF transmitter to transmit information about shopped items. A PC based Software module will also be designed that will allow the mall personnel to update the information about all the items. The idea is to provide every customer entering a mall with a portable hand held unit that can be used to shop for products.

The basic idea of this project is based upon "AUTO BILLING FOR MALLS" used in malls and shopping centers. A device "SMART TROLLEY" also called as Logger Device" is an information storage system. Here the system parameters of an Intelligent Trolley like company name, products name, products amount etc are continuously recorded and displays the name of the product with its cost.

This "SMART TROLLEY" has it's application and with help of proper interface the recorded data can be transferred to the main database at the counter of the mall. The system is an efficient means for commercial purpose to the customers of being time efficient and easy to control.

PROPOSED SYSTEM

Trolley Unit

In this unit the Arduino microcontroller is fixed to a RFID reader. When the user puts the items in the shopping cart the reader on the cart reads the tag and sends a signal to the controller. The controller then stores it in the memory and compares it with the lookup table. If it matches then it shows the name of item on LCD and also the total amount of items purchased**. (See Diagram)**

Billing Unit

As soon as user is done with shopping total amount of bill will be sending to the billing section .The total bill will display on the billing computer.

RFID Tags

Tags are of two types: passive tags which have no battery life and active tags which have battery life. RFID tags released for automatically identifying a person, a package or an items. These are transponders that transmit information. RFID tag contains two parts. One is integrated circuit for modulating, storing and processing information and demodulating radio frequency (RF) signal. The second is an antenna for receiving and transmitting signal.

RFID Reader

RFID reader consists of an RF module that acts as a transmitter and receiver of radio frequency signal. Transmitter consists of an oscillator to create the carrier frequency; a modulator to make impact on data commands upon this carrier signal & a receiver that contains demodulator to extract the data returned.

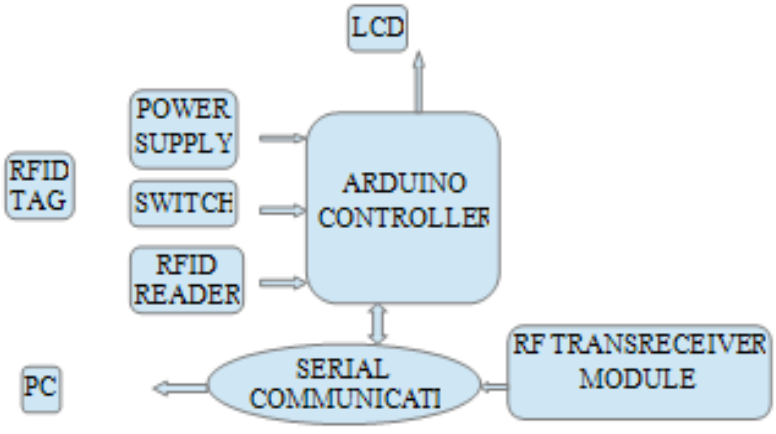

Figure:-1 Block diagram of trolley unit

LCD Display

LCD has the ability to display numbers, characters and graphics. The display is interfaced to I/O port of microcontroller (P0.0-P0.7). The display is in multiplexed mode i.e. only one display remains on at a time. Within 1/10th of a second the next display switches on. In this way sequentially on and off display will result in continuous display of count due to persistence of Vision.

CONCLUSION

The desired objectives were successfully achieved in the prototype model developed. The developed product is easy to use and economical. Though the project showcases the proof of concept, there are a few aspects that can be included to make the smart shopping cart more robust.

To begin with, in this project the latency time of the wireless communication with the server may need to be considered. Secondly, the communication is not very secure. It is impossible to stick RFID tag to some products. In such cases, conventional scanning of barcode is more sophisticated. Further, a more sophisticated micro-controller and larger display system.

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