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Smart Shopping Cart For Automatic Billing In Supermarket

[1] G V Raja, [2] Manoj Kumar S, [3] K N Kashyap, [4] Kiran S, [5] Mohammad Ibrahim
[1] Assistant Professor, [2][3][4][5] UG Scholars
Department of Electronics and Communication Engineering
Sri Sairam College of Engineering, Anekal, Bangalore

Abstract- **A supermarket is a place where customers come to purchase their daily using products and pay for that. Billing in the supermarket takes a lot of time. Billing of products in the supermarket is quite difficult because it takes more time as people have to wait for a long time in a queue for billing. Looking at the advancement in technology, we came up with an innovative idea of "Smart Shopping Cart for Automatic Billing in Supermarket". This project consists of RFID reader, motion detector sensor, Liquid Crystal Display, push buttons, switches and WIFI module. In this system product in the mart will have RFID tag, and every cart will have RFID reading. The user has to scan the Smartphone with the shopping APP to select the trolley. When a user put some product in trolley then its code will be detected using RFID reader and cost of a product added to the list and sensor will sense the direction of motion of the product for fault detection. In case, if the user wants to remove some product then a user should press the remove switch and product code will be detected by RFID reader. At last, while exiting the supermarket, RFID at the exit will detect the cart and the user have to scan the Smartphone with the APP for billing for paying the bill and open the gate.**

Index Terms— RFID Tags, RFID Reader, Anti-Theft , smart shopping cart.

I. INTRODUCTION

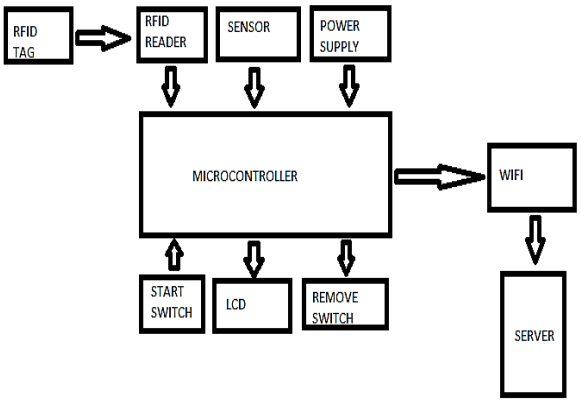
Ever since the debut of wireless technology, electronic commerce has developed to such an extent to provide convenience, comfort, and efficiency in day-to-day life. The main purpose of this project is to provide centralized and automated billing system using RFID and WIFI communication. Each product of shopping mall, super markets will be supplied with an RFID tag, to identify its type. Every cart contains PID (Product Identification Device). Specifically, PID contains a microcontroller, LCD, an RFID reader, switches and WIFI module. There will also be a centralized database which will contain the details of the product like price. The LCD shows the running bill.
The purpose of this project is to provide an automatic billing system by using RFID and WIFI to avoid the queue and save time in malls and super markets & to give product recommendation and information with Anti-Theft.

II. EXISTING SYSTEM

While billing by having the barcode scanner we need to detect every barcode attached to every item in purchased item list. When all the items get scanned the price and quantity of items is automatically get into the system and then the bill is get generated. Customers can pay bill through credit/debit cards or by cash. But it is a time consuming process for the billing purpose, so that the waiting time to pay the bill is increased. To overcome on the time consuming process the RFID based smart trolley is proposed.

III. PROPOSED SYSTEM

1) Every product in the shop or a mall will have an RFID tag on it. And the CART will be taken by scanning Smartphone with the shopping APP.
2) Each Cart will have an RFID reader and WIFI module implemented on it.
3) There will be a Centralized Server System.
4) After the payment of money, the Cart must get reset. There will be online payment procedure for billing.
5) If the product is removed, it must get deleted from bill too.
SYSTEM DESIGN: PID (Product Identification Device)



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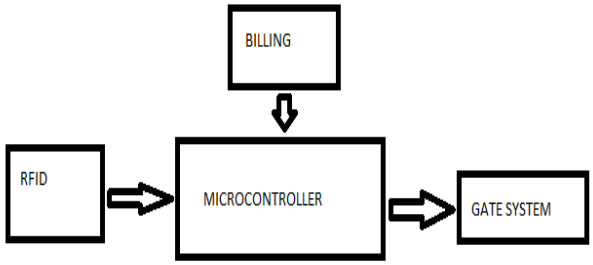
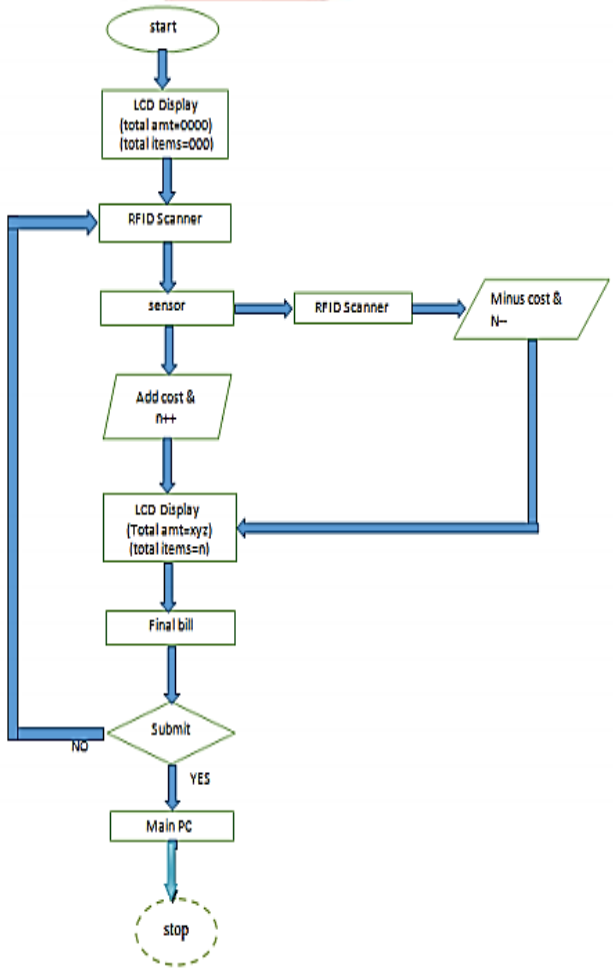
BILLING SYSTEM:



Flow chart:



IV. WORKING OF SMART CART:

A customer enters into a shopping mall. On entering ,she/he first picks up a trolley. Each trolley is associated with a RFID reader and a barcode reader. When the custom er purchases a product, the RF tag of the product is scanned using the RFID reader and while placing it into the trolley into the trolley .When the RF tag of the product is scanned, price of the product is taken and stored in the system's memory. Information stored in system's memory is compared with the lookup table. If matches are found then cost, name of respective product gets displayed on the LCD. At the same time Atmega processor sends the same information to computer for billing purpose with the help of RS232 protocol. Here we have used IR sensor for counting purpose. This works as the IR sensor continuously emits IR rays. If we put a product in a trolley ant at that time there is obstacle for IR rays, then it would result in interruption in counting of products in trolley. This recorded data is stored in processor. Counting is mainly done for security purpose. If in case while wandering round the mall someone removes the RFID tag and puts the product in trolley then counting the no of items helps to get information of items purchased. Thus counting is done but there is no addition of cost respective product in bill. This shows the increase in number of products but not increase in bill. If an unwanted product is removed from trolley then it decreases the number of products as well as bill. Double entry of product deletes the product name with respective to cost of product. After completion of shopping, a key is pressed indicating final billing of all the products. Thus the final information of all products is transmitted to a computer with the help of serial communication & the final billing is done by Mobile App.

V. ALGORITHM

5.1:ID3

In decision tree learning, ID3 (Iterative Dichotomiser 3) is an algorithm invented by Ross Quinlan used to generate a decision tree from a dataset. An ID3 algorithm typically utilized in the machine learning and natural language processing domains. Initially, the original set S was taken as the root node in the ID3 algorithm. On each iteration of the algorithm, it iterates through every unused attribute of the set S and calculates the entropy H(S) or information gained IG (A) of the attribute.

```
Algorithm (Id,Set)
//Scan_list::List of Currently Scan Item
//Bill_list::Bill id List
//Find_Newid::Compare two list and find
//new id
//Fetch Data::Get Data from Serve
 //Delete::Delete item
set=1
Repeat While set=1
 { Scan();
Scan_list();
If (Scan_list==Bill_List)then
 Don't Do Anything
Exit();
Else if (Scan_list>Bill_list)then
 Find_Newid();
```

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```
Fetch_Data();
Display();
Add_Bill();
Update();
Else if (Scan_list < Bill_list)then
Find_Newid();
Delete();
Update();}
```

VI. REQUIREMENT SPECIFICATION

RFID tags: These tags comprise of a microchip for storage of its unique number and a coil which acts as an antenna for radiating its stored data. It may or may not have a battery depending upon its type either active or passive respectively. Passive tags are used which doesn't have a battery. As soon as the tag comes in the RFID reader coverage range the Reader emits RF signals which gives power to passive tags and it re-emits the signal with data to the reader. Purpose of RFID tags is to uniquely identify products. RFID reader: EM-18 is used which operates at 5volts DC and less than 50mA. The frequency at which it works in 125kHz. It can cover a distance of 10cm. It continuously emits RF signals throughout its range and whenever an RFID tag is inside its distance coverage it retrieves the information stored in the tag. Purpose of RFID reader is to retrieve the product information from their RFID tags.

Infra-Red sensor: It is an object detection sensor. It operates in frequency range of 300GHz to 400THz and wavelength range of 700nm to 1400nm. It has a photodiode and an LED. LED as usual emits light in IR range to a certain distance depending upon the manufacturing parameters and whenever there is a reflection of emitted light due to an obstacle, it gets sensed by the photodiode. Purpose of IR sensor is to count the objects entering the trolley for preventing misplacement or theft.

ESP8266 wifi module: The ESP8266 is a low-cost Wi-Fi microchip with full TCP/IP stack and microcontroller capability. This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-style commands.

Atmega328p microcontroller: The Atmel 8-bit AVR RISC-based microcontroller combines 32 kB ISP flash memory with read-while-write capabilities, 1 kB EEPROM, 2 kB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. The device achieves throughput approaching 1 MIPS per MHz.

Arduino IDE :

The Arduino integrated development environment (IDE) is a cross-platform application(forWindows, macOS, Linux) that is written in the programming language Java. It originated from the IDE for the languages Processing and Wiring. It includes a code editor with features such as text cutting and pasting, searching and replacing text, automatic indenting, brace matching, and syntax highlighting, and provides simple one-click mechanisms to compile and upload programs to an Arduino board. It also contains a message area, a text console, a toolbar with buttons for common functions and a hierarchy of operation menus. The source code for the IDE is released under the GNU General Public License, version 2 The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main() into an executable cyclic executive program with the GNU toolchain, also included with the IDE distribution. The Arduino IDE employs the program avrdude to convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware.

Thing Speak Server:

According to its developers, "ThingSpeak is an open source Internet of Things (IoT) application and API to store and retrieve data from things using the HTTP protocol over the Internet or via a Local Area Network. ThingSpeak enables the creation of sensor logging applications, location tracking applications, and a social network of things with status updates". ThingSpeak was originally launched by ioBridge in 2010 as a service in support of IoT applications. ThingSpeak has integrated support from the numerical computing software MATLAB from MathWorks, allowing ThingSpeak users to analyze and visualize uploaded data using Matlab without requiring the purchase of a Matlab license from Mathworks. ThingSpeak has a close relationship with Mathworks, Inc. In fact, all of the ThingSpeak documentation is incorporated into the Mathworks' Matlab documentation site and even enabling registered Mathworks user accounts as valid login credentials on the ThingSpeak website. The terms of service and privacy policy of ThingSpeak.com are between the agreeing user and Mathworks, Inc.

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VII. CONCLUSION

The project will demonstrate the possibility of using Wireless system for developing a Smart Shopping System which automates the entire billing procedure. The system which is developing is highly reliable, fair and cost-effective. It is reliable and fair because of the effectiveness of Wireless system. The system is also energy constraint as it uses a passive sensor and it reduces the communication requirement. The decision making process is done locally within the cart, thereby eliminating an overhead to the communication between the motes.

REFERENCE

1. Galande Jayashree, Rutuja Gholap, Priti Yadav on "RFID based Automatic billing trolley" year - 2015,publicationIJETAE.

2. Mr.Yathisha L, Abhishek A, Harshit R, Drashal Koundinya on "Automation of shopping cart to ease queue in malls by using RFID", year-2015, publication- IRJET.

3. S Sainath, K. Surendra, V.Vikram, Arvind on "Automated smart trolley integrates Raspberry Pie embedded chip with two barcode scanners used in supermarket",year-2014, publication-ICCCMIT.