# Automatic Shopping Trolley Using IoT

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## ABSTRACT

Nowadays activities such as shopping at big malls is really increasing in various cities. We can see huge crowd at the shopping malls on public holidays ,weekends and specially during the festivals which can cause rush at the billing counters. After purchasing the products the customers need to wait in long queues at the billing counter for payments. At billing counter the cashier needs to scan each product using barcode scanner for calculating the amount of product to generate a bill which is very time consuming. In this project, we are going to implement the RFID card scanner on the trolley itself and an automatic billing system in the shopping malls using the WI-FI to transfer the data into the database . The structure of the trolley consists of a door which will block the products to be entered without scanning for security purpose. The trolley has the inbuilt product code reader. The use of product code reader is to read the RFID cards/tags attached to all products to define the name ,weight ,quantity and price of the products. Depending on the signal from the reader, the controller display the name and price of the each product on the LCD display. The wireless billing system is uses the Wi-Fi for data transfering to the cashier . A load cell has been attached so that even if the RFID is not read, the weight of the product is also been measured. If the weight of the products appears to be more than displayed on the LCD screen product code reader then an error message in billing system so that bill can be generated only for the scanned products.

Keywords : Automatic shopping Trolley, RFID

## I. INTRODUCTION

RFID cards that are used for unique identification of products by using radio waves. The RFID cards reading system offer more advantages over Barcodes as they have a major drawback which is these barcode tags have constraints in its durability whereas the RFID cards are more durable and able to read/write data which could even be encrypted. These tags/cards could hold plenty of data like products name, price, size, weight and other information using their identification number. By implementing this RFID card scanning technology for unique representation of each product in a market shopping is done more easily. But decreasing economic and other technical concerns to a substantial extent, one can easily envision a situation where each item in a supermarket is tagged with an RFID label, the trolley consists of RFID readers and computers at the billing counters are provided of the information of the products that are being put in the cart for generating the bills. Item-level deployment of RFID card scanning technology would also allow that customers can scan all products at once and thus eliminate queues, which are consistently taken as one of the most negative aspects of shopping during public holidays or festivals. A simple extension of this system would be to use RFID codes that are embedded in consumers' loyalty cards to identify individuals. In metro cities purchasing and shopping at super shops, big malls is a daily activity.

We have seen big lines for payment of the bill at malls on holidays and weekends. When there are exclusive offers and discount the rush is also even more. After customers done the purchase, they need to go to billing counter for payment. At the billing counter, the customer will prepare the bill using bar code reader which is a time-consuming process and will create the long queues at billing counters. The products in the shop are attached with RFID cards for scanning. When a customer put any products in the trolley, its unique code will be detected, and the price of those products will be get stored in memory. As we put the products on the trolley then costs will automatically get added to total bill. Thus, the amount will be shown on the trolley itself. Total bill information will be transferred to PC by wireless Transmitter and receiver modules at the billing counter. When the customer purchases a product, she/he first scans the RFID tag/cards of the product using the RFID reader and then put it into the trolley. While purchasing the products customer needs to scan the RFID cards/tag of the product, a price of the product is taken and stored in the system's memory.

## II. METHODOLOGY

The Basket Includes the controller and reader with LCD and checkout button.when the product scans the ID the data will add to the memory of controller with the price and unit it taken. When the checkout button pressed then the message will display on the web page at the billing counter.

The RFID tag has to store in the program intially with the product name and cost. When the new tag is scan then it compare with the programmed stored data and calculate the amount and quantity. This will display on LCD.

When all the tags are scanned then after pressing checkout button the total bill amount display on LCD and same will display on billing counter laptop. The trolley to laptop communication is wifi based in LAN and connect using IP address.

Circuit Diagram:→
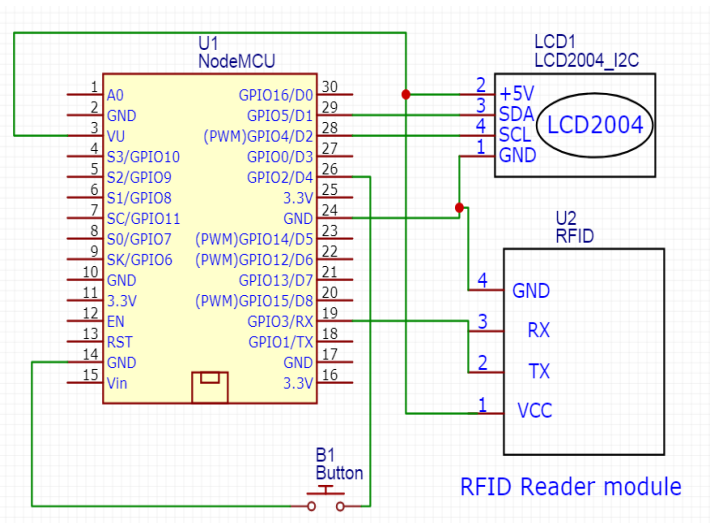


LCD I2C is 16x2 module connected to D1 and D2 pin of nodemcu. RFID Tx is connected to Nodemcu Rx. Chekout button connected to D4.The Nodemcu is programmed to connect with mobile hotspot to get the IP address. When we put IP address on web browser we can access the web page programmed in the nodemcu to see the data of products tat are added in cart and total bill.

Software :-

The compilation process

When you press the 'compile' button, the IDE saves the current file as arduino.c in the 'lib/build' directory then it calls a makefile contained in the 'lib' directory. This make file copies arduino.c as prog.c into 'lib/tmp' adding 'wiringlite.inc' as the beginning of it. this operation makes the arduino/wiring code into a proper c file (called prog.c).

After this, it copies all the files in the 'core' directory into 'lib/tmp'. these files are the implementation of the various arduino/wiring commands adding to these files adds commands to the coding language.

The core files are supported by pascal stang's procyon avr-lib that is contained in the 'lib/avrlib' directoryAt this point the code contained in lib/tmp is ready to be compiled with the c compiler contained in 'tools'. If the make operation is succesfull then you'll have prog.hex ready to be downloaded into the processor.

NOTE:the next release will see each architecture (avr/pic/8051) to treated as a 'plug-in' to the IDE so that the user can just select from a menu the microcontroller board to use and the IDE will pick the right compilation sequence.A program for Arduino hardware may be written in any programming language with compilers that produce binary machine code for the target processor. The Atmel studio(which is the newer version of arduino) provides a development environment for their 8-bit AVR and 32-bit ARM Cortex-M based microcontrollers: AVR Studio (older) and Atmel Studio (newer).

The Arduino integrated development environment (IDE) tool is a cross-platform application that is written in the programming language Java is used for windows,LINUX. It is originated from the IDE for the languages Processing and Wiring.The tool contains of a code editor which can perform text cutting and pasting, searching and replacing text, automatic indenting, brace matching, and syntax highlighting in the arduino, and to compile and upload programs to an Arduino board the user need to press the click button and also have a message area, text console, toolbar with buttons for common functions and a hierarchy of operation menus for arduino. 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. These Arduino IDE tools are used to supply a software library from the Wiring project to the software, which provides many common input and output procedures.The code entered by the users requires two very basic functions for starting the sketch and the main program loop in the software,these codes by the users are compiled and linked with a program stub main() into an executable cyclic executive program with the GNU toolchain,which are 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.

Sketch:-A sketch is a program written with the Arduino IDE. These sketches are saved as text files with the file extension .ino. Arduino Software (IDE) pre-1.0 saved sketches with the extension .pde .A minimal Arduino C/C++ program consist of only two functions:setup(): This function is called once when a sketch starts after power-up or reset. The setup function is used to initialize the variables, input and output pin modes, and other libraries needed in the sketch in the programming .

loop(): The loop() function is executed repeatedly in the main program after the setup function ends in the program so that the program does not stop until it is executed. The loop function is used to control the board until the board is powered off or is reset.
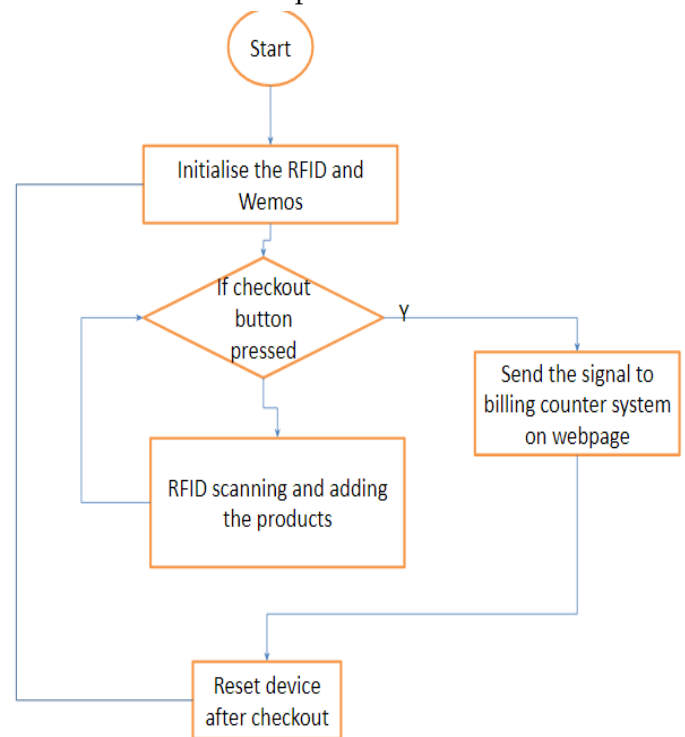
## III. EXPERIMENT AND RESULT
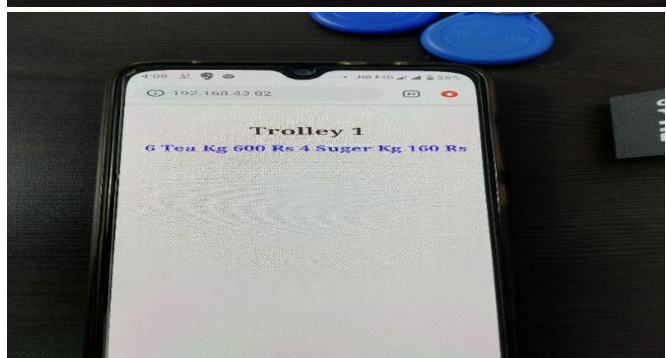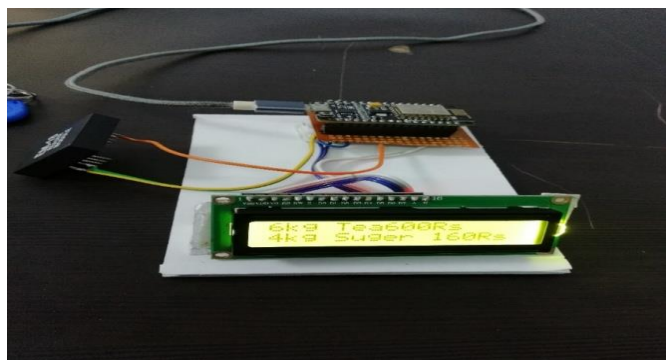






## IV. CONCLUSION

By means of this paper intent to simplify the billing process, make it swift and increase the security using RFID card reading technique. This will help with easy shopping experience containing a different level of procedure for future. It will display the name of the product bought along with its price and weight on the LED display screen to the customer. Thus with the help of the conclusion we can say that, 1.billing of products can be easily by using the reading on the screen that will be a more viable option in the future. 2. The system based on RFID card reading technique is efficient, compact and shows promising performance.

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