# Smart Trolley System For Automated Billing Using Rfid And IoT

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**Abstract- The normal trolley system in malls and supermarket need to be taken manually with the help of this smart trolley system there is no need of human to carry the trolley system. With the help of the RFID system, it automatically follow the user and it detects the materials which kept in the trolley system. It automatically calculate the value and sends the data to the computer of shop with the help of Wi-Fi module. The LCD present in it also show the price and value of product.**

**Keywords:** RFID Tag, IR Sensor, At mega Microcontroller, IoT module.

## I.INTRODUCTION

When we go for a super market or a mall we use normally trolley for carrying materials we brought there. Sometimes it may be a burden to old people and normal consumers. Those who one with children to supermarket also face this same problem they should carry children with that they want to carry trolley. It makes more inconvenience for them. To help in this case this smart trolley system in used, which consist of the RFID tag which helps in detecting the customer and follows them. With that people don't want to carry trolley it follows them automatically manual operation of trolley is not required here.

## II. PROBLEM STATEMENT

Customers can't search products in super markets where it is arranged. Customers cannot carry trolley to all the places it makes us burden. Old peoples cannot pull the trolley when it is fully loaded. Sometimes the billing take longer time than expected.

## SOLUTION OF THE PROJECT

Normally in super markets one should carry trolley to carry materials. To make it advance  this smart trolley is used. This billing system helps in billing products when the kept in the trolley. It search the products and go the places where it is arranged. This trolley helps carrying products from the super markets/malls hands free.

## WORKING

This system consist of the microcontroller unit which in the heart of this system which control all the units in the system. The RFID reader detects the consumer when they take it Detect them and follows them automatically. The IR sensor detects the object which comes into the trolley. The barcode scanning in this system detects the object rate and other details and sends the data to the zigbee with the given data it is send into cloud and data is stored in the PC. The motor drive unit control the PC motor and help in the movement of the vehicle. The data in monitored with the help of the LCD present in it
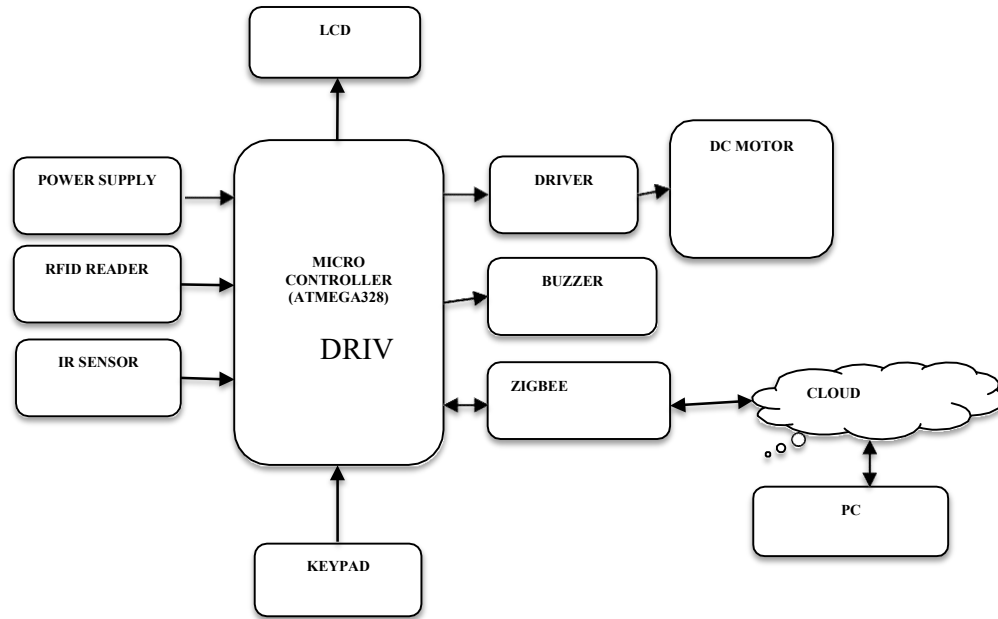
Figure 1: Block diagram of proposed system

## IV.    HARDWARE DETAILS

This system contains several hardware parts. Some of the main parts are as follows,

1. At mega Microcontroller
2. RFID tag
3. IR sensor
4. DC motor
5. Buzzer

**1.** At mega 328 Microcontroller

Basically it is Advanced Virtual RISC(AVR)microcontroller shown in Fig.2. It is a flash type program memory. It consists of 8 bits and 28 pins and it has internal built-in memory of 32KB. In that memory 1KB of memory has EEPROM and 2KB of memory has SRAM.
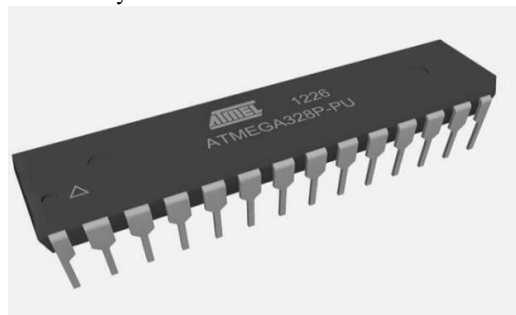


Figure.2: Schematic Diagram of Microcontroller (ATMEGA328p)

If the electric supply is removed to the microcontroller it can store the data and providing results with the electric supply.

It has a several features to make it popular device. Features including good performance, real timer counter, low power consumption and cost efficiency. It consist of 3 inbuilt timer, two of them are 8 bit timer and last one has 16 bit timer. In this microcontroller we use 5V as a standard one, and the operating voltage ranging from 3.3V to 5.5V.

**2.** RFID tag.

Radio Frequency Identification (RFID) is the use of passive, non-contact radio frequency waves for data transfer. Tagging products with the RFID tags allows users to identify and monitor inventory and properties automatically and uniquely. RFID brings auto-identification technology to the next level by allowing tags to be read without line of sight and depending on the RFID type. Its first application to recognize aircraft as a friend or foe in World War II. The technology not only c ontinues to improve yearoveryear, but the cost of implementing and using the RFID system continues to decline, making RFID more cost-effective and efficient as shown figure.3.



Figure.3: Schematic Diagram of RFID Tag

**3.** IR sensor

The infrared sensor is connected with the Arduino board. These sensors are used to sense the obstacles in the way of the trolley. The DC motors are used to provide automatic motion to the trolley. The speed of these DC motors is controlled with the help of the microcontroller as shown Fig.4.



Figure.4: Schematic Diagram of IR sensor

**4.** DC motor

A DC motor is any of a class of rotary electrical motors that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current in part of the motor.

DC motors were the first form of motor widely used, as they could be powered from existing direct- current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances. The universal motor can operate on direct current but is a lightweight brushed motor used for portable power tools and appliances. Larger DC motors are currently used in propulsion of electric vehicles, elevator and hoists, and in drives for steel rolling mills. The advent of power electronics has made replacement of DC motors with AC motors possible in many applications and shown Fig.5

Figure.5: Schematic Diagram of DC motor

**5.** Buzzer

A buzzer is an audio alarm device, which may be electromechanical or piezoelectric. Typical uses of buzzer consists of alarm and timer verification of user input such as keystroke as shown in Fig.6.



Figure.6: Schematic Diagram of

buzzer VI.IoT (Internet of Things)

The Internet of Things (IoT) is a term that first showed up in 1999 and in the recent years quickly gained wide popularity. It is the idea of various devices, such as sensors and embedded devices. The things, being connected to each other through the internet and using it as a means of sharing data and information. The things might have some level of intelligence that enables them to be aware of the surrounding and act accordingly (health monitoring, home automation, ambient intelligence, smart cars etc.,). Some focus on the networking or the connectivity of the devices and the way this connectivity is achieved, others focus on the fact that the things are embedded devices with limited resources.

## VIII. RESULT AND DISCUSION

This project increases the automation in the supermarket and in the malls. With this automated trolley system in the supermarket, the supermarket is made automated it follows the humans in the supermarket and helps carrying their product without human need. It finds the product and goes to that area in an automated way.



Figure.7: Schematic Diagram of Smart trolley

## VII.CONCLUSION

The desired objectives were successfully achieved in the prototype model developed. The developed product is easy to use and economical. Though the paper showcases the proof of concept, there are a few aspects that can be included to make the smart shopping cart more robust. The paper extends a different method of customer following, thus decrementing the hardware usage and inconvenience of customer to be path conscious instead of the traditional line following method. Furthermore, the system is completely user-friendly and free of the hectic queues and billing system providing a whole new shopping experience for the users.

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