



## Auto Billing Shopping System & Analysis Using Python

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# Research Paper on Auto Billing Shopping System & Analysis Using Python

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## Abstract:-

As we all understand that doing shopping is an easy task to perform but at the same time waiting on bill counter after shopping is a tedious task to perform and it makes customer pull extra effort which sometime can become critical. Huge amount of rush plus cashier preparing the bill is a time-consuming process and can delay or postpone one's specific scheduled task because standing in a long queue. Hence, we have made an innovative project which will help customer reduce their average shopping time. Our system has an RFID reader which is controlled by an Atmega328 microcontroller. So, whenever we scan shopping tags over the reader module, it detects the product and displays its information on the computer/laptop. Further, based on the data coming from Arduino to the computer/laptop through USB, we can do a detailed analysis of the information. Hence, this system is suitable for use in places such as supermarkets, where it can help in reducing man power and in creating a better shopping experience for its customers.

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## I. Introduction:-

As we all know that recently the grocery industry is booming and this sector is playing a major part in the world economy. Due to its evolution, there have been key changes in technological, political, social, and economic terms, making it one of the convenient and diverse businesses across the globe. Hence, due to this enhancement, it has also created new challenges and opportunities for the people associated with this business. Hence, to address all these challenges and provide a better solution and increase the consumer service, there is a need for a system which can be used as a problem solver in this business. Emerging technologies such as Radio Frequency Identification (RFID) and wireless networks have completely transformed the conventional retailing methods and have made them work faster, transparent, and efficient. Nowadays, large grocery stores are used by millions of people for the acquisition of products. Hence, to make this process faster, convenient, comfortable, and efficient, there is a huge need for an innovative product with societal acceptance which can be a booster in this field. Hence, looking into the problems and difficulties faced by the customers while doing shopping can be reduced to a large extent by embedding an RFID reader module into the system and controlling it by an Arduino Atmega328 microcontroller. And further, required analysis of data can be done to improve the overall shopping experience. This promotes quick shopping and immediate payment without any queuing process. It reduces labor efforts and increases efficiency by minimizing

errors.

## II. Literature Review :-

Dr. Suryaprasad J has introduced a "A Novel Low-Cost Intelligent Shopping Cart" [1] for bargain-priced smart shopping assist to guide customer to select a items in a shopping malls and insist the customer about the great deals available on the products as they move around in the shopping complex.

Chandrasekar.P [6] explained "Smart Shopping Cart with Automatic billing System through RFID and ZigBee" has develop a shopping cart contain a microcontroller in Product Identification Device (PID), a LCD, an RFID reader, EEPROM, and ZigBee module were used in this model. Shopping product intimation will be read through a RFID reader on cart, meanwhile product information will be accumulated into Electrically Erasable Programmable Read Only Memory attached to it and the data from this will be generate to Central Billing Section through ZigBee module. Then the separate bill detail of the cart will be calculated by the main billing counter and the customer will receive the correct bill of their respective products.

Udita Gangwal et.al,[2] proposed a concept that is "SMART TROLLEY IN MEGA MALL". In present era, automatism of shopping mall they developed a microcontroller based CART which is totally computerized. Only the billing section person has to hold the barcode detail which present in the product covers and it read by the barcode scanner. Then the data of the product will be displayed. By using that cart, in a very less time customer can buy large number of product. At the billing counter, computer can be simply affiliated for confirmation and deliver the bill.

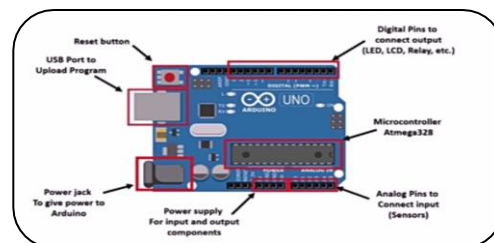
## III. Methodology:-

The Automatic Billing System is equipped with Radio Frequency Identification for product identification and it also has a display that informs customers about product prices and the total bill. As soon as the object is scanned, the RFID Reader identifies the product and updates the bill.

When the customer is done with the shopping, the details will be sent to the display and the customers will have to just pay the amount and leave the mall. Automatic billing system has the potential to make shopping more pleasurable, easier and efficient for the customer.

## IV. Materials Used:-

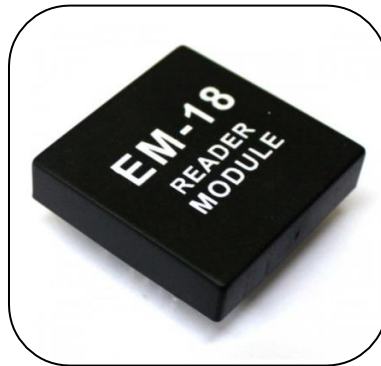
### 1) Atmega328 Microcontroller :-



**Fig.1 : Atmega328 Microcontroller**

The Atmega328 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the Atmega328P achieves throughputs approaching 1 MIPS per MHz allowing the system designed to optimize power consumption versus processing speed.

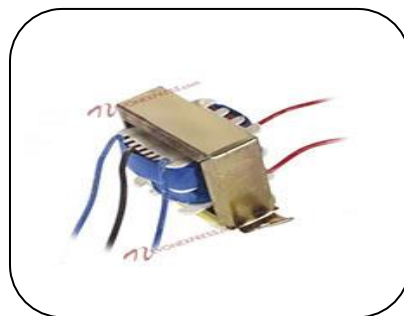
### 2) EM-18 RFID Reader Module:-



**Fig.2: EM-18 RFID Reader Module**

EM-18 RFID reader module uses a RFID reader that can read 125KHz tags. So, it can be called as a low frequency RFID reader. It gives out a serial output and has a range of about 8-12 cm. There is a built-in antenna and it can be connected to the PC with the help of RS232.

### 3) Transformer:-



**Fig.3: Transformer**

Step down transformer is the first part of regulated power supply. To step down the mains 230v A.C. we require step down transformer. Following are the main characteristics of electronic transformer.

- 1) Power transformers are usually designed to operate from source of low impedance at a single frequency.
- 2) It is required to construct with sufficient insulation of necessary dielectric strength.

#### 4) Block Diagram:-

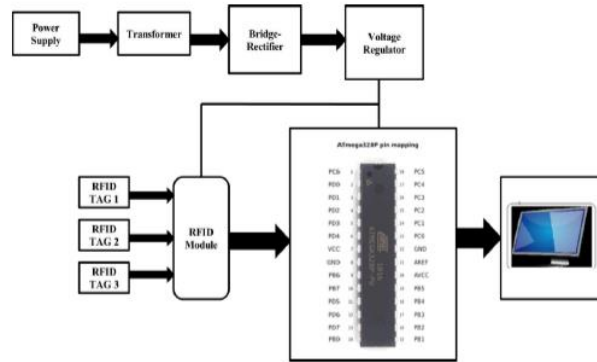


Fig.4: Block Diagram

#### 5) Circuit Diagram:-

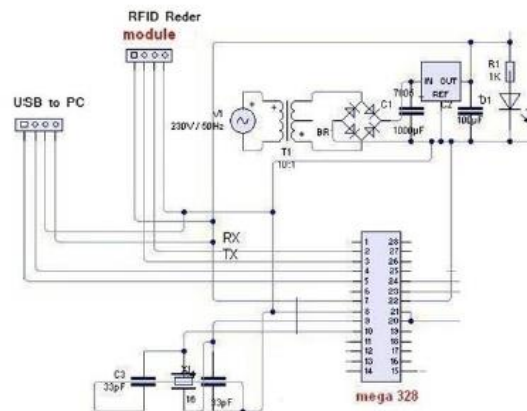


Fig.5: Circuit Diagram

#### 6) Working:-

The working part of auto billing shopping system is not that complex. As far as the hardware section is concerned, firstly we need to turn on the power supply from which we can pass 230v AC main supply to the kit. But, the voltage requirement for our hardware kit is around 12v hence transformer is placed on kit to step down voltage from 230v to 12v. After this we have mounted PCB on kit which is there to include bridge-rectifier, voltage regulator and some other electrical components on it. This rectifier converts 12v AC to 12v DC. After this process, voltage regulator is used to maintain constant voltage through the kit. Further this constant 12v is given to both RFID reader module and arduino controller. 12v is received at arduino power supply section where it is converted to 3.3v to 5v. Arduino has programmable IC in which we can upload program using arduino platform technology with the help of USB(B-type) port on arduino controller. We have used RFID tags which has coil in it along with 12-digit

identification number. And RFID reader module also has coil in it which generates Electro-magnetic waves in the range of 3-5 cm. when we hold tags over RFID reader module for scanning, it detects the 12-digit identification number present in RFID tags and send that 12-digit number to the receiver pin section of arduino controller. After this with the help arduino USB (B-type) port, received information is sent to the desktop/laptop for further detail analysis of incoming data using python language.

### 7) Python Backend:-

After data is received from reader module to arduino controller it further send that data to the desktop/laptop through USB port(B-type) for further processing and analysis of data by interfacing arduino with python technology. Here, the code is written in python language and using this we can manage the data and show the incoming data in .csv file.



**Fig.6: Frontend Mall Image**

### V. Algorithm:-

- 1) Start
- 2) When power is turned on, the system is initialized.
- 3) Now, the tags are scanned and searched for the stored tag code.
- 4) If the scanned product code is detected, display all the product details on the desktop.
- 5) Stop

## **VI. Result:-**

The developed system can be used for various commercial purposes. This system uses RFID Tags or smart label to detect the product the details. This method helps shopkeeper analyze the data and maintain the sell and import criteria based on the outcomes from the developed system. And shopkeeper can also print out the details which is recorded by the system. This approach increases efficiency and provides a smoothing shopping experience.

## **VII. Conclusion:-**

The intended objectives of this project were successfully achieved in the proposed model developed. The system is easy to use and totally error-free, low-cost and does not need much maintenance. This can be installed and utilized in many places such as supermarkets, mini-malls, shopping complexes.

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