EFFICIENT EFFECTIVE AND SECURED ELECTRONIC BILLING SYSTEM USING AI

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Abstract.

The objective of this research paper is that as we see nowadays purchasing and shopping at the malls have become a daily routine and essential activity in metro cities. The rush is even more when there are special offers and discounts & also during festivals and it hasbecome a hobby too. The individuals buy different products and deposit them in the system, after total purchase one needs to go to billing counter for the payment. At the billing counter the person therein prepares the bill using code reader which will consume a lot of time and thisthen results in long queues at billing counters. So to provide solution to this problem which willbe introduced in the single box system and also reduce the labors and eliminate time taken in malls by designing an Automatic Billing System. This will work as when the individual will put any of the product in the box, its product barcode will be scanned and stored in the database, 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 Tran receiver. Billing of products will be done by both method cash and swiping the card and bill will contain anti thefts.
Keywords: *LCD, RFID tags, artificial intelligence, machine learning*

1 INTRODUCTION

Throughout the 20th centuries our views, expectations and methods of doing work have changed drastically. Many of the Innovations and information Technologies have caused a revolution in values, knowledge and perceptions in practically all areas of human understanding. One regular task that human beings spend a considerable amount of time is in Shopping. The customers face the problems regarding the wastage of unnecessary time at the counters for bill. An improvement is required in the billing system to update the quality of shopping experience to the customers [1]. To overcome these problems stated above and to improve the existing system, we have designed a AUTOMATIC BILLING SYSTEM [2-4]. This upgraded system will intend to assist shopping to the individual and help him in reducing wating time[4-8]. The automatic invoicing system is with RF for helps in product identification. Also has an LCD to display that notifies the customer of the product price and the total invoice. As soon as the product is taken out or taken out of the system box, the infrared sensor and RFID reader will recognize the product and update the invoice/item list, then you just need to press the “NEXT” button ” to continue with the item. payment method and select the payment method as CASH OR CARDS and pay the amount on the invoice and print the receipt containing the anti-theft device. Aperson can then leave the point of sale without a security check. Automated checkout systems have the ability and try help in shopping more enjoyable, calmer and more resourceful for customers [9-12].

2 MODEL DESCRIPTION

Billing system (generator part) This is the functional diagram of AUTO INVOICE SYSTEM. In this system, ARDUINO MEGA is mounted with RFID reader, LCD display, RF transmitter, IR sensor, switch. When the user places items in the box, the system reader reads the tag and sends a signal to the ARDUINO MEGA controller.

ARDUINO MEGA then stores it in memory and compares it with the correspondence table. If it matches, it will display the item name on the LCD screen along with the total quantity of the product to be purchased.

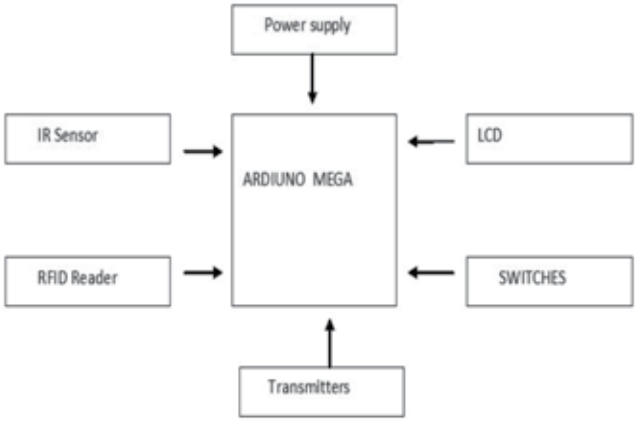


Figure 1Block Diagram of Billing System

The RFID card reader will read the product, and detailed information on the display will be displayed. Detailed information about the purchased product is stored in memory, or database. Total invoice will be displayed on the computer, ie the LCD screen. This is an example of the product details that will be displayed on the screen.

Table 1 Display of products with cost , quantity on screen (LCD)

Item	Rate
Oliveoil5lt.(1)	1500
Soap(1)	40
Total	1540

2.1 FlowChart

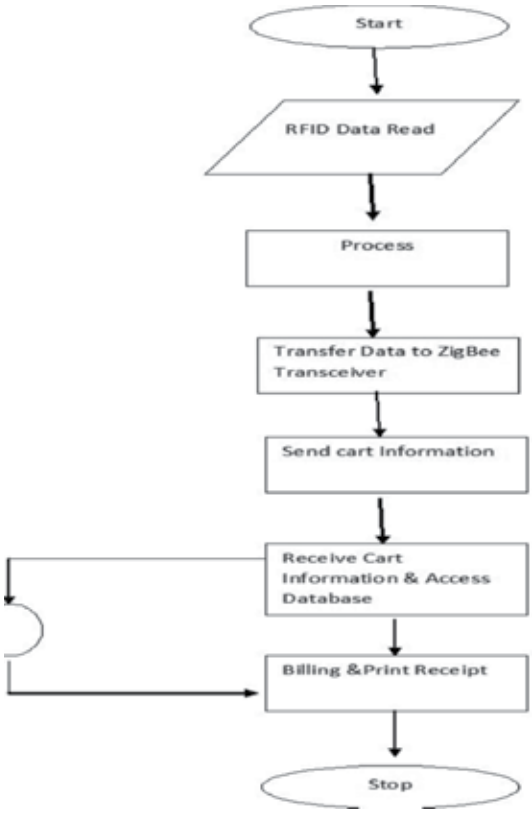


Figure 2 Flowchart

2.2 System Architecture

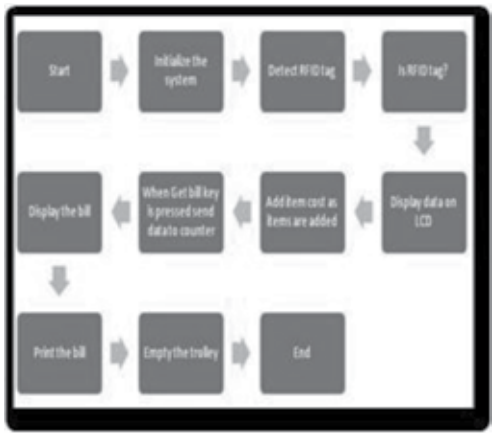


Figure 3 System Architecture

The task works on the following technique. The primary and predominant factor is to create a server or database for the respective shopping center. This server consists of all of the facts about the goods and their price, bargain and gives for the clients. As any purchaser enters the mall .He is suppose

to first pick up a cart to acquire the goods .So that the rfid in the cart can feel the goods and subsequently add them in the invoice amount. Earlier than the Purchaser proceeds with the acquisition, the device equipped in the trolley must be switched on for correct billing method to be observed. As soon as after this the consumer can begin the buy by taking the system towards theracks wherein the products are arranged. The rfid reader outfitted inside the trolley is ready for sensing the tags within its restrict. As a result because the products are delivered in the system the specific id of those products will be read by means of the reader. As soon as the product is examine the invoice will start including up. In addition this method is continued for all the purchase of the products. For eg If the consumer purchases a cleaning soap, the product id for the cleaning soap is 15486464 is connected to the id. This number is read by using the reader as soon as the purchaser put into the system. This id range is crossed checked with the main server, This manner is finished through the zigbee. Once the process of purchasing is achieved it needs to be intimated to the device by the purchaser by pressing the end button which shows the end of the buying confirming the device to begin the billing system. As soon as the affirmation is completed, the generated bill can be dispatched to the principal server. After that the purchaser has to move his trolley to the billing phase. There the purchaser pays their invoice thru their debit card. Think inside the superb instances, if the card could not be accessed then the patron's cell quantity will not be capable of receive the invoice, in order that he/she will be able to pay their bill via net banking. The final step is to take all the products out of the cart and depart the gate from the shopping center. If bill has no longer paid or any product that is unread, can be indicated close to the gate. If all the system are finished legally then the gate will be opened and the customer can leave the market.

2.3 Hardware Requirement Ardiuno

Arduino Mega 2560 is a microcontroller board based on ATmega2560. It includes 54 digital input / output pins (including 15 PWM outputs), 16 analog inputs, 4 UARTs, a 16 MHz crystal oscillator, a USB connection, an ICSP connector, and a reset button. It includes all the necessary elements to support the microcontroller; just plug it into a computer via a USB connection or use an AC-to-DC converter or battery to power it up and get started [14].

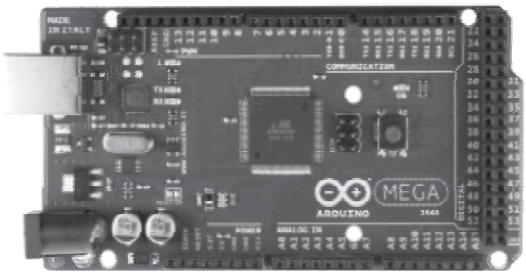


Figure 4Aurdino BoardRFID Reader

The RFID reader can be a portable or permanently attached network-connected device. Radio waves are used for the signaling of the tag. The tag transmits a wave back to the antenna when it is active, where it is converted to data. The transponder itself is included in the RFID tag [15].



Figure 5 RFID Reader

IR Sensor

An infrared (IR) sensor is an electronic device that can measure and detect infrared radiation in the surrounding environment. When an object approaches the sensor, the infrared light from the LED is reflected by the object and detected by the receiver.



Figure 6 IR Sensor

LCD

LCD is a output device is used for display result The Sample LCD display is shown in Figure 7.



Figure 7 LCD Display

Zigbee

Zigbee is based on the IEEE 802.15.4 specification and is used to create a collectionof advanced communication protocols for personal area networks using low-power miniature digital radios.



Figure 8 Zigbee Module

Transmitter Module

An RF transmitter module is a tiny PCB sub-assembly that can broadcast a radio wave and modulate it to convey data. Transmitter modules are typically implemented in conjunction with a microcontroller, which provides data to the module that can be transmitted.

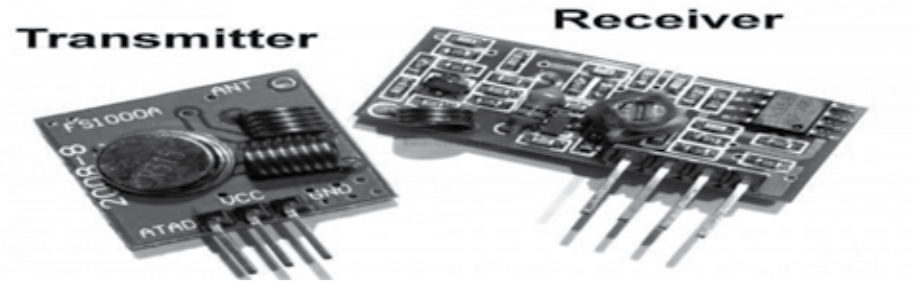


Figure 9 Transmitter and receiver module

Application

This smart trolley will be customer friendly and also it reduces the precious time of the customers. We can also implement an additional advantage in which the identification of the particular product can be indicated to the customer in the matrix format. i.e, the approximate location of the product will be indicated in the trolley with the help of the led. In our proposed system we communicate through wireless which will be secured. In future the entire shopping can be done automatically with the help of the advanced robots

Table 2 Comparison with Conventional method

System	Automatic Billing	Automatic exist	Display item information	Long waiting queue	Automatic payment & Discount	Touch screen panel
Traditional System	No	No	No	Yes	No	No
Conventional System	Yes	Yes	Yes	No	Yes	Yes

Result

The consequences acquired by using simulation is shown in fig. 6 with the hardware of the device in fig. 7 where each digital system and analog machine may besimulated. Analysis is done about how the communique takes area through zigbee inside the proposed technique which makes use of the digital terminal. While scanning is achieved through rfid scanner it is better than the bar code scanner as the scanned information is dispatched straight away to the controller for the invoice quantity to be generated and malfunctioning of the gadget is prevent some stage in addition of each product the invoice is up to date with it call, nice and price along side date & time. This acts as smart billing as client is also up to date as soon as the buy is completed approximately the billing amount to be paid which could both via clever card or cash.

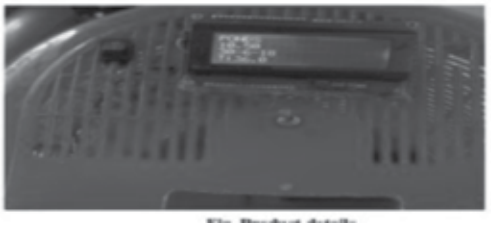


Figure10 System Prototype

CONCLUSION

In our proposed gadget the design is a consumer friendly to the customers. This gadget will make the shopping extra thrilling .The efficiency is higher than some other present gadget. Each the cart and the server facet are be synchronized in order that the output at both the ends coincides with none mess within the product matter or the invoice quantity. This machine can be changed and may be utilized in exceptional regions.

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