Automated Shopping Trolley for Billing System

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Abstract

The modern technology has increased the standard of living for the humans. There has been an emerging demand for quick and easy payment of bills in supermarkets. Every one of us craves for a quality in everything we use in our daily lives. This project describes how to build an automated and time saving system for the world of retail which will make shopping experience impetuous, customer friendly and secure. So, this has resulted in large crowds at shopping malls which have lead to long lines at the billing counter because the cashier has to scan every product item and then enter it into the billing record. The prevailing billing system is a bit time consuming. So, we thought of inventing a remedial electronic product to catch-up with this problem. We call it "Automated shopping trolley for billing system". This is based on Raspberry Pi fitted with a LCD and QR scanner and a wireless technology called Bluetooth. The LCD used is a 16x2 and Bluetooth modules make the wireless network to work easily between a certain ranges. An innovative product with social acceptance is the one that aids the comfort, convenience and efficiency in everyday life. The brief description of its operation is, when you pick a product and drop it into the trolley, the QR scanner scans the product's unique code and its price. And it gets displayed on the LCD screen. So after costumer has finished with the shopping he/she has to visit the counter and pay the bill as displayed on the LCD screen fitted on the trolley. This will save the time that was earlier being consumed to scan each item.

Keywords: Aqua Silencer, Catalytic Converter, Catalyst, Emission Control Technique, Exhaust Emission

I. INTRODUCTION

Humans these days always go for the technology which is useful to them and have always invented a technology which will support their needs. Basically, human wants to decrease the tasks using the technology in faster and easier way in various fields available. A main thing where human spend maximum time is shopping. According to survey we can say human spend approximately 1 to 1.5 hours for shopping and most of the customers will always tend to walk out of a queue if it is long. As we know there are 2 types of shopping i.e. 1) Shopping in person, 2) Online Shopping, here online shopping is the easiest way to shop as we don't have to be present physically in the shop or mall. Where shopping in person have to visit the mall or shop for shopping where customer have to wait in the queue for long time.

In modern world, in every supermarkets and malls have shopping trolley and baskets for customers to store the purchased products. When shopping is done customers have to proceed to checkout at the billing counter. Here this billing process is quite time consuming and have to employ more human resource at the billing section. So in this paper 'Automated Shopping Trolley for Billing System' which will reduce the time of customers & will decrease the manpower at the billing section and increase efficiency. In the world where technology is important and the future of retail industry is also lies in more automated devices.

II. LITERATURE SURVEY

A. T. Shanmugapriyan "Smart Cart to Recognize Objects Based on User Intention"

Shopping in the real world involves both real world objects and smart objects. Products placements & exposure is important for supermarket shopping what product stores shows on display. In this paper, they used sensors for their trolley and also wireless communication to communicate & Barcode Scanner for scanning the barcode on the product and will display the price of the product.

B. Mr.P. Chandrasekar, MsT. Sangeetha "Smart Shopping Cart with Automatic Billing System through RFID and ZigBee"

Supermarket is a place where people come to purchase their daily using products and pay for that. So there is a need to calculate the total products and total amount. Here we use RFID tags to decrease the time and reduce labour costs by shifting to self-service. Also use Zigbee technology which is low data rate, low cost, low power consumption technology.

C. S. Sainath, K. Surender, V. Vikram Arvind "Automated Shopping Trolley for Super Market Billing System"

Now a days in every supermarkets and hypermarkets employ shopping trolley or baskets to store products which customers intend to purchase. The automated shopping trolley which includes Raspberry Pi embedded chip with barcode scanner and a battery kit for customer to self-checkout at mall.

D. Satish Kamble, Sachin Meshram, Rahul Thokal, Roshan Gakre, Developing a Multitasking Shopping Trolley Based On RFID Technology

While doing survey we found that people leave shopping mall as they have to wait in a queue so long to pay at the billing counter. For solving this problem RFID tags are used. This paper presents a few application that are possible using RFID technology such as locating lost items, tracking moving objects, etc.

III. PROBLEM STATEMENT

- When we go for shopping, there must be problem that we have some budget but we take things more than our budget. But after going to counter we realize that our shopping extends the budget.
- Design a system which will reduce billing time in the supermarket and will be cost efficient.

IV. SYSTEM ARCHITECTURE

A. Block Diagram

1) Transmitter Part

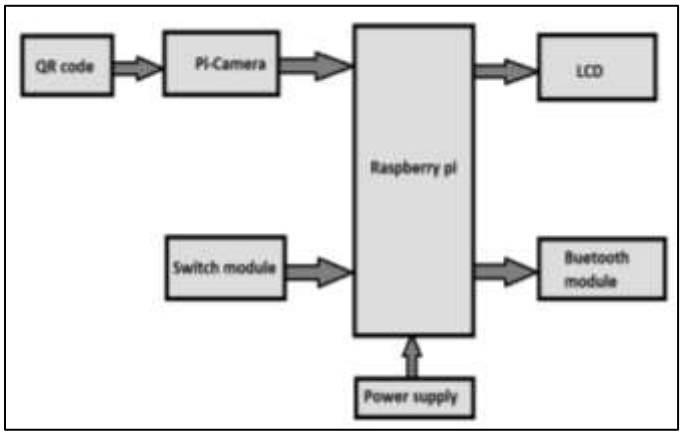

Fig. 1: Transmitter Part

2) Receiver Part

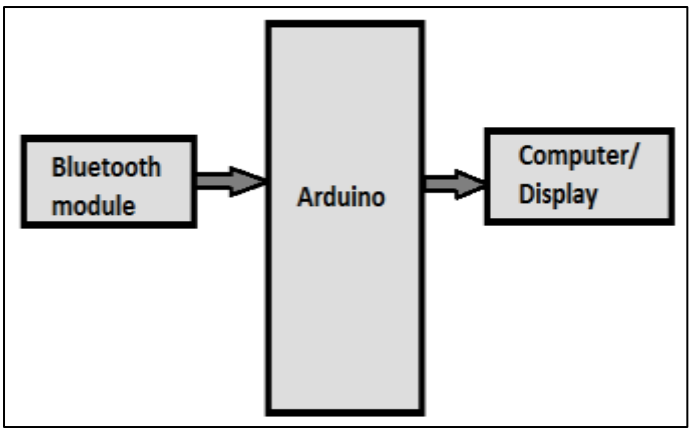

Fig. 2: Receiver Part

B. Description of Block Diagram

1) Power Supply

In most of our electronic products or projects we need a power supply for converting mains AC voltage to a regulated DC voltage. For making a power supply each and every component is essential. The blocks for designing a power supply are transformer, bridge rectifier, filter, and regulator. Here we are designing dual power supply one of 5V and one of 12V. Here we use step down transformer which converts 230V 50Hz to a required small voltage. Bridge rectifier converts the transformer output to a pulsating DC. Filter used to convert the pulsating DC into the ripple DC. Regulator finally converts ripple DC into pure DC.

2) LCD Display

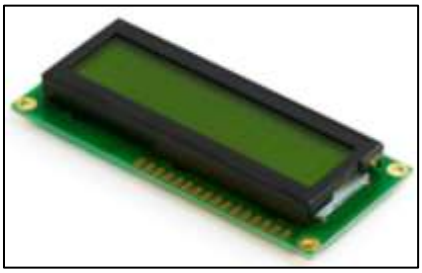

Fig. 3: LCD Display

The most commonly used LCDs found in the market today are 1 Line, 2 Line or 4 Line LCDs which have only 1 controller and support at most of 80 characters, whereas LCDs supporting more than 80 characters make use of 2 HD44780 controllers. Most LCDs with 1 controller has 14 Pins and LCDs with 2 controller has 16 Pins (two pins are extra in both for back-light LED connections).

3) QR Scanner

Fig. 4: QR Scanner

QR code (abbreviated from Quick Response Code) is the trademark for a type of matrix barcode (or two-dimensional barcode) first designed for the automotive industry in Japan. A barcode is a machine-readable optical label that contains information about the item to which it is attached. A QR code uses four standardized encoding modes (numeric, alphanumeric, byte/binary, and kanji) to efficiently store data; extensions may also be used.

Applications include product tracking, item identification, time tracking, document management, and general marketing.

A QR code consists of black squares arranged in a square grid on a white background, which can be read by an imaging device such as a camera, and processed using Reed–Solomon error correction until the image can be appropriately interpreted. The required data are then extracted from patterns that are present in both horizontal and vertical components of the image.

4) Bluetooth

Fig. 5: Bluetooth

HC Bluetooth module use CSR BlueCore or TI CC2540, Master and slaveroles in one, transmission version and remote control version and PIO state acquisition functions in one, Support the AT command modify module parameters, Convenient and flexible. Transmission version can be used to transmit data between two Bluetooth devices. Remote Control version can be used to Control

PIO ports output high or low level without any other MCU. The PIO state acquisition version can be used to acquisition PIO ports state without any other MUC.

5) *Raspberry Pi*

Fig. 6: Raspberry Pi

The Raspberry Pi is designed to be connected to the Internet. Its ability to communicate on the Internet is one of its key features and opens up all sorts of possible uses, including home automation, web serving, network monitoring, and so on. The connection can be wired through an Ethernet cable (at least in the case of the model B), or the Pi can use a USB WiFi module to provide a network connection. This is very useful in situations where the Raspberry Pi itself is in- accessible and does not have a keyboard, mouse, and monitor attached to it.

6) *Camera*

Fig. 7: Camera

The Raspberry Pi Camera Module is a custom designed add-on for Raspberry Pi. It attaches to Raspberry Pi by way of one of the two small sockets on the board upper surface. This interface uses the dedicated CSI interface, which was designed especially for interfacing to cameras. CSI bus is capable of extremely high data rates, and it exclusively carries pixel data. The board itself is tiny, at around 25mm x 20mm x 9mm. It also weighs just over 3g, making it perfect for mobile or other applications where size and weight are important. The camera is connected to the BCM2835 processor on the Pi via the CSI bus, a higher bandwidth link which carries pixel data from the camera back to the processor.

7) *Arduino Uno*

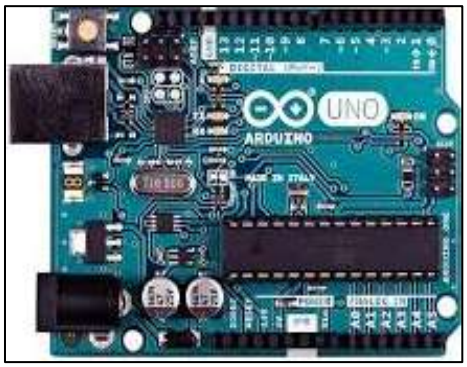

Fig. 8: Arduino Uno

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter.

"Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduno, moving forward.

V. SYSTEM FLOW

A. Flowchart

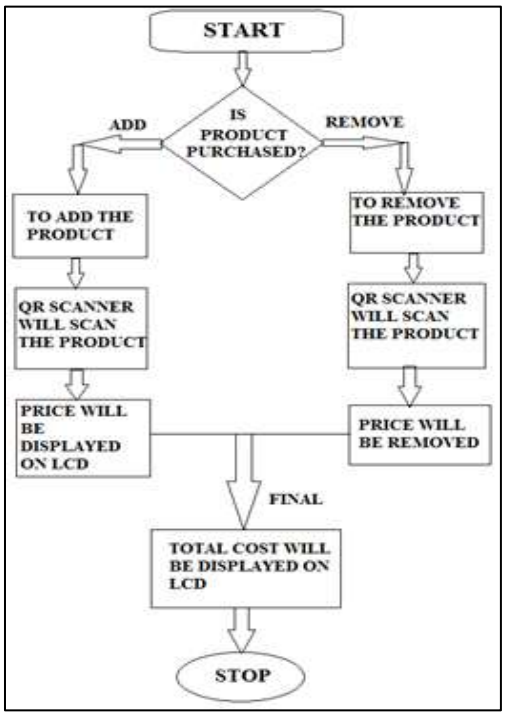

Fig. 9: Flowchart

B. Result

The result of our project is seems to be beneficial to all the people who decides a budget for purchasing the products.
Also it will help to consume time and the increasing manpower will become less at the billing section.

VI. CONCLUSION

- The project implementation will help all the people who are shopping in the supermarket and face problem of standing in a long queue for final billing.
- The device is simple to operate and does not need any help.
- This project is mainly useful for middle class people who face difficulties while shopping in supermarket.
- The project implementation is easy, very economical and will reduce the billing time.
- In our project we designed automated shopping trolley for billing system, which can be use in any supermarket and by any person easily.

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