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SMART SHOPPING TROLLEY WITH AUTOMATED BILLING SYSTEM

Dr. A. Kalaimurugan[1], R. Hemalatha[2], M. Gopinath[3], R. Israel Rufus[4], M. Vishnupriya[5]
Professor[1], UG Scholar[2], UG Scholar[3], UGScholar[4], UGScholar[5]
Department of Electrical and Electronics Engineering
Agni College of Technology, Chennai, Tamil Nadu, India

Abstract*— *Modern technology has increased the standard of living of humans. There has been a large queue near the billing counter which reduces the interest for the customers during shopping. This project describes how to build an automated and time-saving system that makes the shopping experience easy, customer-friendly, and secure. In present method has resulted in large crowds at shopping malls which makes long queues near the billing counter because the cashier has to scan every item and then put separate bills to the products. The present billing system is a bit time-consuming. So, we have a project which solves this problem in shopping malls. "Smart Shopping Trolley With Automated Billing System" is a project that gives a solution to the problem in malls and supermarkets.

***Keywords*—** *Raspberry pi, Raspberry pi camera, SD card, Card reader, USB cable, Ethernet cable, and LCD.*

1. INTRODUCTION

A shopping mall is a place where almost every people in the city goes shopping for the daily requirements of life such as food, clothing, electrical products. Almost all weekends of the week are meant for shopping at these kinds of shopping malls and supermarkets. Shopping malls are very common in modern cities when compared to towns. All the products which are present in the shopping malls are provided with barcodes. Every product has a barcode that has been placed at the back of the product. Shopping Trolleys are normally used in malls for shopping purposes. The crowd that occurs near the counters for billing is very time-consuming.

All shopping malls have trolleys and baskets for customers to store the purchased products. When shopping is over, customers have to proceed to checkout at the billing counter. This process is quite a time consuming and have to employ more human resource at the billing section. So, in this project 'Smart Shopping Trolley with Automated Billing System' will reduce the time of customers and will decrease the manpower at the billing section.

Customers will go to the billing counter only for payment and the overall total bill is already displayed on the LCD screen which is connected to raspberry pi and the customer is already aware of the total bill. This system is also beneficial for the customer who has a certain budget limit. This automated shopping trolley will provide a solution to customers as the customer will not stand in a long queue to know the total amount of the product which they have purchased.

2. EXISTING SYSTEM

The present system is used in the shopping malls is the Barcode System. This system has replaced the previous manual system but has some disadvantages. The Barcode system requires the barcode on the back of the products. A scanner can read products only one at a time. Barcodes define the type of every product but can't do it uniquely. Some of the packages in python are installed in it. When the barcode or QR code is scanned through the webcam then the information of the product is transferred to the PC. Product details will be displayed on the pc and touch screen LCD.

3. BLOCK DIAGRAM OF PROPOSED SYSTEM

Barcodes are read the only type and can't be overwritten. The barcode system runs on laser technology. Barcode requires manpower and human effort. The barcode system requires the customer to stand in long queues to get their products scanned and their bills generated. This process also consumes a lot of time of the customers, thereby adding to their frustration. With many disadvantages, the Barcode system is still in use. There is a need to bring on a smarter and more efficient system.

4. PROPOSED SYSTEM

This shopping trolley makes note of all the scanned commodities of the particular trolley with allotment number and is linked with the supermarket's backend database which contains details of the product such as cost price, available stock, the quantity of the product, and weight of the product. In this system, the trolley is linked with various devices such as Raspberry Pi, Raspberry pi camera, and Ethernet cable, and touch screen LCD. Raspberry pi is a mini computer when compared with the computer it has a special feature like can connect sensors in raspberry pi. A web camera is used to scan the barcode which contains product details. USB cable is used

to give power supply to Raspberry pi and a Web camera. Ethernet cable is used to connect raspberry pi and PC.

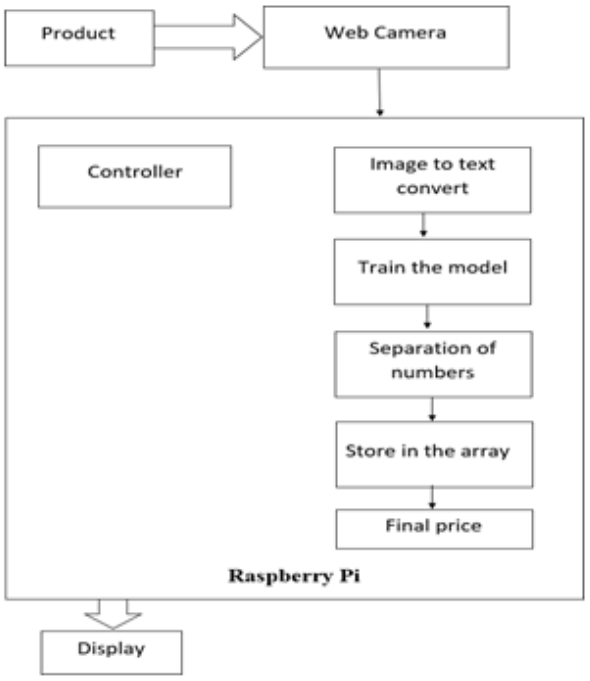

FIGURE 1: BLOCK DIAGRAM OF PROPOSED SYSTEM

5. METHODOLOGY

A. RASPBERRY PI 3 B+

It is a mini-computer that needs the OS to be installed in it. There are so many OS versions available out of which "RASPBIAN JESSI" works fine. Monitor, Keyboards, and Mouse are used to create a system set up with Raspberry pi 3 b+. When compared to the computer it has a special feature to connect the sensor with it. The Raspberry Pi 3 Model B+ is an improved version of the Raspberry Pi 3 Model B. It is based on the system-on-chip (SoC), which includes a 1.4 GHz quad-core ARMv8 64bit processor and a powerful Video Core IV GPU. The Raspberry Pi can run ARM GNU/Linux distributions, including Snappy Ubuntu Core, Raspbian, Fedora, and Arch Linux, as well as Microsoft Windows 10 Iot Core.

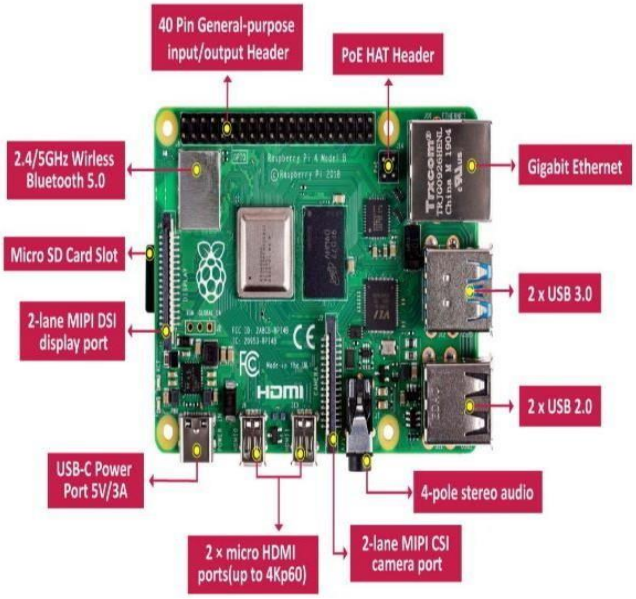

FIGURE 2: RASPBERRY PI 3 b+

B. RASPBERRY PI CAMERA

Raspberry Pi web camera is used to scan the bar code or QR code that is interfaced with the product. So that they are decoded later and the product can be recognized easily. When the product has been recognized the details which are encoded into the barcode or QR code are displayed in the LCD. This Raspberry Pi Camera Module is custom-designed for Raspberry Pi.

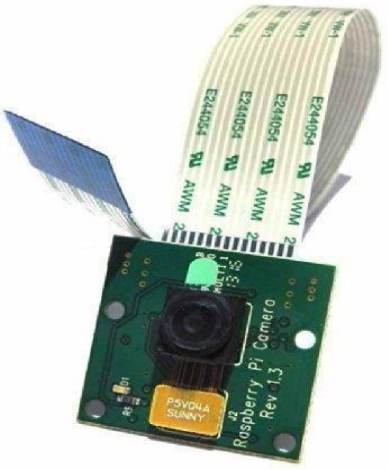

FIGURE 3: RASPBERRY PI CAMERA

C. SD CARD

It is used to install OS and packages which help to run the Raspberry Pi and Raspberry pi camera. It is a part of the Raspberry Pi and it provides the initial storage for the Operating System and files. When the Raspberry Pi is 'switched on, that is connected to a power supply, a special piece of code called the boot loader is executed, which reads more code from the SD card that is used to start up the Raspberry Pi. When SD Card is not inserted, it will not start. Do NOT push in or pull out an SD card while the Raspberry Pi is connected to the power, as this is likely to corrupt the SD card data.

FIGURE 4 SD Card D.CARD READER

A card reader is an input device that reads data from a storage medium. Punched cards that were used during the first several decades of the computer industry to store information and programs for computer systems. Modern card readers can read plastic cards embedded with either a barcode, magnetic stripe, or another storage medium. A card reader is used for communication with a memory card. A magnetic card reader is a device used to read credit cards. A business card reader is a device used electronically to save printed business cards.

FIGURE 5: CARD READER

E. USB CABLE

Term USB stands for "Universal Serial Bus". USB cables are used mostly to connect computers to peripheral devices such as cameras, camcorders, printers, scanners, and more. This used to give power supply to raspberry pi and raspberry pi cameras. The USB cable assemblies are designed with several distinct connector types. The most common types. They are called Type A and Type B.

FIGURE 6: USB CABLE

F. ETHERNET CABLE

It is used to interface Raspberry Pi, Raspberry camera, and LCD. Ethernet is a computer networking commonly used in local area networks (LAN), metropolitan area networks (MAN), and Ethernet support higher bits, a greater number of nodes, and longer distances. Systems communicating over Ethernet divide large data into shorter pieces called frames. Each frame contains source, destination addresses, and error-checking data so that damaged frames can be detected and discarded.

FIGURE 7: ETHERNET CABLE

G. RASPBERRY PI TOUCH SCREEN DISPLAY

It is used to display the product details which are stored in barcode and QR code. It is designed for Raspberry Pi Model B/B+, an ideal alternative solution for HDMI monitor 320×480 resolution, better display Convenient Men-Machine. interface for Raspberry Pi, combined with the portable power, can use anywhere anytime it Supports the Raspbian system, enables your system to Play videos, and Support software keyboard (without keyboard/mouse).

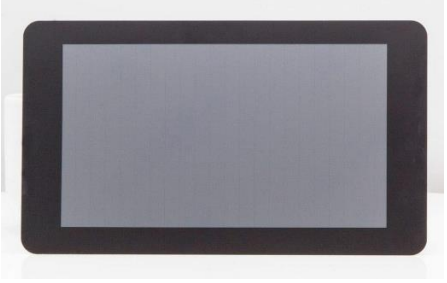

FIGURE 8: RASPBERRY PI TOUCH SCREEN DISPLAY

6. WORKING

The components used in this proposed system are Raspberry pi, Raspberry pi web camera, SD Card, Card Reader, USB Cable, Ethernet Cable, and LCD. This raspberry pi is a low-cost minicomputer. When compared to the computer it has a special feature like can connect sensors in it. SD card is used to install OS and packages which can run on PC. When code is read by the card reader which runs on PC and helps to run the raspberry pi. Raspberry pi web camera is interfaced with raspberry pi. In this, the corresponding code should be written on pc which runs the raspberry pi and raspberry pi camera. Putty application is to be installed from Google. After the installation, Open putty as user administrator and login as pi, and enter the password as raspberry. When the power supply is given through USB cable to raspberry pi and raspberry web camera, product details are stored in SD Card. when the barcode or QR code is shown in raspberry pi web camera will capture it. Barcode or QR code that has the product details which is displayed through LCD.

7. HARDWARE IMPLEMENTATION

FIGURE 9: HARDWARE IMPLEMENTATION

8. RESULT OF PROPOSED SYSTEM

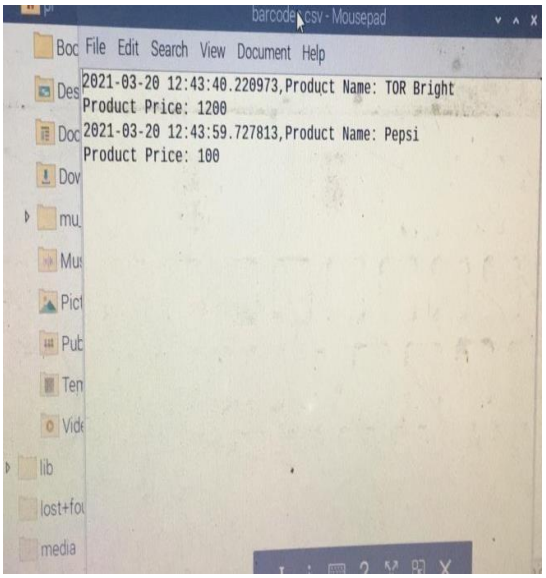

FIGURE 10: RESULT OF PROPOSED SYSTEM

9. ADVANTAGES OF PROPOSED SYSTEM

- It saves customer's time.
- It also reduces manpower.
- It doesn't need a line of sight.
- It is easy and very economical.

10. CONCLUSION

This project implementation will provide the facility to customers to self-scan the products which the customer wants to purchase. A wireless smart device scan products of the trolley which is linked with the supermarket backend database which contains the detail of the products such as price and stock. As we have provided the self-scan facility to the user and the wireless smart devices which make up all the scanned products and are connected with the supermarket database. The scan products are automatically billed in the wireless smart device for their purchase. At the time of purchasing the products, the customer is aware of the total bill. This system will help all the people who are shopping in the supermarket and face the problem of standing in a long queue for final billing. This device is simple to operate and does not need any help during shopping in supermarkets and shopping malls. The project "**SMART SHOPPING TROLLEY WITH AUTOMATED BILLING SYSTEM**" implementation is easy, very economical, and will reduce the billing time. We designed an automated shopping trolley for billing system, which can be used in any supermarket and by any person easily.

11. FUTURE SCOPE

- In addition to the product details, nutrition facts of the eatables can be added.
- Automatic detection in the movement of the cart can be implemented by using various sensor technologies.
- When the limit exceeds buzzer should beep.
- Providing an option to the shoppers to create a shopping list.
- The same system can be used in various places.

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