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SMART SHOPPING CART

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ABSTRACT

In supermarket a wide variety of product items are available. These product items can be food, beverages or any household product. The main purpose of supermarkets is to provide availability of all the products and save the time of the customers but Sometimes customers get frustrated while waiting in the queue at the billing counter and sometimes they get confused while comparing the total price of all the products with the budget in the pocket before billing. To overcome these problems, we have designed a smart trolley using an LCD display, Arduino ,ESP32-CAM and Application. With this system, there is no need for customers to wait in the queue for the scanning of the products for billing purposes. The camera is attached to the trolley, when a customer scans the product QR code and places it in the trolley , the product quantity, price and total price is displayed on the lcd screen. Billing can be done in Application.

Keywords: Supermarkets, Smart Trolley, LCD Display, Arduino, ESP32_CAM, QR Code, Application, Online Billing, Total Price.

I. INTRODUCTION

We are in the world of the Internet of things (IoT), and here all interactions between physical objects have become real. This has created a new revolution in all our systems. This created many disputes in data management, wireless communication and real-time decision making. Initially, we used to generate bills in the paper format and then later we used the technology. The barcode scanner was used to read and scan the barcodes. But later, we focused on the smart trolley billing system using QR codes.

When a person goes shopping in any mall then he/she takes a trolley and after completing the shopping he/she has to go to the counter for billing. Billing is done with barcodes which is a very time-consuming process. But if the smart shopping cart is used, The person he/she first scans QR code of the product using the ESP32 Cam and puts it into the trolley. The price of the product is Dispalyed on LCD and payment can be done through Application. It reduce the problem of standing in queue and wasting time.

II. METHODOLOGY

The methodology of this project design includes the implementation of the proposed method. There are some basic steps involved in the Methodology of the product. The first major step is to scan the QR code and get data using ESP32-CAM. Second step is sending data from esp32-cam to Arduino uno via UART communication and sending data to Firebase. The third step is displaying data on Graphic LCD using Arduino Uno. The fourth step is displaying the bill in Application and also payment gateway thought application. By following these four steps, the implementation of the proposed system is going to be done.

The smart trolley which is designed with additional features compared with the usual trolley in all supermarkets. This Smart trolley includes a camera which scans the QR code of the product, displays all the information of the product in LCD display with the help of Arduino and payment through application.

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III. MODELING AND ANALYSIS

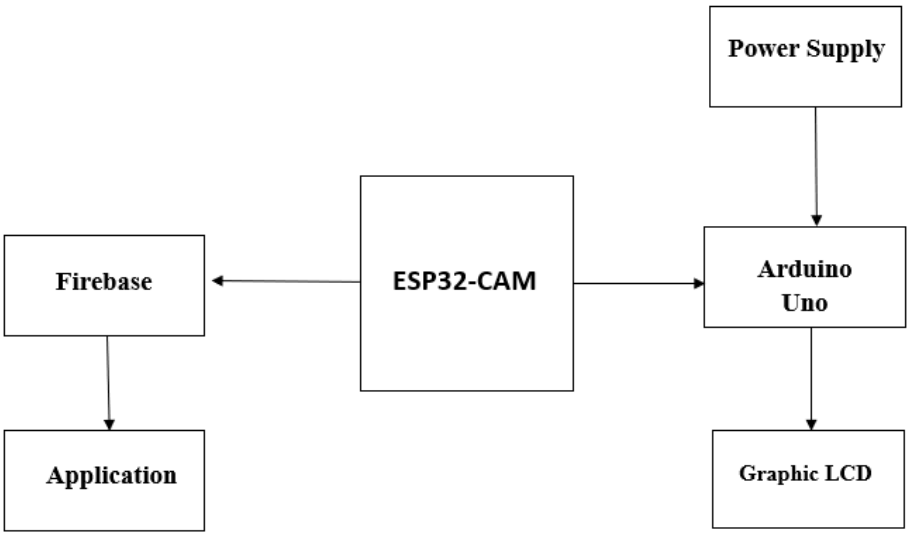

Figure 1: Block Diagram Of Smart Trolley.

ESP32 cam:

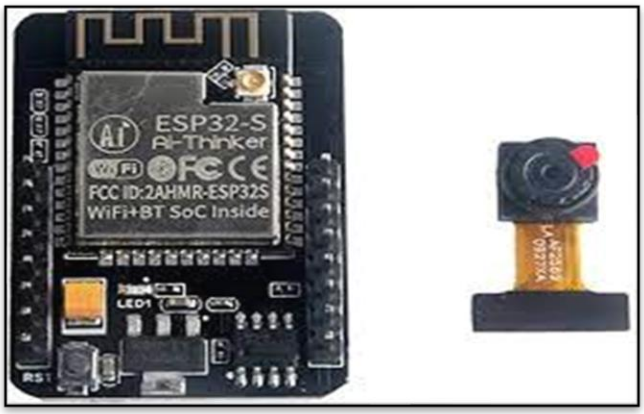

Figure 2: ESP32 Cam AI Thinker

The ESP32-CAM is an Ai-Thinkers Original ESP32 CAM Wi-Fi + Bluetooth with OV2640 Camera Module based on the ESP32 chip with the additional facility of using a camera. It is ideal for various IoT applications. The ESP32-CAM has a very competitive small-sized camera module that can operate independently as a minimum system.

ARDUINO UNO:

Figure 3: Ardunio Uno

Arduino is a prototype platform (open-source) based on easy-to-use hardware and software. It consists of a circuit board, which can be programmed (referred to as a microcontroller) and a ready-made software called

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Arduino IDE (Integrated Development Environment), which is used to write and upload the computer code to the physical board.

ST7920 128X64 Graphic LCD display:

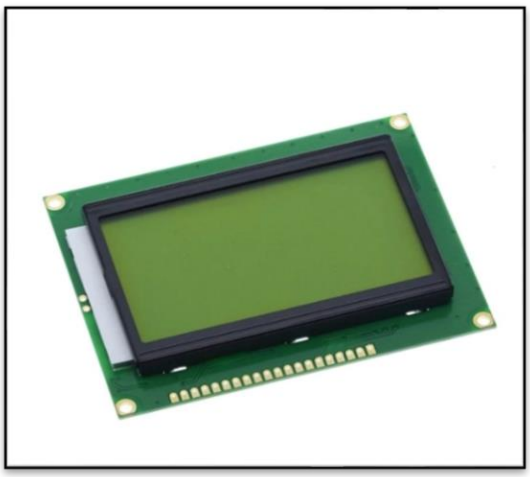

Figure 4: Graphic LCD Display

The 12864B Graphic LCD module is a 128 x 64-pixel LCD display with a blue backlight and white foreground. The display is fully programmable and can display a combination of both graphics and text. It can operate in both parallel and serial (SPI) modes which can be configured by the external pin PSB. In SPI mode only 3 data pins are required to drive this display.

Firebase:

Firebase is a product of Google which helps developers to build, manage, and grow their apps easily. It helps developers to build their apps faster and in a more secure way. No programming is required on the firebase side which makes it easy to use its features more efficiently. It provides services to android, iOS, web, and unity. It provides cloud storage. It uses NoSQL for the database for the storage of data.

Application:

An application program (application or app for short) is a computer program designed to carry out a specific task other than one relating to the operation of the computer itself, typically to be used by end-users. Word processors, media players and accounting software are examples of. The collective noun refers to all applications collectively. The other principal classifications of software are system software, relating to the operation of the computer, and utility software ("utilities").

IV. RESULTS AND DISCUSSION

The main objective of our project is to overcome the problem of standing in queue and wasting time. After scanning a product our LCD displays product name, price, count, total.

In this project two microcontrollers are used, one is ESP32-CAM and other one is Arduino Uno. A push Button is connected to esp32. GREEN, RED and BLUE LEDs are connected to esp32. A 128x64 Graphic LCD Display is connected to Arduino UNO. An application is used to display bill details and payment through application.

Green LED - indicates that everything is ready and the push button can be pressed to scan the QR code.

Red LED - Indicates that there is an error in scanning the QR code, so please scan the QR code again.

Blue LED - Indicates that the scanning is done, and the decoding of QR code is under process.

When the power supply is given to the project setup, The LCD displays a welcome page and after a few seconds another page loads with null values of Item Name, Item Price, Total Items and Total Price. After esp-32 cam connected to WIFI, then Green LED glows, indicating that everything is ready and the button can be pressed. Place Item QR code in front of the esp32-cam and press the button. If the QR code is not recognized, then the Red LED glows, indicating that rescan the item QR code again. If the QR code is scanned correctly then Blue LED glows, indicating that data from the QR code is processing.

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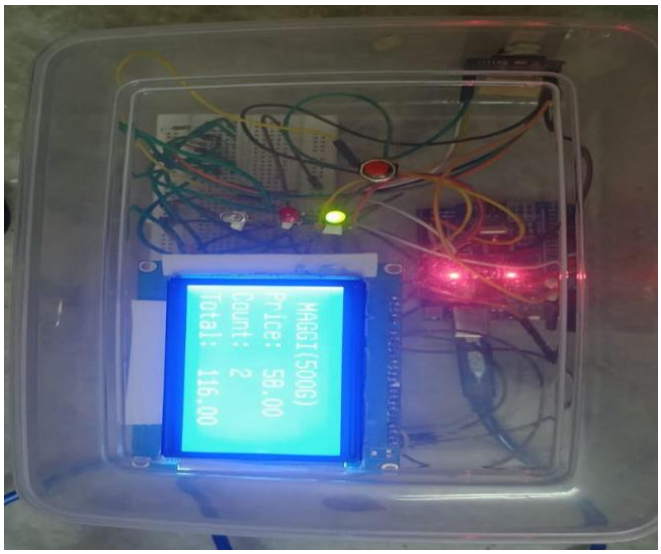

Figure 5: Trolley Output

Then the data from the esp32-cam is transferred to Arduino uno via UART communication in string form and also the data is transferred to Firebase. Arduino uno again does some string slicing, conversions of data type and displays the Item Name, Item Price, total quantity, Total Price on the LCD screen. For the next item to scan, check for the Green led glow, if everything is ready repeat the same process.

If the scanning of every item is completed, open the Application and enter the basic details like name and Device number. The device number is displayed on cart. After submit you can see the item name and price of each item and total price of them. Below the bill details there will be a payment gateway, to pay the amount. The Application output is shown in figure 5.

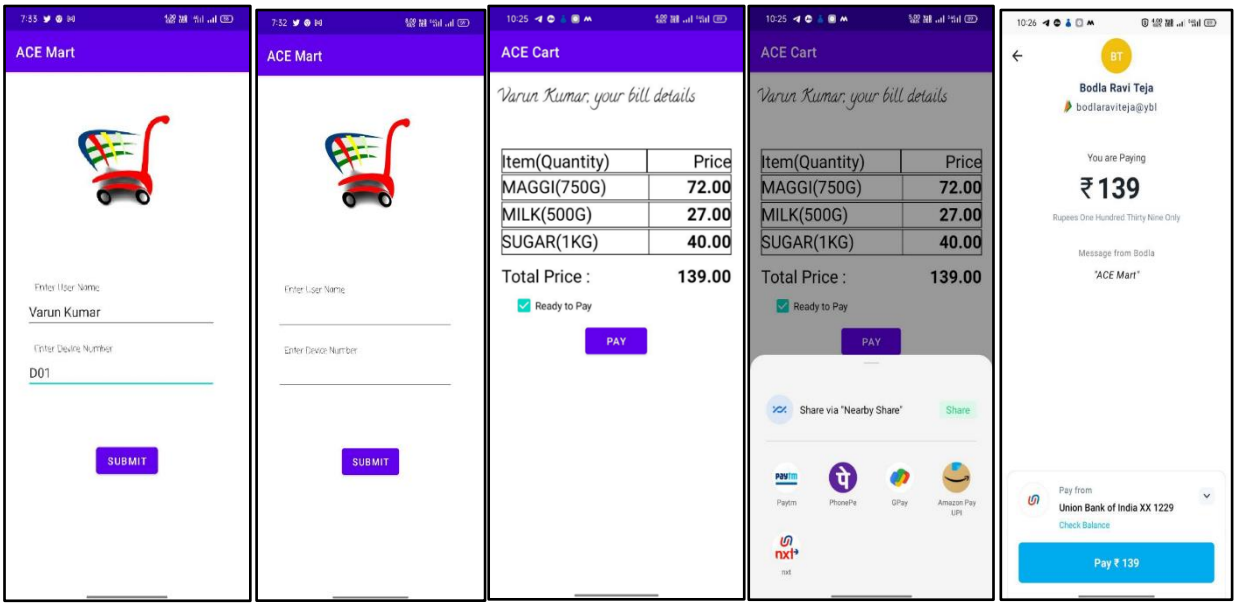

Figure 6: Application output

V. CONCLUSION

In conclusion, this project is successful as we are able to create and design a shopping cart with an ESP32-CAM. Although there are some changes here and there, we believe that the shopping cart we created can help ease the buyers at the shopping mall to save their time shopping at the supermarket.

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