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SMART SHOPPING CART USING RFID

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ABSTRACT

Shopping trolleys are used to purchase various things in shopping malls or markets. The shopping malls are nowadays becoming very crowdy and customer have to wait for long time in ques which uses barcode scanning method also Purchasing a product is complicated task as client have to continuously keep the track that how much money is he spending. To change it we are developing a smart shopping trolley equipped with RFID scanner and lcd display and microcontroller.

Keywords: ESP 32 Microcontroller, LCD Display, RFID Scanner, RFID Tag, Smart Trolley.

I. INTRODUCTION

A mall or market is a vast area where clients may purchase everyday essentials such as branded food, snacks, apparel, and electrical and technology items, among other things. The globe now contains a huge number of shopping malls, both large and small. Customers waste unnecessary time at the billing counter after making many purchases over a long period of time. To increase the quality of the shopping experience for customers, the common billing system needs continuous development. We developed the smart trolley shopping system to address these difficulties while also updating and improving the old system. This is accomplished by simply employing RFID tags for the items instead of barcodes and an RFID reader with an LCD display is mounted on the shopping cart. in this system, customers will be able to see the price of each item that is scanned using RFID. the microcontroller installed in the system performs all the billing actions. the entire price of the items will be presented on the LCD display.

II. EXISTING SYSTEM

We are now employing the method at malls with the assistance of a barcode scanner. The vendor scans the item with a barcode scanner. This is going to be a slow process, with customers having to wait in huge lines. As a result, this is one of the reasons why most people desire to leave the mall rather than wait in a long queue to buy a few items. The barcode system have many disadvantages Typically, barcodes are printed on labels that are always visible to the outside world. This renders it vulnerable to environmental harm. Even if only one component of the label is broken, it might cause issues while scanning. A barcode reader should not be kept more than 15 feet away from the barcode label in order for it to operate. If it is inserted more than once, the barcode scanner will not be able to scan it. This reduced range might be problematic in some situations.

Figure 1: Typical barcode scanner

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Table 1: Comparison of barcode system vs RFID System.

Scans one by one.	Can scan multiple items at the same time.
Scanning time is more 5 to 10 seconds per read.	Scanning time is less 1 mile second per read.
Scanning distance is very less.	Scanning distance is comparably more
Scanning requires direct visibility of tag.	Scanning do not require direct visibility of tags
Easy to copy and anyone can read the code hence less secure.	Cannot be copied hence more secure.
It uses static memory I.e., read only.	It uses dynamic memory i.e. read and write.
Label is used only once.	Label can be used multiple times.
Risk of damage and no reading.	Resistant to external conditions such as temperature, humidity, impact, scratches.

III. PROPOSED SYSTEM

System architecture: All of the components require a dc power supply to work. An RFID tag uses an antenna and a microchip to broadcast and receive data. The tag is embedded into the product. The RFID reader's microchip may be configured with any data the user wants. When a reader scans a passive RFID tag, it delivers energy to the tag, allowing the chip and antenna to relay information back to the reader. As a result, the reader reads the information from the RFID tag. The reader receiver is linked to an ESP-32 microcontroller. The ESP 32 microcontroller serves as the system's heart, doing all billing and counting functions, and the data set is given for that reason. The microcontroller-connected LCD display then shows all of the purchase information, including the name of the item, price, and quantity. The final bill is shown on the LCD panel.

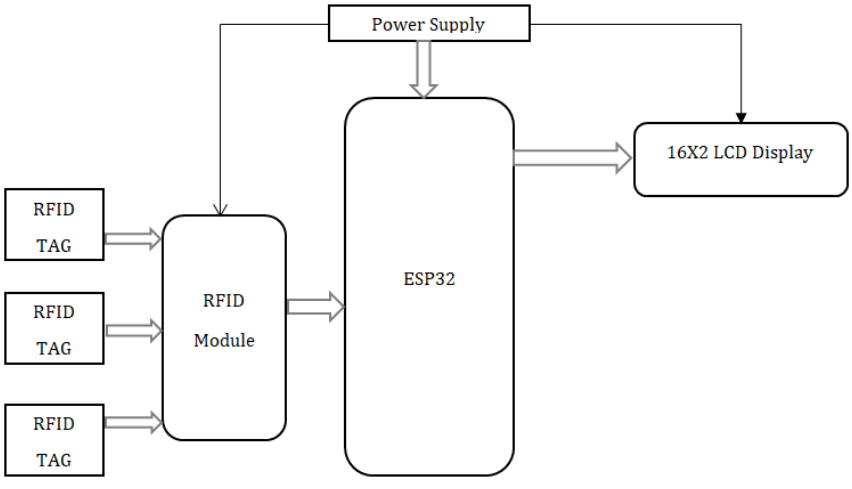

Figure 2: Block Diagram of System

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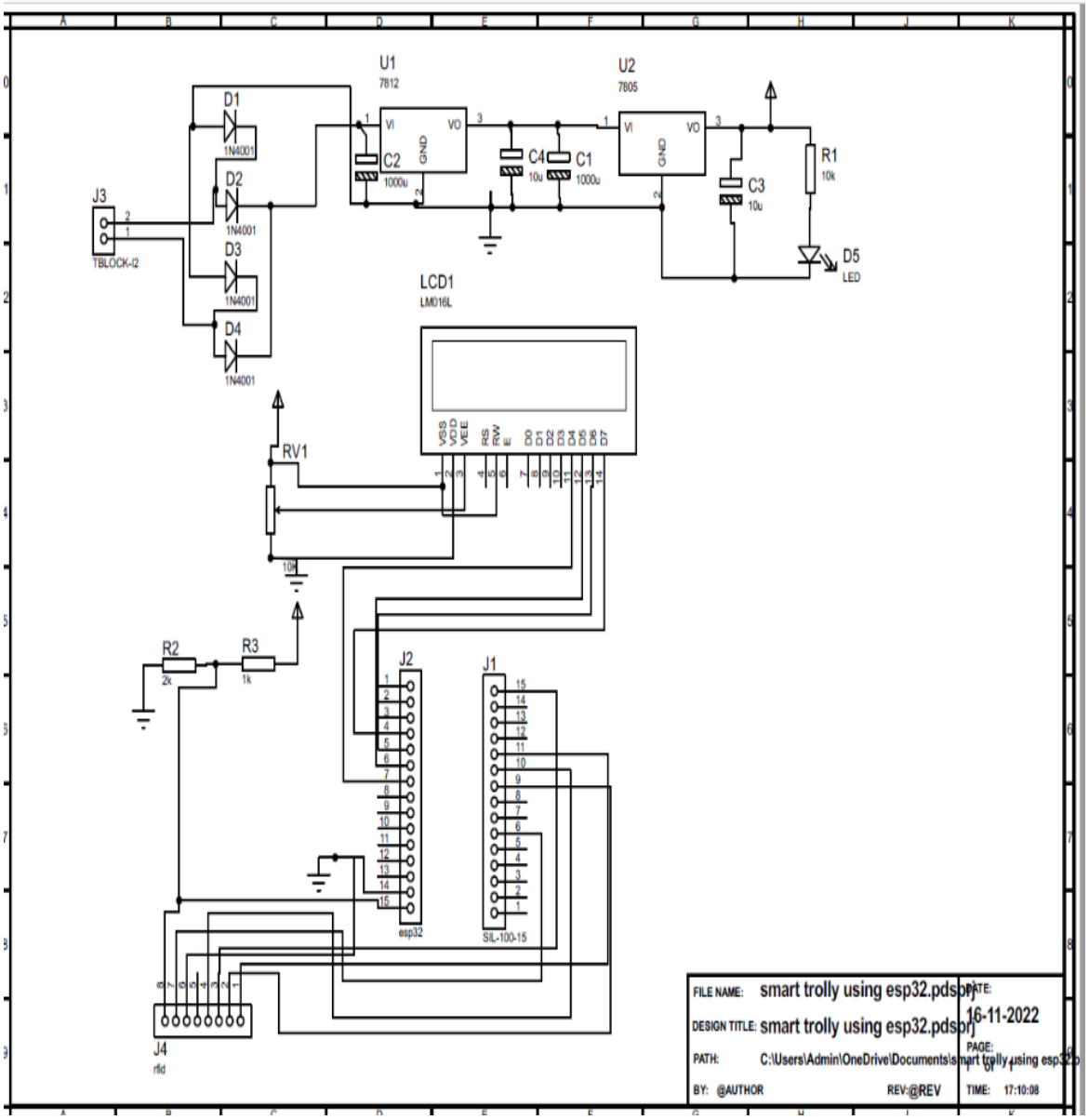

Figure 3: Circuit Diagram of System

System Working: When a consumer enters a shopping centre, she or he first takes a trolley. Every trolley is outfitted with a scanning tag and an RFID tag for each user. While the client is inspecting the item's RFID tag, a cost of the purchasing item is obtained and saved in the framework's memory/Arduino. A flowchart can assist you understand how the system works. When a product is placed in the cart, the RFID reader reads the tag embedded in the items, and the product information is obtained and shown on the LCD screen. At the same moment, billing information is updated. The operation of the smart Shopping Cart may be demonstrated in the following steps: When customers with carts press the "start button," the system activates and all components, including RFID readers, microcontrollers, and physical media, begin to work. Each product is equipped with an RFID tag that has a unique identification. These IDs are recorded into the database and assigned to the corresponding products. When a customer sets a product in the RFID reader examines the tag in the basket. The information about the product is extracted and displayed on the LCD panel. Repeat these steps till the end of shopping button is pressed. When you press the "End Shopping" button, the entire bill is submitted to the master computer. You can also remove some of the items from the basket, and the bill will be adjusted accordingly. The customer's preference determines this. At the conclusion of the shopping expedition, the customer can pay the bill and leave. At the completion of the purchasing procedure, the inventor status of the objects is also changed.

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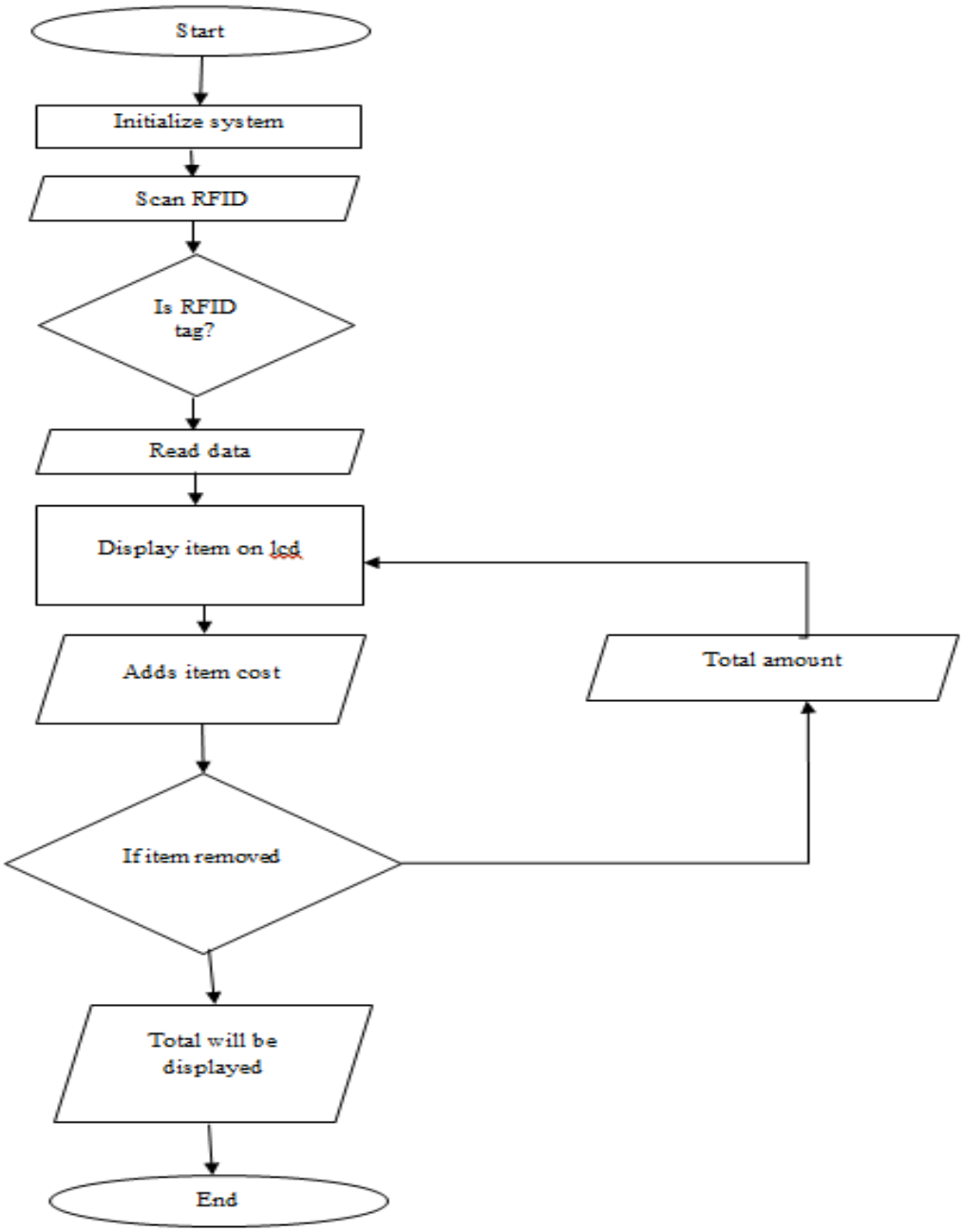

Figure 4: Flowchart of proposed system

IV. RESULTS AND DISCUSSION

The smart trolley concept for retail Mart is simple to operate and does not need any specific training. This clever trolley saves customers time at the billing counter by automatically checking all goods and generating a complete charge for payment. As a result, the consumer does not lose time at the billing counter because billing is done in the trolley itself. Using a smart shopping system to improve mall security and track theft among shoppers and personnel. To automatically verify shopping carts, which reduces personnel and employment costs at the billing counter. To improve corporate productivity by offering excellent customer service. To establish contact between client and server in order to monitor each portion Each part is repeated indefinitely. Following figures shows the prototype model of smart shopping trolley which contains ESP32 microcontroller, RFID reader, LCD display**.** As the power supply is turned on, the system starts and the welcome message is displayed on the LCD display. After showing RFID tag to the reader, it scans the information from tag and transfers it to microcontroller which then processes the information and is sent to the display.

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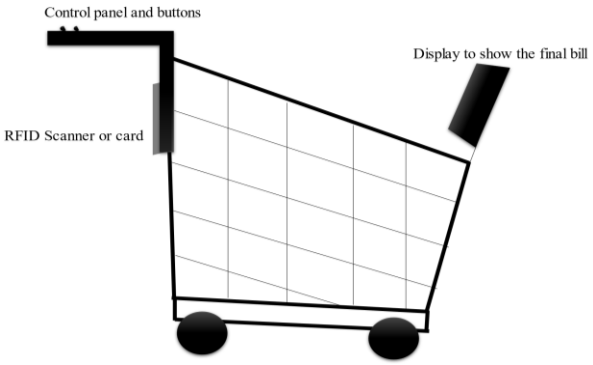

Figure 5: Structure of smart shopping trolley

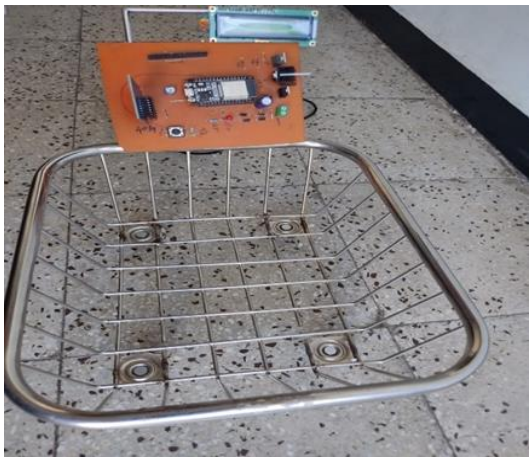

Figure 6: prototype model of implemented smart shopping trolley

V. CONCLUSION

This project is utilized in shopping malls to shorten client lines at the billing counter. An RFID tag is employed as a security card for things in the present job. This technology improves shop safety while simultaneously speeding up the process. The suggested intelligent shopping cart is simple to use, affordable, and does not need any additional training. As the entire system becomes smarter, the need for manpower will decrease, as will employment costs and customer wait times. Users may control theft in the mall by utilizing this smart shopping system. The suggested smart system will eliminate waiting lines, increasing time efficiency. A greater number of clients may be served at once, benefiting both businesses and customers.

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