## COPY RIGHT

IJIEMR Transactions, online available on 02 Aug 2022. Link

:http://www.ijiemr.org/downloads.php?vol=Volume-12&issue=Issue 08

Paper Authors **Mr. J. Mahipal Yadav , P. Bhavana, H.Anusha, P.Gnaneshwari, D.Shivani, G.Rajshekar**

USE THIS BARCODE TO ACCESS YOUR ONLINE PAPER

To Secure Your Paper As Per UGC Guidelines We Are Providing A Electronic Bar Code

## SMART CART WITH AUTOMATED BILLING

**Mr. J. Mahipal Yadav [1], P. Bhavana[2], H.Anusha[3], P.Gnaneshwari[4], D.Shivani[5], G.Rajshekar[6]**

[1]Assistant Professor, Dept. of Electronics & Communication Engineering, Balaji Institute of Technology and Science, Warangal, Telangana, India.

[2,3,4,5,6]UG Student, Dept. of Electronics & Communication Engineering, Balaji Institute ofTechnology and Science, Warangal, Telangana, India.

**Abstract** - Shopping is simple, but standing in line to buy something at a counter takes time and is tedious. There is a lot of rush, which takes time, and long lines are the outcome when the cashier produces the bill using a barcode scanner. An automatic billing system that can be integrated into a smart shopping cart is the basis of this ground-breaking idea. This creative idea uses an RFID scanner that is managed by Arduino. As a result, whatever the user places in the cart is detected by the RFID module, which also displays the item's price on the LCD. As the buyer keeps adding things, the price will increase correspondingly since the RFID reader will identify each one as it is added. Anything can be done.

**Keywords**— Arduino UNO, RFID Reader, RFID Tags, Push buttons, GSM Module, LCD Display, Buzzer and Power supply.

## I. INTRODUCTION

Shopping malls in major cities are crowded with people purchasing their daily requirements. Consumer tastes have changed along with the expansion of products as the market continues to supply daily life with a variety of goods. Shopping malls are a well-liked location because of the significant discounts on goods and the availability of a wide variety of goods under one roof, including household supplies, decorative items, kitchenware, sports equipment, educational materials, stationery, food, etc. In this article, we recommend cutting-edge technology that saves customers time and makes it possible to bill effectively and efficiently using a smart trolley. This technology should be located particularly close to the bill counter. Every item in a shopping cart has an RFID tag that may be scanned many times. RFID tags are already used in shopping centres. There is a severe problem and a time- consuming condition when clients wait in long lines for a single item. An RFID reader is more versatile than a barcode reader since it can read an unlimited number of items. Only a small amount of space can be used to put the LCD (liquid crystal display), RFID module, and built-in microcontroller of the Arduino UNO, so that the tram proves to be more effective. Additionally, it addresses important issues, including inadequate or inaccurate product information and price traps. So, as a unique answer to this issue, we have proposed the "smart tram." Barcodes require an external power source because current technology require human labour and material resources, which takes a lot of time when scanning things and producing customer bills for a single item. So, utilising RFID technology, we here suggest a smart trolley to address all of the customer's needs. This proposed study concentrated entirely on the most recent RFID technology, which saves a customers'

valuable time through quick item scanning. The oversized shopping cart system helps consumers cut down on the valuable time they would have otherwise spent shopping, and it also provides real-time information on the records in the store management unit. Once the purchase has been made, the total amount or bill will be shown on the LCD, and billing can be done via a QR code. After the payment has been made, the store employee will check the items they have purchased using a Master Card. Various technologies were suggested for intelligent shopping trolleys to make shopping inmalls and stores less difficult for customers.



**Figure 1.** Shopping trolley

"Smart shopping trolley with automated billing" is our creative concept. In order to relieve strain at the checkout counters during busy periods, a scaled-down version of the automated self-checkout system is mounted on a trolley with a user/customer interface screen. The so-called neoliberal economy was developed as a result of changes in socio- demographics, the urbanisation of modern society, and technological developments in production, distribution, and information. These problems call for innovative solutions, which serve as inspiration for the concepts presented in this paper using RFID (radio frequency identification) technology. Every product has an RFID tag attached, and every shopping cart has an RFID reader built in to scan the tag. Consumers buy various goods and load them into the shopping cart. A trolley- attached LCD (liquid crystal display) screen will show the price of all of those items as well as their names.

## II. PROBLEM STATEMENT

The issue with shopping in malls is that the product's billing is done via barcode. This is the main issue that causes customers to stand in long lines to be billed for their purchases. This technology was developed using an RFID module and an Arduino UNO. So the clients can scan the things on their own thanks to this new creative technology. Furthermore, there's no need to drag a bulky trolley up to the billing counter.



**Figure 2.** Billing is manual and Barcode is used for billing process.

## III. EXISTING SYSTEM

Scanning each product's details takes extra time. As a result, consumers used to manually estimate the total amount to be paid to mend in small. Even when there is only one product, customers must wait in a long line for the transaction to be completed. Currently, bar codes are used to scan product information while clients wait in a long queue to receive their bills and have their spending tracked. Each and every item must be physically examined.

## IV. PROPOSED SYSTEM

This cutting-edge technology consists of an RFID module that an Arduino UNO controls. So, each time a customer adds an item to the basket, the RFID module recognises it and shows it, along with the item's price, on the LCD. The price will increase in line with the number of things the buyer continues to add because the RFID module has identified every item. The consumer can remove an item from the cart by simply scanning it once more if they have changed their mind and do not want it to be added. Automatic deductions will also be made for the additional cost. The customer just presses the button after finishing their purchase to enter the total amount due. Once the transaction is complete.



**Figure 3**. Billing is automatic and RFID is used for billing process.
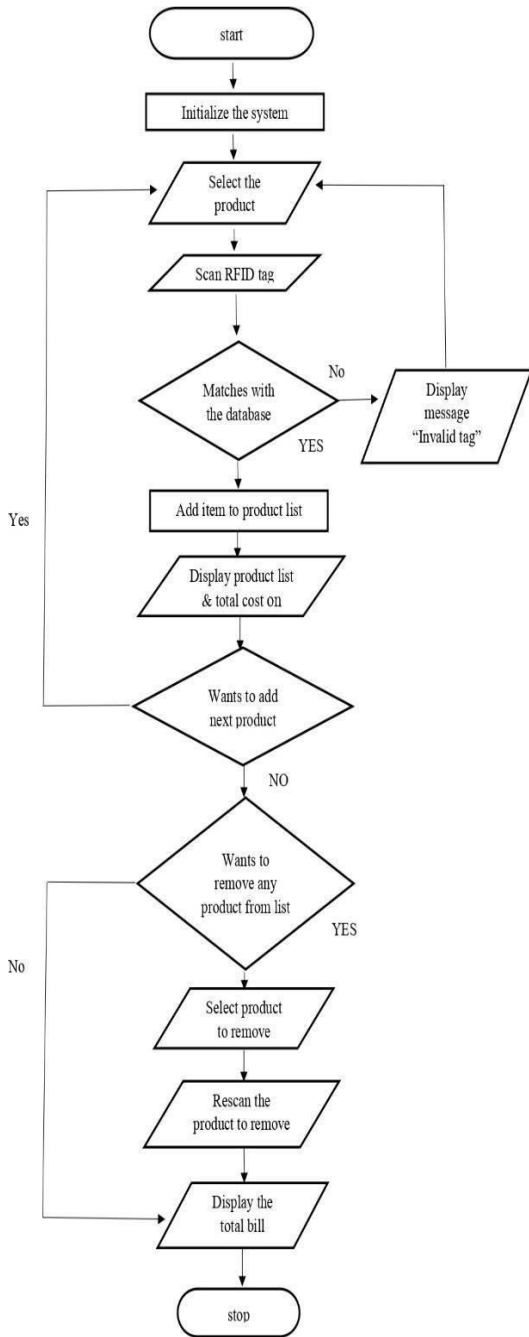
## V. OBJECTIVE

1. This system's primary goal is to facilitate shopping for us by utilising the RFID tags that are connected to every item in the market.
2. To avoid wasting valuable time on the billing system.
3. Using an RFID ATM card, pay the bill inside the trolley. also to receive our bill's SMS.

## VI. BLOCK DIAGRAM
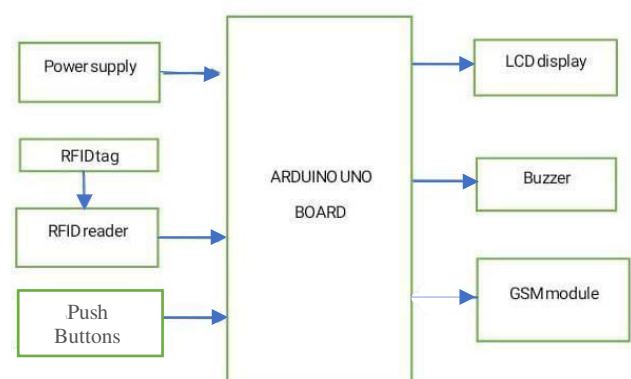


**Figure 4**. Block diagram of smart shopping trolley

*A) Flow Chart*



*B) Circuit Diagram*



**Figure 5.** Circuit diagram of smart trolley

If the goods being scanned don't match the database that is kept on the microcontroller, then an "invalid tag" warning will be displayed on LCD.

Step 6: If product was added to the product list, then the product information and price were displayed. The cycle repeats if the user chooses to add another product.

Step 7: The user only needs to choose the product to remove when the client wishes to remove any goods.

Step 8: The user must rescan the merchandise after choosing the item to remove. The item will then be withdrawn, and the price will be automatically subtracted.

Step 9: If the user chooses not to remove the product, the whole bill is displayed.

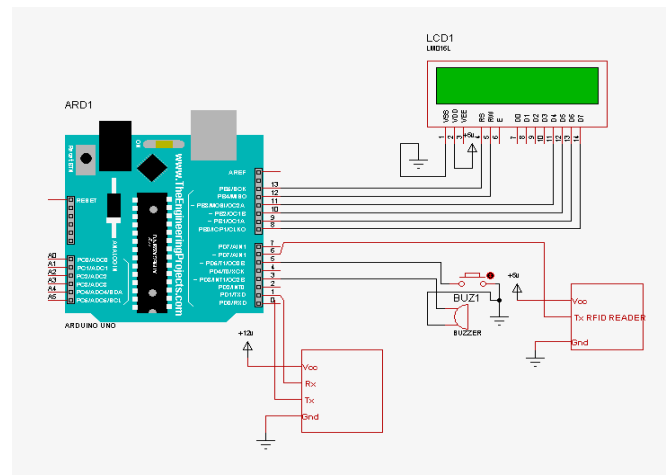Step 10: If another membership card is scanned and detected, repeat the entire process.

## VII. WORKING

The Arduino UNO is interfaced with all of the remaining components, as indicated in the schematic picture above. The system is now ready to move forward, allowing the RFID card and tag to be scanned after the microcontroller has been turned up using a power supply and initialised. If the scanning process is successful, the item details are sent from the microcontroller to the LCD module, where they are used to show the item information on the LCD screen. The RFID reader then extracts all the information from the scanned card or tag. Each RFID card or tag functions as a product or item, with the information about the product or item being pre-set or put into the RFID card. Once the customer has paid the bill in full, the shopping information will be sent via the SIM900 GSM module to the specified customer's mobile phone. The software known as Arduino IDE is used to carry out the complete process.

Step 1: Begin

Step 2: The system displays the initial data when it is powered on

Step 3: The user must choose the product after the system has been powered on.

Step 4: After choosing the item, The consumer must scan the product's RFID tag.

Step 5: The product will be added to the product list if the scanned item matches the database kept on the microcontroller.

Before the implementation of the hardware, the simulation results were verified using the proteus simulation programme.
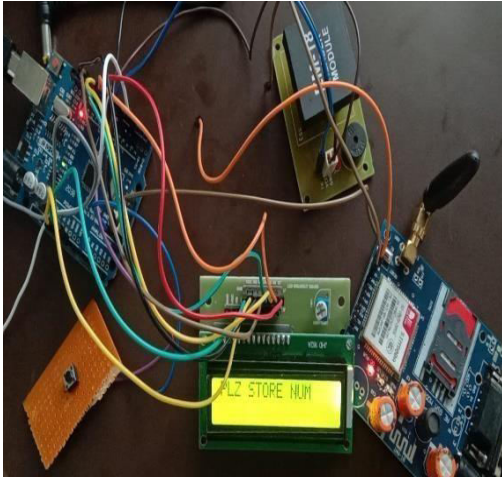


**Figure 6**. Generating message of shopping details
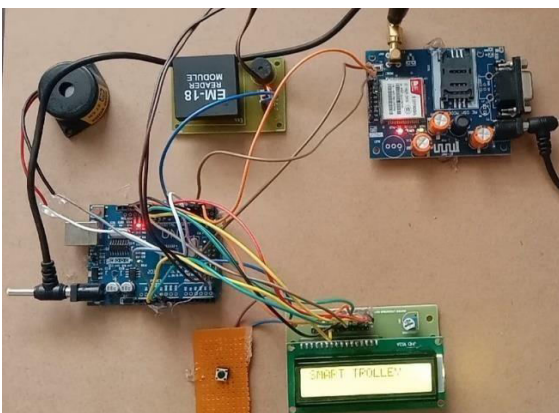


**Figure 7.** Entire project kit

### VIII. SOFTWARE & HARDWARE DESCRIPTION

*A) Arduino IDE:*



**Figure 8**. Arduino UNO

*C) RFID Reader:*

Nine pin devices make up the EM-18 RFID reader receiver, although only eight of them can be used or connected. The RFID tag is 125 KHz and is read with an EM-18 RFID reader. It is simpler to use and uses less power thanks to its smaller form factor. Its operating voltage ranges from 4.5 to 5.5 volts, and its current draw is 50 mA. The reading distance of the EM-18 RFID reader, which depends on the tag, is between 8 and 10 cm.

*D) RFID Tag:*

It makes use of radio frequency technology and is known as "Radio Frequency Identification" (RFID). The radio frequency waves that the RFID reader received from the RFID tag An RFID chip is another name for it. There are two varieties of RFID tags: active or passive.



**Figure 9**. RFID Tag

*E) GSM Module:*

The Arduino IDE is used for testing distinctive properties. This is used to code and troubleshoot programme faults. This applies to the various kinds of system-operating software, including Windows and Linux. C and C++ are supporting languages. Open-source software is available.

*B) Arduino UNO:*

The expanded microcontroller known as an Arduino has an inbuilt power source, as seen in the figure. Since it is open-source software, the Arduino is simple to use for both hardware and software. By turning on motors, switching LEDs, and doing other operations, they are used to analyse input using analogue or digital warnings from the relevant sensors.

GSM stands for Global System for Mobile. It uses a GSM SIM900A-type module with a supply voltage of between 3.4 and 4.4 volts. It can function in four frequency bands (850, 900, 1800, and 1900 MHz). GSM mostly uses the 850, 900 MHz frequency bands. It has the capacity to transfer data via GPRS text via SMS (Short Message Service), and voice via calls.



**Figure 10.** GSM Module

## IX. ADVANTAGES & APPLICATIONS

*A) Advantages:*
  i. Saves time by avoiding lengthy payment lines.
  ii. Automatic billing.
  iii. Can connect numerous carts to a single item.
  iv. A trustworthy, safe, and secure transaction.
  v. Reduces human resources on billing sections.
  *vi.* Client satisfaction.

*B) Applications:*
  i. Super markets.
  ii. Shopping centre's.
  iii. Grocery store.

## X. FUTURE SCOPE

The suggested Smart Shopping Trolley System intends to make in-person shopping easier, which will cut down on the amount of time required for both shopping and quickly finding the desired item. The consumer just needs to type the item's name into the search field on their Android device, and the cart will take them right to the thing(s) they're looking for.

[5] T.R. Lekha, S. Rajeshwari, J. Aishwarya Sequeira, and S. Akshaya, 2019,"Intelligent Shopping Cart Using Bolt Esp8266 Based on the Internet of Things".

[6] Vaishali Rane, Krutik Shah, Kaushal Vyas, Sahil Shah, and Nishant Upadhyay, January 2019, Smart Trolley Using RFID.

[7] Priyanka S. Sahare, Jayant Rohankar, and Anup Gade The International Information and Engineering Technology Association published a review on automated billing for smart shopping systems on December 20.

[8] P.T. Sivagurunathan, P. Seema, M. Shalini, and R. Sindhu (2018), International Journal of Pure and Applied Mathematics, "Smart Shopping Trolley Using RFID".

[9] Sangeetha T., "Smart shopping cart with zigbee and RFID-based autonomous central billing system," IEEE, 2017.

[10] Hubert, T. Eberhardt, M. Blut, C. Brock, C. Backhaus, and Acceptance of Smart Phone-Based Mobile Shopping: Mobile Advantages, User Traits, Perceived Hazards, and the Impact of the Application Environment, IEEE 2018.

## XI. CONCLUSION

To buy the products, this creative project idea might be employed at establishments like malls, supermarkets, and shopping centres. Here, every item in stores can be accessed safely with an RFID card. The LCD screen will show all the necessary information about the goods when they have been scanned and added to the cart. Therefore, accessing the products requires an RFID tag or card. Thus, this effort will contribute to bettering security while also cutting down on shopping time.

## REFERENCES

[1] Prasiddhi Khaimar et al,"Innovative Shopping Cart for Smart Cities," 2nd conference on recent trends in electronics, information, and communication technology, IEEE, 2018.

[2] Mr. P. Chdrasekhar, Prof. ,"Smart Shopping Cart with Automatic Billing System,"S.A. Engineering College, IEEE 2017.

[3] Suganya R, Swarnavalli N, Vismith S, and Mrs. G.M. Rajathi, "Automated Smart Trolley with Smart Billing Using Arduino," International Journal of Advanced Research in Computer Engineering & Technology (IJARCET), Volume 4 Issue III, March 2017.

[4] Gyu Sang Choi, Saleem Ullah, Muhammad Faheem Mushtaq, Maqsood Ahmad 1, and Mobeen Shahroz, 2020, "IoT-Based Smart Shopping Cart Using Radio Frequency Identification".