IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 6, May 2023

Instinctive Invoicing BOT

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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. Everyone in their life have craves for a quality in everything they use 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 led to long lines at the billing counter because the cashier must scan every product item and then enter it into the billing record. The prevailing billing system is a bit time consuming. So, by thinking of inventing a remedial electronic product to catch-up with this problem. "Instinctive Invoicing Bot" is better approach for the above said problem.*

I. INTRODUCTION

In retail environments, the billing process can be laborious and time-consuming, often requiring many employees to manage the workload. Despite these efforts, customers frequently face long waiting times during checkout as each item needs to be placed on the counter for scanning. o addresses this issue and streamline the shopping experience; a system has been designed specifically for use in shopping malls and large retail establishments. The project, known as the Instinctive Invoicing Bot, draws inspiration from automated self-checkout systems found in many UK retail stores. By adapting this concept into a compact form, a shopping trolley with an integrated self-checkout system has been created, allowing customers to scan and pay for items as they place them in the trolley. If a customer changes their mind about a purchase, they can easily remove the item from the trolley using a simple push button.

This feature ensures that customers have control over their purchases while keeping track of the total amount due. Allowing customers to monitor their spending in real-time enables them to make informed decisions about essential items based on their budget. The prototype aims to ease the pressure on supermarkets and shopping centres during peak hours, making the shopping experience more efficient and enjoyable for everyone. Considering that there are over 435,000 supermarkets in India alone, with an average of 3 to 4 employees per billing counter, this solution has the potential to transform the industry by reducing labour costs and enhancing overall customer satisfaction. By implementing the Instinctive Invoicing Bot, shopping centres and supermarkets can not only reduce the operational costs associated with employing multiple cashiers but also create a more positive shopping environment. This innovative system caters to the growing demand for a seamless and stress-free shopping experience, promoting customer loyalty and encouraging repeat business.

II. LITERATURE SURVEY

The purpose of this literature survey is to study the Instinctive Invoicing Bot and its drawbacks. To know more about the alternative solutions that are implemented instead of our proposed model related literature review and to get the knowledge about the different technologies that are implemented to design a system.

[1] SMART BILLING SYSTEM WITH INTELLIGENT TROLLIES FOR MARTS Dr.S. Jagan Mohan Rao, K. Likhitha, M. Durga Bhargavi, A. Bala Chandra Rao, P. L. P. Sowmya Sri, Department of ECE, Ramachandra College of Engineering, Eluru, A.P. the barcode tag attached to the product is scanned by the barcode reader. Each tag has a unique EPC. Based on the EPC received by the Arduino, the information of the product is displayed on the LCD along with the updated cost. This information is also sent to central PC with the help of IOT transmitter at the trolley and IOT at android phone using WEB application. If the customer wants to remove the added product, the product should be scanned again. Then the cost of the corresponding product will be deducted from the bill.

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The push button is provided at the trolley to remove product. On pressing of push button, we can remove the product by scan again. The final bill is displayed on the LCD. This whole information is available on IOT android app.

[2] IOT Applications on Secure Smart Trolley System, Elizabeth P, Harshitha Y, Navaneetha V, Suhas A Bhayratae, 2019. This project is primarily based on RFID supported with other simple technologies. In supermarkets, the products are provided with RFID tags instead of barcodes. The shopping trolleys include the setup containing RFID reader, IR sensor, CLCD, Keypad with a start and end button.Smart shopping carts are given to customers for their unique identification Barcode Reader can be used instead of RFID tags for each Products. The proposal finally results in an effective outcome where RFID technology replaces barcode due to its drawback where barcode requires the line of sight and should be placed in its exact boundary while scanning, but RFID's only constraint to be considered is its distance coverage. RFID tags are more durable than the barcode which damages due to temperature, water, physical tear etc. This ensures the process of scanning easy and precise. Then the password authentication process aids in avoiding the illegal usage of smart cards and prevents data sniffing.

[3] Smart shopping trolley for supermarkets using rechargeable smart card, S. Sabari Manoj, C. Sandeep, M.R. Maniganda Dinesh, 2019. RFID reader scans the RFID tag on product without requirement of line-of-sight communication. RFID reader sends information of each scanned product to microcontroller. Price and product name is displayed on LCD on the trolley. When a person is done with the shopping, he must press a switch. This eliminates the queue issue. The trolley will start its processing once the vendor presses the 'START" button on the trolley which will be only seen by the vendor. Thus, now the customer can use the smart trolley for shopping. Whenever the customer places a product into the trolley, the RFID Reader will read the tag information and display the related results on the LCD Display. These steps are repeated till the customer finishes his shopping and the "STOP" button are pressed by the vendor. Once the "STOP" button is pressed there is an option provided to end the shopping with the same purchased products or to delete or remove some of the products from the trolley. This totally depends on the customer choice. At the end of shopping, the customer can straight away pay the bill and leave the shopping centre. Inventory status of the products is also updated at the end of shopping.

[4] RFID BASED SMART TROLLEY, Kirti Mhamunkar, Himanshu Saroj, Prajakta Katkar, Akansha Tiwari, Rahul Jena. 2016. This paper uses an NodeMCU, a RFID reader, an LCD, buzzers, etc. and RFID tags to be attached on the products. The RFID reader shall be used to scan the RFID tags present on the product and all the information received from the tags shall be stored in the NodeMCU. The product can be directly scanned by the reader and if the customer wishes to remove any product, they just must scan the product again, then the product should be deleted. Also, there is weight machine to calculate the product weight if RFID reader fails to calculate weight. After the purchasing product the total amount of the bill is generated and displayed on LCD of the trolley and at the billing section. When a customer goes to the billing section, he must only pay the amount. LCD screen will show the total bill of the items present in the cart.

[5] SMART SHOPPING TROLLEY USING RFID, P T Sivagurunathan, P Seema, M Shalini, R Sindhu, 2018. The customer must wait for long queue to get their products scanned using RFID reader with help of barcode Scanner and get their billed. To modify that and customer must purchase in smart way in shopping mall. Every product must place a RFID barcode to scan the product with RFID reader. The smart trolley will consist of a RFID reader, LCD display and ZigBee transmitter. When customer if want to buy any product is insert in the trolley. It will scan and read the product and display the cost and the name of the product in LCD. The total cost of all the purchased products will be added to the final bill, in that final bill will be saved in the Arduino will act as a memory. These are all performed in the transmitter side. In receiver side, it is wireless transmitting process. It is used to share the product information and final bill amount of the items are placed in the trolley will be transfer using a ZigBee transmitter to the billing system. Disadvantage of this system is easy to damage.

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[6] Smart Trolley System for Automated Billing using RFID and ZIGBEE, Janhavi Iyer, Harshad Dhabu, Sudeep K. Mohanty. 2015. In This Billing Trolley System environment, each product will have the passive Radio Frequency ID tag which is bearing a unique Electronic Product Code. This Electronic Product Code provides the information about the product, i.e., its name and price. When the customer puts the product in the Smart Trolley, the Radio Frequency ID scans the tag, and the Electronic Product Code number is generated that is previously known by Radio Frequency ID reader. Radio Frequency ID reader passes the Electronic Product Code to the micro-controller 89S52 where the controller compares the Electronic Product Code with the database of the system containing various products. After that the name and price of the product obtained by the controller gets displayed on the LCD display of the Smart Trolley, where user can see the product information. The microcontroller 89S52 also passes the data obtained from the database to the ZigBee transmitter from where the data is wirelessly transmitted to the billing computer. The master computer receives this data through ZigBee receiver using Max 232 interface. Thus, the final information of all products is transmitted to a computer with the help of serial communication.

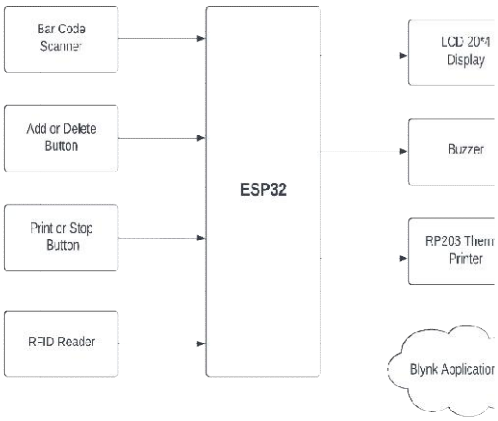
Summary of the Literature Survey

The outcome for the literature survey are as follows:

1. Understand the various methods that are implemented for Automatic Billing System.
2. RFID tags for the products can be replaced by original barcode which is provided on the product.
3. Using ESP32 instead of Zigbee will store the product details in cloud instead of storing at offline stores.
4. Using Li-Fi Module will be highly Expensive.
5. Reducing the whole billing process time and making it easy to access to users.

III. METHODOLOGY

The smart billing machine consists of trolley that incorporated with Barcode scanner. As soon as the customer place the product, they want to buy into the trolley, the barcode reader attaches to the trolley detect the barcode number of the product to identify it. Each barcode number is linked to a product it describes. All the information regarding the product associated with the barcode is in database can be retrieved using centralized server. All the activities are coordinated together using ESP32.



The product can be directly scanned by the reader and if the customer wishes to remove any product, they just must scan the product again, then the product should be deleted. After the purchasing product total amount of bill generated and display on LCD of the trolley. Then the customer can pay the amount using RFID card during the checkout. The bill will be printed out from the printer.

The main objective of this project is to improve the speed of purchase. This prototype has some enhanced features which will overcome this queue issue. The Smart Trolley idea is based on the most popular automated self-checkout system in most UK retail stores. After Checkout the billing data of the customer will be uploaded to google spreadsheet through ESP 32. Product wise data Analytics will be easier through spreadsheets. The recharge of smart card can be done through Blynk application The block diagram of instinctive invoicing bot is shown in Figure 1.

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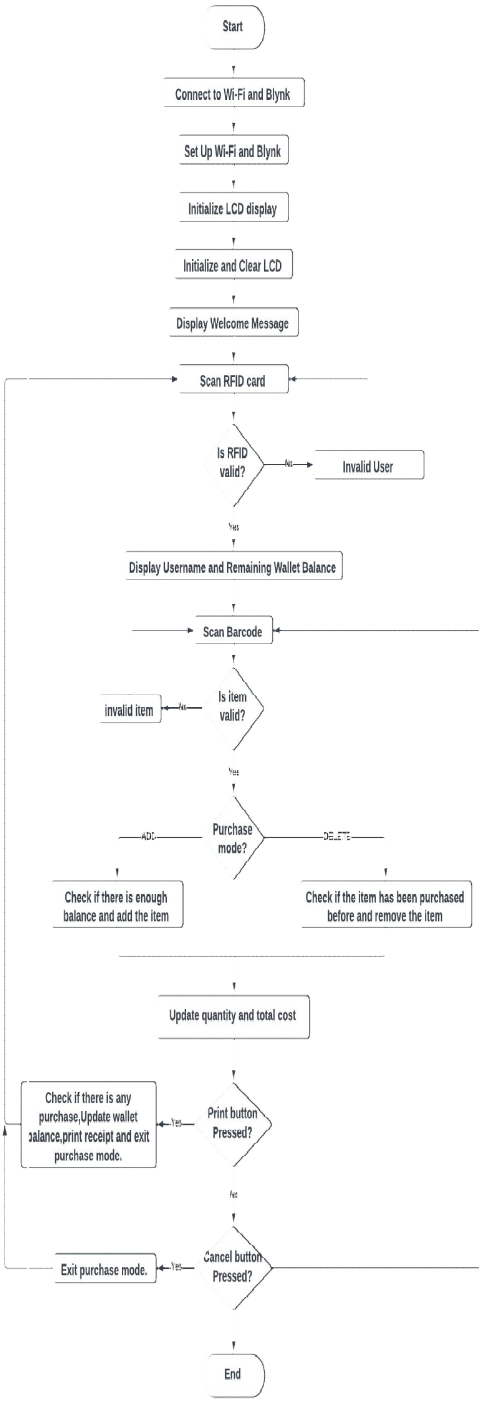
The customer just needs to scan the barcode of the product using barcode Scanner the cost and product name will be displayed on LCD and when at the end the bill amount will be displayed on LCD and the user can swipe his RFID card to pay the bill amount. Records the data of the products with the help of Barcode Scanner and RFID Module. This recorded data helps the owner with detailed analysis of shopping by the customer and their preferences through the computer; printout of the same can be obtained.

IV. FLOWCHART



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Results and Discussions

In this project the customer just needs to scan the barcode of product using barcode Scanner the cost and product name will be displayed on LCD and at the end the bill amount will be displayed on LCD and the user can swipe his RFID card to pay the bill amount. This device records the data of the products with the help of Barcode Scanner and RFID Module. This recorded data helps the owner with detailed analysis of shopping by the customer and their preferences through the computer; printout of the same can be obtained. It gives the number of products and total cost of the products on the spot and no need to wait in the long queue for the billing process. Recharging of Smart Card is done through Blynk Application.

Figure 2. Proposed Model of "Instinctive Invoicing Bot"

Result Analysis

Test Case 1 - Valid RFID Card scanned: This test case checks if the system correctly recognizes and displays user information when a valid RFID card is scanned. When a valid RFID card is scanned, the system should display the user's name and activate the purchase mode.

Test Case 2 - Invalid RFID Card scanned: This test case verifies the system's ability to detect and display an error message when an invalid RFID card is scanned. If an invalid RFID card is scanned, the system should display "Invalid User" and trigger a buzzer sound to alert the user.

Test Case 3 - Scanning valid barcode in Add mode: This test case checks the system's ability to recognize and display item information when a valid barcode is scanned in Add mode. When a valid barcode is scanned, the system should display the item name, cost, and update the grand total for the user's shopping cart.

Test Case 4 - Scanning invalid barcode in Add mode: This test case validates the system's ability to detect and display an error message when an invalid barcode is scanned in Add mode. If an invalid barcode is scanned, the system should display "Invalid Item!" and trigger a buzzer sound to alert the user.

Test Case 5 - Scanning valid barcode in Delete mode: This test case checks the system's ability to recognize and delete item information when a valid barcode is scanned in Delete mode. If a valid barcode is scanned and the item is present in the user's cart, the system should display "1 qty reduced!" and update the grand total accordingly.

Test Case 6 - Scanning invalid barcode in Delete mode: This test case verifies the system's ability to detect and display an error message when an invalid barcode is scanned in Delete mode. If an invalid barcode is scanned, the system should display "Invalid Item!" and trigger a buzzer sound to alert the user.

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Test Case 7 - Adding item exceeding wallet balance: This test case checks the system's ability to prevent users from adding items to their cart when their wallet balance is insufficient. If a valid barcode is scanned but the item's cost exceeds the user's available balance, the system should display "Low Balance! Can't Add. Plz keep it back" and trigger a buzzer sound to alert the user.

Test Case 8 - Press Add button: This test case validates the system's ability to activate Add mode when the Add button is pressed. When the Add button is pressed, the system should activate Add mode and turn on the Add LED to indicate the current mode.

Test Case 9 - Press Delete button: This test case checks the system's ability to activate Delete mode when the Delete button is pressed. When the Delete button is pressed, the system should activate Delete mode and turn off the Add LED to indicate the current mode.

Test Case 10 - Press Cancel button: This test case verifies the system's ability to exit purchase mode when the Cancel button is pressed. When the Cancel button is pressed, the system should exit purchase mode and trigger a buzzer sound to alert the user.

Test Case 11- Press Print button without items: This test case checks the system's ability to handle a Print button press when the user's cart is empty. If the Print button is pressed and the total cost of items in the cart is 0, the system should display "You haven't purchased anything!" to inform the user.

Test Case 12 - Press Print button with items: This test case checks the system's ability to correctly process a transaction when the Print button is pressed and there are items in the user's cart. If the Print button is pressed and the total cost of items in the cart is greater than 0, the system should print the bill, deduct the total cost from the user's wallet balance, and update the wallet balance in the Blynk app accordingly.

Test Case 13 - Recharge with valid mobile number: This test case verifies the system's ability to recharge a user's wallet using a valid mobile number and a recharge amount greater than 0. When a valid mobile number is entered along with a recharge amount, the system should add the recharge amount to the user's wallet and update the wallet balance in the Blynk app.

Test Case 14 - Recharge with invalid mobile number: This test case checks the system's ability to prevent recharging the user's wallet with an invalid mobile number. If an invalid mobile number is entered along with a recharge amount greater than 0, the system should display "Invalid Mobile Number" in the Blynk app to inform the user that the recharge was unsuccessful.

V. CONCLUSION

The Instinctive Invoicing Bot features a Barcode reader, LCD, Thermal Printer, RFID module and Blynk. When a customer places his card the card will be sensed, and the balance will be displayed on screen. When a person places any product on the trolley, it is scanned and the product's name, cost, total amount will be displayed on the LCD screen. The total cost is added to the final check-out bill and deducted from the card. The bill is then printed, and the product information is updated in spreadsheets for data analysis. The process was successfully executed, and the desired outcomes were achieved. This suggests a standardized and organized approach to purchasing and data management.

REFERENCES

[1] SMART BILLING SYSTEM WITH INTELLIGENT TROLLIES FOR MARTS Dr. S. Jagan Mohan Rao, K. Likhitha, M. Durga Bhargavi, A. Bala Chandra Rao, P. L. P. Sowmya Sri, Department of ECE, Ramachandra College of Engineering, Eluru, A.P, 2023.

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[2] "SMART TROLLEY BILLING SYSTEM",Anitha.R, Dr. Subburam.S, Keerthana.G, K.H. Yogananda raj urs. Volume 7, Issue 11 | ISSN: 2515-8260 | 2020.
[3] "IOT Applications on Secure Smart Trolley System", Elizabeth P, Harshitha Y, Navaneetha V, Suhas A Bhayratae, 2019.
[4] "Smart shopping trolley for supermarkets using rechargeable smart card", S. Sabari Manoj, C. Sandeep, M.R. Maniganda Dinesh, 2019.
[5] "RFID BASED SMART TROLLEY", Prof. Kirti Mhamunkar, Himanshu Saroj, Prajakta Katkar, Akansha Tiwari, Rahul Jena. Volume 4, Issue 4 | ISSN: 2456-3315 | 2019.
[6] "SMART SHOPPING TROLLEY USING RFID", P T Sivagurunathan, P Seema, M Shalini, R Sindhu, 2018.
[7] "Automated Shopping Trolley for Super Market Billing System", B Sudha, Rupesh Kumar, Mahanthesh K H, Angad Kumar Ratnakar, Sudhakar Gouda. Volume 3, Issue 5 | ISSN: 2455-2631 | 2018.
[8] "SMART SHOPPING TROLLEY FOR SUPERMARKETS USING RECHARGEABLE SMART CARD". Volume 8, Issue 7 | ISSN: 2229-5518 | 2017.
[9] "RFID BASED SMART TROLLEY", Kirti Mhamunkar, Himanshu Saroj, Prajakta Katkar, Akansha Tiwari, Rahul Jena. 2016.
[10] "Smart Trolley System for Automated Billing using RFID and ZIGBEE",Janhavi Iyer, Harshad Dhabu, Sudeep K. Mohanty. 2015..