IJAREEIE

e-ISSN: 2278-8875
p-ISSN: 2320-3765

International Journal of Advanced Research

in Electrical, Electronics and Instrumentation Engineering

Volume 10, Issue 3, March 2021

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.122

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.122|

||Volume 10, Issue 3, March 2021||

DOI:10.15662/IJAREEIE.2021.1003013

Barcode Based Smart Trolley for Supermarkets

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ABSTRACT: With the advancement in science and technology, our world is getting automated in more aspects. No one likes to waste their time, because it is most valuable than anything. But, many customers waste their valuable time while shopping. Every supermarket, hypermarkets, shopping malls, retail shops consists of more number of trolleys for storing the purchased products by the customers. After shopping gets over they should pay their bill in the billing section. In this section customer have to spend more time for scan their products and to pay their bill. So we have proposed a solution for this problem. Our solution is that we have designed a smart trolley which will be helpful for the customers to reduce the time spent in billing sections. We have used bar code scanner in smart trolley to scan the products and the smart display shows the product description which will be useful in automatic bill generation. It will be helpful in improving consumer experience and reduces the time spent in supermarkets.

KEYWORDS: Smart trolley, Barcode scanner, Automatic billing, Smart display.

I.INTRODUCTION

Shopping is also an activity which is loved by almost all people, especially the young ones. Going shopping is also an important and it is necessary for some people. Generally, people prefer shopping malls, supermarket, hypermarkets which is very big and holds many sections. Because, it is easy to purchase all the products they need to buy in a single place. Otherwise, they have to go for many places to buy the needs which are a time consuming process. Although in supermarkets they spent more time in billing section. It is mainly happens because the products that the customer purchased should be scanned by the employee of the supermarket to made a bill for them. The billing counter is located near the exit of the supermarket. In billing section, employee should scan every product in the trolley which is purchased by the customer.Then every customer has to wait in a queue until the previous customer pay and leave the billing section. This took more time for an employee to scan every product from trolley himself/herself. To tackle this problem we have proposed a solution by designing a smart trolley. Every supermarket has trolley at the entrance itself. The smart trolley will be helpful for the customers to store the products they have purchased. We have fixed camera in a trolley which is used as scanner to assist customers to scan the products they have purchased before store into the smart trolley. The supermarket has a server which is used as storage of description of products from different sections of supermarket. Every section of supermarket consists of variety of products from various brands. The products have a unique bar code at its back side. If we scan the bar code then the details of that particular product has been displayed at the display. The details of the product include quantity of the product, brand name and price of the product. After every Product scanned it will be automatically added to the list of cart along with its description.

It will be very simple and easy process to scan the products they have purchased themselves. The customer should scan the product by using the camera which is fixed at the corner of the trolley before store it to the trolley. If the customer didn't scan the products before store it to the trolley then it will be identified. The load cell which is placed at the bottom of the trolley will be used to measure the weight of the products added to the smart trolley. If customer adds the products to the smart trolley without scanning, then it will be identified by using load cell which will measure the weight of the products then match the weight with the total weight of the list of items in a cart. If mismatch of the weight occurs then it will be known automatically. Then we can easily identify the products in a trolley which is not scanned and it will be added to the cart after scanning.

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II.LITERATURE SURVEY

Generally the process of shopping consumes more time. Every supermarket has many floors with lot of sections. The customer should go to respective sections to buy the needed products. They were not familiar about the locations of the section in the supermarket. They should find the correct location to buy the expected products from a particular section of the supermarket. It consumes more time, hence introduced the IoT technology which will guide them to the correct location from where they should go inside the markets. The carts also communicate with neighbour cart which help the co-shopper to enable parallel shopping [1].

The supermarket can use RFID and Zigbee technology to scan the products by using RFID tags which is sticked to every product located inside the supermarket. The scanned products have been added to the list of items in a cart automatically by using Zigbee technology which has trans-receiver. Then the bill will be generated automatically. So that the customer need not to wait in queue instead they can pay their bill using any third party applications or through debit cards or credit cards [2].

The trolley can follow the customer when he moves from one rack to another rack. The trolley uses accelerometer and Omni wheels to make this process of moving from one rack to another automatically. The trolley also keeps track of the products placed inside the trolley and the bill will be generated automatically. Hence there is no need for billing counter in the supermarkets [3].

III. PROPOSED SYSTEM

The main purpose of innovation is to simplifying the works we were doing in our day to day life. According to survey, people spend considerably more time in shopping. The trolley designed initially is used to help the customers to store the products they have purchased. But it was made more efficient by adding special features to it. This will be easier and more convenient for the customers to handle the smart trolley.

CAMERA: The camera is mounted on the smart trolley. It is used to capture the digital images which are then transferred to the personal computer and then it will be forwarded to the server. Finally the images are transferred from server to the hosting page. The main purpose of the camera in smart trolley is to scan the bar code in the products which is unique and used to find their details while adding the product to the cart by the customers. We have to show the products to the camera to scan the same to add them into the list of items in a cart.

Fig.1. Camera

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IV. WORKING

The trolley was located near the entrance of the supermarket. The customer can take any trolley to store the products that they have purchased. The smart trolley consists of camera at the corner which is used to scan the products taken from the rack of supermarket. The bar code is printed in every product in the supermarket. The customer should scan the product by showing them in front of the camera at the corner. Then it will scan the bar code in the product and then display the scanned bar code in the smart display.

Fig.2. Smart Trolley

The products in the supermarket has stored in the server of the supermarket. Once the bar code is displayed then the corresponding product along with its quantity, weight, brand, and product name has been displayed in the smart display. We have an option “ADD” and “REMOVE” in the smart display. If customers want to add items to the list of items in a cart then he/she should scan and press that add option or if customers want to remove items from cart then he/she should press remove option and then it will be removed.The load cell was attached in the bottom of the smart trolley which is used to measure the weight of the products placed inside the cart. When the products were placed inside the trolley, the pressure will be developed which will be measured by the load cell and then it output the voltage as output. So we can measure the weight of the products added to the trolley by using the voltage change occurs. The weight will increase or decrease according to the products placed or removed from trolley. If the customers add any products after scanning the product using camera located at the corner of trolley, then the pressure will increase according to the weight added to the trolley. If the customers remove any product from the trolley, then the pressure will decrease according to the weight removed from the trolley. Hence the pressure of the load cell will increase or decrease according to the weight added or removed from the smart trolley.

Fig.3. Load Cell Measurement

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The smart trolley can scan the products by using camera and after scanning the image will be moved to the personal computer and then forwarded to the server of the supermarket. The server already stores the product details in its server will match the image received from the scanner to the image which is stored in the server of the supermarket. If the image doesn't match with each other, then the process of scanning is not done properly. If the weight of the products in a cart doesn't match with the equivalent voltage then it will be displayed in the screen that any of the products in the trolley was not scanned and it should be scanned by the customer. Finally the bill to be paid is generated automatically and the customers need not to wait in the billing counter.

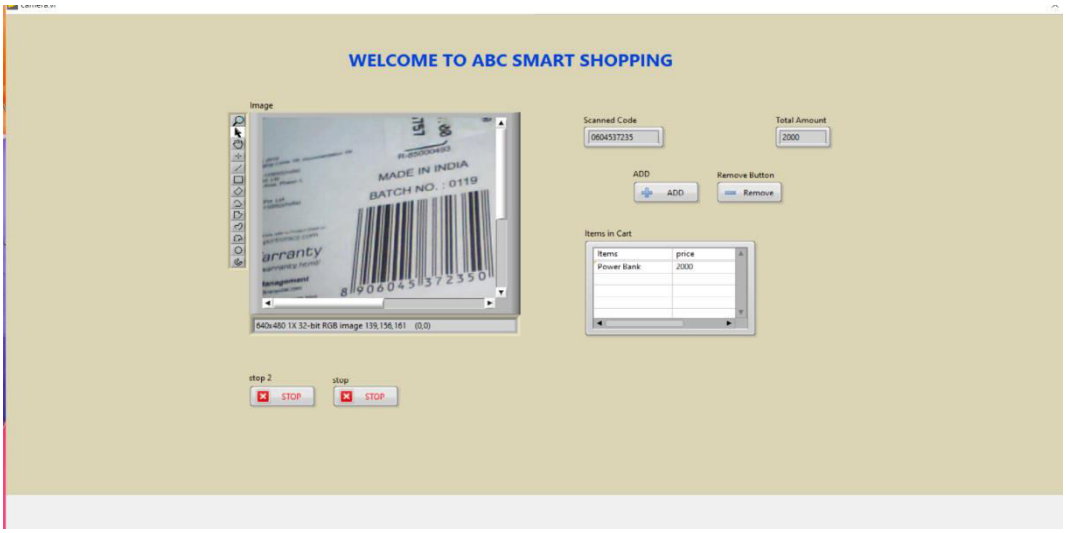

Fig.4. Smart Display

V.CONCLUSION

The main objective of this project is to reduce the time spent in the billing counters of the supermarkets. To make this process easier we have designed a trolley where the camera is mounted on the corner of the trolley while the load cell is placed at the bottom of the trolley. The camera is used for scanning the product purchased by the customer themselves and the load cell is used to measure the weight of the scanned products placed inside the trolley. If the trolley contains the unscanned products then it will be detected by observing the load cell output. Supermarkets have many floors and each floor consists of bill counter at the centre of the floor. If we automated the scanning and billing process, there is no need for bill counters at every floors of the supermarket. It will reduce the time spent by the customers in the bill section. It also saves space from every floor so that the seller can use that space to place some other section to showcase more products to the customers. The profit will also get increased for the seller if he place suitable section in the centre of the floor.

VI. ADVANTAGES

- In this proposed solution, Camera is used to scan the products which is easy for every customer to scan the product themselves by showing the products to the camera.
- The level of accuracy is maintained in this process.
- Easy to implement the process in supermarkets, malls, hypermarkets.
- It is cost efficient compared to other proposed solutions which used RFID and IoT technology.
- Smart display will show the product availability.

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- Automatic bill generation
- It saves time for the customers.
- It reduces man power.

VII. FUTURE WORK

In future we are going to introduce mobile phone based shopping. The home page of the supermarket can be accessible in the customer mobile phone itself. They can log into the server of the supermarket using their credentials. There is a dashboard in the mobile will show the products which were added by the customer to the smart trolley. It is possible to remove a product from the list by mobile itself. The process of payment will also be automated. The customers need not to bring cash or ATM cards while come to shopping. The amount to be paid will be automatically deducted from the customer bank account after the passcode verification is done. There is no need for any third party application to pay the bill. We also planned to design a smart display, if the amount to be paid to the supermarket by the customer is higher than the bank balance of the customer, and then it will guide the customer to remove the suitable products from the trolley. It is not necessary to remove that suggested products, the customer can remove the product whatever he/she want to remove.

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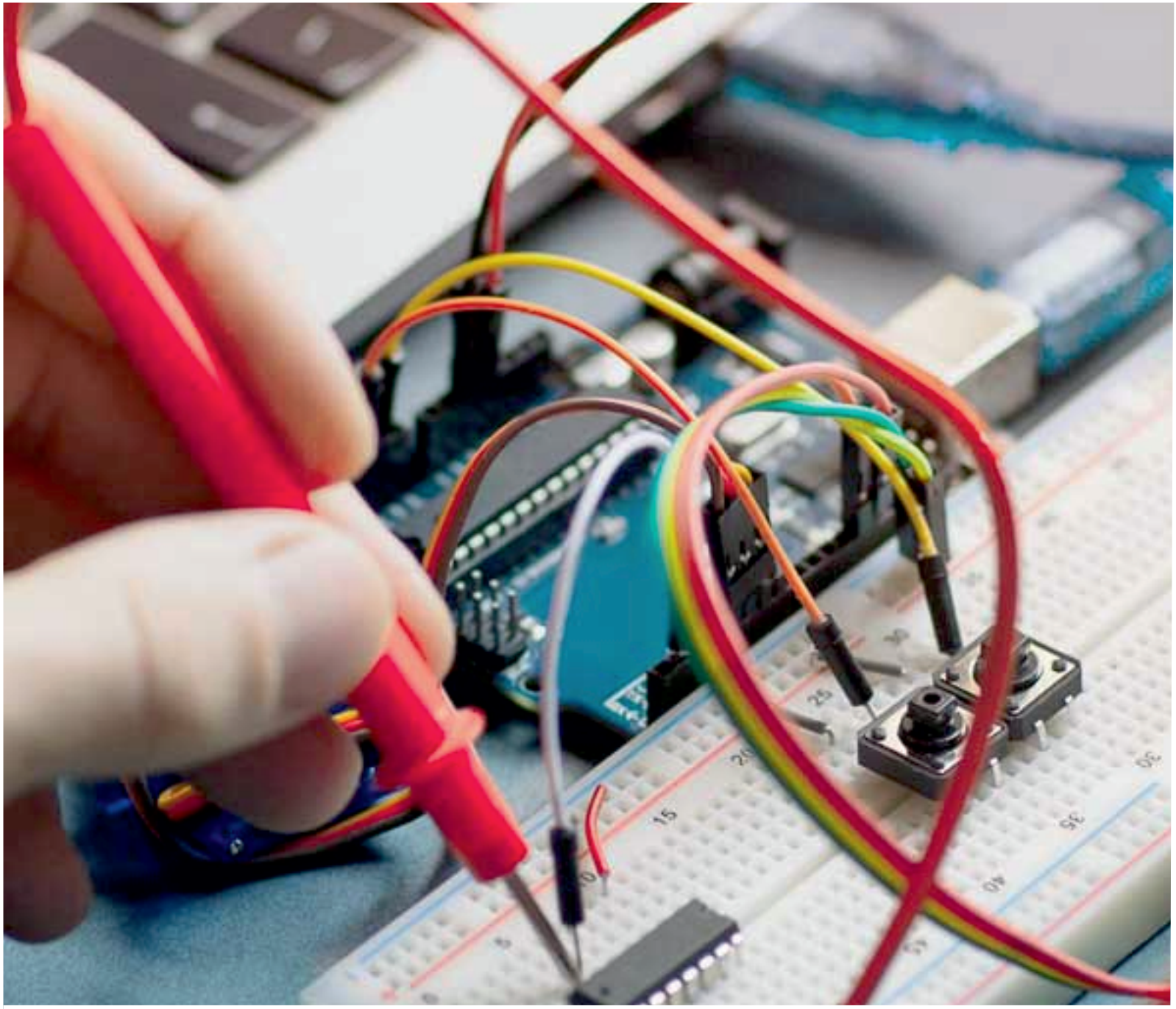

INNO SPACE
SJIF Scientific Journal Impact Factor

Impact Factor:
7.122

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

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International Journal of Advanced Research

in Electrical, Electronics and Instrumentation Engineering

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