SMART INTERACTIVE SHOPPING TROLLEY

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Abstract - *In a world where time is everything, a lot of time is wasted in following procedures and stereotypical ways to get things done. This paper aims at designing a device that would break the usual regulations and provide an alternative way to get things done in a more efficient way while saving time. The device is meant to be portable and stand-alone which can be attached to any trolley to make it a smart one. The use of image processing plays a key role in the building of the device along with a coordinated work of all the sensors and components.*

1.INTRODUCTION

A modern innovative product is the one that assists in the comfort of our everyday life. In this project, we discussed a revolutionary concept of Smart Shopping Trolley with Instant Billing and interactive aids. Our main objective is to provide a technology oriented, low-cost, easy and rugged system for aiding shopping right at the cart. The automatic shopping trolley will reduce the time and effort of the customer. Currently the shopping centers and marts are most of the time over crowded, even though shopping has gone online then also supermarket has a surge of customers because many customers still prefer this shopping method where they can see the products themselves and purchase. So in order for the customers to do this but in a more efficient and convenient way, that is the aim of our project. In this project we make the billing right at the shopping trolley to reduce queues and save time.

2. LITERATURE SURVEY

1] "Smart Trolley Shopping System", International Journal for Research in Applied Science & Engineering Technology

This paper proposes the use of RFID tags to identify each product and to eliminate the problem of long queues. The microcontroller will read the RFID input will then search for the RFID tags number in the database and return the products price. The proposed system uses an LCD display to add just the total amount which will be displayed on the display. However, no additional information about the product can be viewed using this proposed system. Also it is not possible to use RFID tags on every item specially the cheaper ones. So this proposed system will be good for stores having only expensive items, but for implementing a Smart Shopping Experience in malls having cheaper products as well, this system needs to be modified.

2] "Automated Shopping Trolley for Super Market Billing System", International Journal of Computer Applications.

Instead of using the RFID tags this system used two barcode scanners to scan the products and automatically bill them in the LCD display connected with the raspberry Pi. The proposed system solves the problem of using RFID tags which cannot be used with cheaper products. The display is just used to bill the products together and it does not provide any additional information about the products. Also using two barcode scanners instead of one is not very efficient and it draws more power and increase the cost of system with no additional benefits. The proposed system solves the problem of long queues very well using this approach however it failed to give any security features to the system .It'll be very hectic for the admin to manually check each and every product with the bill generated by the system.

3] "RFID Based Smart Shopping Trolley with IR Sensor", International Journal of Scientific Research in Science and Technology.

This trolley system uses RFID tags on products that one wants to buy, which are read by barcode scanner and the cost of that product is displays on the LCD screen attached to that system. As customer buy the next product its price is added with the previous amount. The cost of the product is given to the microcontroller by using Zigbee communication from the host PC. Zigbee supports a bidirectional communication between microcontroller and host PC. Customer get direct bill at the billing section which is already stored at host PC which ultimately reduces queue. AS in this it uses Zigbee communication it has disadvantage like low transmission as well as low network stability and also Zigbee is not secure like Wi-Fi based security system.

4] "International Journal of Advanced Research in Computer Science and Software Engineering"

This System is aimed to design the smart shopping in the malls. The customer can purchase different products in the mall after shopping customer must wait in the queue so to reduce that time our system is going to help. After purchasing each product customer can scan the product (i.e. NFC tag) via NFC scanner which is inbuilt in the smart phone. The total is automatically done by the server. The server and the smartphone are connected via Wi-Fi. The transaction server or shop owner can add, delete, update and modify the details of product. This application is smarter than previous shopping application.
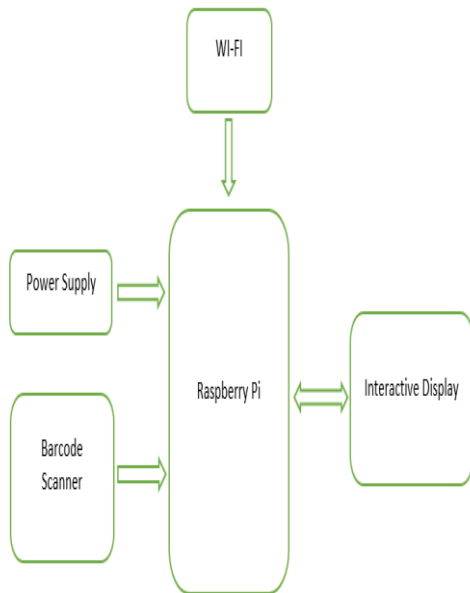
3. BLOCK DIAGRAM

Fig.1 : Block Diagram

3.1 Barcode Scanner

A barcode scanner usually consists of three different parts including the illumination system, the sensor, and the decoder. In general, a barcode scanner scans the black and white elements of a barcode by illuminating the code with a red light, which is then converted into matching text. More specifically, the sensor in the barcode scanner detects the reflected light from the illumination system (the red light) and generates an analog signal that is sent to the decoder. The decoder interprets that signal, validates the barcode using the check digit, and converts it into text. This converted text is delivered by the scanner to a computer software system holding a database of the maker, cost, and quantity of all products sold.

3.2 LCD Display

• Displays the item name, rate, end date and total amount.

• Complete listings of the items along with their rate on LCD display.

• Up/down switch are interfaced with the microcontroller which can be used to analysis all the purchase.

3.3 Raspberry PI Device

The device has involved through a number of versions that facet variations in capability and peripheral-tool support.
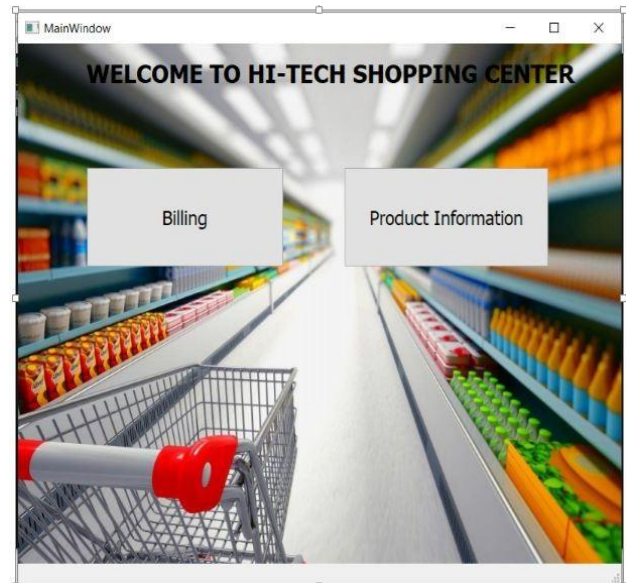
4. WORKING METHOLOGY

Fig.2 : Front View of Website

A customer gets into the mall, picks up the smart trolley, searches for the product he wants on the interactive display. The customer will then pick up the product and simply scan the product on the barcode scanner, the product price and weight will be added, similarly he can do the same for all the products and price and weight of all the products will be added and total price and weight will be displayed on the display. After this the customer will go for checkout where the total weight of the trolley will be weighed, the initial weight of the trolley will be subtracted and the remaining weight will be verified, with the total weight displayed on the display.

After the product is scanned the corresponding price and weight of the product is cumulatively added by taking values from the dictionary where the product's barcode acts as a key. Similarly if the customer wants to remove a product he can type 'remove' and scan the product he wants to remove.

After the customer is finished scanning all the products, he has to type **'Done'** the program will end and return the total price and weight.

If the Customer clicks on the **Product Description** button he'll be redirected to a website, which will have all the information about the products. Where the product is located, are there any offers, is it in stock or out of stock. The website is created using HTML and CSS.

5. VERIFICATION PROCESS

The idea is to use weight as a verification medium because just like barcode, weight is also available on products. This idea can be used to figure out what products are bought by the consumer. The verification works by the formula –

"Estimated weight =

 Total weight of Trolley – Initial weight of Trolley"

Estimated weight :- summation of weight on the packaging of products

Total weight of Trolley :- total weight of the trolley after the products are placed inside the trolley

Initial weight of trolley – weight of the trolley when it's empty

If the above condition is satisfied, then only the trolley will be allowed to bill. This process allows the consumer to bill his own products without going to the counter for billing.

6. DESIGN

Without actually making a smart trolley, the idea is to make a stand-alone device that can be attached to any trolley and make it a smart one. This feature arises the need to make the device as portable as possible. This difficulty is solved by proper placing of the components and using components that are smaller in size but equally effective.
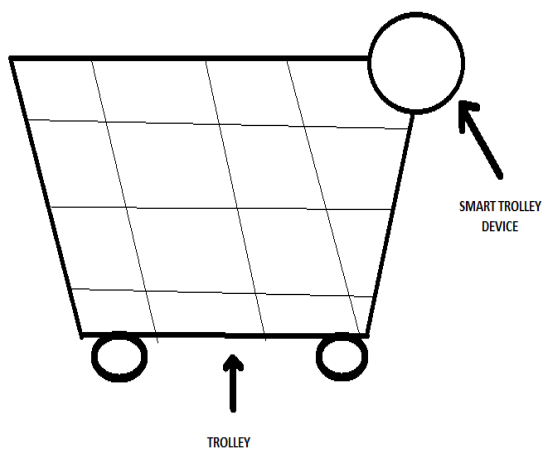

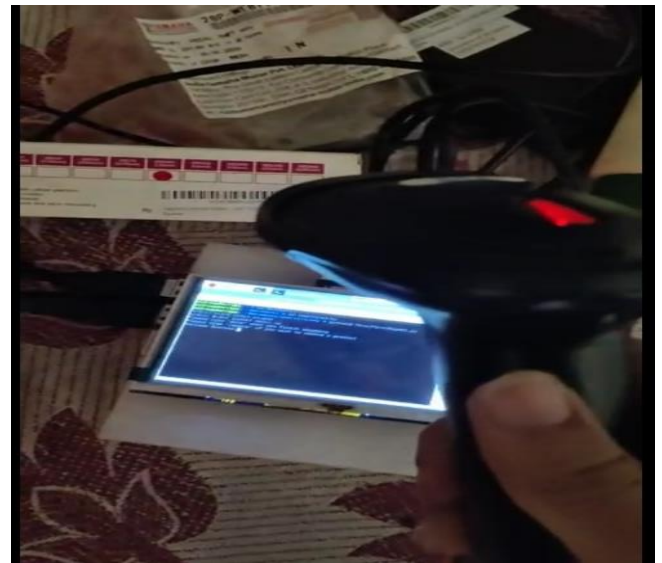**Fig.3 :** Device placement on Trolley

7. RESULTS

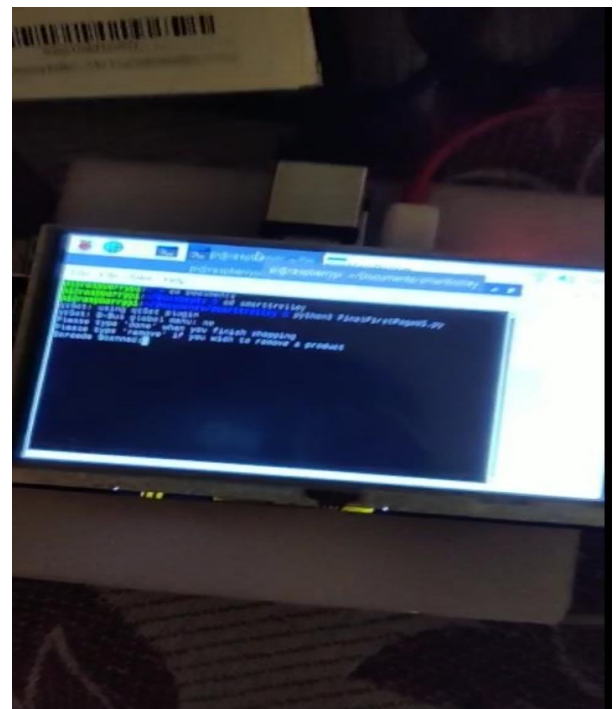**Fig.4 :** Scanning barcode of product as an input

Fig.5 : Product description after scanning

	A	B	C	D	E
1	barcode	name	price	weight	
2	1	Amul Milk	50	50	
3	2	Lays	10	20	
4	3	Oreo	60	100	
5	4	Sony Earphone	1000	100	
6	5	Cipla Oxymeter	5000	50	
7	6	Canon 40d	50000	500	
8	7	Sony Ps4	28000	1000	
9	8	Philips Aquatouch	2000	200	
10	9	Iphone 12	80000	600	
11	10	Oneplus Nord	28000	800	

Fig.6 : CSV file of products

```
Please type 'done' when you finish shopping
Please type 'remove' if you wish to remove a product
Barcode Scanned:1
Amul Milk Product added
Price:50 Rs
Barcode Scanned:6
Canon 40d Product added
Price:50000 Rs
Barcode Scanned:9
Iphone 12 Product added
Price:80000 Rs
Barcode Scanned:remove
Scan the product you want removed:9
Product removed:Iphone 12
Barcode Scanned:done
Thank you for shopping with us :)
Total amount to be paid 50050 Rs only
Total weight:550 gms
```

Fig.7 : Overview of Instruction & Product Description

8. CONCLUSIONS

Shopping experience has been stereotypical for too long, this is an attempt to take shopping experience into the 21st century by making it more efficient for the consumers. This research paper will help the people to reduce manpower required in billing section. This can reduce the expenses incurred by the management. Users can be aware of the total bill amount during the time of purchase.

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