

Smart Cart

Pandemic Response: An Innovative, Sustainable, Experimental smart shopping

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Abstract - Shopping in malls is an experience of the urbanites to destress themselves from the hectic life. In the current COVID-19 situation, we see that the world will face a lot of changes and to meet these expectations, we are proposing smart shopping carts which shall help the customer to bill on their own thus bringing new experience in queuing. Thereby, designing a new methodology to simplify the billing process and reduce the time spent in searching products in the supermarket. Every product will be uniquely identified by the barcode. All purchased product's price will have to be read by the barcode scanner on the Smart-Cart. The device provides facilities like initialization of customer's budget at the start of their purchase, addition and removal of an item from the cart. The cost and the name of the scanned product will be displayed on the LCD Display.

It will also benefit the customer by notifying the expiry date, location of product, suggestions related to their purchase using mobile connectivity. An application makes note of all the scanned commodities of the particular trolley and is linked with the backend database which contains details of the products such as Cost Price, Available Stock. Algorithms like knapsack and apriori will be implemented to make the system efficient.

Key Words: Barcode Scanner, LCD Display, Supermarket, Barcode, Knapsack, Apriori, Expiry date

1. INTRODUCTION

The experience of queuing for billing is common experience for many of us. Based on our experience and observations, we identified the problem people face at the billing counter. At places like Big Bazar, Malls, people keep adding to the cart with a mindset that they can always remove it at the billing counter. This adds to the time needed to process the items at the billing counter leading to long queue, frustrating the people who are waiting, lower efficiency and joy of shopping is lowered. Old people, people with physical challenges might find it more irritating and physical taxing. To enhance this experience and bring joy and comfort to people we are proposing a smart and intelligent shopping

cart. This cart helps you to remember your earlier shopping list, your favorite brands, offers you coupons, discounts, prepares a list depending on your previous list, helps you keep a check on the budget. It will also display information like manufacturing date, expiration date which will help you make an informed decision and save money. The solution prepares auto bill and enables you to autopay using various options.

1.1 Existing System

[3] T Mohammed Ashique, V Mohammed Rishin, T Sneha, Subrahmanian, Quick Cart: A Smart Cart System describes how RFID reader can be used scan the products purchased by the customer. The paper also proposes use of micro controller to locate the products within the supermarket.

[4] Dr.K.A.Shirsath-Nalavade, Aarti Jaiswal, Swati Nair, Gayatri Sonawane, Suchita describes their IOT Based Smart Shopping Cart (SSC) With Automated Billing using RFID tag containing RFID reader and transmitter. In this paper, RFID reader is proposed to scan the products purchased by the customer. The transmitter is used to wirelessly transfer the product information of the items placed in the trolley to the main using a transmitter to the main computer. Billing, IEEE paper-2016.

[6] P.Chadrasekar, T.Sangeetha have developed smart shopping cart with automatic billing system through RFID and ZigBee. The paper uses RFID tags to scan products purchased by the user and the electronic code number is obtained through the RFID reader. ZigBee is used here to wirelessly transfer the information to the billing computer

1.2 Proposed System

Smart cart aims to make the shopping experience better. Smart Cart consists of a mobile through which the user shall create an account. After the user has created the account, it will get access to all the products present in the supermarket. The user now needs to add an initial

budget after exceeding which a notification will be shown. After adding the initial budget, the user can now scan the products that he/she wishes to buy using barcode scanner. Now, after the customer finishes buying the desired product he/she will click on the checkout button. After clicking the checkout button the customer needs to select a payment option and pay for the purchased products

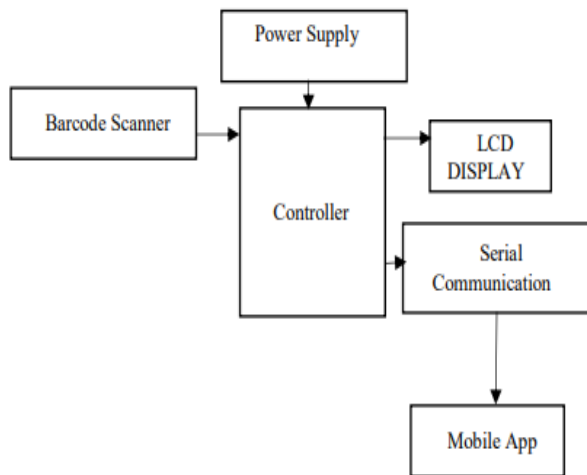


Fig1: Block diagram of smart cart system

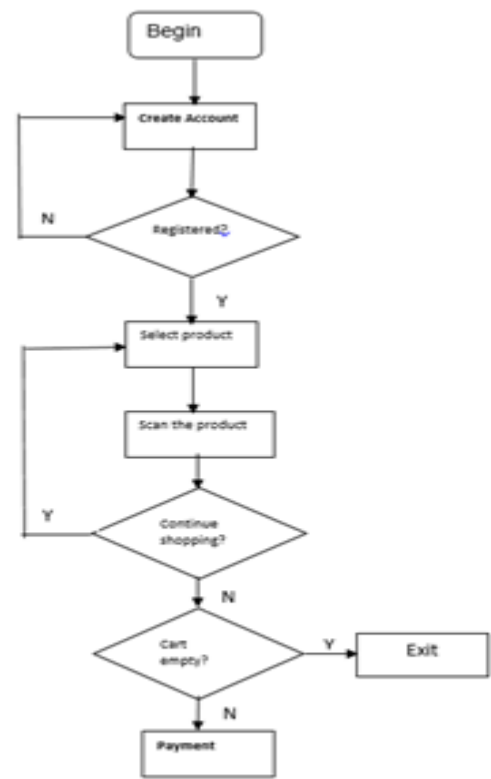


Fig 2: User End

A. Authentication:

Every product in the shopping mart is tagged with barcode for the billing process. The customer can initiate the shopping by registering on the mobile app connected to the cart. After registering, the details of the customer will be updated on the server. Once the customer is identified by the cart, he/she can scan the products, one wishes to buy and add it in the cart. The previous purchase history is managed in the database to facilitate the customer to choose the daily needs easily. It is also maintained so that the owner can provide suggestions to the customer based on the previous purchase.

B. Billing:

The customer has to scan the products while dropping them into the Smart-Cart. With the help of barcode scanner products are displayed on app as well as LCD as soon as they are scanned. The customer needs to add initial budget at the start of the session. This helps the customer to plan the shopping according to his/her initial budget. The Fig. 2. Shows the billing display system. After completing the shopping the customer can choose the payment option.

2. IMPLEMENTATION

1. Raspberry pi:

Raspberry pi is an important component of Smart Cart. It is a low cost, credit-card sized computer which uses a standard keyboard and mouse. It allows you to code in languages like C, Scratch and Python. It is used as a controller in the proposed system. It is a central unit of a device, as it has faster processing speed than its previous versions



Fig 3: Raspberry Pi 3 B+

2. 4*4 matrix Keypad:

• The 4*4 matrix keypad is used as input in the project. It is a matrix non- encoded keypad consisting of 16 keys in parallel. The keys of each row and column are connected through the pins present on the raspberry pi. It is used to enter the budget and submit the session in the proposed system.

3. 16*4 LCD display:

• An LCD is an electronic display module which uses liquid crystal to produce a visible image. The 16*4 LCD display is a very basic module. The 16*4 translates the display of 16 characters per line in 4 such lines. The LCD display acts as an o/p port to the raspberry pi. In the system LCD display is used to display the total cost of items added in the cart, notifications of expired items and suggestions related to previous purchase.



Fig 4: LCD Display

4. Barcode scanner:

• A Barcode scanner is an electronic device which is able to scan and decode barcodes. The device uses optical technology such as infrared light to scan the barcode. Barcode scanner helps scans the barcode of every item purchased so that details about that item can be fetched from the database

2.1 Experimental Results

The system was tested for various barcodes and the results are shown with the help of the figures. Each stage of customers interaction from entry to exit is shown with assistance of snapshots of the User Interface designed. This system enhances the shopping experience of customer by saving time, not queuing, less effort, higher efficiency, more choices and updates information.



Fig 4: After account creation, customer logs in with his/her credentials

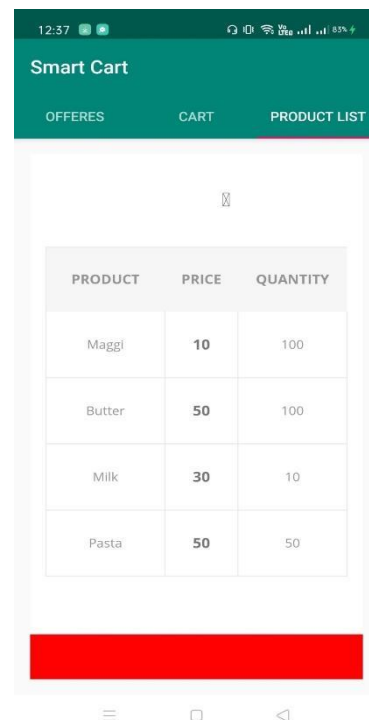


Fig 6: The required products scanned by the customer will viewed here

Table 8.1: Systems comparison

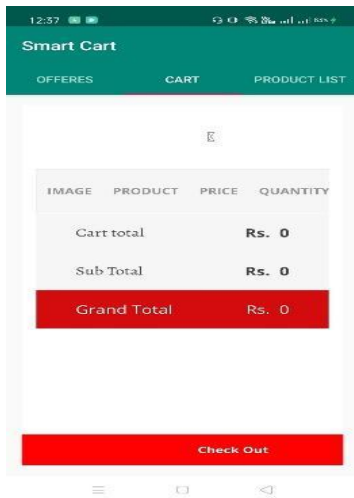


Fig 5: Customer can choose required products from the available product list

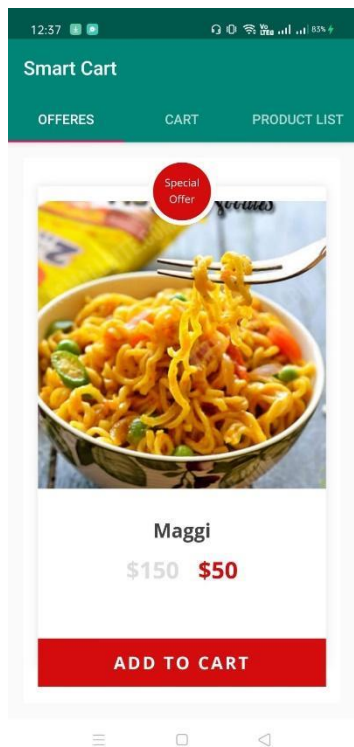


Fig 7: Customer is notified with all ongoing offers on his/her mobile app

Sr No	Technology used	OS used	Features	Algorithm Cost
1	RFID reader AIDC (Automatic Identification and Data Capture)	Raspbian OS	1.Product location 2. History of purchases	No algorithm used 5700
2	Bluetooth module ,RFID reader	Raspbian OS	1. Calculate bill mechanically 2. Show full cost on LCD display	No algorithm used 4673
3	RFID code system, ZigBee module, EEPROM	Raspbian OS	1. Product placement 2. Extraction Cartesian system	SCADA, MATLAB database IRcoupling 4616
4	Barcode Scanner, LCD display	Raspbian OS	1.Bill calculation 2.Cost on LCD as well as on app 3.Exipry date	Knapsack Apriori 3704barcode(as available in all supermarkets)

Our project amount is in long term benefits. As the initial investment is already made in the supermarket

3. CONCLUSION

The proposed work brings a new change in the whole shopping experience. Here the main issues like remembering the shopping list, searching for the product in the supermarket and the time wasted in billing queues

are overcome. In this work, by displaying the product list and the past purchase, remembering the shopping list is made much easier for the shoppers. The system designed for billing helps the customer to plan their own budget for shopping. Supermarket owners get benefit with respect to time saving, less manpower and space which reduces the investment.

Thus it shows a high possibility of integrating IOT system in supermarkets. In the future, transactions can be done through MasterCard, generating paperless bills which may be sent to registered email-id.

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