A Synopsis on

IOT Based Smart Grocery Store

Submitted in partial fulfillment of the requirements of
the degree of

Bachelor of Engineering

in

Information Technology

by

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CERTIFICATE

This is to certify that the project Synopsis entitled ***"Smart Trolley"*** Submitted by ***"Samiksha Mhatre (16104025), Jagruti Patil (16104061), Uddharth Ajja (16104063)"*** for the partial fulfillment of the requirement for award of a degree ***Bachelor of Engineering*** in ***Information Technology*** to the University of Mumbai is a bonafide work carried out during academic year 2021-2022

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I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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Abstract

This technology provides a way for reducing the amount of time spent shopping in supermarkets. At the billing counter, customers may encounter a variety of issues, such as waiting and not knowing if they have enough money to pay for the things they have purchased. The billing procedure at the counter is time intensive, and the billing area requires more human resources. To address this issue, we presented a method that uses a Smart Trolley App to circumvent these issues. The app can be easily used on the mobile phone. The mobile camera via the smart trolley app can be used for scanning items, displaying product information, pricing, and total bill. The user may pay the bill using any of the online payment methods available, through various UPI apps or via net banking. This method improves the purchasing experience for the customer while shortening the shopping time.

Introduction

Supermarkets and retail malls are springing up in ever-increasing numbers these days. Due to cheaper prices, a wider choice of product availability, and better service, individuals are shifting their shopping habits from traditional neighborhood general shops to supermarkets. As a result, we are seeing an increase in the number of individuals who buy at supermarkets and shopping malls. However, while shopping, everyone wastes the most of their time waiting in lines at the billing counters. Customers waste a lot of time waiting in line for checkout, especially at busy hours of the day, weekends, and during festivals. The project's major purpose is to cut down on total shopping time. The Smart Trolley initiative intends to do this by allowing consumers to complete the paying process on their mobile device while shopping using the Smart Trolley app. Shopping malls may lower the number of people working at billing counters and the amount of space used, which saves time and money. These efforts and investments may be put to bettering the quality and experience of consumers.

Objectives

- To minimize the consumer's overall shopping time.
- To design a system that is simple to use, customer-centric, and shortens the checkout process.
- To provide customers with an organized list of the products in their cart as well as the overall payment.
- To minimize the workforce and increase the availability of space at the billing counters.
- To improve the customer service and shopping experience.

Literature Review

In literature [1], the author explains a smart trolley with advanced billing system using RFID technology and a technology oriented, low-cost, easily scalable, and rugged system for aiding shopping in person. Author has developed system comprises of a Server unit (SU), a User Interface unit (UIU), an in-built Billing Unit (BU) and Central unit (CU).SU will help in establishing and maintaining the connection of the shopping cart with the main server.

In literature [2], the author has explained a RFID based smart trolley for automatic billing system using a RFID reader, where the wireless communication is established using HC-12 communication module between the trolley and central PC. Here Author has used a pre-charged RFID card for the payment purpose.

In literature [3], the author aims to reduce the time of billing for the customers and to ease the process of shopping so that the customers gets benefited. It can be implemented in shopping malls where there is a large crowd and huge rush into malls. In the world of Automation. This technology will replace the present barcode system which is present being followed. Hence this technology can help people to make their shopping easy and time saving too without any much human intervention. This also reduces manpower and shopping mall maintenance.

In literature [4], the innovative project idea can be used is places like shopping complexes, supermarkets & malls to purchase the products. Here RFID card is used to securely access every product in shopping places. If a product is scanned & put into the cart, all the required details of the product will be displayed on the LCD screen. Therefore, an RFID tag/card is used for accessing the products. Hence this project will help in improving the security & also the shopping time can be reduced. It also provides an enjoyable & user-friendly shopping experience to the customers.

Problem Definition

While shopping at supermarkets during peak hours, weekends and festival season; a lot of time of the customer is wasted waiting in line at the billing counter. The time wasted at the billing counter may range from 30 minutes to 1 or 2 hours. This leads to increasing crowds and decreasing shopping area. The time wasted at billing counters, makes customers tired and unhappy. The supermarkets too have to employ more employees at billing counters thus more investment required for working. Sometimes customers waiting in line at the billing counters for hours only to realize that they cannot afford certain products or miscalculate the offers or discounts on the products. If there is a breakdown of billing machine then the billing times increases excessively.

Proposed System Architecture

The proposed system is represented through a flowchart below introducing the steps involved to buy and checkout at the shopping list.

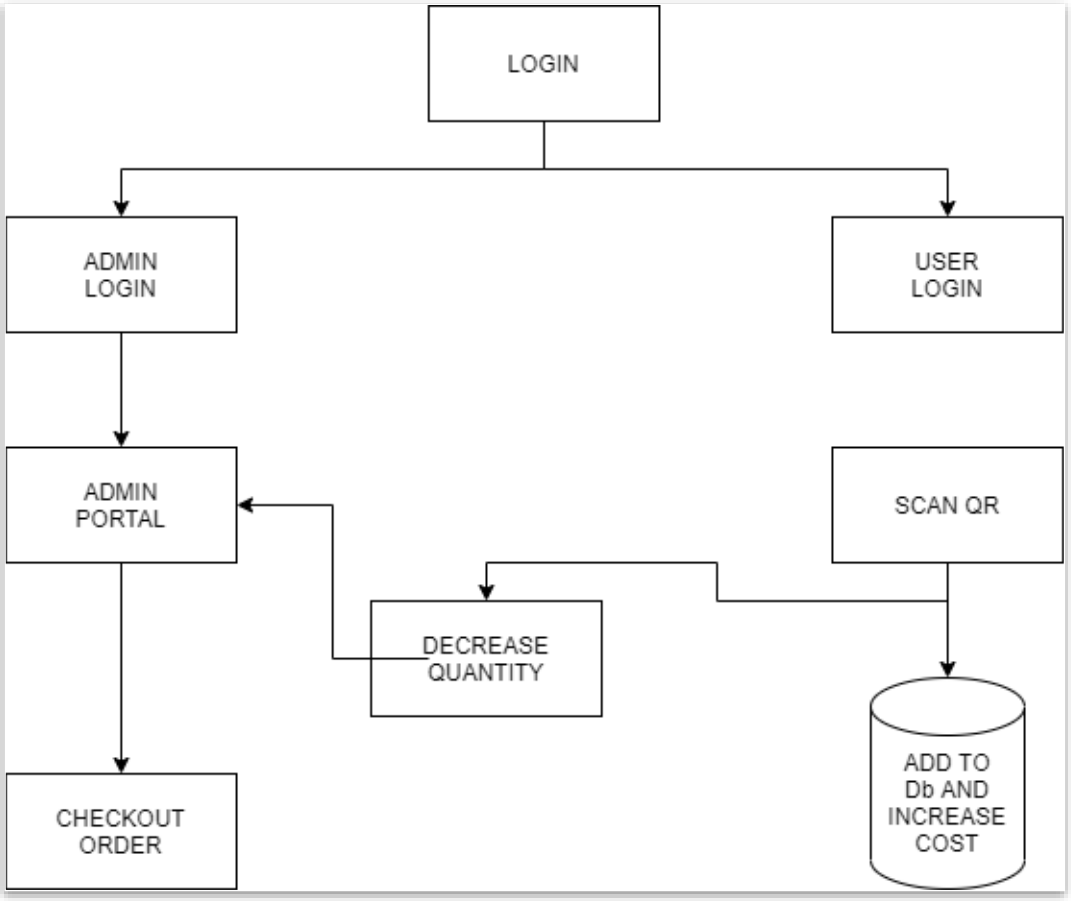

Figure 1: Proposed System Architecture

Principle Working of the System

1) **Admin End Process:** The flow of the system in figure 2 demonstrates the admin end process of the system. The process begins with the admin logging in to the smart trolley system, by using username and password generated at the inception of the process. Once username and password inputted by the admin for login are correct the Administrators Panel is displayed on the screen of the device.

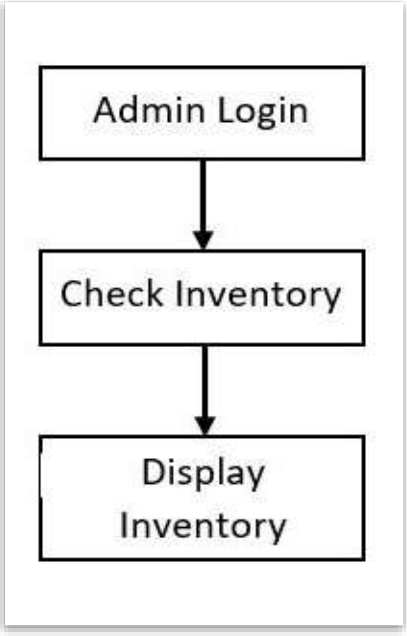

Figure 2: Admin End Process

1.1) Admin Panel: The administrator's portal displays the inventory of all the products available by the product name, Net price of the product and the stock remaining in the inventory. If a customer scans and adds product to the cart, that products reduces in number from the inventory. The administrator can manage the supply of the products and stock up the products based on the quantities required in the inventory.

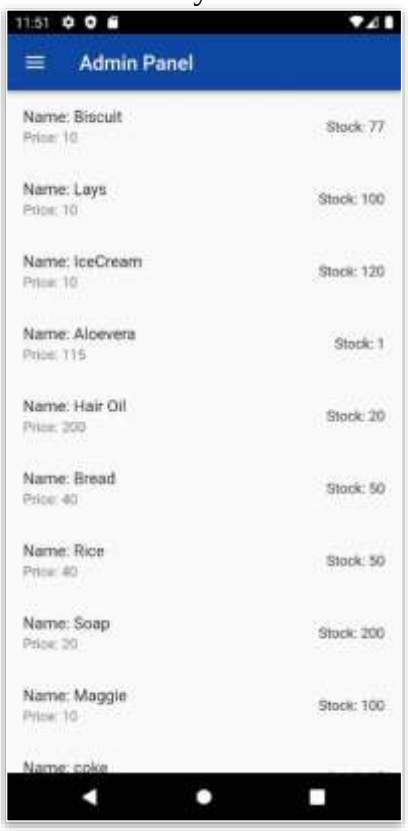

Figure 3: Administrator's Panel

2) **User End Process:** The flowchart for user end process is illustrated in figure 4. This process includes the steps followed by the user for scanning a product, viewing product details, adding products to cart and finally confirmation and payment.

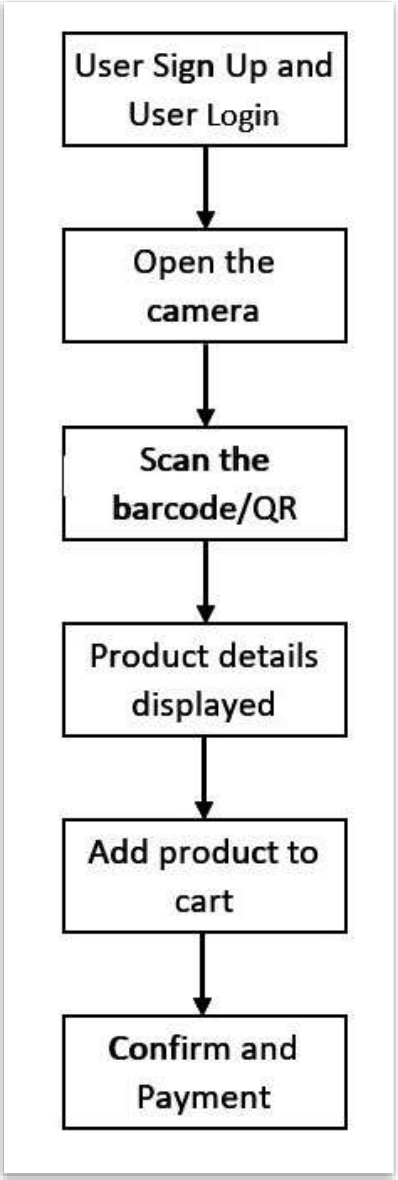

Figure 4: User End Process

2.1) Sign Up Process: The user end process begins with sign up. If a user is new to the shopping Centre, he or she must first download the smart trolley app and sign up and register on the app. The user is prompted to submit basic information throughout this procedure. The user is also asked to provide a username and password for future logins to the website. The data collected from the user is transferred to the server database, where it is saved for future use. The password will be saved in the database while the hash password is used to protect the user's data. When this procedure is completed, a response is displayed advising the user of a successful sign up.

2.2) Login process: Only previously registered users can access the app and utilise the system. Users begin the login procedure by inputting the username and password they used to sign up. The information is collected and delivered to the server database. During sign up, the

password is hashed and compared to the password saved in the database. If the value collected from the user during login and the value kept in the database do not match, a failure response is sent to the user, suggesting erroneous login details. If the data entered during login matches the data saved in the database, the user can continue buying. The figure 5 shows the signup and login page of the smart trolley app.

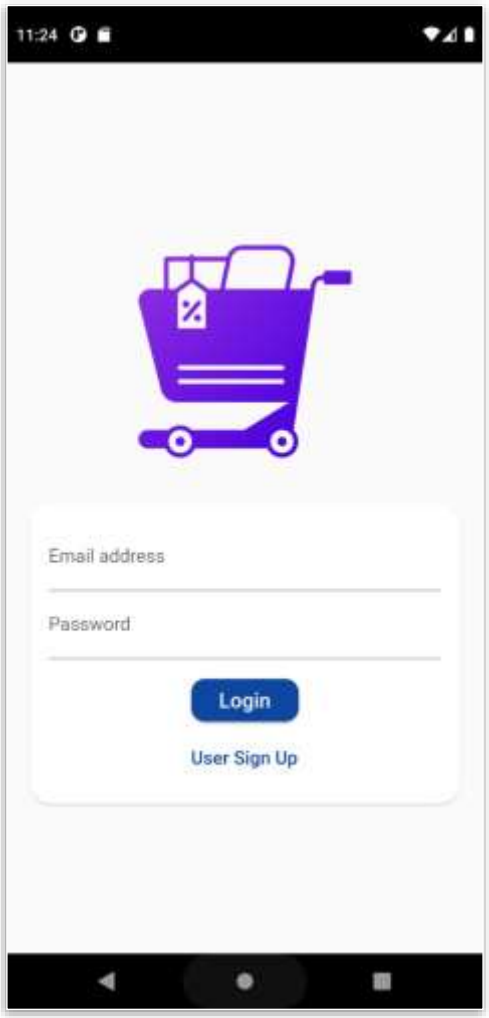

Figure 5: Sign Up and Login Page

2.3) Barcode/QR scanning Process: The user completes this procedure by aiming the camera at the product barcode or QR code using the smart trolley app. The user must frame the barcode or QR code so that it may be seen properly through the camera. The software reads the barcode and produces product information. Figure 6 displays Barcode or QR scanning process of the product by the user through the app.

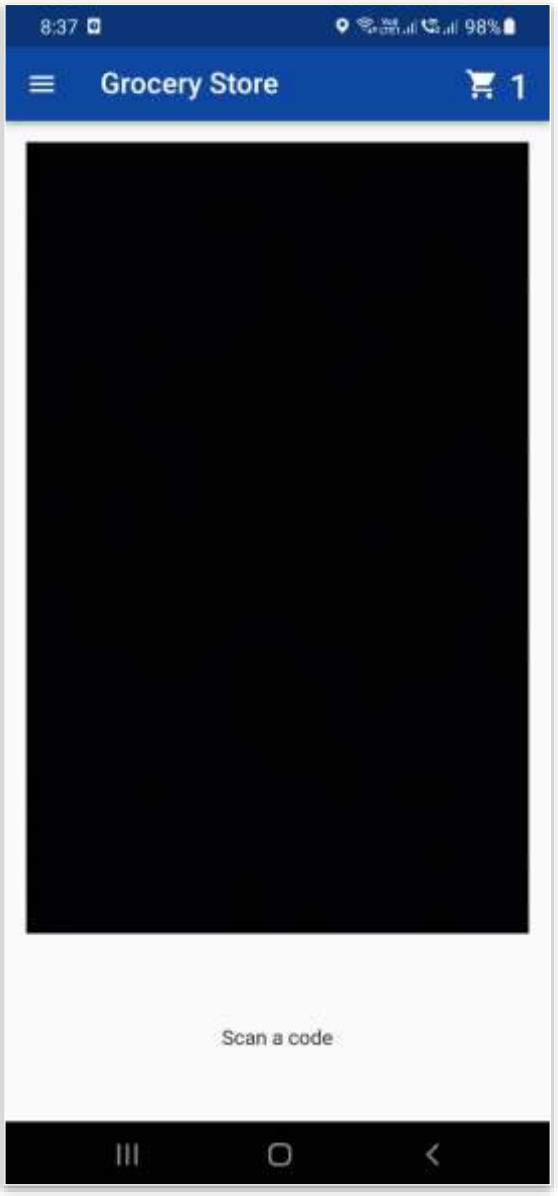

Figure 6: Barcode and QR Scanning Page

2.4) Product Detail Display and Add to cart: Following the scanning process of the product the product details of the scanned products is displayed. The product details include the name of the product, brand and description of the product, specifications, quantity, net price and discount available on the product. The users can go through these details to check if they would like to proceed with buying the product. Once the user wishes to purchase the product, the user can add the product to cart. The users can select any number of products and add them to cart. Users can keep adding various products and it keeps adding to cart in an organized manner. The users can easily check the product, quantity and price of product in the cart.

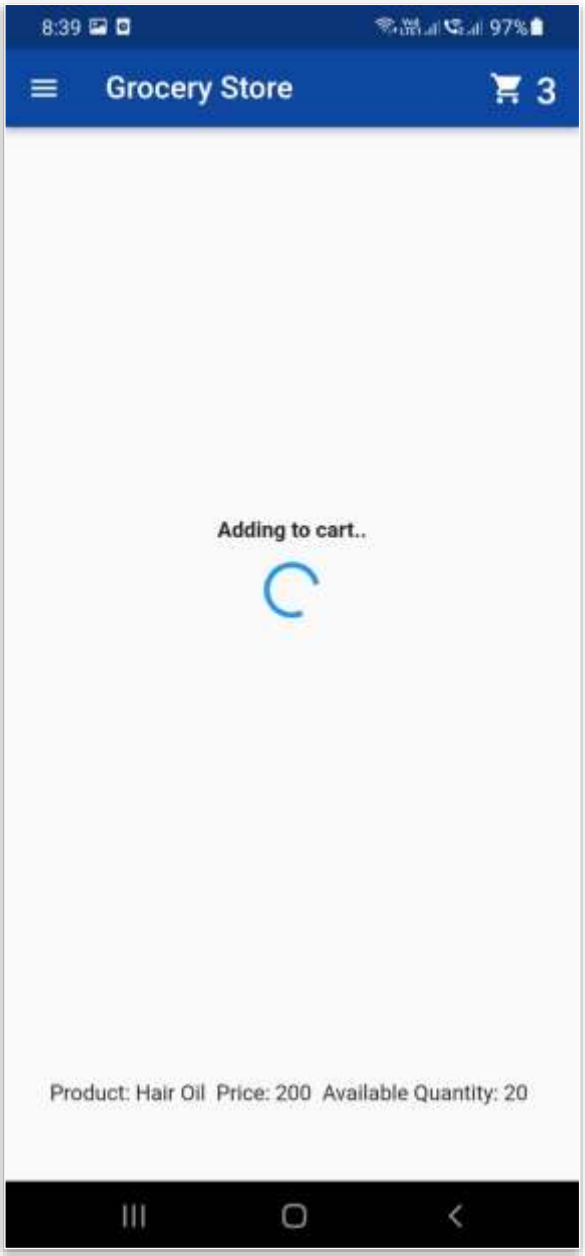

Figure 7: Adding a product to cart

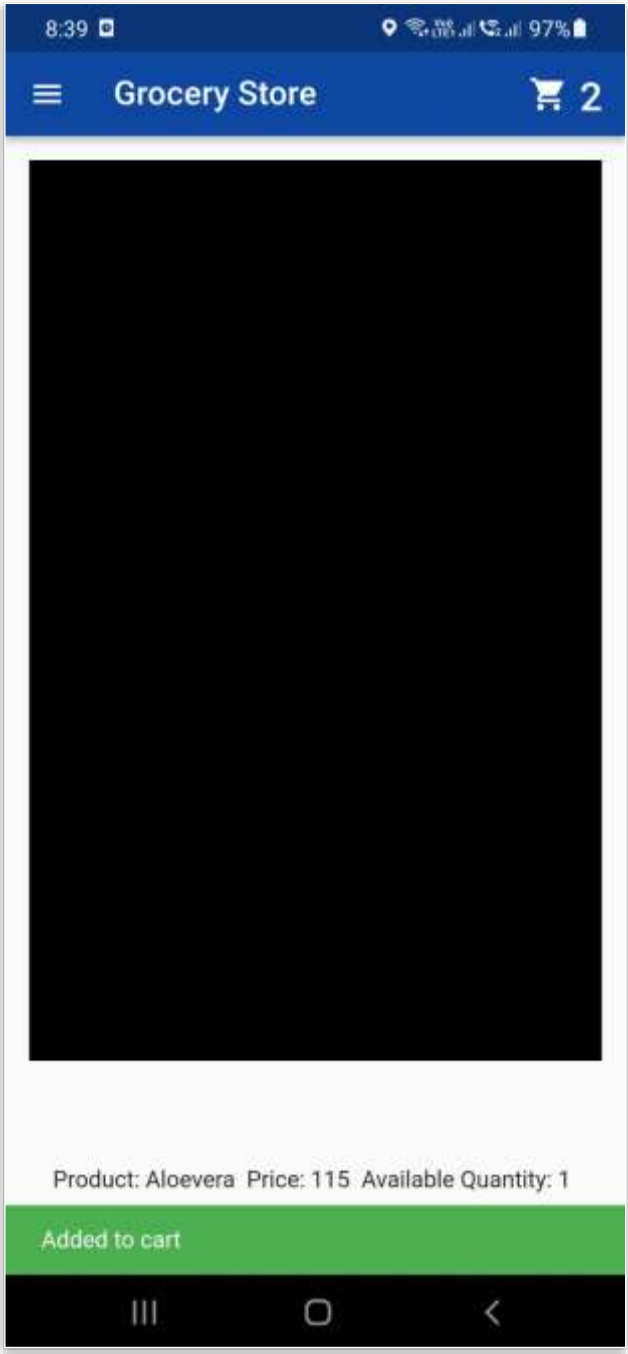

Figure 8: View after adding product to cart

2.5) Confirm and Payment Process: This process is the final part of the user end process. It includes the billing of all the products the users wish to purchase and proceed with the payment. After adding all the products to the cart the user can check the list of products bought along with the quantity and net and gross price of each product along with the overall total of all the products. The user after reviewing the items in the cart can confirm the purchase of the products and proceed with the payment. The user can make cash payment at the counter or make online payment via UPI payment apps and net banking facility. The Figure 9 shows the items inside the cart with the name, quantity and total of all products in the cart.

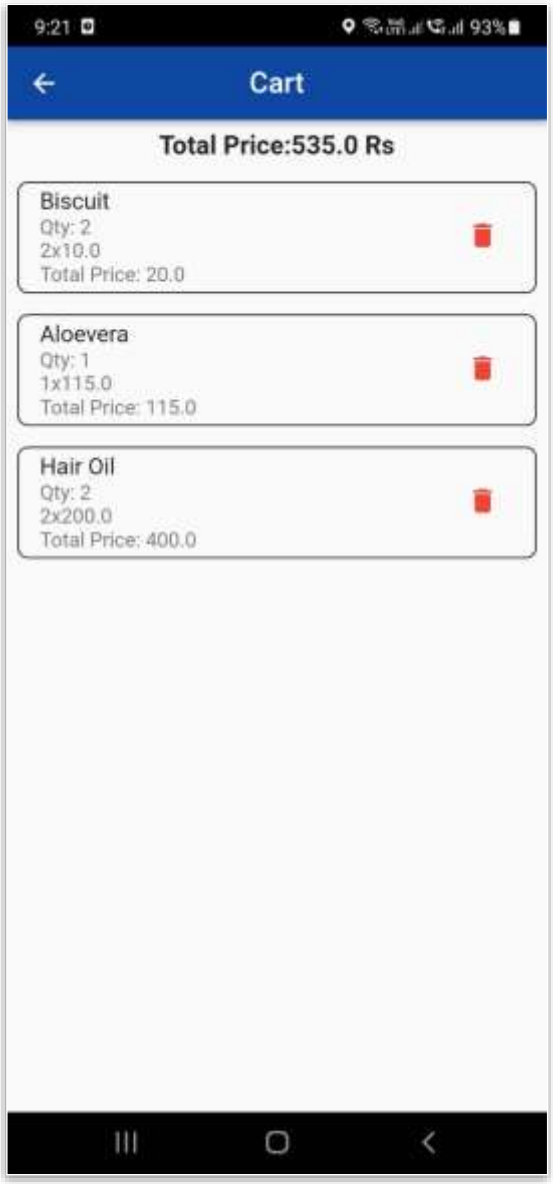

Figure 9: Items in cart for confirmation

Conclusion

In this project we have created a smart shopping framework that allows the users to scan the barcode on the products in the shopping mall by adding to cart, detailed description of the product, view of products in cart in organized manner with name, quantity and net rate and real time total of overall products. The Smart Trolley system leads to significant decrease in time required for billing and thus reduces the overall shopping time for the user. This system is beneficial for both the customer as well as the super market management. The customer is benefitted by not having to waste time waiting in line for checkout, easy calculation of the products to be bought and thus satisfied customer. On the other hand on implementation of the smart trolley app the supermarkets are highly profitable due to reduced number of employees thus reduced expenditure, providing quality service to customer, less

space required for billing thus more area for products and better understanding of the inventory. By using the app the customers are highly engaged in the shopping experience. This project thereby improves the efficiency, simplifies the process and consumes less time to shop.

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