A

Mini Project Report

on

Shelfsmart

Submitted in partial fulfillment of the requirements for the degree

Second Year Engineering – Computer Science Engineering (Data Science)

by

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CERTIFICATE

This to certify that the Mini Project report on **Shelfsmart** has been submitted by Srushti Hate (23107120), Dhiraj Jadhav (23107131), Shubham Chavan (23107082) and Aarya Bhangare (23107104) who are bonafide students of A. P. Shah Institute of Technology, Thane as a partial fulfillment of the requirement for the degree in **Computer Science Engineering (Data Science)**, during the academic year **2024-2025** in the satisfactory manner as per the curriculum laid down by University of Mumbai.

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TABLE OF CONTENTS

1. Introduction……..1

    1.1. Purpose.....1

    1.2. Problem Statement……...2

    1.3. Objectives..... 2

    1.4. Scope.....…...3

2. Proposed System…….....4

    2.1. Features and Functionality……...4

3. Project Outcomes.....…...6

4. Software Requirements.....7

5. Project Design……..…….....8

6. Project Scheduling.....10

7. Results…….11

8. Conclusion…….....17

References

Chapter 1

Introduction

A inventory store is a vital retail business that provides consumers with daily necessities such as food, beverages, and household essentials. With evolving consumer preferences and technological advancements, grocery stores must adapt to maintain efficiency and customer satisfaction. Effective inventory management, competitive pricing, and seamless customer service are crucial for success in this industry.

The primary challenge faced by grocery stores is managing perishable goods, maintaining stock levels, and ensuring a smooth shopping experience. This report aims to analyze strategies for optimizing store operations, integrating digital solutions, and enhancing customer engagement. By implementing efficient supply chain management and modern payment solutions, grocery stores can improve profitability and service quality.

1.1 Purpose:

The purpose of this study is to develop and analyze a grocery store application that enhances the shopping experience for customers while optimizing store operations. The application aims to provide a seamless digital platform that improves inventory management, enables online ordering, enhances customer engagement, and simplifies payment processing. By integrating smart technology, the grocery store application will help retailers manage stock efficiently and offer customers a more convenient shopping experience.

A well-designed grocery store application can transform the traditional shopping process by offering features such as product search, digital catalogs, smart recommendations, and contactless payments. With the rise of e-commerce and digital transactions, grocery businesses must adapt to consumer preferences for convenience, speed, and accessibility. By leveraging real-time inventory tracking, users can be assured of product availability before visiting the store or placing an online order. This feature minimizes wasted trips and improves customer satisfaction.

Additionally, the application will provide store owners with comprehensive analytics and reporting tools, allowing them to monitor sales trends, customer preferences, and inventory

levels. This data-driven approach ensures that businesses can make informed decisions to optimize stocking strategies and reduce wastage of perishable goods. Moreover, features such as loyalty programs, personalized discounts, and push notifications will enhance customer retention and brand loyalty.

1.2 Problem Statement:

Traditional grocery shopping often faces challenges such as inventory mismanagement, long checkout lines, stock shortages, and customer dissatisfaction due to inefficient tracking systems. Additionally, with the rise of e-commerce, grocery stores must integrate digital solutions to stay competitive. This study examines how a well-designed grocery store application can address these issues by enhancing real-time inventory updates, streamlining the checkout process, and improving overall user experience.

1.3 Objectives:

- Convenience: To provide a seamless shopping experience for users to buy groceries online from the comfort of their home.
- Efficiency: To enable smooth checkout processes for customers.
- Inventory Management: To help store owners track stock, manage orders, and update product availability.
- Secure transactions: To provide secure transaction with UPI id.

1.4. Scope

The inventory store digital aims to enhance the shopping experience for both customers and store owners by providing a comprehensive digital solution. For customers, the application will offer features such as product browsing, online ordering, personalized recommendations, multiple payment options, and real-time order tracking. Users will be able to search for products, place orders for home delivery or in-store pickup, and receive notifications on order status, promotions, and restocked items. The application will also support a variety of payment methods, including digital wallets, credit/debit cards, UPI, and cash-on-delivery, ensuring secure and convenient transactions.

For store owners, the application will provide real-time inventory management, allowing them to monitor stock levels, receive automated restocking alerts, and track perishable goods efficiently. Additionally, the system will generate sales analytics and customer insights to help businesses make data-driven decisions on stocking strategies, pricing, and promotions. Features such as loyalty programs, targeted discounts, and multi-store management will further enhance customer retention and streamline operations. Secure payment processing and fraud prevention mechanisms will also be integrated to ensure a safe transaction environment.

From a technical standpoint, the grocery store application will be designed for cross-platform availability, accessible via both web and mobile (Android & iOS). It will be scalable to handle large numbers of users, transactions, and product listings efficiently. The user-friendly interface will ensure ease of navigation for both customers and store administrators, while third-party integrations with payment gateways, delivery services, and analytics tools will further enhance the application’s capabilities. Overall, this digital platform will serve as a one-stop solution for modern grocery shopping, bridging the gap between traditional and online retail while improving efficiency, customer engagement, and business profitability.

Chapter 2

Proposed System

The proposed grocery store application is designed to modernize and streamline grocery shopping by integrating digital solutions that enhance customer experience and improve store management. The system will offer a user-friendly interface, allowing customers to browse products, place online orders, make secure payments, and track deliveries effortlessly. For store owners, the application will provide real-time inventory management, sales analytics, and automated restocking alerts, ensuring efficient stock control and reducing wastage.

The application will feature a robust backend system that handles user data, order processing, and payment transactions securely. It will support multi-store management, allowing grocery chains to operate multiple branches seamlessly. Additionally, it will include loyalty programs, personalized recommendations, and promotional offers to enhance customer engagement and retention. By incorporating AI-powered product recommendations and real-time order tracking, the system aims to provide a seamless and efficient shopping experience.

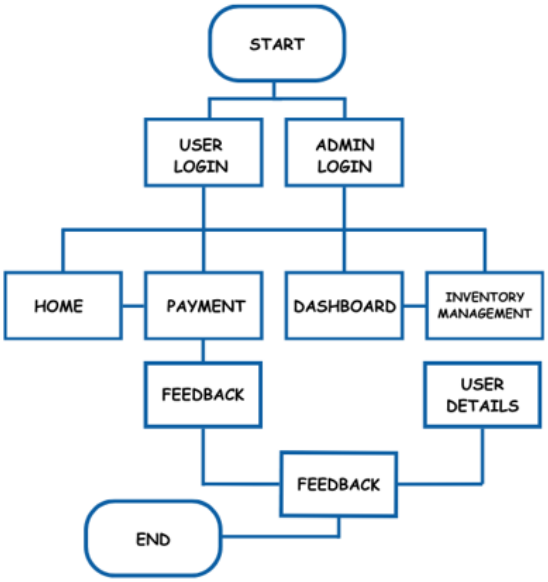

Figure 2.1 Block Diagram

This flowchart illustrates the navigation process for both users and admins, starting from login and proceeding through various modules like home, dashboard, payment, and feedback. It ensures both roles can access relevant sections such as inventory management and user details before ending the session.

2.1 Features and Functionality

The grocery store application will include the following key features and functionalities:

- Product Catalog**:** View grocery items by categories.
- Search: Find products easily.
- Shopping Cart & Checkout: Add items to cart and securely complete purchases.
- Customer Feedback: Customer can rate their shopping experience.
- User Accounts: Save personal information for quick checkouts.
- Payment Options: Pay with UPI.
- Inventory Management: Store owners can manage products, and prices.

Chapter 3

Project Outcome

The implementation of the inventory management application is expected to enhance shopping convenience, streamline store operations, and improve customer engagement through digital transformation. Customers will benefit from a seamless shopping experience, with features such as real-time inventory updates, online ordering, multiple payment options, and personalized recommendations. This will reduce shopping time, minimize stock unavailability issues, and offer greater flexibility in purchasing groceries, whether for home delivery or in-store pickup.

For store owners, the system will automate inventory management, sales tracking, and customer interactions, leading to improved efficiency and reduced operational costs. The integration of data analytics and AI-powered insights will enable businesses to understand shopping patterns, optimize stock levels, and implement targeted marketing strategies to boost sales and customer loyalty. Additionally, the multi-store management feature will allow grocery chains to efficiently oversee multiple locations through a single platform.

The expected key outcomes of the grocery store application include:

- Higher Sales Volume: Increased efficiency, better targeting, and improved customer loyalty directly contribute to a growth in overall sales.
- Enhanced User Experience: Users can easily find and purchase grocery items with a smooth and intuitive interface.
- Improved Inventory Control: Store owners can track and manage stock levels in real time, update pricing, and avoid overstocking or shortages.
- Faster checkout processes with self-checkout, UPI payments.
- Better customer satisfaction through feedback system to ensure good consumer experience everytime.

Chapter 4

Software Requirement

The system project requires specific software for development and deployment, as follows:

1. Python (3.12 version): Provides the libraries and tools needed for developing the Python-based frontend of the system.

2. Vscode IDE: Used for writing, testing, and debugging Python code, Vscode offers an integrated environment to streamline development processes.

3. MySQL Database Server: Manages and stores employee and payroll data, handling SQL queries and transactions for backend operations.

4. MySQL Workbench: A graphical tool for database design, management, and maintenance, facilitating schema design and query execution.

Chapter 5

Project Design

Project design is planning how a project will work before starting it. It involves figuring out what's needed, setting goals, and deciding how to build it. Key parts include figuring out how the system will be set up, how data will be stored, what the interface will look like, how things will work, how to test it, and how to handle any problems.

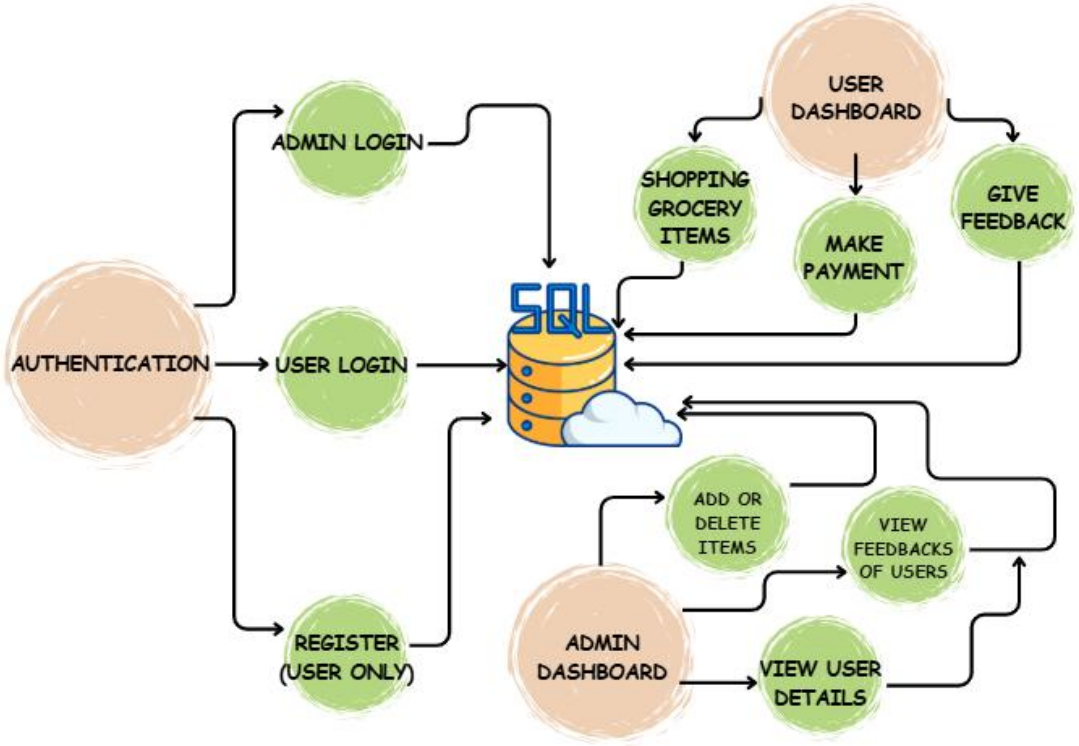

Figure 5.1 Workflow

The figure 5.1 shows the flow of an online grocery system where users and admins log in through authentication. Users can shop, make payments, and give feedback, while admins manage items, view user details, and monitor feedback—all connected through a central SQL database.

Chapter 6

Project Scheduling

A Gantt Chart is a powerful project management tool that visually represents a project's schedule, showing tasks, their duration, and dependencies over a timeline. It helps teams plan, coordinate, and track progress efficiently by displaying activities in a structured manner. Each task is represented by a horizontal bar, with its length indicating the duration and its position reflecting the start and end dates. The chart also includes task dependencies, allowing teams to understand which activities need to be completed before others can begin. By incorporating progress tracking, Gantt charts enable project managers to monitor task completion and identify potential delays. They are widely used across industries for effective time management, resource allocation, and team collaboration. This structured approach ensures that projects stay on track, deadlines are met, and bottlenecks are identified early, leading to better overall project execution.

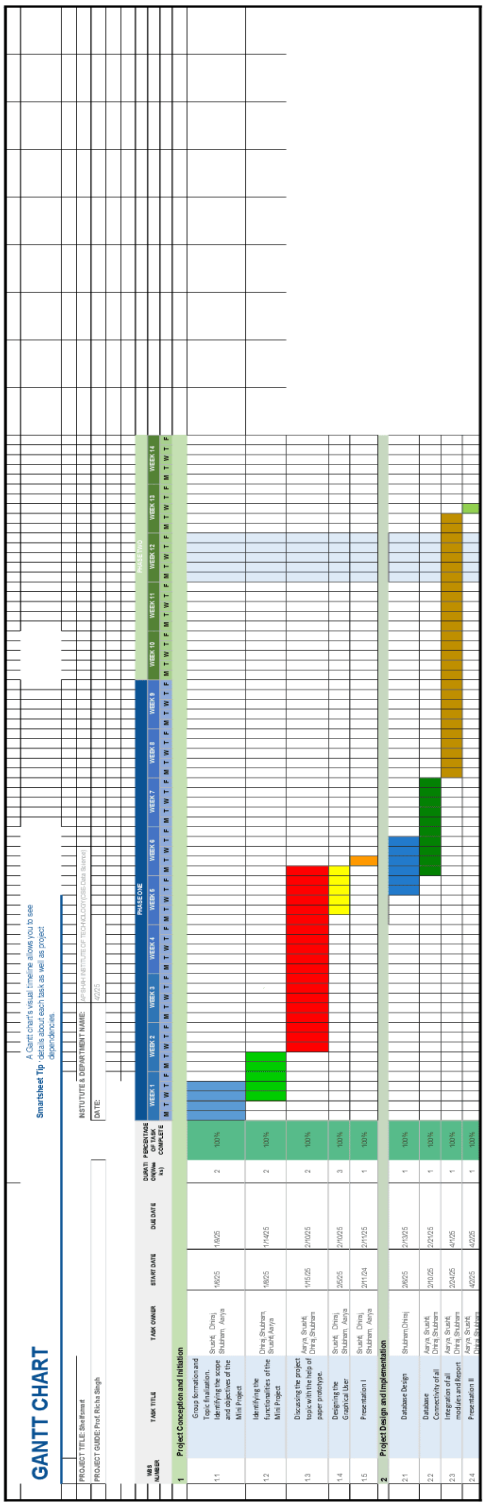

Figure 6.1 Gantt Chart

Chapter 7

Result

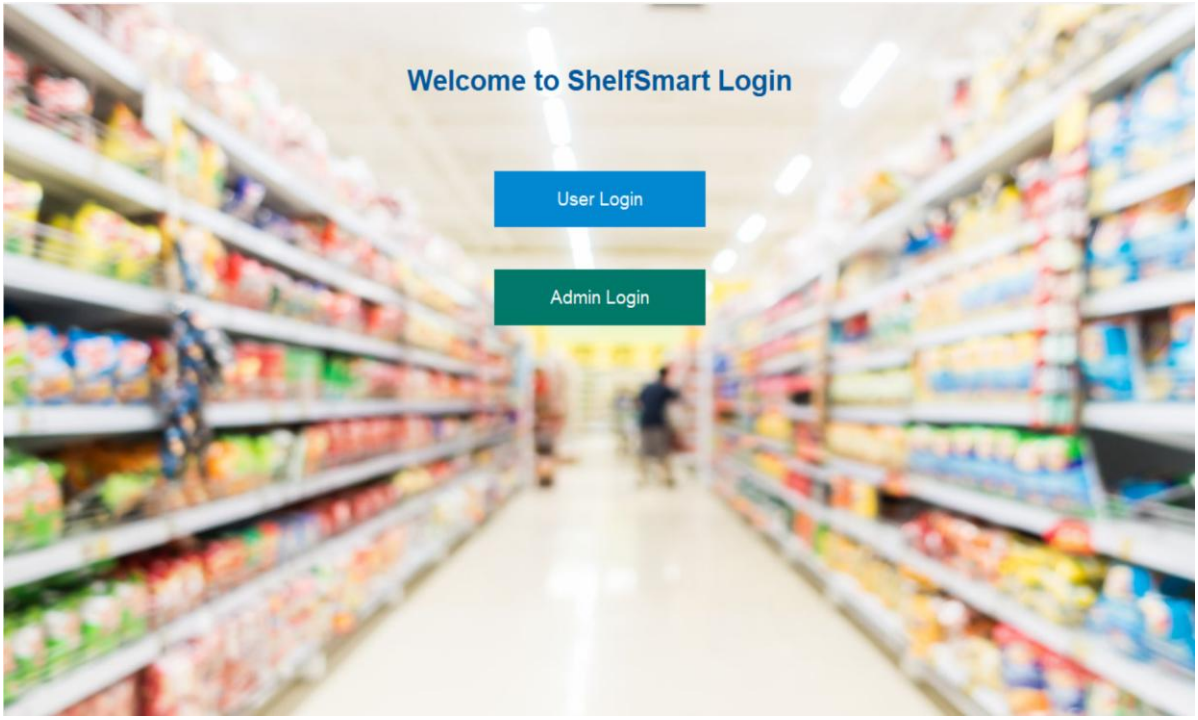

Figure 7.1

The figure 7.1 shows a Login Selection screen with User Login and Admin Login options for role-based access. Customers (users) can login through user login and Store owners (admin) can login through admin login.

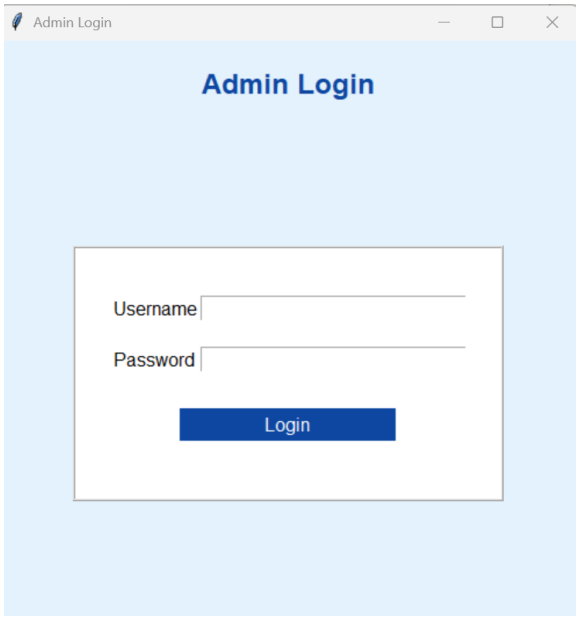

Figure 7.2

The figure 7.2 shows an Admin Login screen with fields for Username and Password, along with a green Login button. The simple interface is designed for administrator authentication, ensuring secure access to admin functionalities.

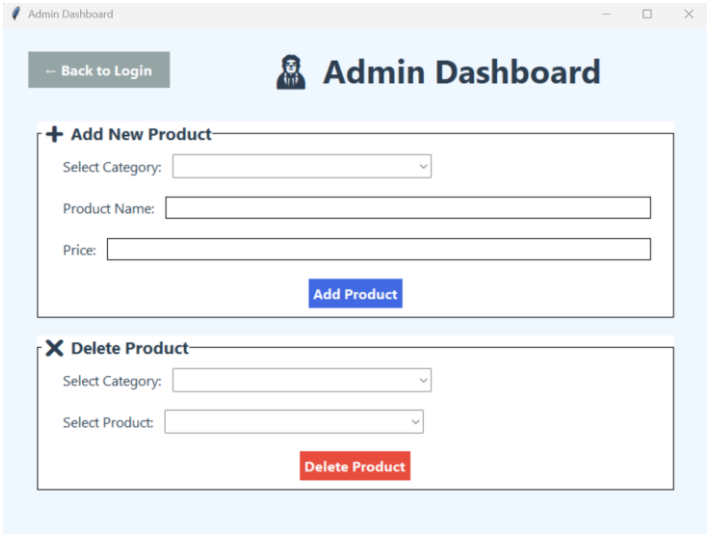

Figure 7.3

The figure 7.3 shows admin dashboard which have update, delete, add the data.

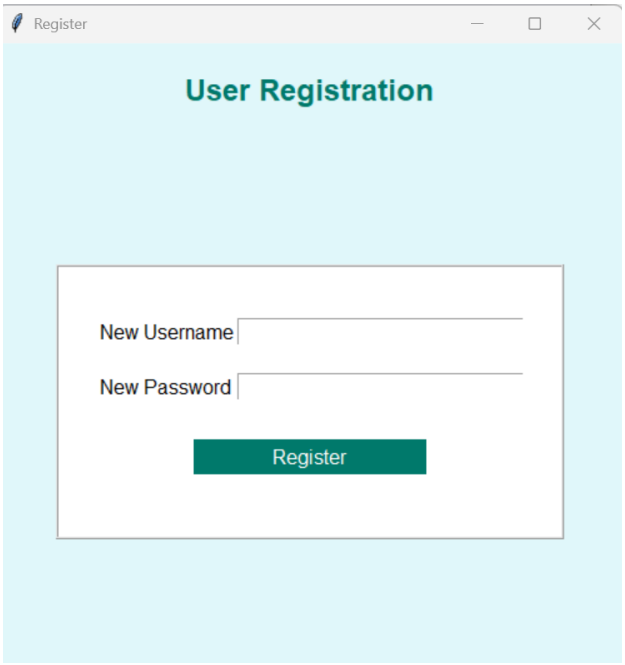

Figure 7.4

A figure 7.4 shows simple registration form with username, password fields, and a "Register" button Beakons,a gateway to a new account.

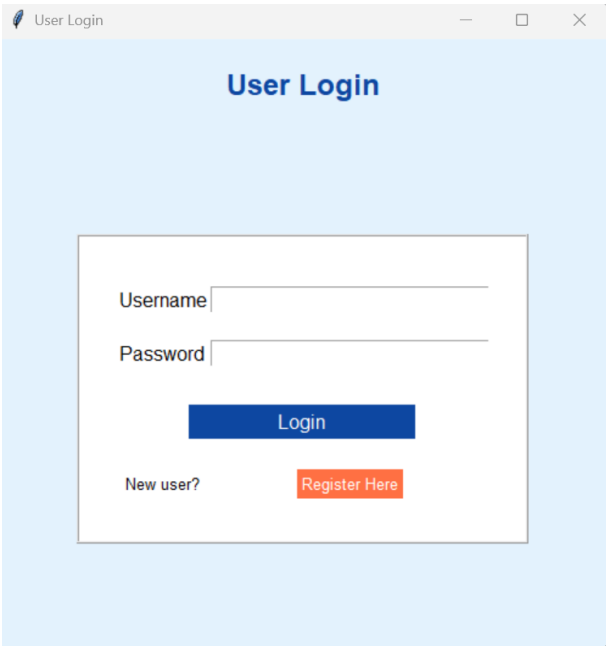

Figure 7.5

This figure 7.5 shows a rudimentary login form with basic input fields, a login button, and a link/button new users.

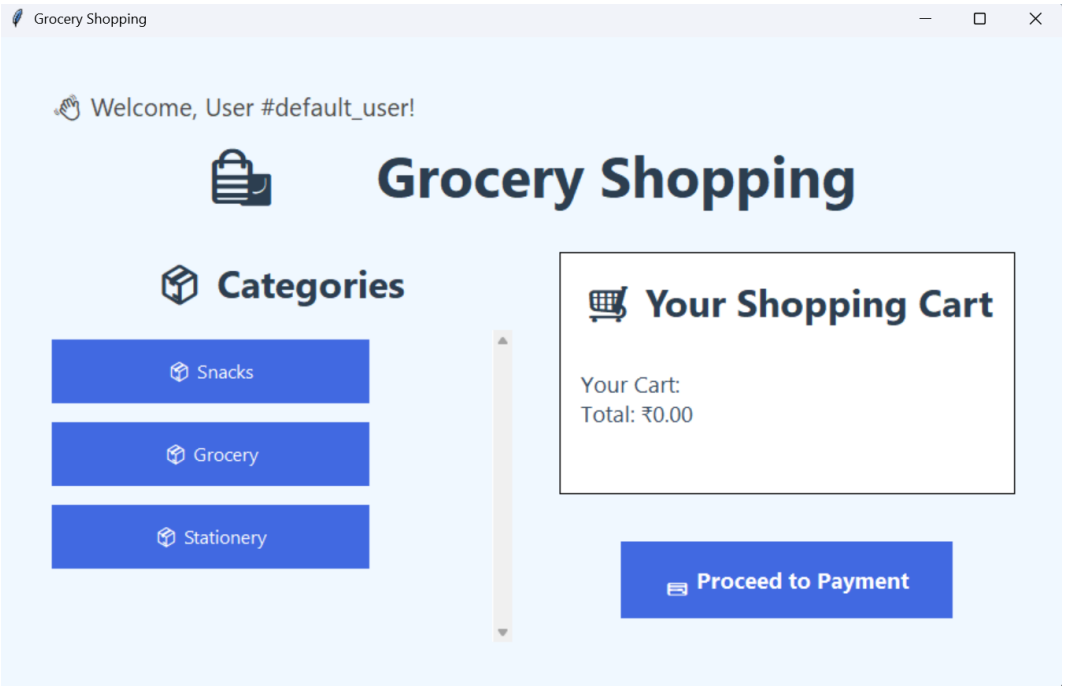

Figure 7.6

The figure 7.6 of shows interface mockup with category buttons, an empty shopping cart, and a "Proceed to Payment" button.

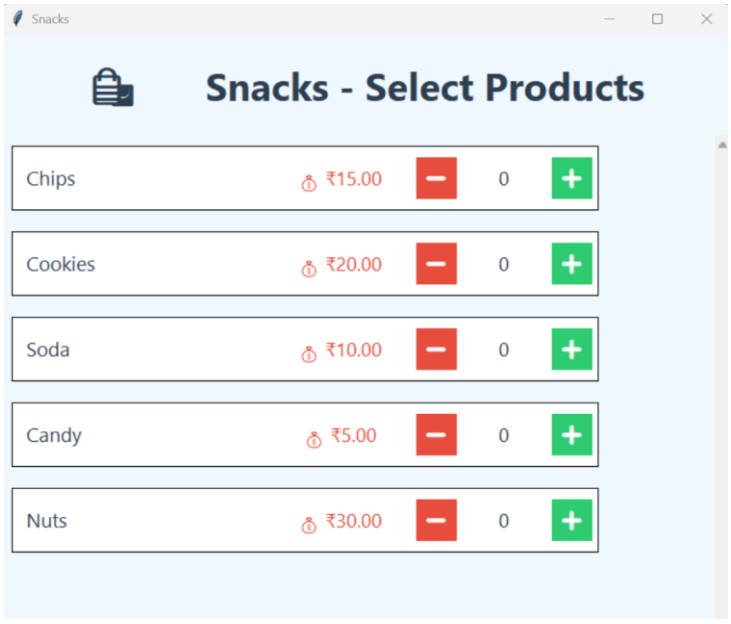

Figure 7.7

This figure 7.7 shows a UI mockup for selecting snacks with prices and quantity adjusters, featuring items like Chips, Cookies, Soda, Candy, and Nuts, and a "Close" button.

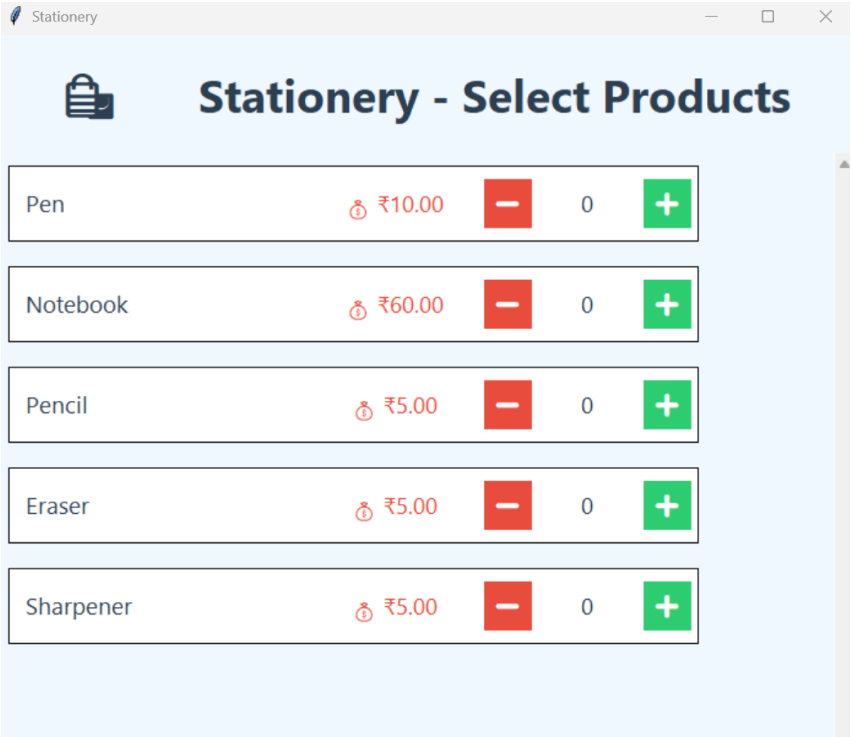

Figure 7.8

This figure 7.8 shows a UI mockup for selecting stationery products like pens, notebooks, pencils, erasers, and sharpeners, with prices and quantity adjusters, and a "Close" button.

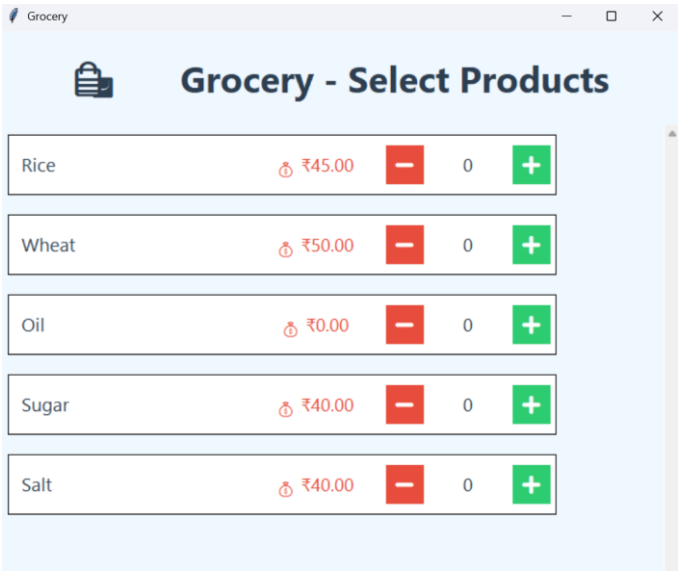

Figure 7.9

The figure 7.9 shows simple grocery selection interface displays items with prices and quantity adjustment controls.

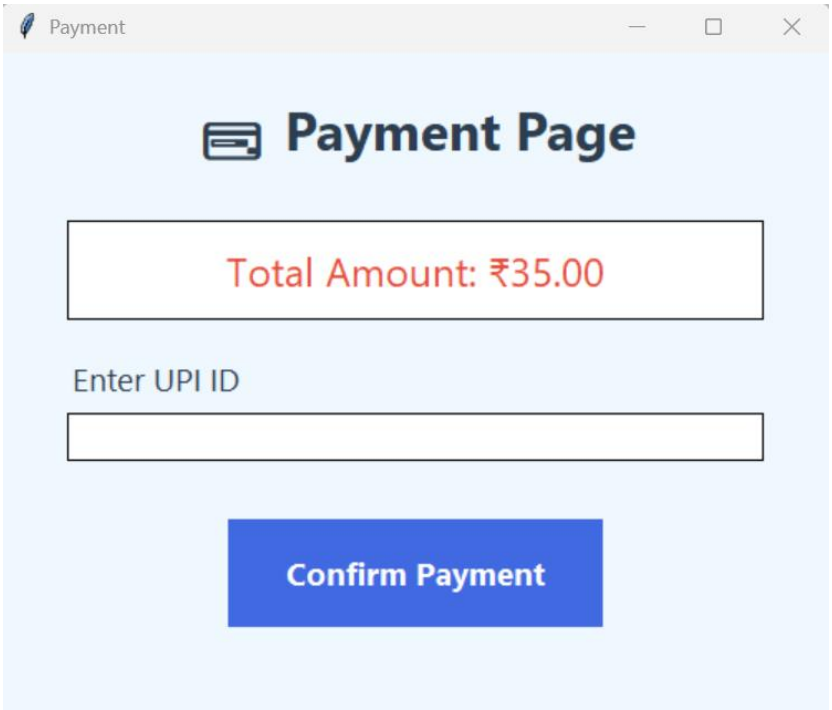

Figure 7.10

A figure 7.10 shows simple payment interface displays a total amount and requests a UPI ID for confirmation.

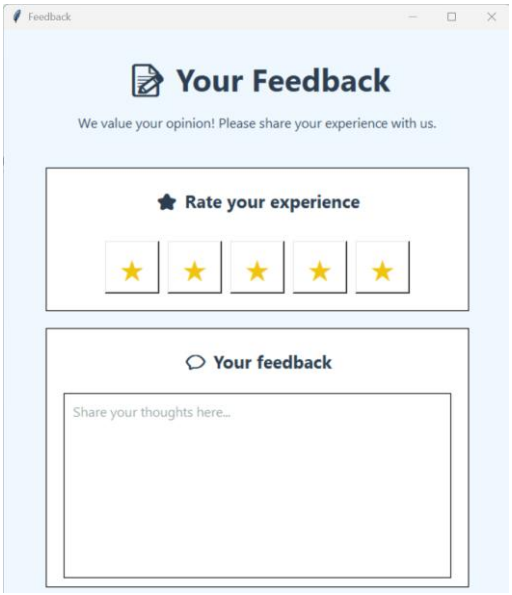

Figure 7.11

The figure 7.11 shows feedback form and user can rate the experience.

Chapter 8

Conclusion

The development and implementation of ShelfSmart, an advanced Inventory Management System, play a crucial role in optimizing supply chain operations and ensuring efficient stock management. As businesses face increasing challenges in maintaining accurate inventory levels, minimizing waste, and improving order fulfillment, the need for a smart, centralized, and user-friendly system becomes essential.

ShelfSmart provides a comprehensive solution by integrating real-time inventory tracking, automated stock alerts, demand forecasting, order management, and data analytics into a single platform. By enabling businesses to monitor stock levels, track product movement, and automate replenishment, ShelfSmart helps reduce stockouts, overstocking, and operational inefficiencies.

The system's AI-powered demand forecasting ensures businesses can anticipate inventory needs accurately, optimizing procurement and reducing costs. Additionally, automated restocking alerts enhance supply chain efficiency, preventing disruptions and improving customer satisfaction. With barcode and RFID integration, inventory updates are seamless and accurate, eliminating manual errors.

Furthermore, ShelfSmart's analytics dashboard provides actionable insights into sales trends, inventory turnover rates, and supplier performance, empowering businesses to make data-driven decisions. Its multi-location support allows centralized control over distributed warehouses and retail outlets, ensuring consistency across the supply chain.

By streamlining inventory operations, reducing losses, and improving overall efficiency, ShelfSmart contributes to better resource utilization and increased profitability, making it an essential tool for modern businesses.

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