INVENTORY MANAGEMENT SYSTEM

Higher National Diploma in Software Engineering

Final Project Documentation

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School of Computing and Engineering

National Institute of Business Management

Kandy

INVENTORY MANAGEMENT SYSTEM
FOR
A SUPER MARKET

Higher National Diploma in Software Engineering

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Date: ....

“ **The project is submitted in partial fulfillment of the requirement of the Higher National Diploma of Computer System Design of National Institute of Business Management**.”

Declaration

“I certify that this project does not incorporate without acknowledgement, any material previously submitted for a Diploma in any institution and to the best of my knowledge and belief ,it does not contain any material previously published or written by another person or myself except where due reference is made in the text. I also hereby give consent for my project report, if accepted, to be made available for photocopying and for interlibrary loans, and for the title and summary to be made available to outside organizations”

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Abstract

An Inventory Management System is an essential software solution that is designed to facilitate and speed up the control and management of stock within an organization. This process ensures that inventory is managed correctly, reduces errors due to manual work and enhances how the business operates. The purpose of implementing an inventory management system is to ensure that activities such as monitoring stocks, sorting items, handling orders and creating reports are neatly handled in one place.

This report presents detailed information about an Inventory Management System that allows real-time tracking, improves data entry and provides detailed inventory reports. Each item in the system is kept track of with an ID, its name, the quantity bought or sold, suppliers and all other vital information. Integration of features such as stock-in, stock-out and low-stock notifications with inventory auditing makes stock visibility and decision-making better.

With this system, managing inventory and keeping it secure and correct becomes easy for administrators and authorized users. It also makes it possible for companies to prevent overstocking, stockouts, inventory losses and achieve better results with money and resources. Because it offers in-depth reports, the system supports demand review, purchasing plan set up and perfect inventory balance. Adding Augmented Reality (AR) to the system means users can use their mobile devices to scan products and find out details right away, making the shopping experience more enjoyable.

By transitioning from manual to automated inventory control systems gives companies better accuracy, saves time and increases how productive they are. This system of managing inventory is adaptable and can meet the requirements of different organizations or departments, regardless of how big or small they are. Overall, the system makes sure inventory is properly managed, enhances the way operations are run and helps with planning and expanding the organization.

Acknowledgement

We would like to express our sincere gratitude to everyone who contributed to the successful completion of this project.

First and foremost, we extend our heartfelt thanks to our supervisor, Mr. Sandaruwan Herath, for his continuous guidance, valuable feedback, and unwavering support throughout the project. His expertise and insightful suggestions played a crucial role in refining our research and implementation.

We are also immensely grateful to the faculty and staff of the National Institute of Business Management, School of Computing and Engineering, for providing us with the resources and knowledge necessary to undertake this project.

A special mention to our families and friends for their continuous encouragement and support during this journey.

Lastly, we thank each team member for their dedication, hard work, and collaborative efforts that made this project a reality.

List of Key Words

Core Features:

- Inventory management – track and manage product inventory efficiently
- Real-time stock updates – ensure up-to-date stock levels across the system.
- Auto email restock – automatically sends restock request emails to suppliers.
- Combo offers – creates combo offers for least selling products.
- Sales analysis – monitor sales trends and performance with visual insights.
- Stock prediction – uses machine learning to forecast future stock needs.
- Low stock notifications – notifies the admin when product quantity is below limit
- Product filtering – enable efficient product search using filters.
- Monthly reports – generates monthly reports for inventory and sales.
- AR product details – views the products for customer experience

User Roles:

- Admin – manages inventory, sales data, users, and system configurations
- Customer – views product details, places orders, and tracks purchases
- Supplier – provides stock, receives restock emails, and updates delivery status

Functionalities:

- login authentication - secure user login for Admin, Customer
- Stock monitoring - real-time tracking of stock inflows and outflows
- Email automation - automatic emails for stock restocking and low-stock alerts
- Sales dashboard - graphical representation of sales data and analytics
- Predictive analytics - forecast future demand using machine learning models
- Notifications - alerts for low stock, new offers, and order status
- Search filter - refine product listings using category, price, or availability
- Reporting - monthly and custom reports for sales, orders, and inventory
- Augmented Reality - interactive AR product preview feature

Technical Aspects:

- Database - structured storage for products, users, orders, and sales.
- Web application - cross-platform web-based interface for users.
- User Interface - clean, intuitive, and role-based UI design.
- Responsive design - optimized for mobile, tablet, and desktop devices.
- Machine learning - integration for stock prediction and trend analysis.
- GitHub repository - version-controlled codebase for collaborative development.

Entities:

- Owner
- Warehouse Management
- Supplier
- Customer
- Product
- Order
- Sales
- ComboOffer
- Notification
- MachineLearningModel

Development Tools:

- Git/GitHub - version control and project collaboration.
- PlantUML - tool for drawing UML diagrams.
- Frontend - HTML, CSS, JavaScript (for UI and responsiveness.
- Backend - Python, Java, Node.js

Concepts:

- ER diagram - entity-relationship representation of system.
- Sequence diagram - interaction flow between users and system processes.
- DFD - flow of data across modules.

- UML - visual modeling of software structure.
- Version control - track code changes over time
- Collaborative development - team-based software development practices using Git

Pseudo codes:

Resembles the simplest version of the actual code segment.

Firebase:

Cloud-based platform which offers real-time databases, authentication, hosting and tools to accelerate web development

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List of Acronyms and abbreviations

Acronym/Abbreviation	Full Form	Description
AR	Augmented Reality	Technology enabling customers to view product details by scanning a .patt image.
DFD	Data Flow Diagram	A visual representation of data movement within the system.
ER	Entity-Relationship	Refers to the ER diagram depicting entities and their relationships.
ID	Identifier	A unique code or number assigned to entities (e.g., Product_id, Customer_id).
ML	Machine Learning	The technology is used for predicting future stock needs.
UI	User Interface	The visual layout and interaction design of the system, noted as responsive and user-friendly.
UML	Unified Modeling Language	A standard for creating system diagrams (e.g., use case, sequence, class diagrams).

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Chapter 1: Introduction

1.1 Introduction of the Organization

Inventory Management is important for a business to maintain the proper stock levels, reduce costs and identify for shortages of best-selling products and overstocking unnecessary products. Traditional method is not effective for this kind of business. It does not provide accurate results and is prone to errors. In this project we aim to overcome the traditional method and modernize the business using AI technology. Using this technology, a real-time inventory stock checking system with smart prediction is created. AI helps to improve business operations. We have decided to use several programming languages to automate the system and provide an accurate, proper, efficient and reliable automated Inventory Management System. This approach helps to resolve the shortcomings of traditional methods, reduce errors, and save time.

1.2 Organization Structure

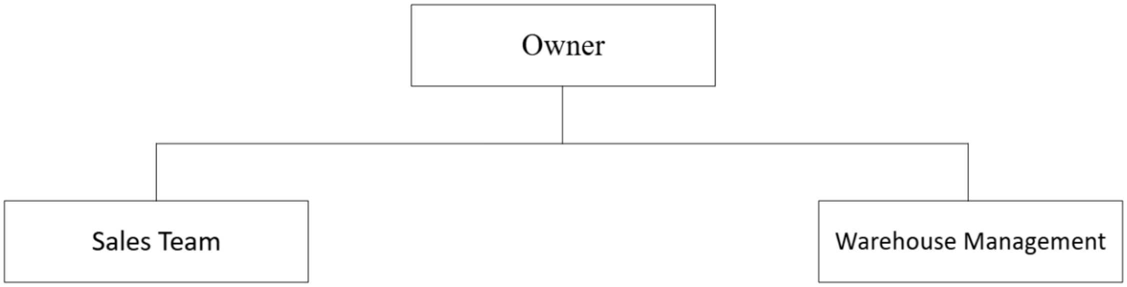


Figure 1 - Organization Structure

Owner: Oversees overall operations, strategic planning, financial and legal management.

Warehouse Manager: Manages product sales tracking, advertising and shares stock insights with the warehouse

Sales team: Manges the product sales tracking, advertising and shares stock insights with the warehouse

1.3 Current Operations in Organization.

Currently, the organization relies on a traditional manual system to manage its inventory operations. This involves manually counting all product stock items, The process is labor-intensive, time-consuming, and highly prone to human errors, such as miscounts, data omissions, or outdated information.

- Delayed Decision-Making: Without real time data, business decisions regarding reordering, sales promotions, or stock adjustments are based on outdated information.
- Inaccurate Stock Records: Human errors during manual counting can lead to discrepancies between actual stock and recorded data.
- Overstocking or Understocking: The inability to track stock levels accurately in real-time can lead to purchasing excess inventory or failing to reorder essential products on time, causing lost sales or increased holding costs.
- Inefficiency in Operations: Employees spend a considerable amount of time performing manual counts and updating records, which reduces productivity and increases operational costs.
- Limited Forecasting and Reporting: With limited and infrequent data, the organization struggles to analyze trends, predict demand, or plan effectively for the future

1.4 Users and Responsibilities of Organization.

Inventory Management Business individuals play different roles and have specific responsibilities. Organization can be broadly categorized into two groups, which is internal users and external users.

Internal users:

These are individuals who work within the organization and have access to its systems and resources. Internal users can be further divided into different categories based on their roles and responsibilities, such as:

1. Owner: Maintain entire Organization of the company and take full Responsibilities of the organization. Financial support and legal issues solving, etc.

2. Warehouse Management: Work under company vision and mission to achieve company goals. Give their hard work to improve the company. overseeing inventory levels and generating stock reports.

3. Sales: Monitor what products are being sold and how much stock is being used and

advertisement. Help to warehouse.

External users:

These are individuals who interact with the organization but do not work within it. External users can be further divided into different categories based on their relationship with the organization.

1. Customer: A person who needs a product to Buy for their day today life needs. Approach some kind of feedback to improve the company.

2. Suppliers: Those who supply needed products for the business. They help to improve the business with lend the products.

1.5 Problem Definition

The current inventory management system in the organization is based on a traditional manual approach, which presents numerous operational challenges. Inventory stock levels are counted manually and updated into records only once a month, making the process highly time-consuming and inefficient. This method is prone to human errors, such as miscounts and data entry mistakes, leading to inaccurate stock records. As a result, the organization often experiences issues like overstocking or understocking of products, which can waste resources, increase costs, or cause missed sales opportunities. The lack of real-time data makes it difficult to forecast future demand or make informed decisions, ultimately limiting the company's ability to plan and grow effectively. Additionally, the outdated system restricts responsiveness and scalability, creating obstacles in adapting to market changes and customer needs. Overall, the manual inventory management method significantly affects business accuracy, efficiency, and long-term improvement.

1.6 Project Objectives

Integrating AI to analyze the sales data and the trends.

Enabling the system to automatically create promotional combo offers by combining the most selling and least selling products, based on the stock data and sales history.

Automatic offer generation which integrates a functionality where the system automatically combines two products into a promotional combo offer.

When the product quantity falls below it auto generates a message to supplier ensuring the timely restocking.

User friendly Dashboard for easy-to-use sales management.

Minimize manual input and reduce risk of human error, thereby lowering the operational cost and increasing the overall efficiency of inventory control.

Customers use mobile cameras and scan product details(AR).

1.7 Proposed Solution

To address the challenges of the current manual inventory management system, we propose the development and implementation of an AI-powered Inventory Management System. This modernized solution is designed to replace the traditional methods with a smart, automated approach that significantly enhances operational efficiency and accuracy.

The system will utilize AI-driven analytics to evaluate historical sales data and predict future stock requirements. By identifying the most selling and least selling products, the system can automatically generate promotional combo offers, strategically combining items to boost sales and manage inventory more effectively. This feature not only helps increase revenue but also reduces the risk of overstocking and understocking, which can lead to unnecessary costs or missed sales opportunities.

Additionally, the system will include a real-time stock monitoring module that triggers automated restock alerts to suppliers whenever inventory levels fall below a predefined threshold. This ensures timely replenishment and prevents inventory shortages.

A user-friendly dashboard will provide an intuitive interface for staff to monitor inventory, view sales insights, manage combo offers, and track restock alerts, thereby simplifying the management process. The automation of stock counting and reporting will reduce manual labor, minimize human errors, and save time, ultimately lowering operational costs.

In summary, this AI-based solution offers a smart, efficient, and scalable way to manage inventory, helping the business make accurate, data-driven decisions and remain competitive in a fast-paced market.

1.8 Chapter Summery

This chapter provided an overview of the organization and the limitations of its current inventory management system, which relies heavily on manual processes. It highlighted key operational challenges such as time delays, human errors, and inaccuracies caused by monthly stock updates and manual data entry. These issues often result in overstocking or understocking of products, inefficient resource usage, and hindered business growth due to poor forecasting capabilities. The chapter also described the roles and responsibilities of internal users, including the owner, warehouse management, and the sales team, as well as external users such as suppliers and customers. To address these challenges, the chapter proposed an AI-powered inventory management solution that integrates predictive analytics, automated combo offer generation, and real-time stock monitoring. This smart system aims to reduce human error, improve inventory accuracy, generate timely supplier alerts, and enhance overall business efficiency through a user-friendly dashboard. By modernizing the traditional approach, the proposed solution supports better decision-making and sets the foundation for a more responsive and scalable inventory management process.

Chapter 2: Methodology

2.1 Introduction

This project aims to develop a smart, AI-powered Inventory Management System that automates and streamlines the inventory operations of the organization. The goal is to eliminate the inefficiencies of the current manual system such as time delays, human errors, and inaccurate stock tracking by replacing it with a more reliable and intelligent solution. The proposed system will integrate real-time inventory tracking, automated combo offer generation, and AI-based predictions to enhance decision-making and reduce operational costs.

The system is designed to support multiple user roles, including the owner, warehouse staff, and sales team, each with tailored access to functionalities based on their responsibilities. All essential inventory information, such as product names, quantities, sales history, and stock levels, will be stored in a centralized database that can be accessed securely by authorized users. The methodology outlines how data was gathered, what development tools were used, and the steps taken to ensure the system is functional, user-friendly, and efficient in managing day-to-day stock operations.

2.2 Data Collection Methods

The system incorporates various methods to gather essential information, ensuring accuracy and reliability.

1. Manual Data Collection: Involves physically gathering project documents, surveys, and collaborative inputs.
2. Automated Data Collection: system-integrated data on labor, resources, environment, and materials.

3. Data Mining: Existing facial image datasets from public databases or social media platforms become valuable resources. Machine learning algorithms are. then applied to identify individuals within these images, enriching the systems. recognition capabilities through a data-driven approach.
4. Interviews: Conducted with warehouse managers and Sales staff to understand current processes.
5. Observation: Observed inventory operations to identify problems and needs.
6. Document Analysis: Reviewed existing inventory logs and sales records.
7. Questionnaires: Distributed to staff for feedback on existing systems.

2.3 Software Process Model

We have decided to use the Agile model as our software process model. The company has requested to collaborate with our team to ensure that every step of the process aligns with their needs and expectations. To work effectively, we plan to split the project into smaller parts so that team members can work separately and be more efficient.

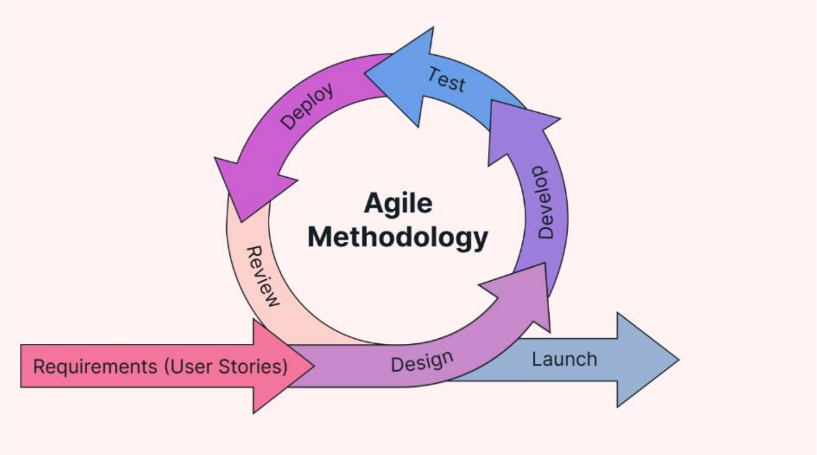


Figure 2 - Agile Model

2.4 Software Development Tools

Fronted development

- HTML
- CSS
- JavaScript
- ReactJS

Backend development

- Python

Database connection

- Firebase

AI Tools

- Flask
- Scikit-learn.

2.5 Testing Strategies

Once the system has been designed and developed, we use rigorous testing procedures to evaluate its performance. These testing strategies are crucial to ensure accuracy, reliability, and seamless functionality. Here are several testing strategies commonly employed in such systems.

1. Unit Testing: JUnit for backend logic.

2. Integration Testing: communication between IoT devices and backend.

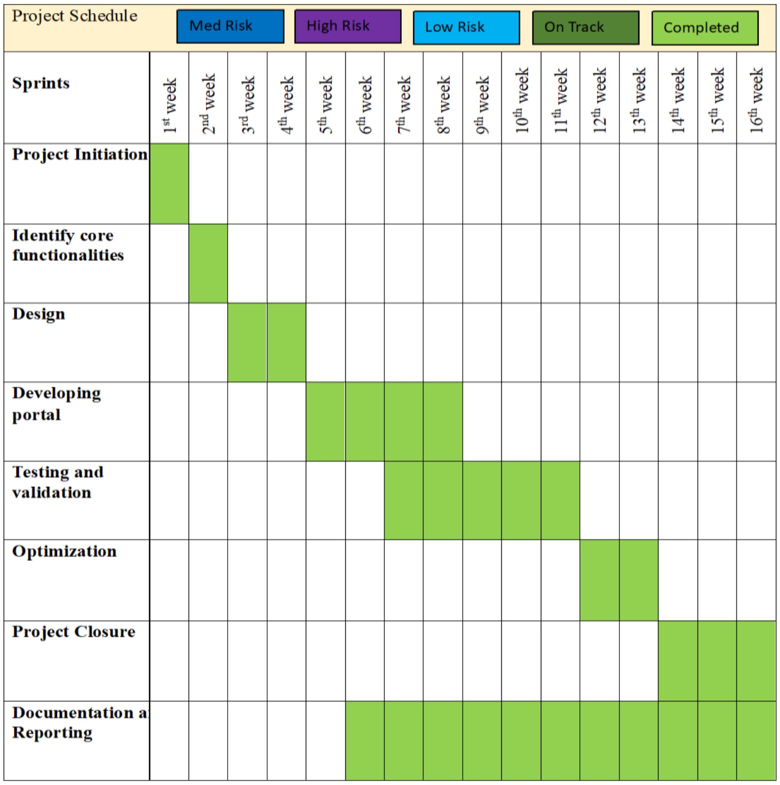
3. System Testing: Validating complete workflows.

4. User Acceptance Testing: Feedback from end-users to ensure usability.

The main purpose of unit testing is to identify whether the system functionally is working perfectly. Hence each button in the system is tested to ensure its functionality. Unit testing has proven its value to identify errors and issues of a system. The entire software was tested during the software testing phase to follow the requirements of the scope of the project which started in the first phase of the methodology.

2.6 Implementation Plan

Our implementation plan follows the Agile model, which emphasizes collaboration and adaptability. We will break the project into smaller parts, allowing team members to work independently and efficiently. Regular meetings with the company will ensure alignment with their needs and expectations throughout the process. This approach will enable us to deliver a final product that meets their requirements and fosters effective communication.



Project Schedule | Med Risk | High Risk | Low Risk | On Track | Completed

Sprints	1st week	2nd week	3rd week	4th week	5th week	6th week	7th week	8th week	9th week	10th week	11th week	12th week	13th week	14th week	15th week	16th week
Project Initiation	🟩															
Identify core functionalities		🟩														
Design			🟩	🟩												
Developing portal					🟩	🟩	🟩	🟩								
Testing and validation							🟩	🟩	🟩	🟩	🟩					
Optimization												🟩	🟩			
Project Closure														🟩	🟩	🟩
Documentation a Reporting						🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩

Table 1 - Implementation Plan

2.7 Chapter Summery

In the methodology chapter, we outline our approach for developing the Inventory Management System. To gather comprehensive requirements, we conducted interviews with warehouse managers and held discussions with employees. Observations at the organization provided valuable insights into their data collection processes. We chose agile model as our Software process model to effectively collaborate with the company. The project will be divided into smaller parts to ensure efficient work. For Development, we will be using HTML/CSS, JavaScript, Python, Java, MySQL, and TensorFlow as our software development tools. Our testing strategies involved bug identification. This comprehensive methodology ensures alignment with company's inventory management goals and supports efficient processes.

Chapter 3: Analysis

3.1 Introduction

In this chapter, we aim to analyze the inventory Management system we're implementing using various types of diagrams. These diagrams will help us visually represent the different aspects and functionalities of the system. By using diagrams such as flowcharts, entity-relationship diagrams, and case diagrams, we can provide a clear understanding of how the systems work and their interactions with different components. This analysis will enhance the report by providing visual aids that complement the written explanations, making it easier for readers to grasp the stock maintenance system's architecture and functionality.

This analysis is crucial step towards modernizing stock management operations, boosting efficiency, and addressing limitations of the existing manual system. It aligns with the company's long-term goals.

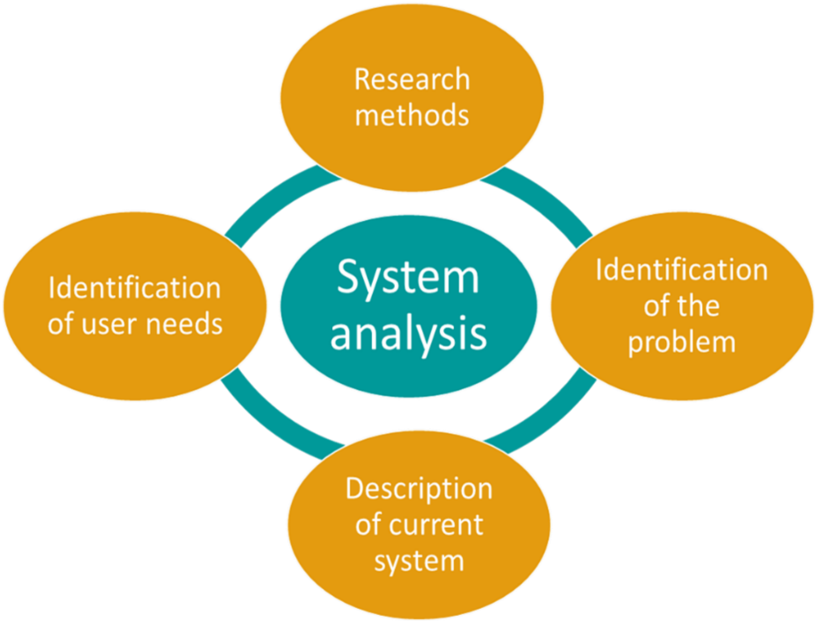

Research methods
Identification of user needs
System analysis
Identification of the problem
Description of current system

Figure 3 - System Analysis Method

3.2 UML Diagram

Use Case Diagram of Current System

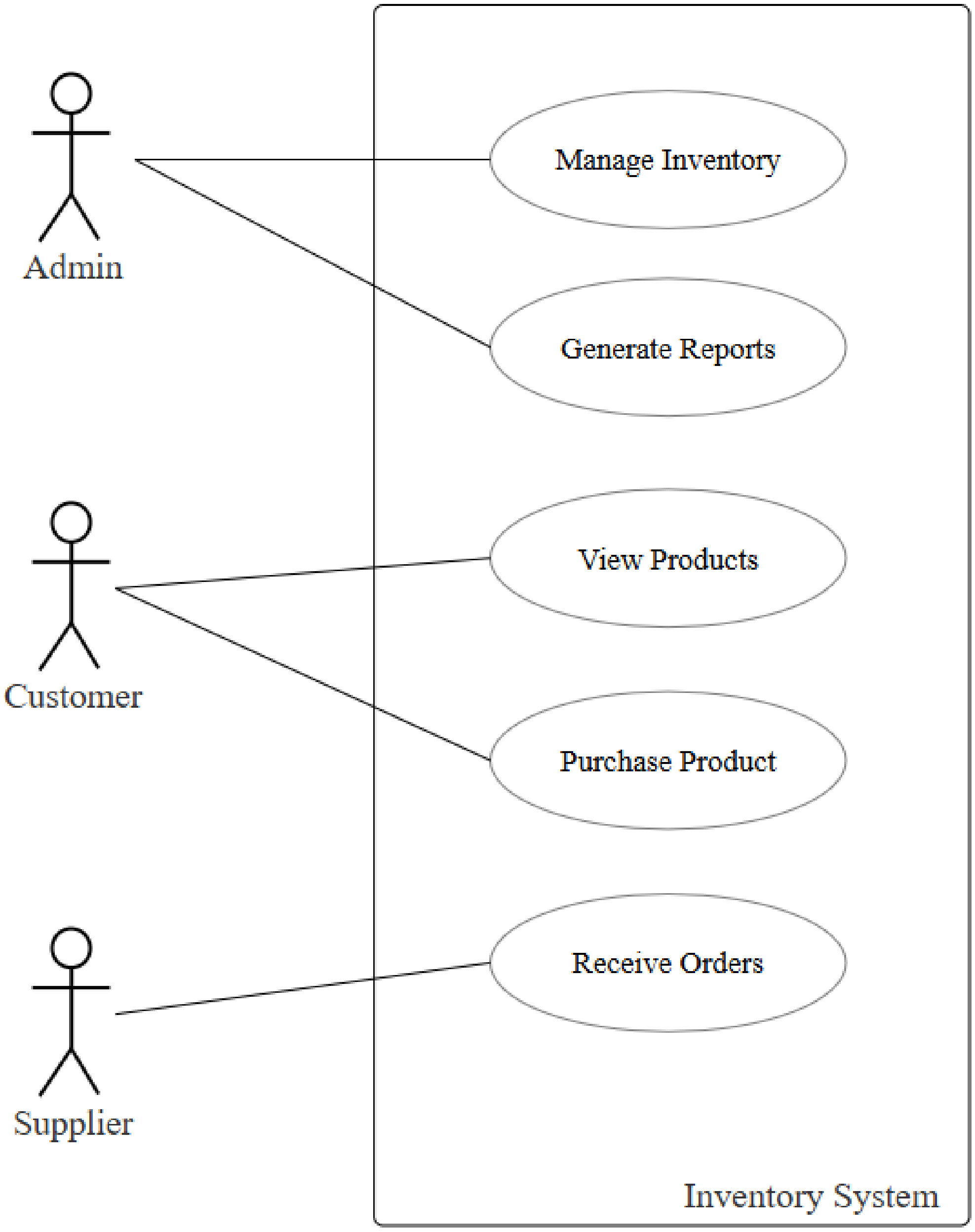


Figure 4 - Use Case diagram of Current System

Use case Diagram of Proposed System

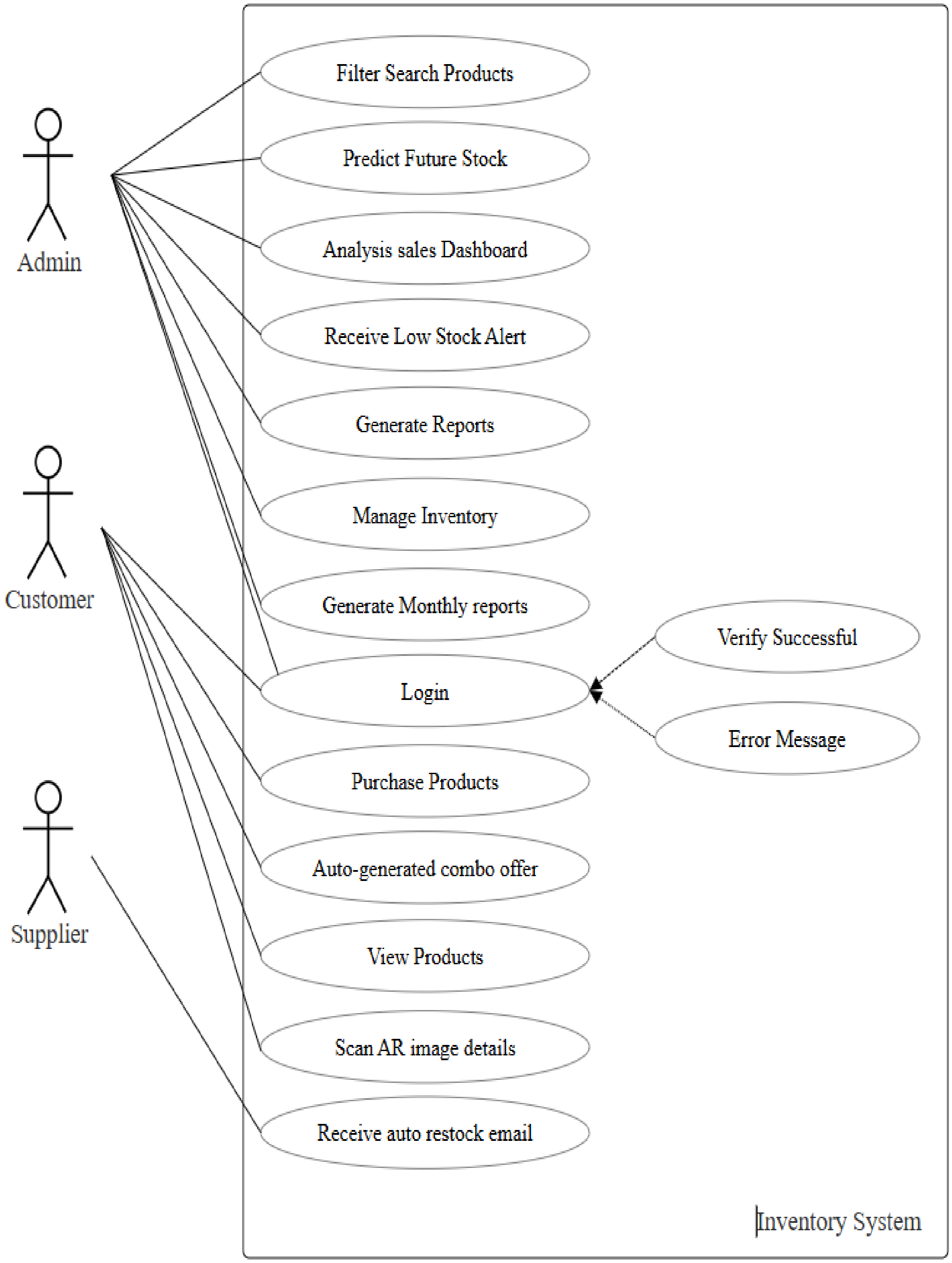


Figure 5 - Use case diagram of proposed system

Class Diagram of Proposed System

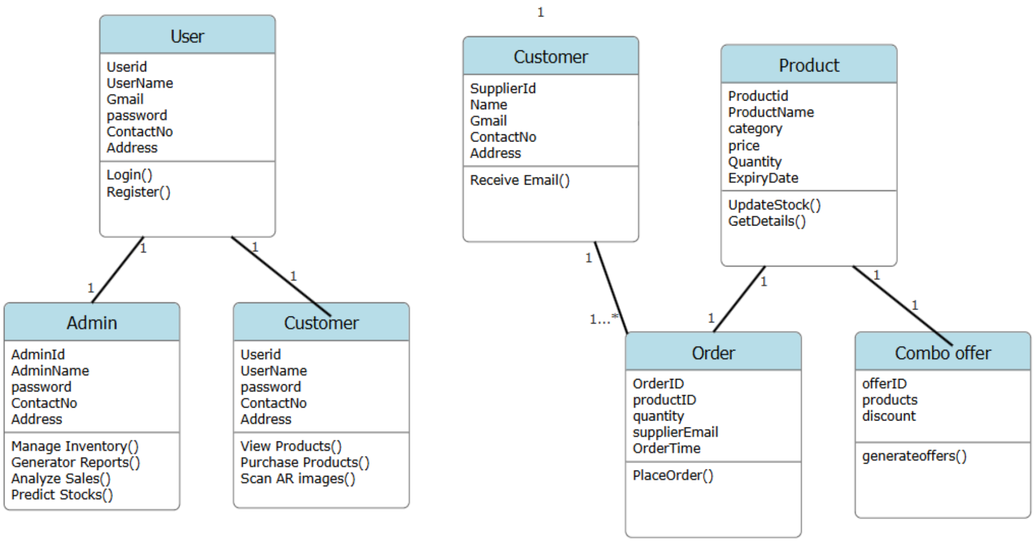


Figure 6 - Class diagram of proposed system

Sequence Diagrams for Proposed System

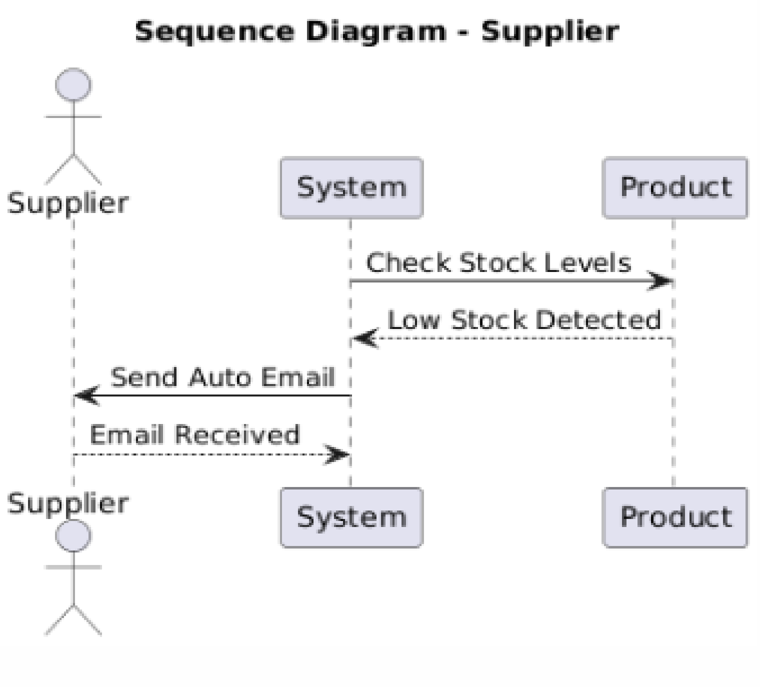


Figure 7 - Sequence diagram of supplier

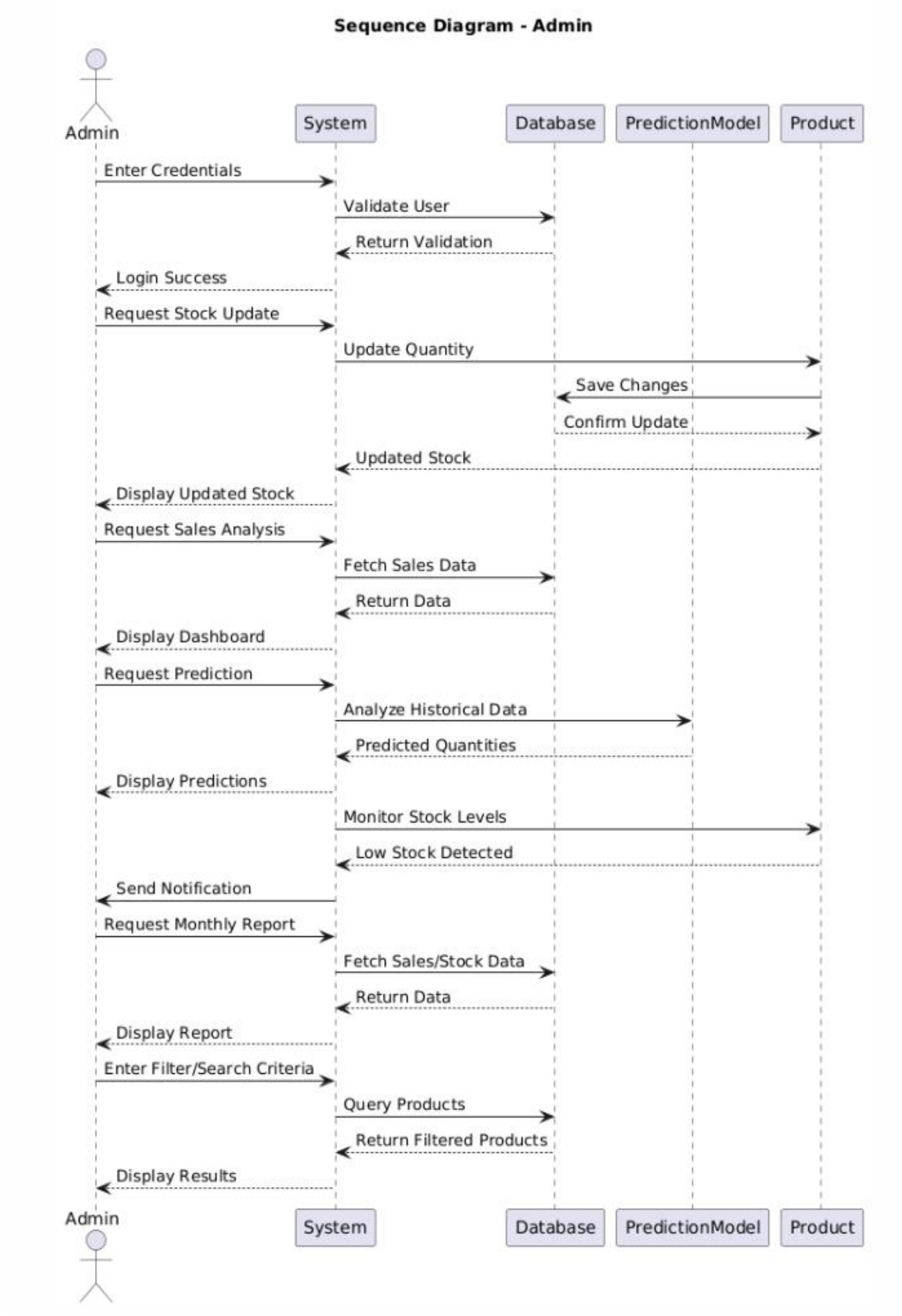


Figure 8 - Sequence diagram of Admin

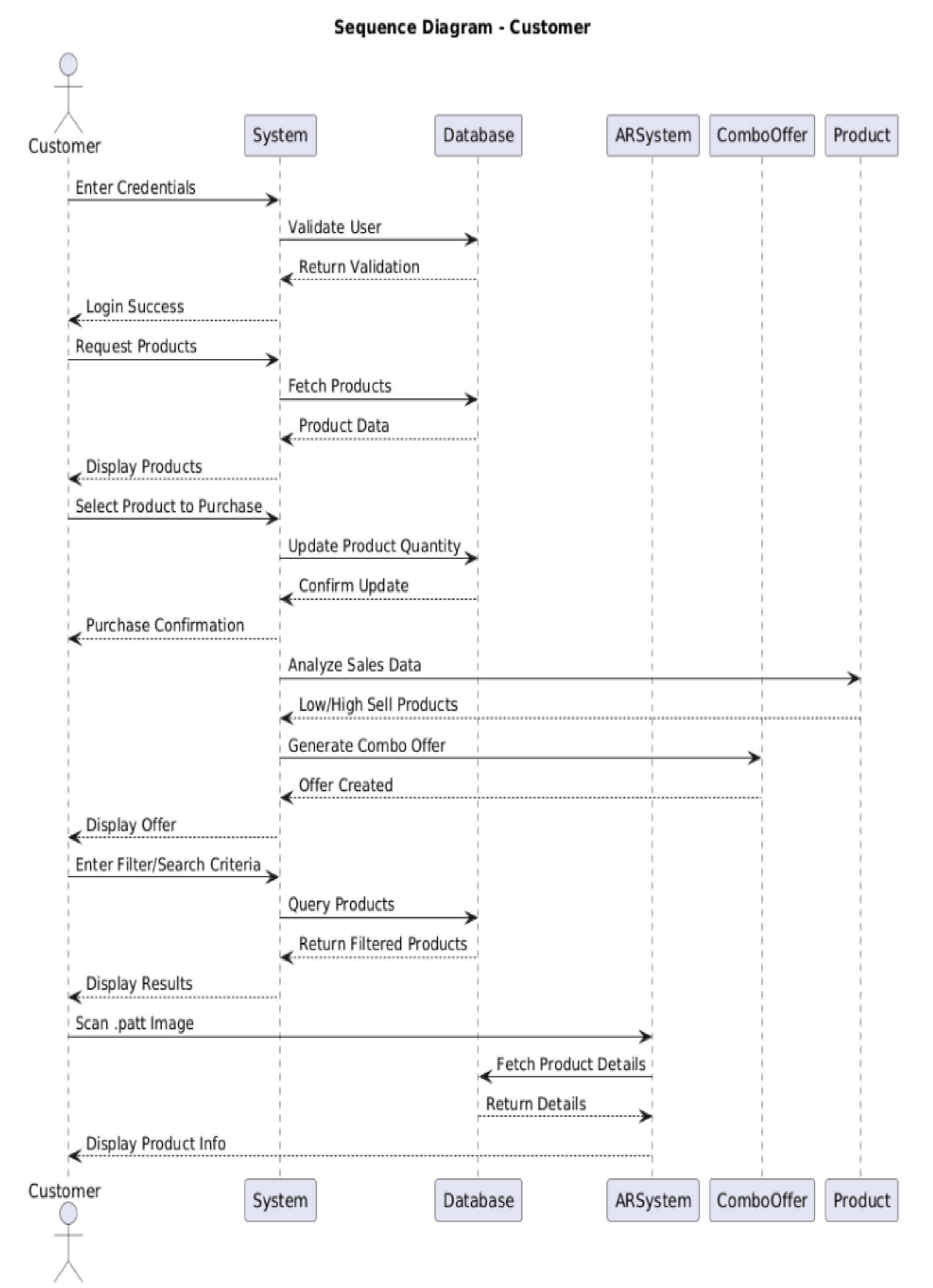


Figure 9 - Sequence diagram of Customer

3.3 ER Diagram of the Proposed System

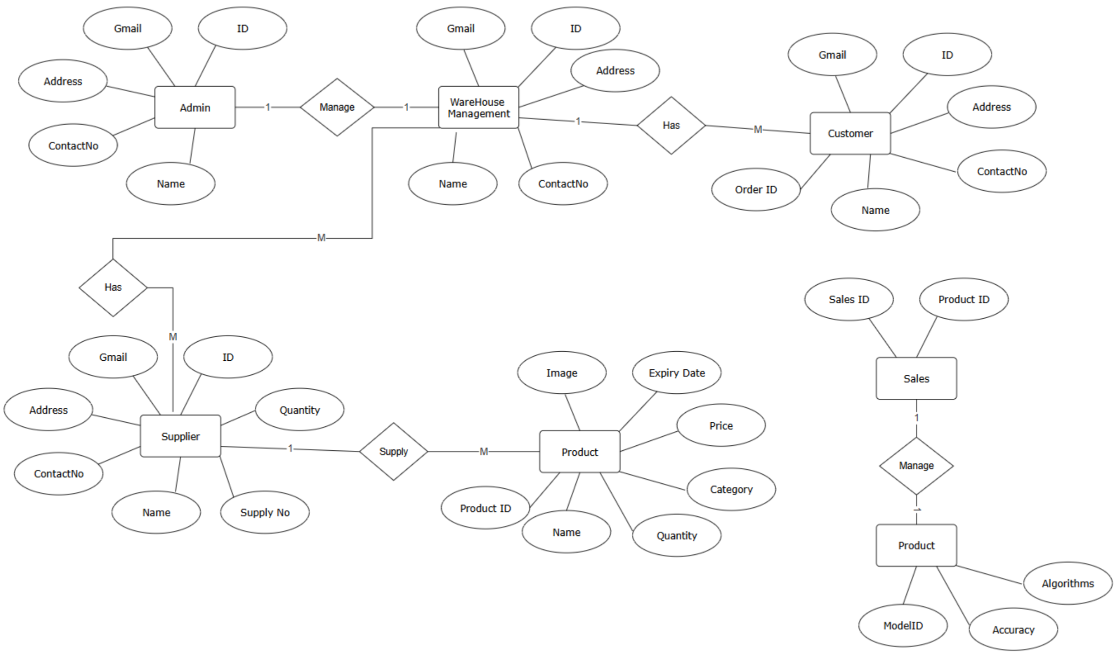


Figure 10 - ER diagram of proposed system

3.4 Chapter Summery

In this chapter, we go through the visual representations and analysis of the proposed Inventory Management System. By utilizing various diagrams and models, we aim to provide a comprehensive understanding of the system's functionality and its potential impact on addressing challenges.

- Use Case Diagram: Illustrates the system's functionalities and the interactions between actors and the system.
- Class Diagram: Provides a structural overview of the system, including its classes, attributes, and relationships.
- Sequence Diagram: Demonstrates the step-by-step flow of events for key scenarios, such as login, employee dashboard and admin dashboard.
- Entity-Relationship Diagram: Presents the data model for the proposed system, showcasing the relationship between entities.

By presenting the visual representations, we aim to provide a comprehensive analysis of the proposed Stock Maintenance System and its potential benefits for the company.

Chapter 4: Solution Design

4.1 Introduction

This chapter provides an in-depth exploration of the user interfaces, pseudo codes, and database design implemented in our system. It aims to provide a comprehensive understanding of the visual aspects, logical flow, and data structure that drive our system.

This chapter provides a thorough exploration of the below three key components.

- User Interface: The main way users interact with our system.
- Pseudo Codes: Provide a simplified representation of the system’s logic.
- Database Structure: Essential for efficient data organization and storage.

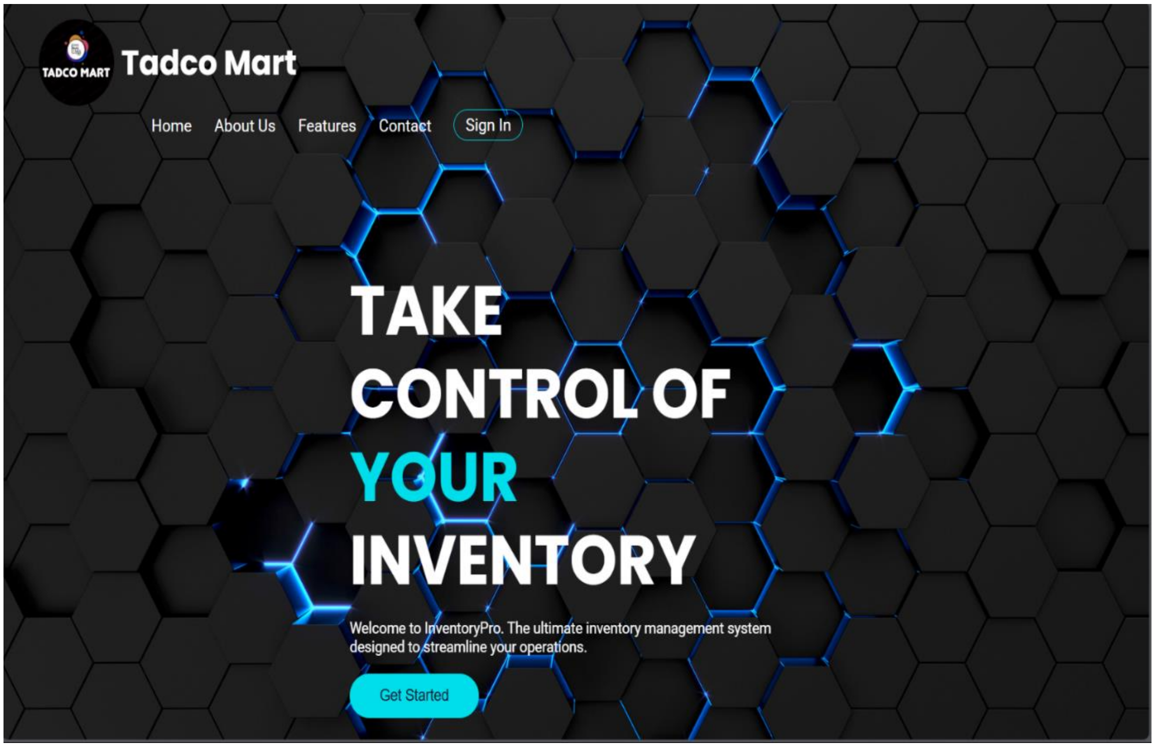
4.2 Interface Design

Interface ID : 01

Interface Name : Index.html

Interface Description : Landing Page of the Website

Interface Design :



TAKE CONTROL OF YOUR INVENTORY

Welcome to InventoryPro. The ultimate inventory management system designed to streamline your operations.

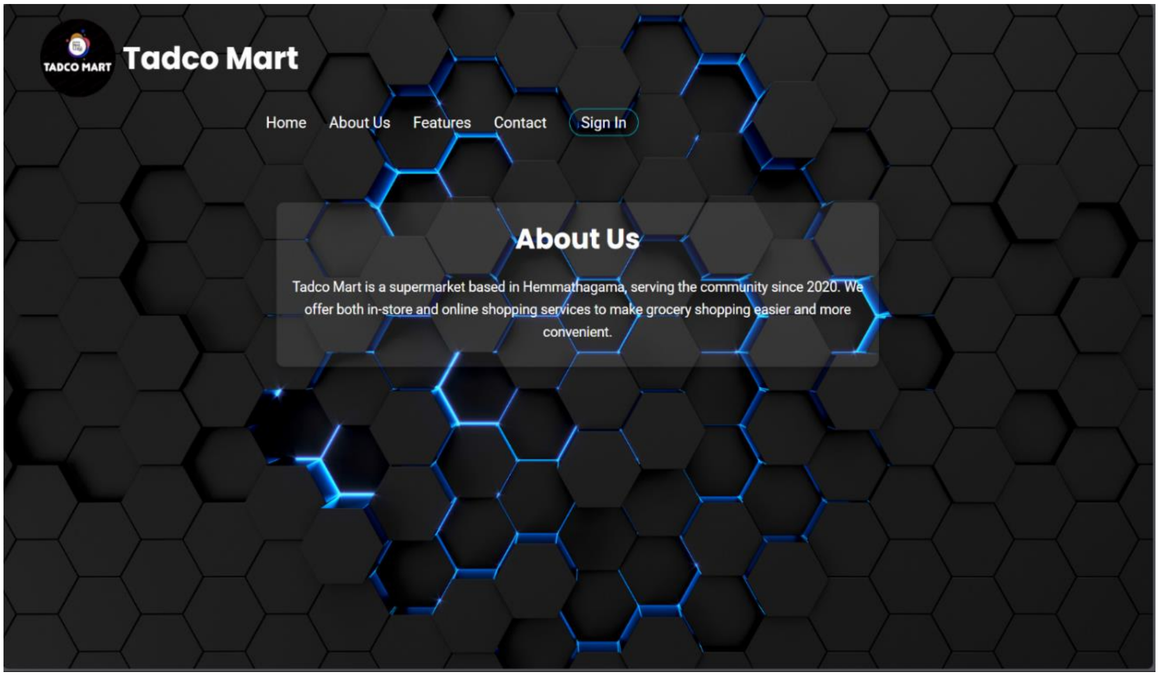
Figure 11 - Landing page of the website

Interface ID : 02

Interface Name : index.html

Interface Description : Landing page Company Details

Interface Design :



About Us

Tadco Mart is a supermarket based in Hemmathagama, serving the community since 2020. We offer both in-store and online shopping services to make grocery shopping easier and more convenient.

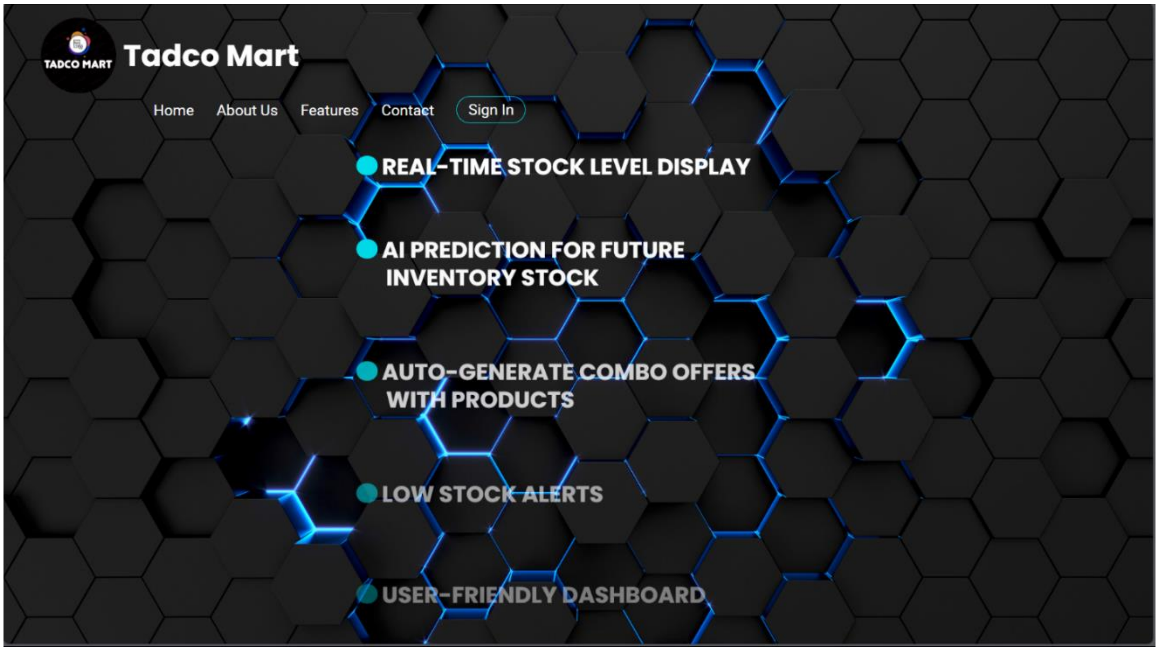
Figure 12 - Landing page of Company Details

Interface ID : 03

Interface Name : index.html

Interface Description : Company Providing feature details.

Interface Design :



- REAL-TIME STOCK LEVEL DISPLAY
- AI PREDICTION FOR FUTURE INVENTORY STOCK
- AUTO-GENERATE COMBO OFFERS WITH PRODUCTS
- LOW STOCK ALERTS
- USER-FRIENDLY DASHBOARD

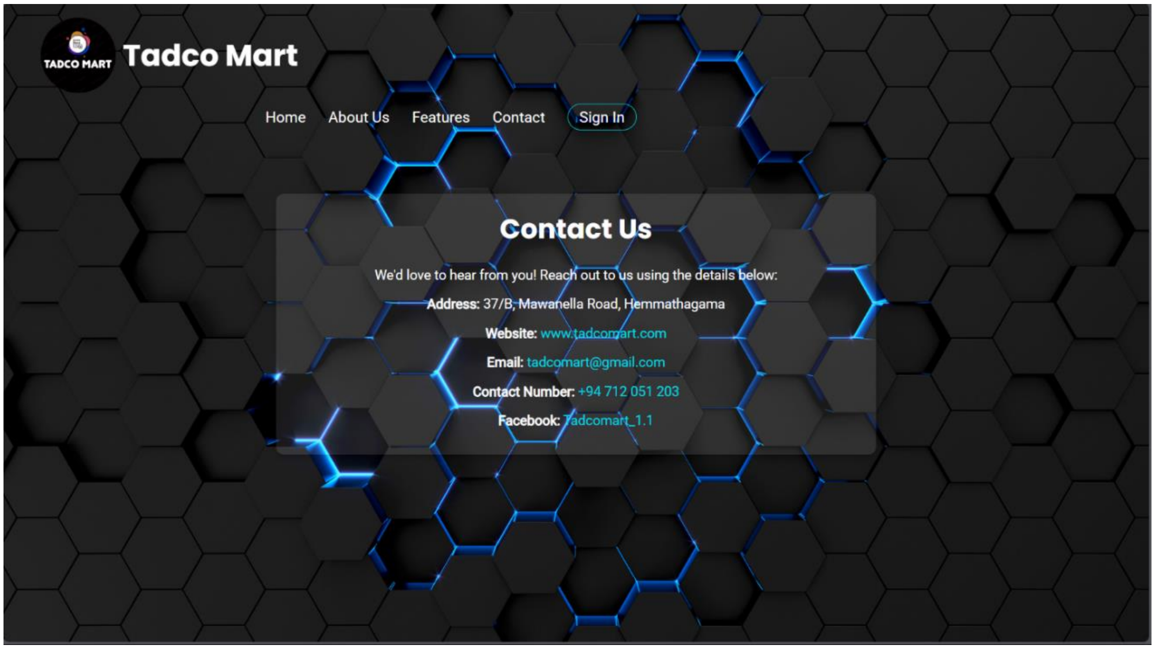
Figure 13 – Company providing feature details

Interface ID : 04

Interface Name : index.html

Interface Description : Display the contact details to communicate with company

Interface Design :



Contact Us

We'd love to hear from you! Reach out to us using the details below:

Address: 37/B, Mawanella Road, Hemmathagama

Website: www.tadcomart.com

Email: tadcomart@gmail.com

Contact Number: +94 712 051 203

Facebook: Tadcomart_1.1

Figure 14 - Display the contact details to communicate with company

Pseudocode:

```
Start
// Single Landing page of the Tadcomart company website
//Inputs: button click events    //Output: Load and display the details

Start
If click the Getstarted button
        Load the login  page (Login.html)
```

```
End if
If click the Home button
    Load the Home container details landing page.
End if
If click the About us button
    Load the About us container details in the landing page.
End if
If click the features button
    Load the features container details landing page.
End if
If click the contact us button
    Load the contact us container details landing page.
End if
If click the login button
    Load the login  page (Login.html)
End if
END
```

Interface ID	: 05
Interface Name	: Login.html
Interface Description	: Customer Or Admin login form
Interface Design	:

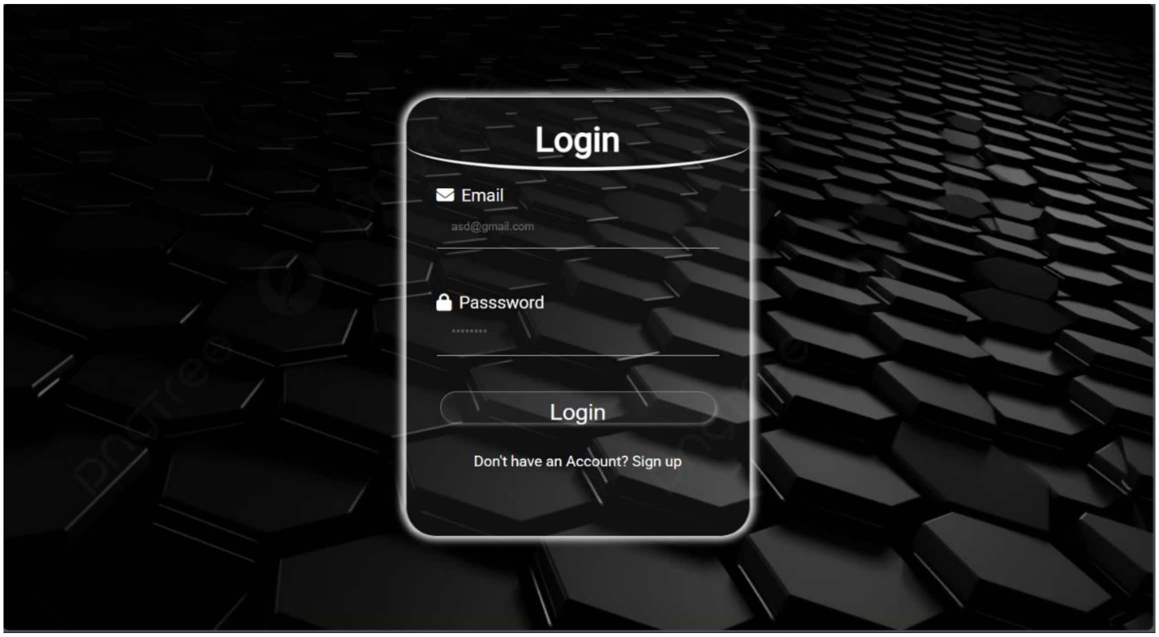


Figure 15 - User Or Admin login form

Pseudocode:

```
Start

// Login page for user and admin check with type

//Inputs: Email, password.

//Output: login to the system


Start
```

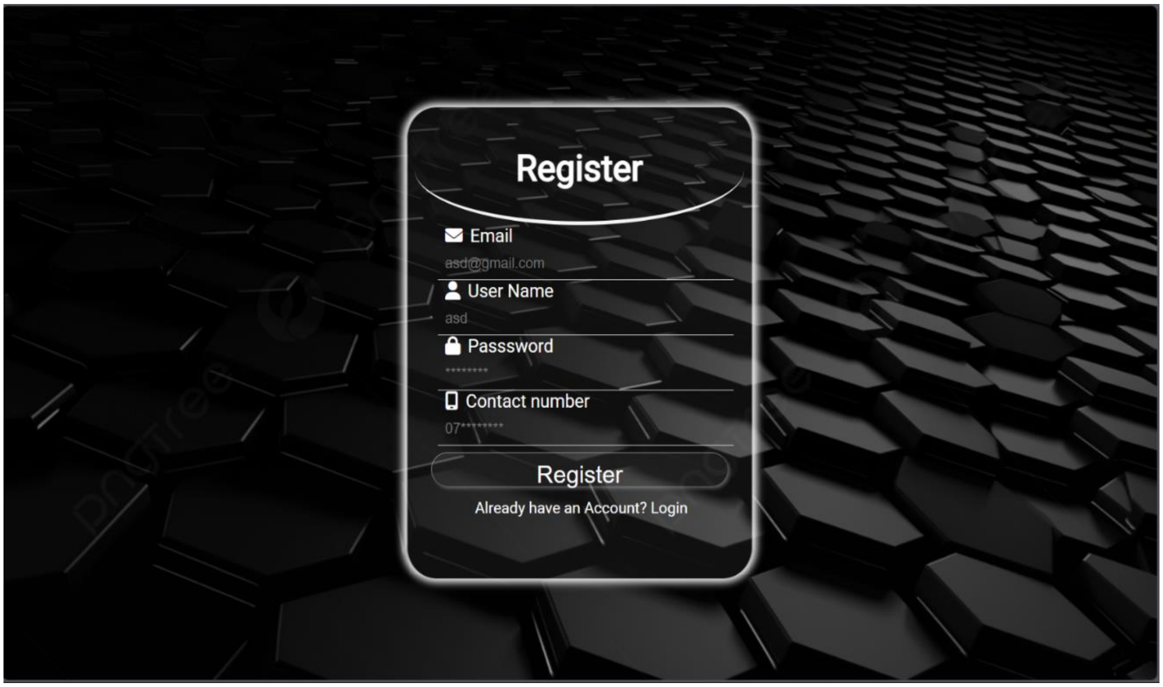
```
if click the login button

                  if(email && pass correct)

                    if(check user type admin)

                           load the admin page.

                    else

                           load the user page.

                    end if

                  else

                    show Error Messages

                  end if

End if

END
```

Interface ID : 06

Interface Name : Login.html

Interface Description : User Registration form

Interface Design :



Email

asd@gmail.com

User Name

asd

Passsword

****

Contact number

07********

Figure 16 - User Registration form

Pseudocode:

```
Start
// Register page for customer
//Inputs: Email, password, name, contact number.
```

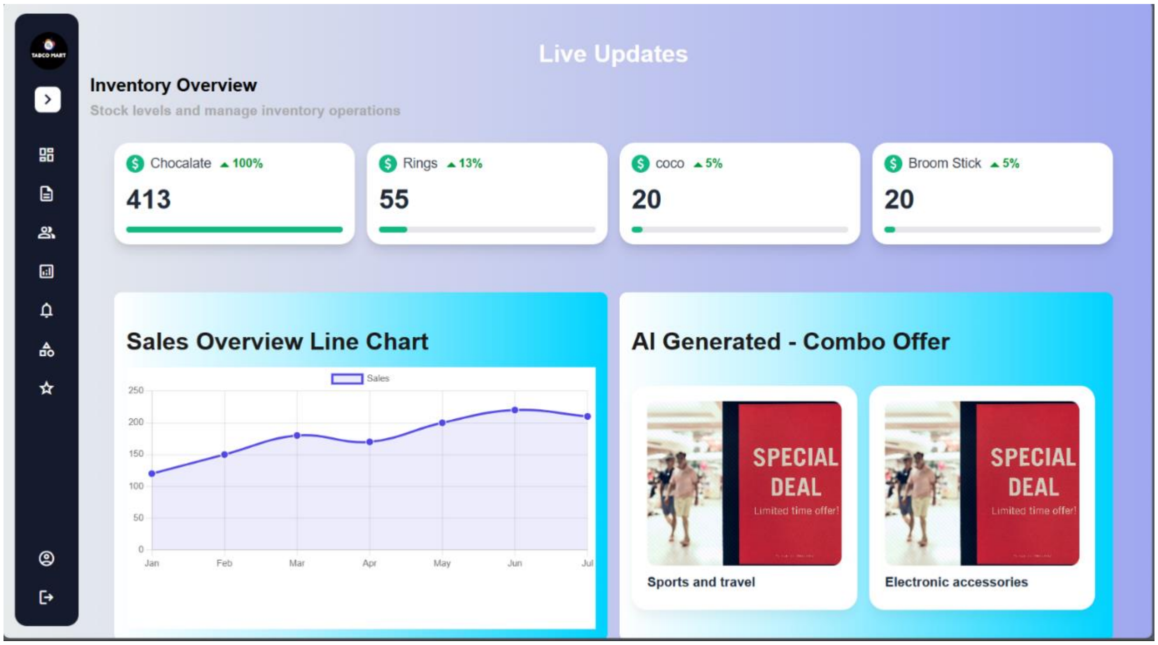
```
//Output: Register to the system


Start
if click the Register button
                if(email && pass correct && name && contact number filled )
                  Add details to database.
                  Navigate to Login page.
                else
                  show Error Messages
                end if
End if
END
```

Interface ID : 07

Interface Name : dashboard.html

Interface Description : Admin dashboard

Interface Design :



Live Updates

Inventory Overview

Stock levels and manage inventory operations

Chocalate ▲100%
413

Rings ▲13%
55

coco ▲5%
20

Broom Stick ▲5%
20

Sales Overview Line Chart

AI Generated - Combo Offer

Sports and travel

Electronic accessories

Figure 17 - Admin dashboard

Interface ID	: 08
Interface Name	: dashboard.html
Interface Description	: Admin Menu bar
Interface Design	:

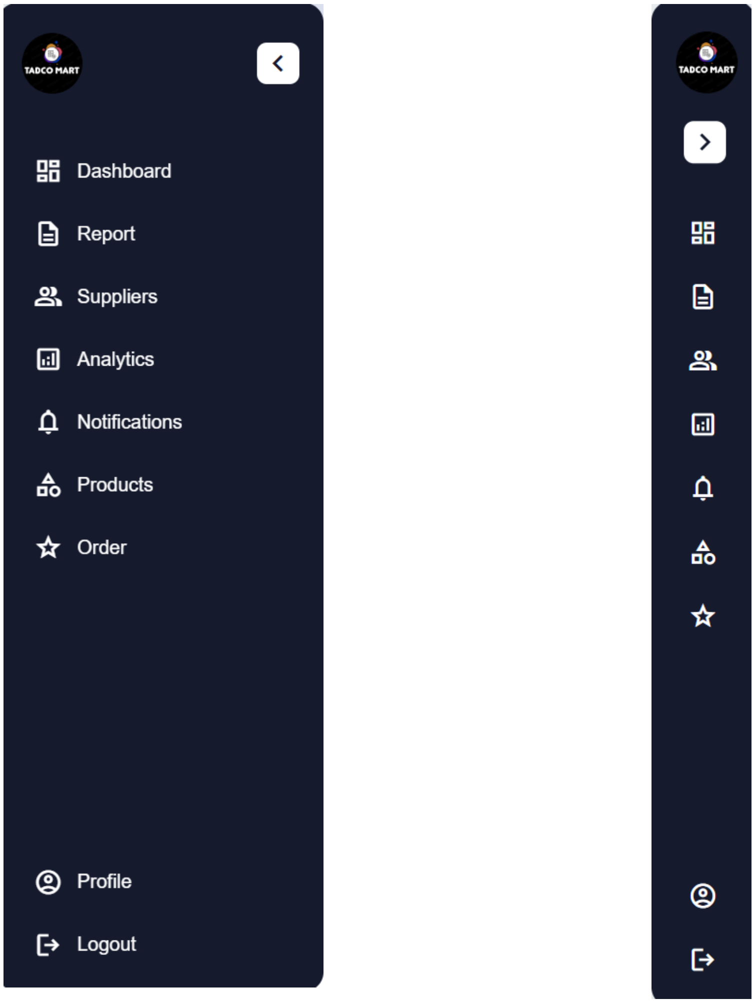


Figure 18 - Admin Menu bar

Pseudocode:

```
Start

// AdminHome page //Inputs: button click event.
```

```
//Output: menu bar with buttons

Start

if click the menu button

                    display the menu

End if

if click the Dashboard button

                    display the Admin Home page

End if

if click the profile button

                    display the Profile page

End if

if click the report button

                    display the report page

End if

if click the suppliers button

                    display the suppliers page

End if

if click the Analytics button

                    display the admin Analytics page

End if

if click the Notification button

                    display the Notification page.

End if
```

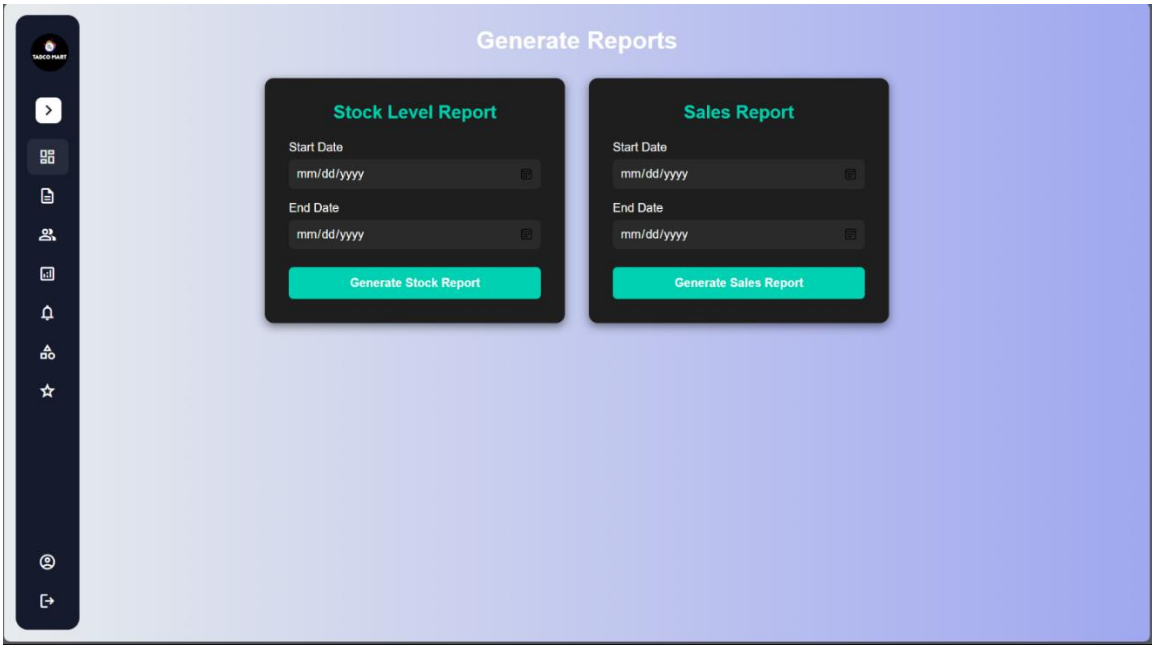
```
if click the Product button
                    display the Product page.


End if
if click the Order button
                    display the Order page.
End if
if click the logout button
                    display the landing page
End if
// Inventory Overview Cards
FOR EACH product IN productList
   DISPLAY product card (name, stock, trend, progress bar)
END FOR
// Sales Overview Line Chart
DISPLAY line chart with salesData
// AI Generated Combo Offers
FOR EACH offer IN comboOffers
   DISPLAY offer card (image, title)
END FOR
END
```

Interface ID : 09

Interface Name : Report.html

Interface Description : Admin Report generate sales and stock

Interface Design :



Generate Reports

Stock Level Report

Start Date

mm/dd/yyyy

End Date

mm/dd/yyyy

Sales Report

Start Date

mm/dd/yyyy

End Date

mm/dd/yyyy

Figure 19 - Admin Report generate sales and stock

Pseudocode:

```
// Generate Reports Page
// Inputs: start date, end date (for each report)
// Outputs: Generated report or error message

Start
```

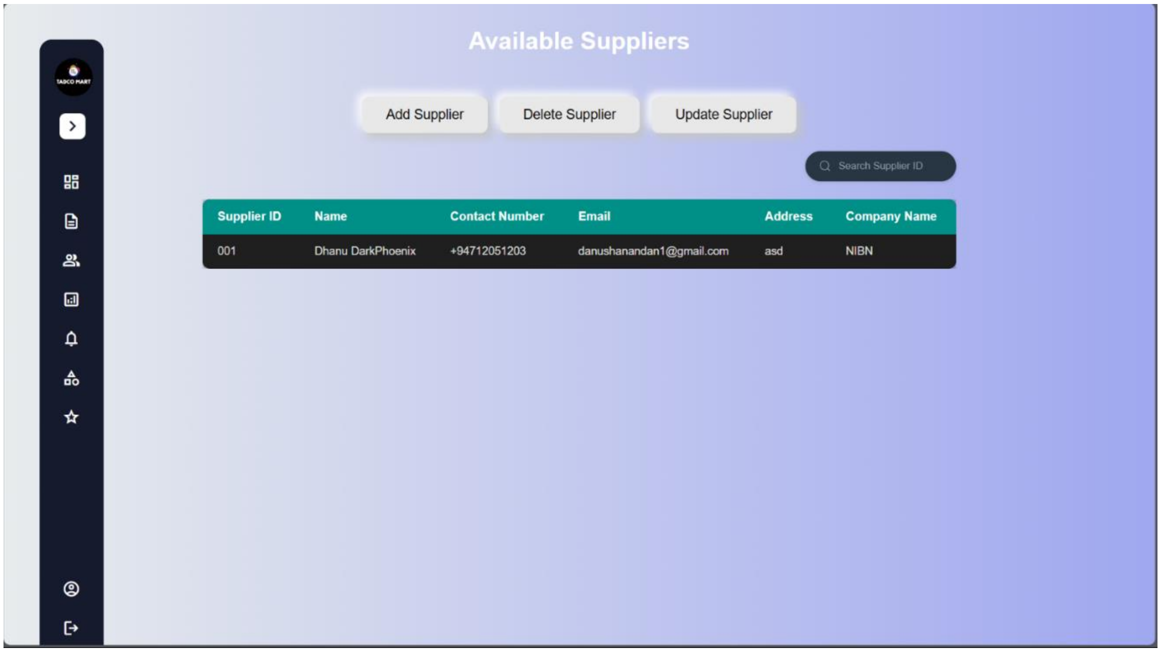
```
// Stock Level Report
IF user clicks "Generate Stock Report" button THEN
   READ startDate FROM Stock Level Report input
   READ endDate FROM Stock Level Report input

   IF startDate and endDate are valid AND startDate <= endDate THEN
      CALL generateStockReport(startDate, endDate)
      DISPLAY generated stock report
   ELSE
      DISPLAY error message ("Please enter valid dates.")
   END IF
END IF

// Sales Report
IF user clicks "Generate Sales Report" button THEN
   READ startDate FROM Sales Report input
   READ endDate FROM Sales Report input

   IF startDate and endDate are valid AND startDate <= endDate THEN
      CALL generateSalesReport(startDate, endDate)
      DISPLAY generated sales report.
   ELSE
      DISPLAY error message ("Please enter valid dates.")
   END IF
END IF

END
```

Interface ID : 10

Interface Name : Supplier.html

Interface Description : Admin Supplier manage dashboard

Interface Design :



Supplier ID	Name	Contact Number	Email	Address	Company Name
001	Dhanu DarkPhoenix	+94712051203	danushanandan1@gmail.com	asd	NIBN

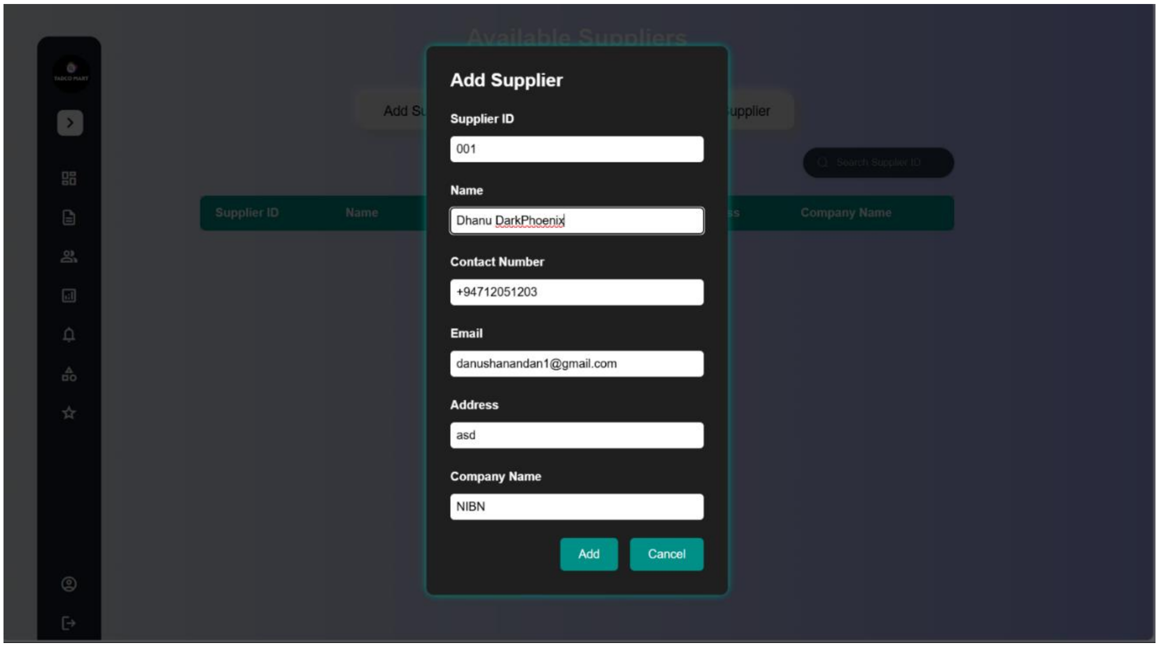
Figure 20 - Admin Supplier manage dashboard

Interface ID : 11

Interface Name : New Supplier form.

Interface Description : Admin add new Supplier form

Interface Design :



Add Supplier

Supplier ID: 001

Name: Dhanu DarkPhoenix

Contact Number: +94712051203

Email: danushanandan1@gmail.com

Address: asd

Company Name: NIBN

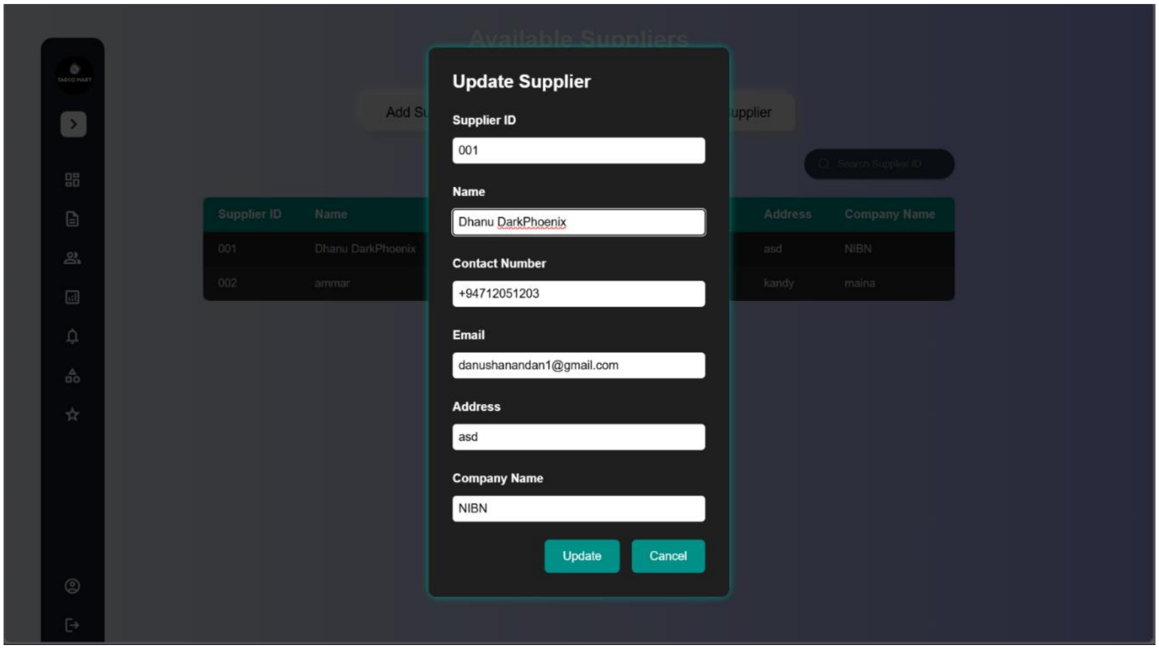
Figure 21 - Admin add new Supplier form

Interface ID : 12

Interface Name : Update Supplier form.

Interface Description : Admin update Supplier form

Interface Design :



Update Supplier

Supplier ID: 001

Name: Dhanu DarkPhoenix

Contact Number: +94712051203

Email: danushanandan1@gmail.com

Address: asd

Company Name: NIBN

Supplier ID	Name	Address	Company Name
001	Dhanu DarkPhoenix	asd	NIBN
002	ammar	kandy	maina

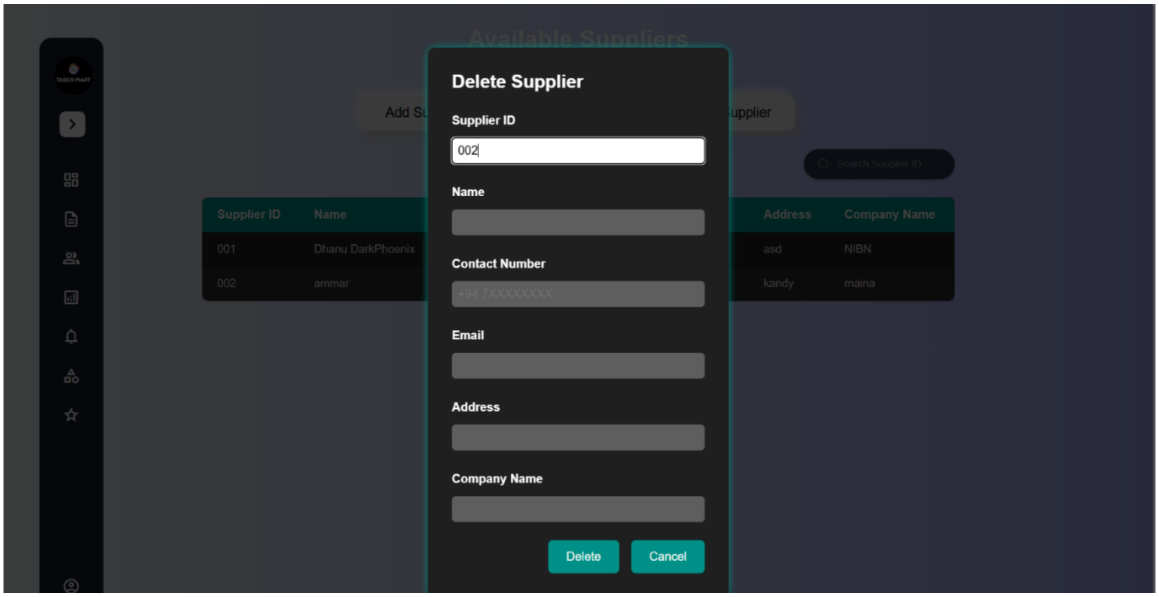
Figure 22 - Admin update Supplier form

Interface ID : 13

Interface Name : Delete Supplier form.

Interface Description : Admin Delete Supplier form

Interface Design :



Delete Supplier

Supplier ID: 002

Name:

Contact Number: +94 7XXXXXXXX

Email:

Address:

Company Name:

Supplier ID	Name	Address	Company Name
001	Dhanu DarkPhoenix	asd	NIBN
002	ammar	kandy	maina

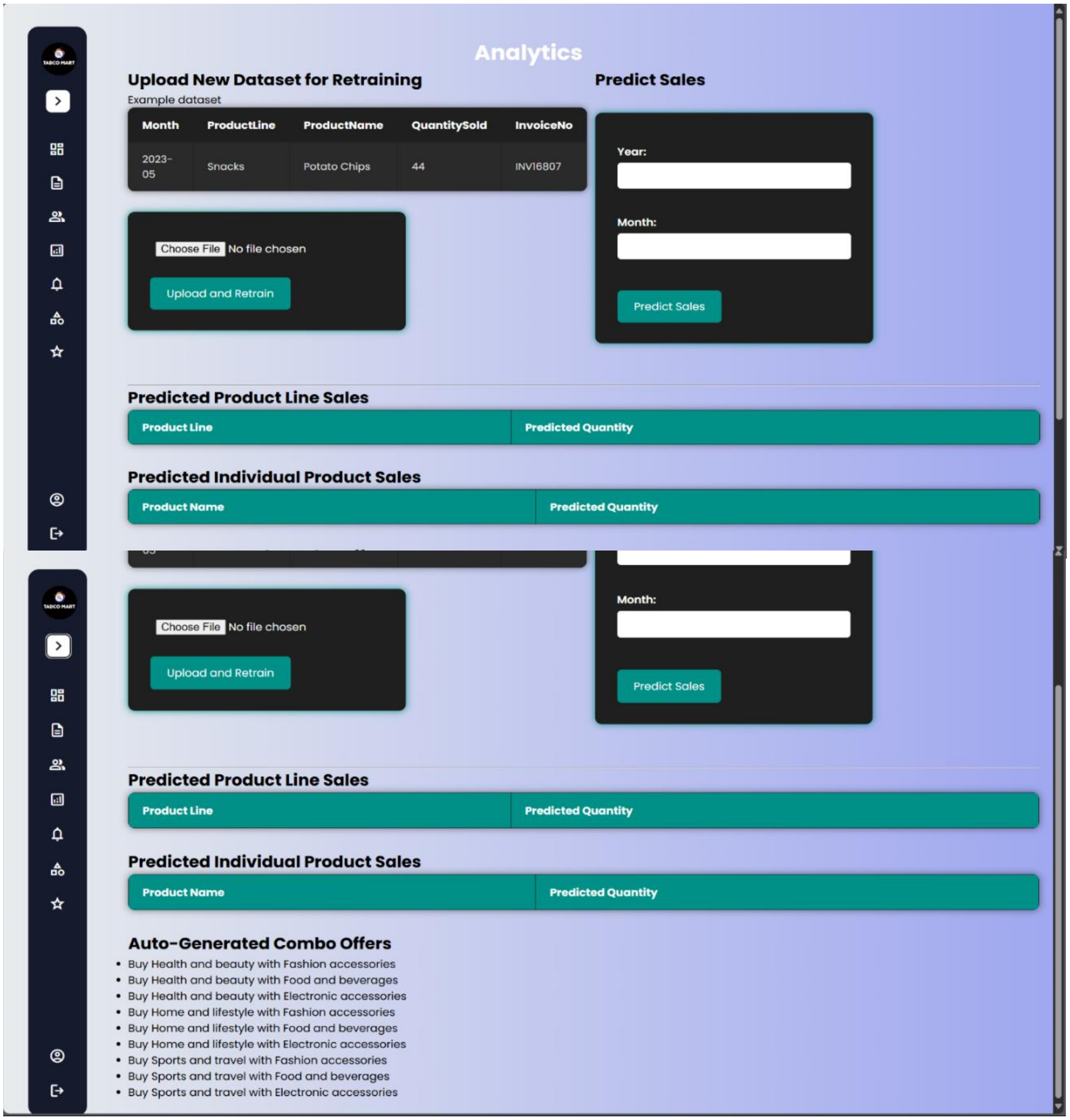
Figure 23 - Admin Delete Supplier form

Pseudocode:

```
// Supplier Management Page
// Inputs: supplier_id, name, contact_number, email, address, company_name
// Output: add/update/delete supplier in database
Start
if click the "Add Supplier" button
    OPEN modal dialog for adding supplier
    if (supplier_id, name, contact_number, email, address, company_name are valid)
        ADD supplier to database
        CLOSE modal dialog
        REFRESH supplier list
    else
        DISPLAY error message in modal
    end if
    if click the "Cancel" button
        CLOSE modal dialog
    end if
end if

if click the "Update Supplier" button
    OPEN modal dialog for updating supplier with pre-filled data
    if (supplier_id exists and name, contact_number, email, address, company_name are valid)
        UPDATE supplier in database
        CLOSE modal dialog
        REFRESH supplier list
    else
        DISPLAY error message in modal
    end if
    if click the "Cancel" button
        CLOSE modal dialog
    end if
end if

if click the "Delete Supplier" button
    OPEN modal dialog for deleting supplier with pre-filled data
    if (supplier_id exists)
```

```
        DELETE supplier from database
        CLOSE modal dialog
        REFRESH supplier list
    else
        DISPLAY error message in modal
    end if
    if click the "Cancel" button
        CLOSE modal dialog
    end if
end if

if click the "Search Supplier ID" button
    if (supplier_id is provided)
        FETCH supplier from database
        DISPLAY supplier details in table
    else
        DISPLAY error message
    end if
end if
END
```

Interface ID	: 14
Interface Name	: Analytics.html.
Interface Description	: Admin Analytical and Model prediction page
Interface Design	:



Analytics

Upload New Dataset for Retraining

Example dataset

Month	ProductLine	ProductName	QuantitySold	InvoiceNo
2023-05	Snacks	Potato Chips	44	INV16807

Predict Sales

Predicted Product Line Sales

Product Line	Predicted Quantity

Predicted Individual Product Sales

Product Name	Predicted Quantity

Predicted Product Line Sales

Product Line	Predicted Quantity

Predicted Individual Product Sales

Product Name	Predicted Quantity

Auto-Generated Combo Offers

- Buy Health and beauty with Fashion accessories
- Buy Health and beauty with Food and beverages
- Buy Health and beauty with Electronic accessories
- Buy Home and lifestyle with Fashion accessories
- Buy Home and lifestyle with Food and beverages
- Buy Home and lifestyle with Electronic accessories
- Buy Sports and travel with Fashion accessories
- Buy Sports and travel with Food and beverages
- Buy Sports and travel with Electronic accessories

Figure 24 - Admin Analytical and Model prediction page

Pseudocode:

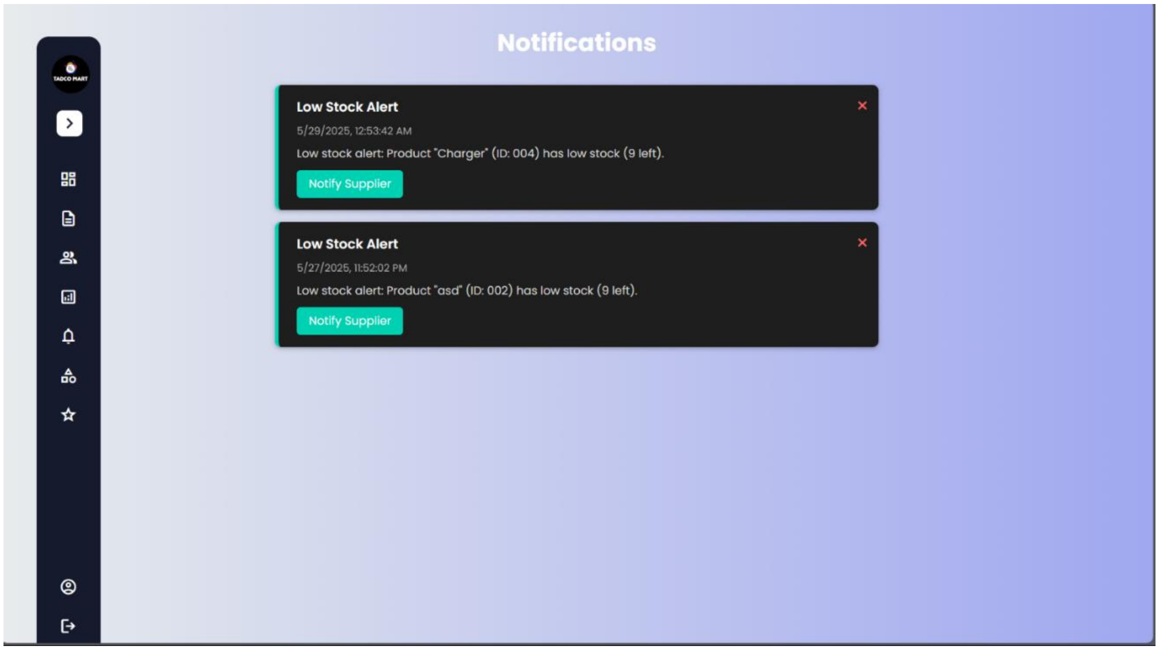
```
// Analytics Page
// Inputs: dataset_file, year, month
// Outputs: retrain model, predict sales, display predicted product line sales, individual product sales, and combo offers
Start
if click the "Upload and Retrain" button
    if (dataset_file is selected and format is valid)
        UPLOAD dataset_file to server
        RETRAIN sales prediction model with dataset_file
        DISPLAY success message
    else
        DISPLAY error message "Invalid file or no file selected"
    end if
end if
if click the "Predict Sales" button
    if (year and month are provided and valid)
        SEND year and month to server
        RUN sales prediction model
        FETCH predicted sales data
        DISPLAY predicted product line sales (Product Line, Predicted Quantity)
        DISPLAY predicted individual product sales (Product Name, Predicted Quantity)
        DISPLAY auto-generated combo offers
    else
        DISPLAY error message "Invalid year or month"
    end if
end if
END
```

Interface ID : 15

Interface Name : Notify.html.

Interface Description : Admin Notification Low stock alert page

Interface Design :



Notifications

Low Stock Alert

5/29/2025, 12:53:42 AM

Low stock alert: Product "Charger" (ID: 004) has low stock (9 left).

Low Stock Alert

5/27/2025, 11:52:02 PM

Low stock alert: Product "asd" (ID: 002) has low stock (9 left).

Figure 25 - Admin Notification Low stock alert page

Pseudocode:

```
// Notifications and Place Product Order Page
// Inputs: product_id, order_quantity, product_name, supplier, supplier_email (from order page)
// Outputs: notify supplier, place order in database, display order history
Start
// Notifications Page
if new low stock alert is triggered
```

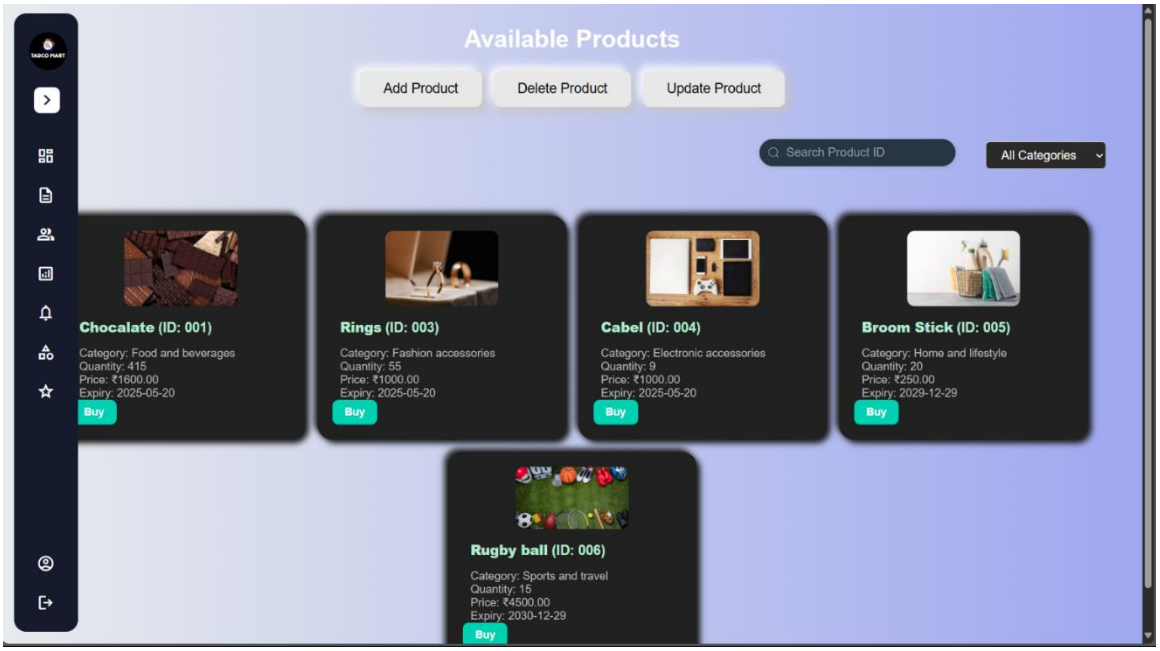
```
    D1ISPLAY alert with timestamp, product name, product ID, and quantity left
    DISPLAY "Notify Supplier" button for each alert
end if

if click the "Notify Supplier" button
    NAVIGATE to Place Product Order page
    PRE-FILL product_id and product_name from the alert
end if

// Place Product Order Page
if click the "Place Order" button
    if (product_id, order_quantity, product_name, supplier, supplier_email are valid)
        ADD order to database with generated order_id and current timestamp
        SEND order confirmation to supplier_email
        UPDATE order history table with new order
        DISPLAY success message
    else
        DISPLAY error message "Invalid order details"
    end if
end if

if page loads
    FETCH order history from database
    DISPLAY order history in table (Order ID, Product ID, Product Name, Quantity,
Supplier, Supplier Email, Order Time)
end if
END
```

Interface ID : 16

Interface Name : Product.html.

Interface Description : Admin Product display page

Interface Design :



Chocalate (ID: 001)
Category: Food and beverages
Quantity: 415
Price: ₹1600.00
Expiry: 2025-05-20

Rings (ID: 003)
Category: Fashion accessories
Quantity: 55
Price: ₹1000.00
Expiry: 2025-05-20

Cabel (ID: 004)
Category: Electronic accessories
Quantity: 9
Price: ₹1000.00
Expiry: 2025-05-20

Broom Stick (ID: 005)
Category: Home and lifestyle
Quantity: 20
Price: ₹250.00
Expiry: 2029-12-29

Rugby ball (ID: 006)
Category: Sports and travel
Quantity: 15
Price: ₹4500.00
Expiry: 2030-12-29

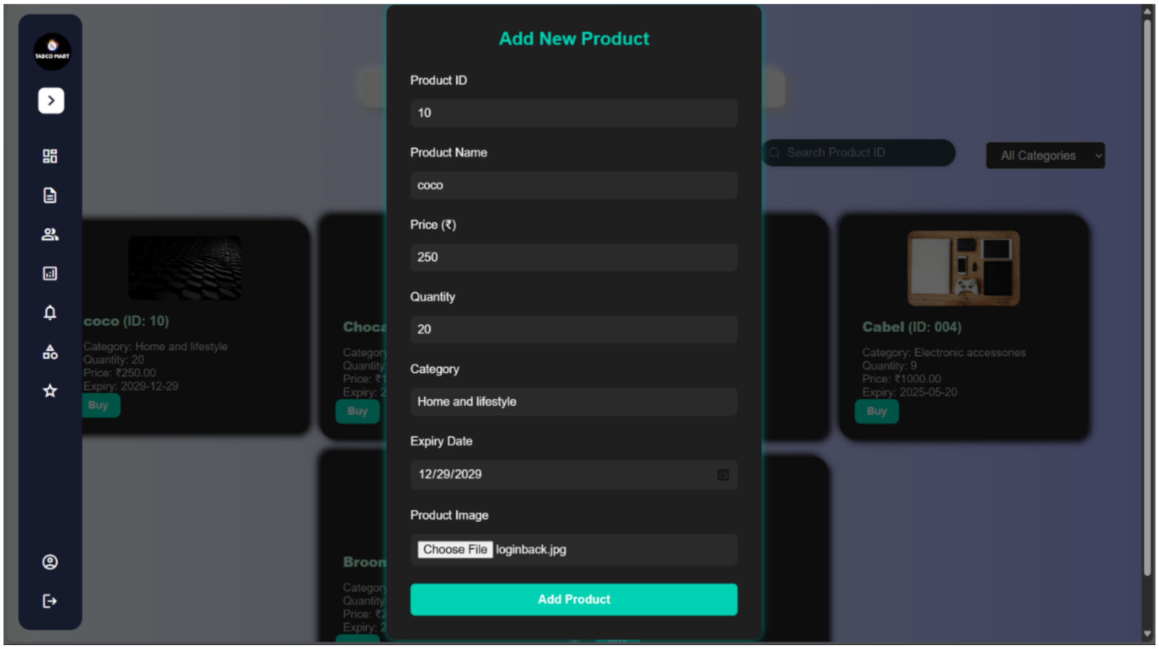
Figure 26 - Admin Product display page

Interface ID : 17

Interface Name : Product.html.

Interface Description : Admin add new Product display page

Interface Design :



coco (ID: 10)
Category: Home and lifestyle
Quantity: 20
Price: ₹250.00
Expiry: 2029-12-29
Buy

Cabel (ID: 004)
Category: Electronic accessories
Quantity: 9
Price: ₹1000.00
Expiry: 2025-05-20
Buy

Add New Product

Product ID
10

Product Name
coco

Price (₹)
250

Quantity
20

Category
Home and lifestyle

Expiry Date
12/29/2029

Product Image
Choose File loginback.jpg

Add Product

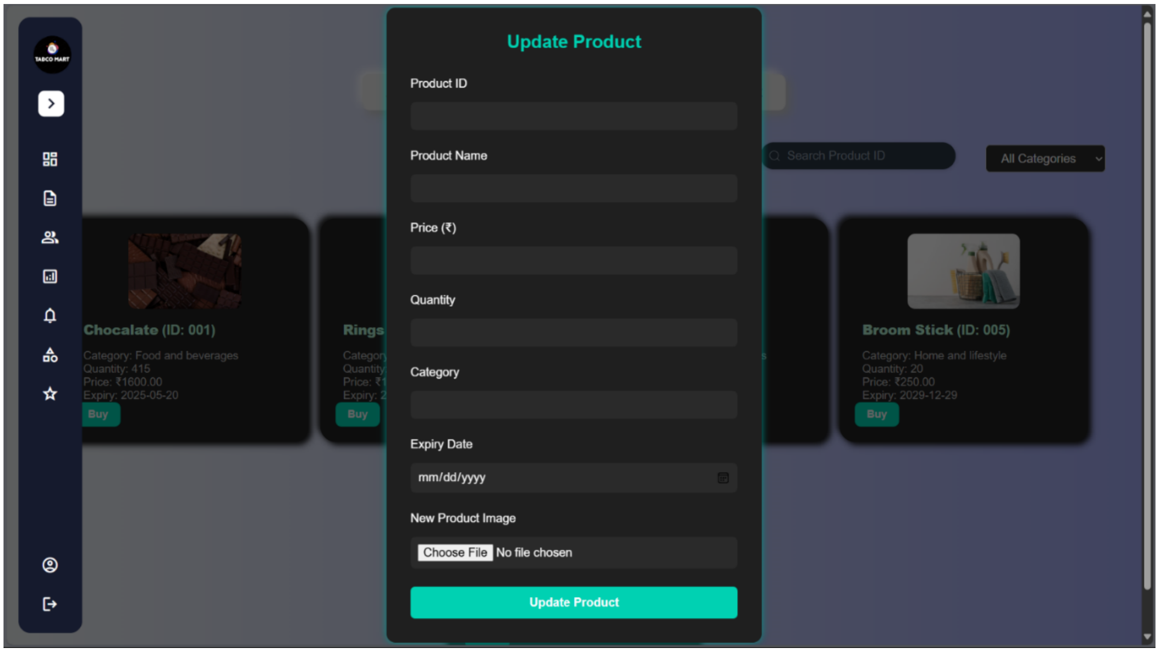
Figure 27 - Admin add new Product display page

Interface ID : 18

Interface Name : Product.html.

Interface Description : Admin update Product display page

Interface Design



Chocalate (ID: 001)
Category: Food and beverages
Quantity: 415
Price: ₹1600.00
Expiry: 2025-05-20

Broom Stick (ID: 005)
Category: Home and lifestyle
Quantity: 20
Price: ₹250.00
Expiry: 2029-12-29

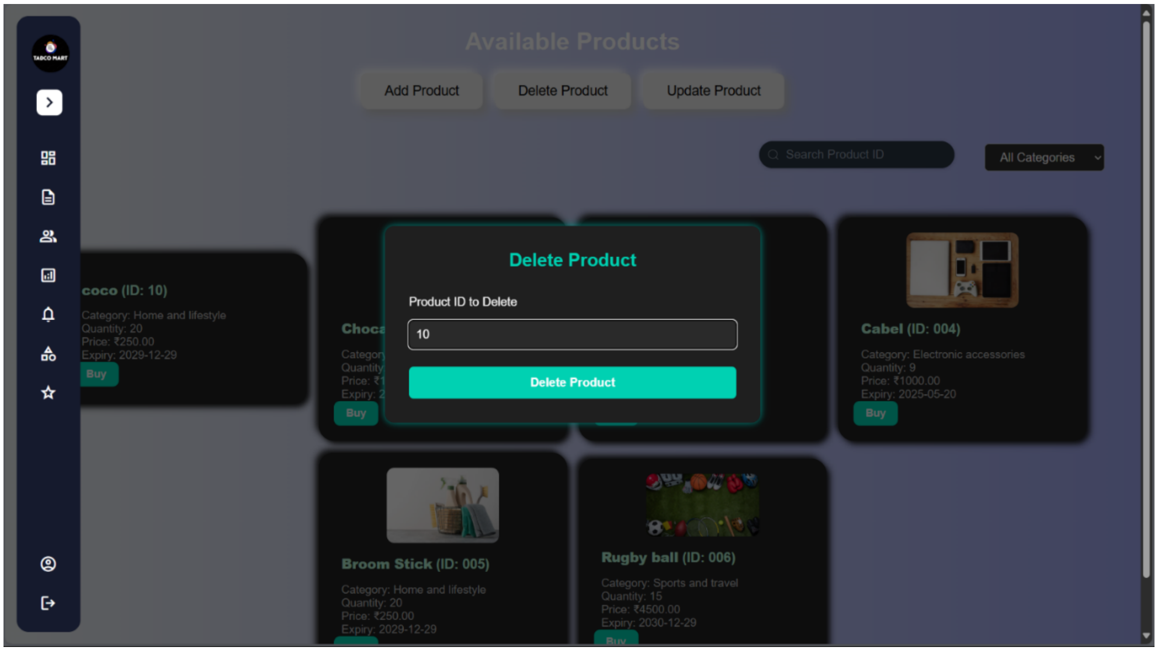
Figure 28 - Admin update Product display page

Interface ID : 19

Interface Name : Product.html.

Interface Description : Admin delete Product display page

Interface Design :



Delete Product

Product ID to Delete: 10

coco (ID: 10)
Category: Home and lifestyle
Quantity: 20
Price: ₹250.00
Expiry: 2029-12-29

Cabel (ID: 004)
Category: Electronic accessories
Quantity: 9
Price: ₹1000.00
Expiry: 2025-05-20

Broom Stick (ID: 005)
Category: Home and lifestyle
Quantity: 20
Price: ₹250.00
Expiry: 2029-12-29

Rugby ball (ID: 006)
Category: Sports and travel
Quantity: 15
Price: ₹4500.00
Expiry: 2030-12-29

Figure 29 - Admin delete Product display page

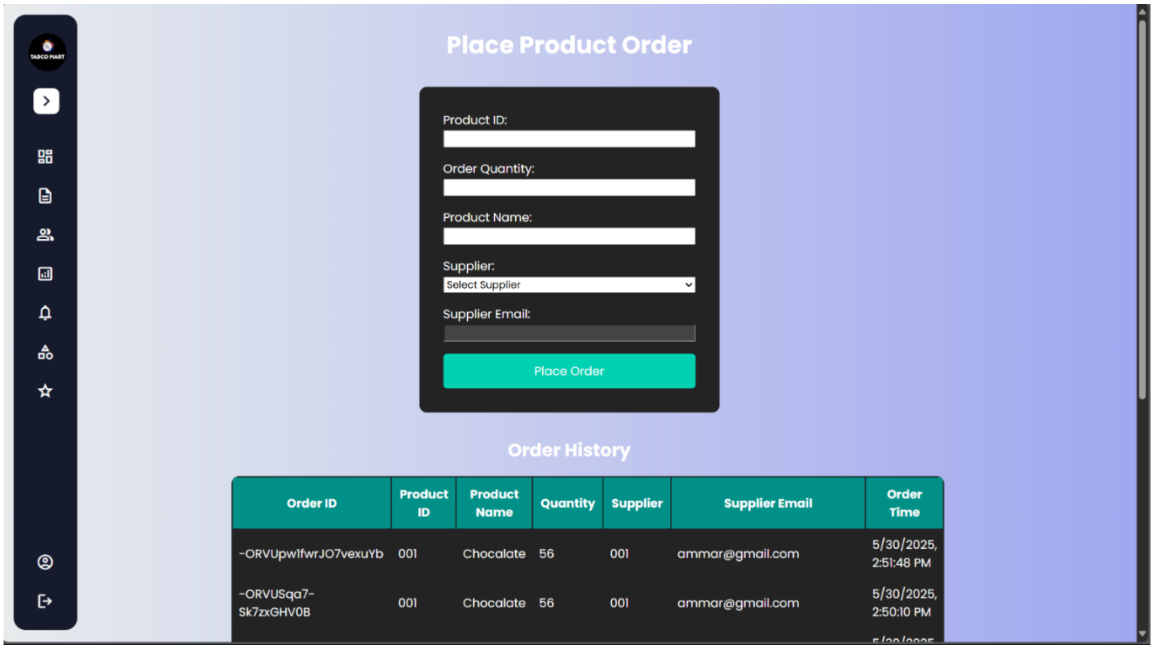
Pseudocode:

```
// Available Products Page
// Inputs: product_id, product_name, price, quantity, category, expiry_date, product_image
// Outputs: add/update/delete product in database, display updated product list
Start
if click the "Add Product" button
   OPEN modal dialog for adding product
   if (product_id, product_name, price, quantity, category, expiry_date, product_image are valid)
```

```
        ADD product to database
        CLOSE modal dialog
        REFRESH product list
        DISPLAY success message
    else
        DISPLAY error message in modal "Invalid product details"
    end if
end if
if click the "Update Product" button
    OPEN modal dialog for updating product with pre-filled data
    if (product_id exists and product_name, price, quantity, category, expiry_date, product_image are valid)
        UPDATE product in database
        CLOSE modal dialog
        REFRESH product list
        DISPLAY success message
    else
        DISPLAY error message in modal "Invalid product details or ID not found"
    end if
end if
if click the "Delete Product" button
    OPEN modal dialog for deleting product
    if (product_id exists)
        DELETE product from database
        CLOSE modal dialog
        REFRESH product list
        DISPLAY success message
    else
```

```
        DISPLAY error message in modal "Product ID not found"
    end if
end if
if click the "Search Product ID" button
    if (product_id is provided and exists)
        FETCH product from database
        DISPLAY product in product list
    else
        DISPLAY error message "Product ID not found"
    end if
end if
if select a category from "ALL Categories" dropdown
    FETCH products from database where category matches selected category
    DISPLAY filtered product list
end if
if click the "Buy" button for a product
    if (product quantity > 0)
        DECREMENT product quantity in database
        REFRESH product list
        DISPLAY success message "Product purchased"
    else
        DISPLAY error message "Product out of stock"
    end if
end if
END
```

Interface ID	: 20
Interface Name	: order.html.
Interface Description	: Admin order Product display page
Interface Design	:



Order ID	Product ID	Product Name	Quantity	Supplier	Supplier Email	Order Time
-ORVUpwIfwrJO7vexuYb	001	Chocalate	56	001	ammar@gmail.com	5/30/2025, 2:51:48 PM
-ORVUSqa7-Sk7zxGHV0B	001	Chocalate	56	001	ammar@gmail.com	5/30/2025, 2:50:10 PM

Figure 30 - Admin order Product display page

Pseudocode:

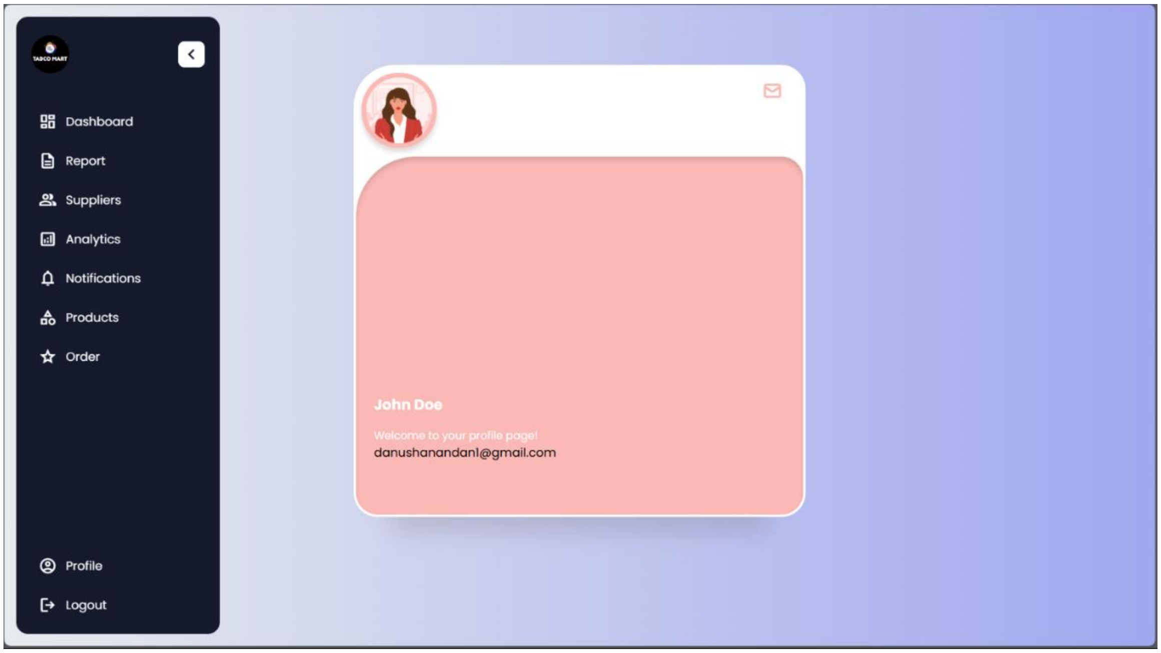
```
// Place Product Order Page
// Inputs: product_id, order_quantity, product_name, supplier, supplier_email
// Outputs: place order in database, update order history
Start
if click the "Place Order" button
    if (product_id, order_quantity, product_name, supplier, supplier_email are valid)
    GENERATE unique order_id (e.g., -ORVUPwlfwJrJ07vexuYb)
    SET order_time to current timestamp (e.g., 6/01/2025, 10:23 PM +0530)
    ADD order to database with order_id, product_id, product_name, order_quantity, supplier, supplier_email, order_time
    SEND order confirmation to supplier_email
    UPDATE order history table with new order
    DISPLAY success message
  else
    DISPLAY error message "Invalid order details"
  end if
end if

if page loads
  FETCH order history from database
  DISPLAY order history in table (Order ID, Product ID, Product Name, Quantity, Supplier, Supplier Email, Order Time)
end if
END
```

Interface ID : 21

Interface Name : profile.html.

Interface Description : Admin Profile details display page

Interface Design :



John Doe

Welcome to your profile page!

danushanandan1@gmail.com

Figure 31 - Admin Profile details display page

Interface ID : 22

Interface Name : customerdashboard.html.

Interface Description : Customer dashboard display page about offers and sales

Interface Design :

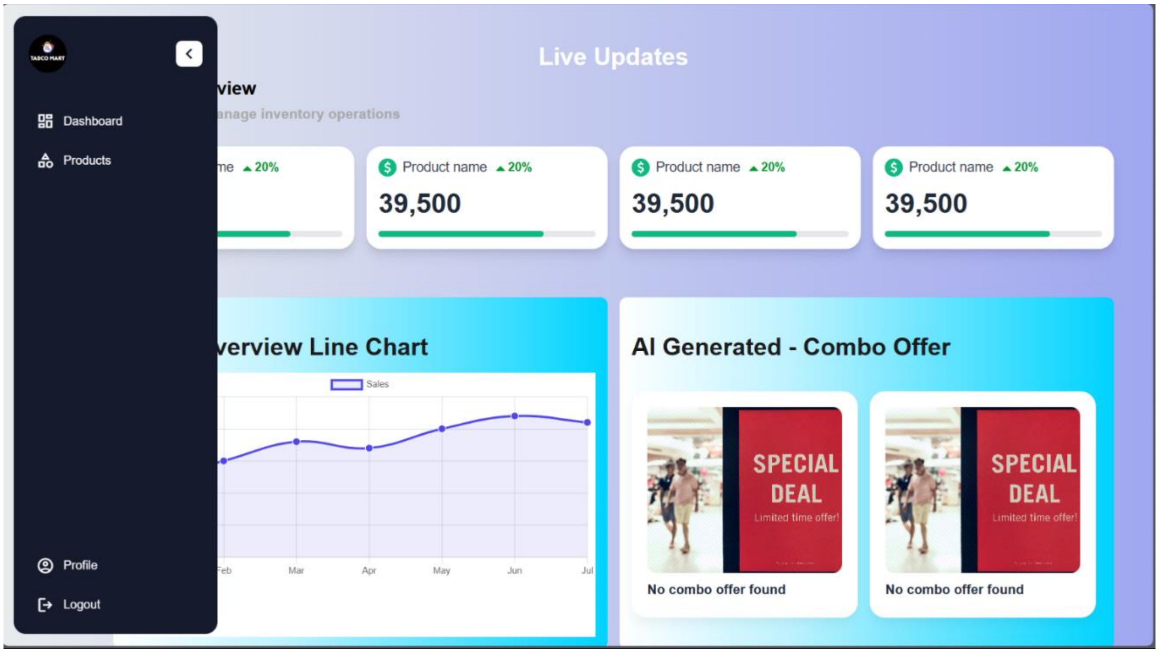


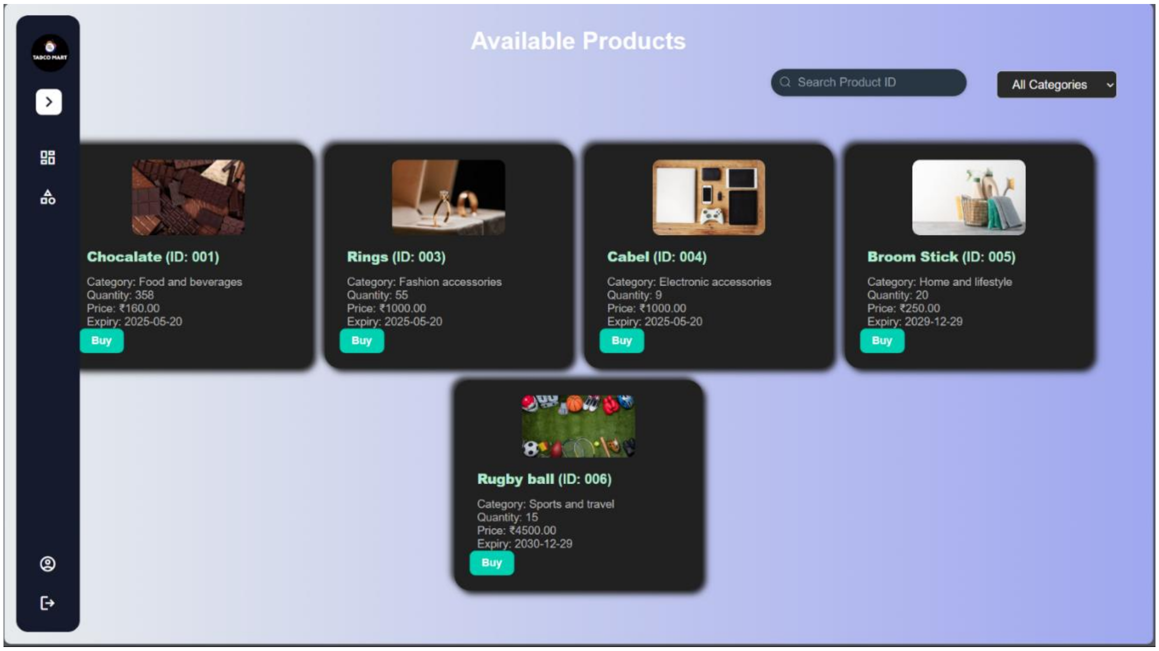
Figure 32 - User dashboard display page about offers and sales

Interface ID : 23

Interface Name : customerproduct.html.

Interface Description : Customer product details display page

Interface Design :



Chocalate (ID: 001)
Category: Food and beverages
Quantity: 358
Price: ₹160.00
Expiry: 2025-05-20

Rings (ID: 003)
Category: Fashion accessories
Quantity: 55
Price: ₹1000.00
Expiry: 2025-05-20

Cabel (ID: 004)
Category: Electronic accessories
Quantity: 9
Price: ₹1000.00
Expiry: 2025-05-20

Broom Stick (ID: 005)
Category: Home and lifestyle
Quantity: 20
Price: ₹250.00
Expiry: 2029-12-29

Rugby ball (ID: 006)
Category: Sports and travel
Quantity: 15
Price: ₹4500.00
Expiry: 2030-12-29

Figure 33 - User product details display page

Interface ID : 24

Interface Name : index.html.

Interface Description : Customer product details display using AR

Interface Design :

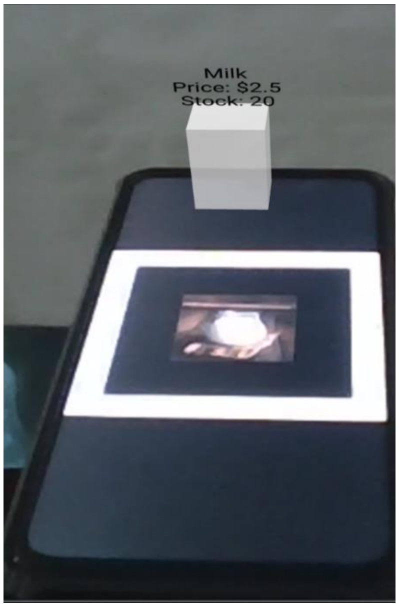
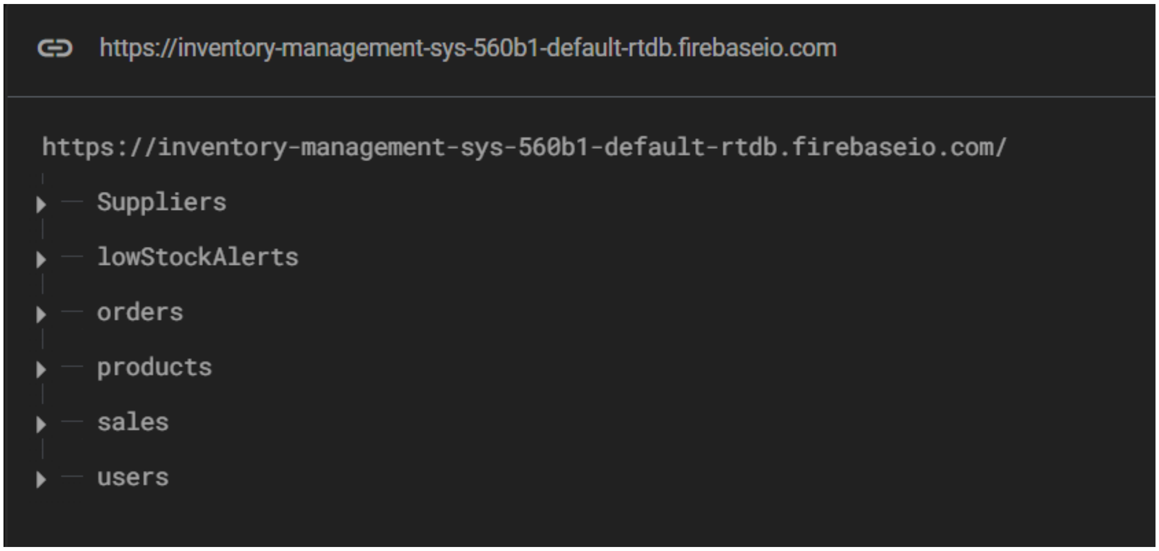


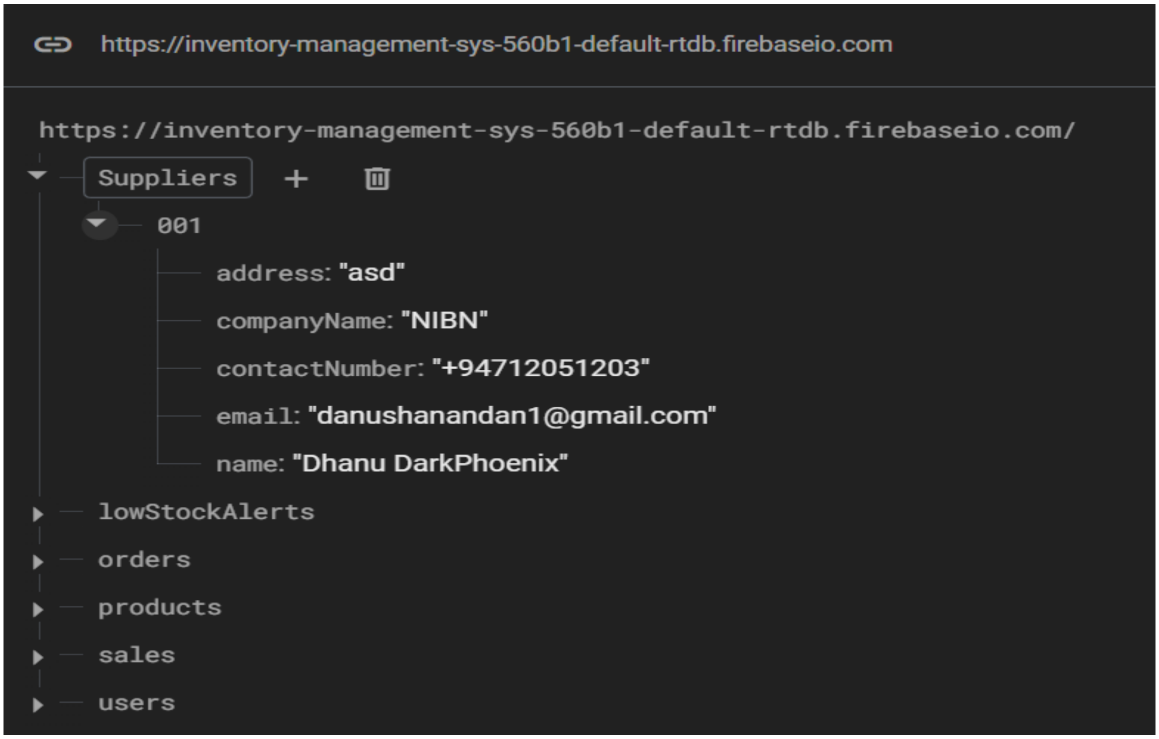
Figure 34 - User product details display using AR

4.3 Database Design



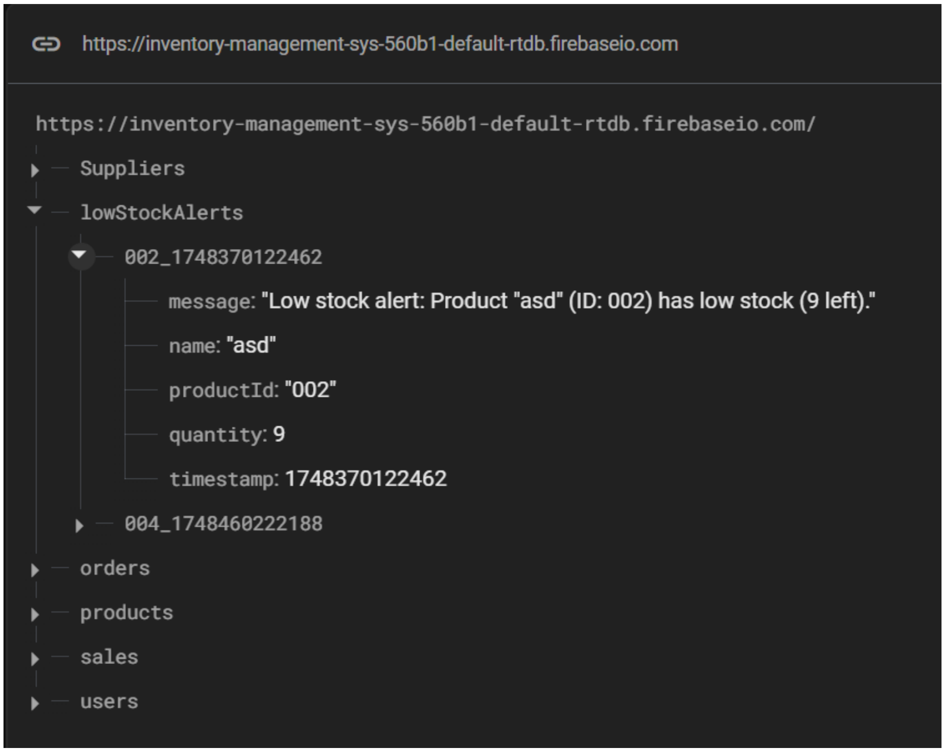
```
https://inventory-management-sys-560b1-default-rtdb.firebaseio.com

https://inventory-management-sys-560b1-default-rtdb.firebaseio.com/
├─ Suppliers
├─ lowStockAlerts
├─ orders
├─ products
├─ sales
└─ users
```

Figure 35 - Main nodes of the database



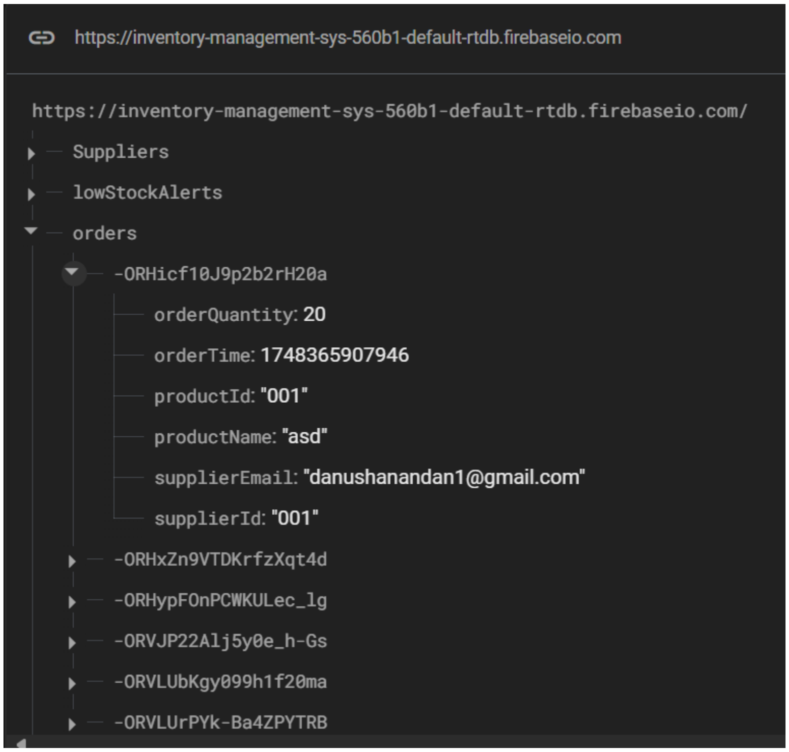
```
https://inventory-management-sys-560b1-default-rtdb.firebaseio.com

https://inventory-management-sys-560b1-default-rtdb.firebaseio.com/
├─ Suppliers  +  
│  └─ 001
│       ├─ address: "asd"
│       ├─ companyName: "NIBN"
│       ├─ contactNumber: "+94712051203"
│       ├─ email: "danushanandan1@gmail.com"
│       └─ name: "Dhanu DarkPhoenix"
├─ lowStockAlerts
├─ orders
├─ products
├─ sales
└─ users
```

Figure 36 - Supplier Details store node



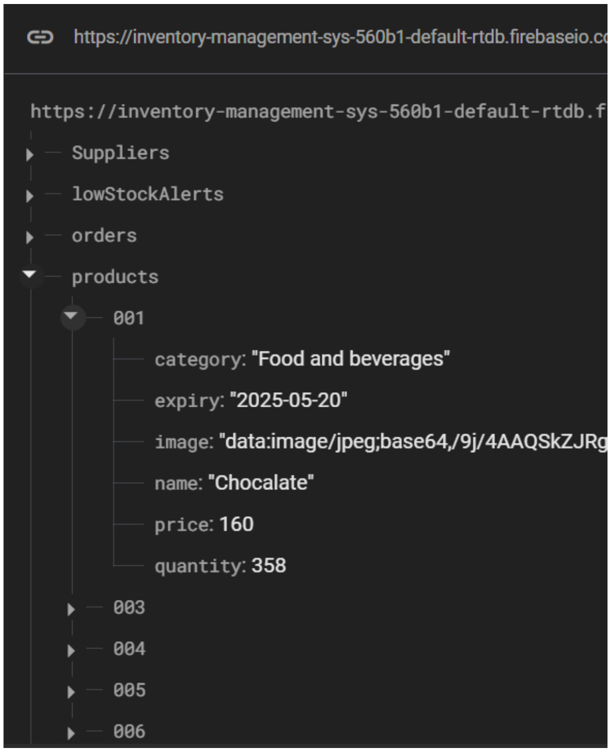
```
https://inventory-management-sys-560b1-default-rtdb.firebaseio.com

https://inventory-management-sys-560b1-default-rtdb.firebaseio.com/
  Suppliers
  lowStockAlerts
    002_1748370122462
      message: "Low stock alert: Product "asd" (ID: 002) has low stock (9 left)."
      name: "asd"
      productId: "002"
      quantity: 9
      timestamp: 1748370122462
    004_1748460222188
  orders
  products
  sales
  users
```

Figure 37 - Low stock alert details store node



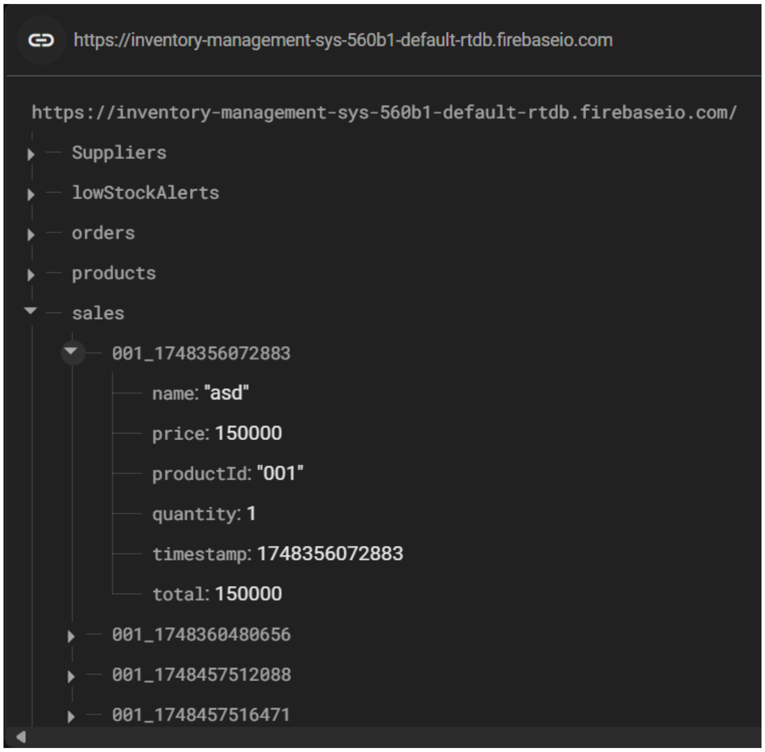
```
https://inventory-management-sys-560b1-default-rtdb.firebaseio.com

https://inventory-management-sys-560b1-default-rtdb.firebaseio.com/
  Suppliers
  lowStockAlerts
  orders
    -ORHicf10J9p2b2rH20a
      orderQuantity: 20
      orderTime: 1748365907946
      productId: "001"
      productName: "asd"
      supplierEmail: "danushanandan1@gmail.com"
      supplierId: "001"
    -ORHxZn9VTDKrfzXqt4d
    -ORHypFOnPCWKULec_lg
    -ORVJP22Alj5y0e_h-Gs
    -ORVLUbKgy099h1f20ma
    -ORVLUrPYk-Ba4ZPYTRB
```

Figure 38 - Orders details store node



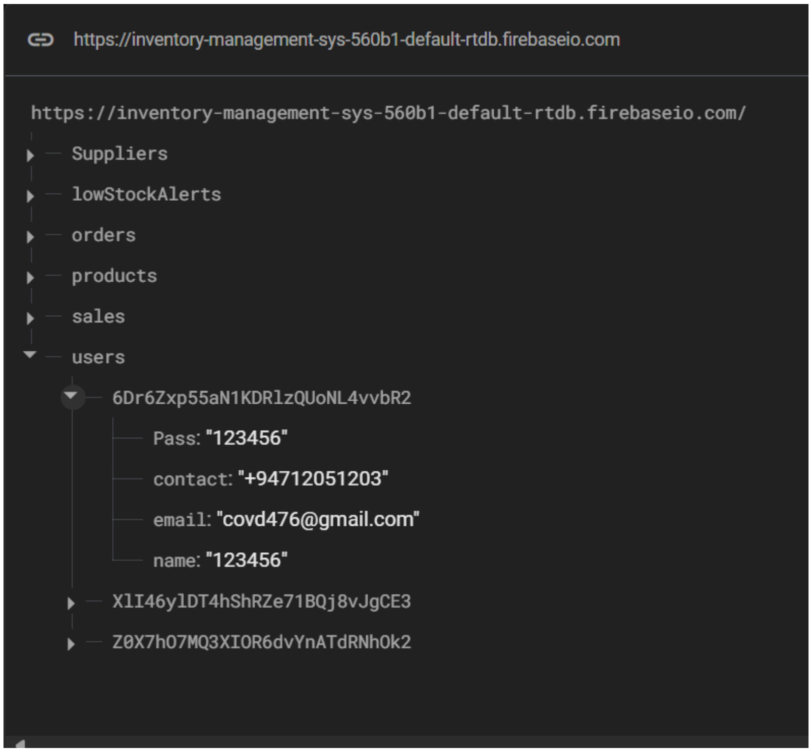
```
https://inventory-management-sys-560b1-default-rtdb.firebaseio.co

https://inventory-management-sys-560b1-default-rtdb.f
├─ Suppliers
├─ lowStockAlerts
├─ orders
├─ products
│  ├─ 001
│  │  ├─ category: "Food and beverages"
│  │  ├─ expiry: "2025-05-20"
│  │  ├─ image: "data:image/jpeg;base64,/9j/4AAQSkZJRg
│  │  ├─ name: "Chocalate"
│  │  ├─ price: 160
│  │  └─ quantity: 358
│  ├─ 003
│  ├─ 004
│  ├─ 005
│  ├─ 006
```

Figure 39 - Product details store node



```
https://inventory-management-sys-560b1-default-rtdb.firebaseio.com

https://inventory-management-sys-560b1-default-rtdb.firebaseio.com/
├─ Suppliers
├─ lowStockAlerts
├─ orders
├─ products
├─ sales
│  ├─ 001_1748356072883
│  │  ├─ name: "asd"
│  │  ├─ price: 150000
│  │  ├─ productId: "001"
│  │  ├─ quantity: 1
│  │  ├─ timestamp: 1748356072883
│  │  └─ total: 150000
│  ├─ 001_1748360480656
│  ├─ 001_1748457512088
│  ├─ 001_1748457516471
```

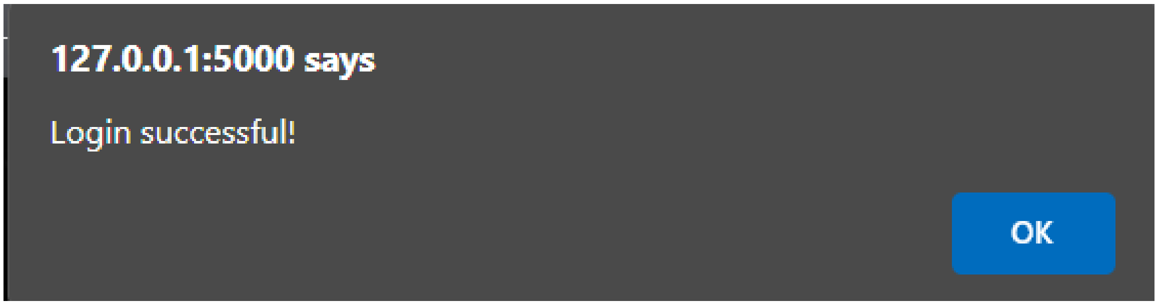
Figure 40 - Sales details store node



```
https://inventory-management-sys-560b1-default-rtdb.firebaseio.com

https://inventory-management-sys-560b1-default-rtdb.firebaseio.com/
  Suppliers
  lowStockAlerts
  orders
  products
  sales
  users
    6Dr6Zxp55aN1KDRlzQUoNL4vvbR2
      Pass: "123456"
      contact: "+94712051203"
      email: "covd476@gmail.com"
      name: "123456"
    XlI46ylDT4hShRZe71BQj8vJgCE3
    Z0X7hO7MQ3XIOR6dvYnATdRNhOk2
```

Figure 41 - User details store node

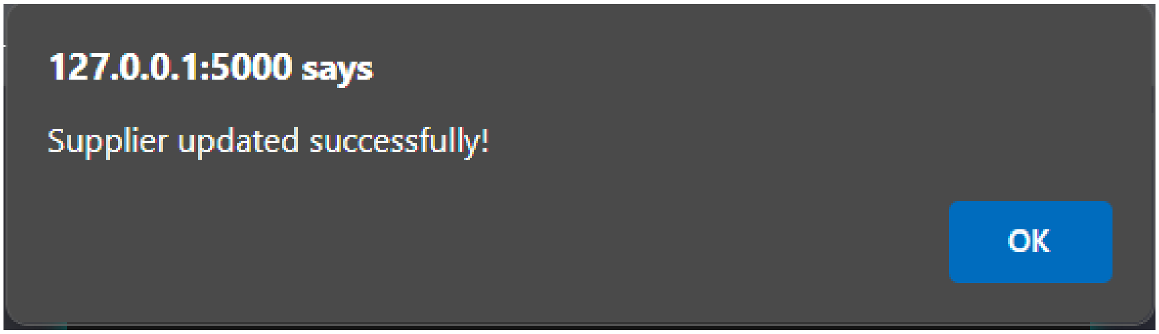
Alert Message Design



127.0.0.1:5000 says

Login successful!

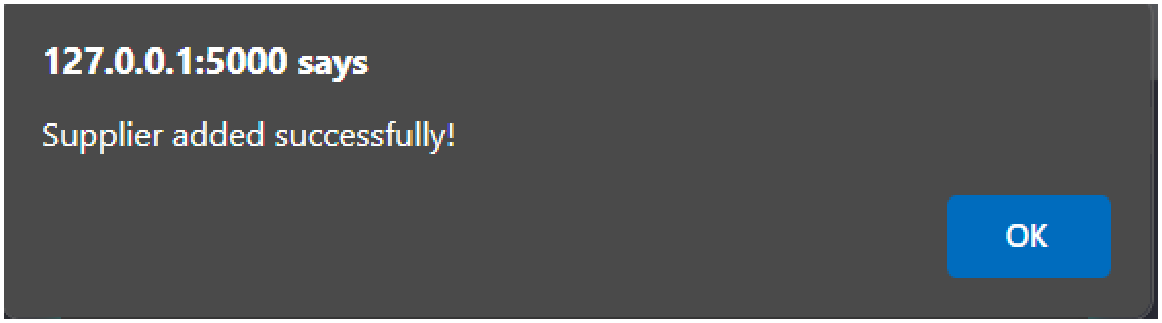
Figure 42 - Login successful message



127.0.0.1:5000 says

Supplier updated successfully!

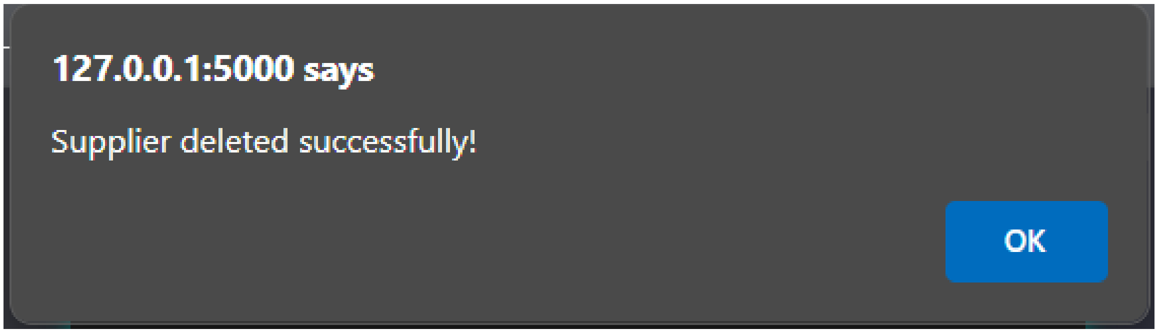
Figure 43 - Supplier updated message



127.0.0.1:5000 says

Supplier added successfully!

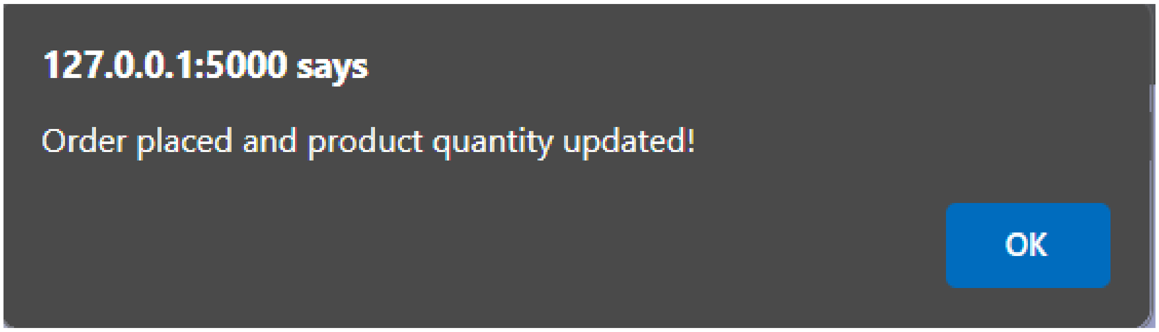
Figure 44 - Supplier Add message



127.0.0.1:5000 says

Supplier deleted successfully!

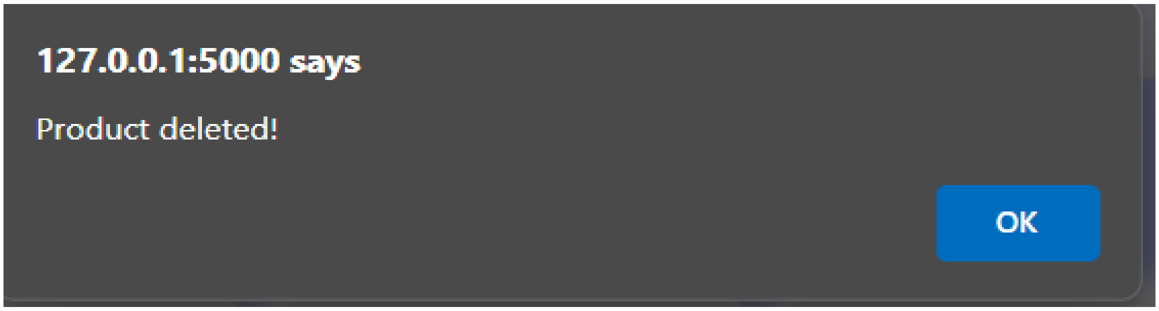
Figure 43 - Supplier deleted message



127.0.0.1:5000 says

Order placed and product quantity updated!

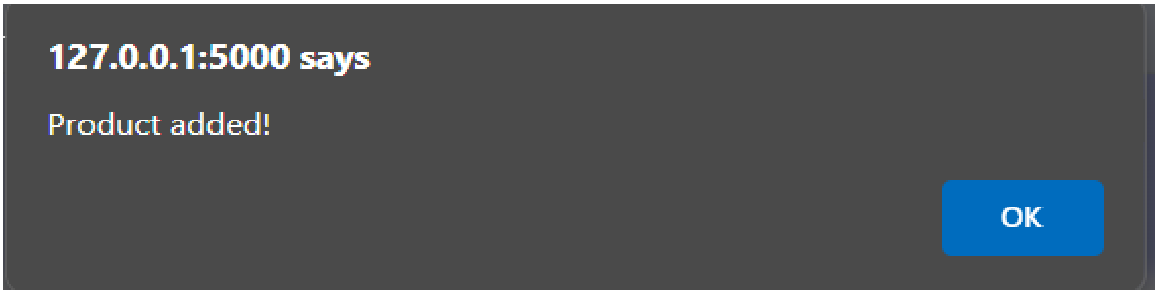
Figure 44 -Order placed message



127.0.0.1:5000 says

Product deleted!

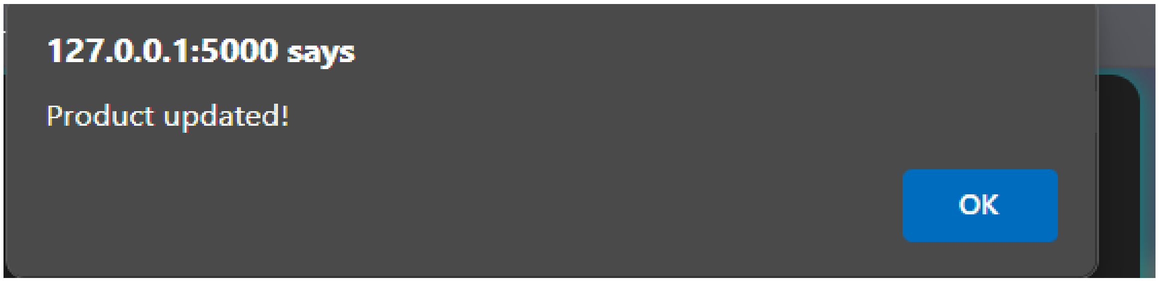
Figure 47 – Product deleted message



127.0.0.1:5000 says

Product added!

Figure 48 - Product added message

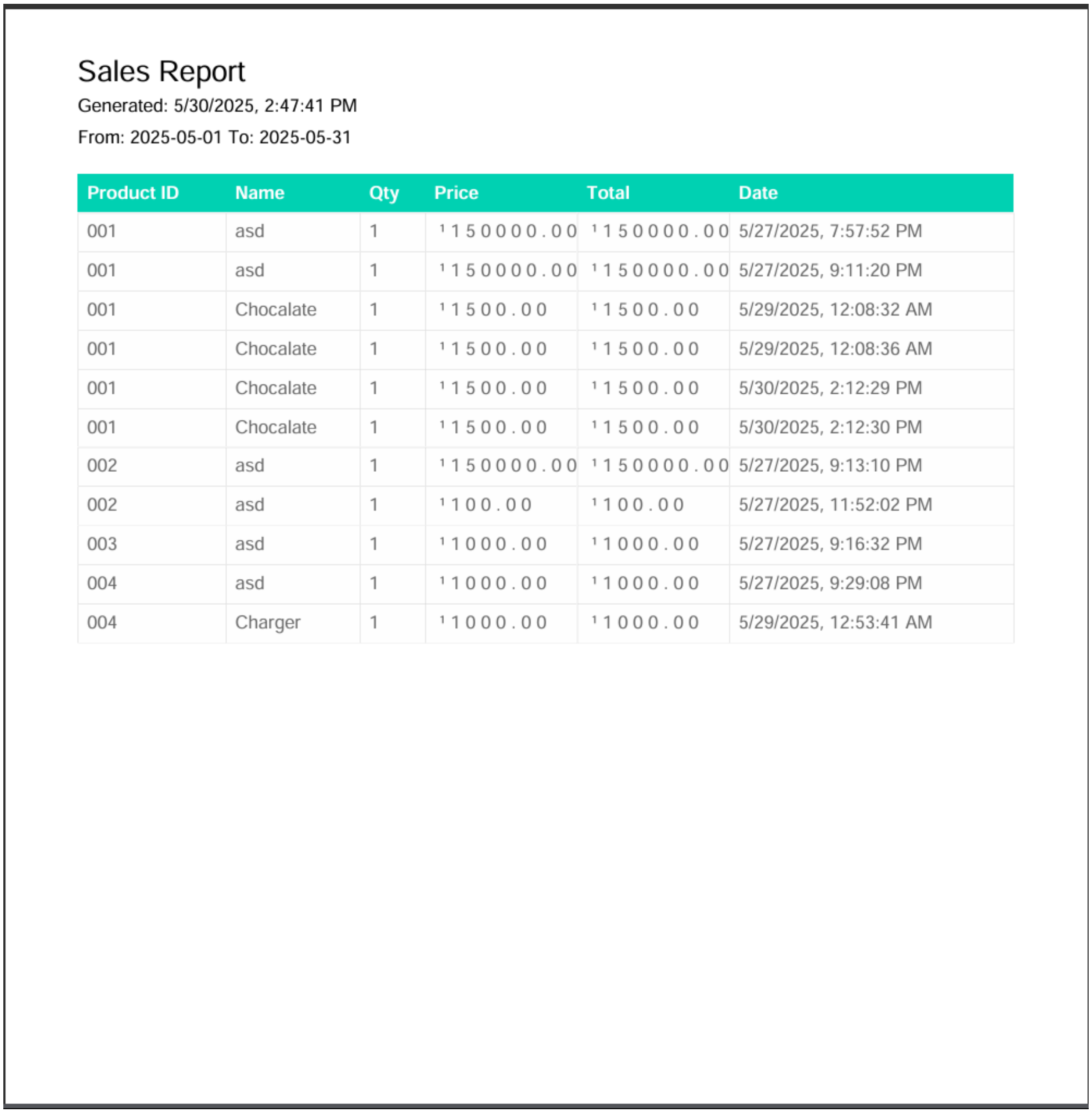


127.0.0.1:5000 says

Product updated!

Figure 49 - Product updated message

4.4 Report Layout Design



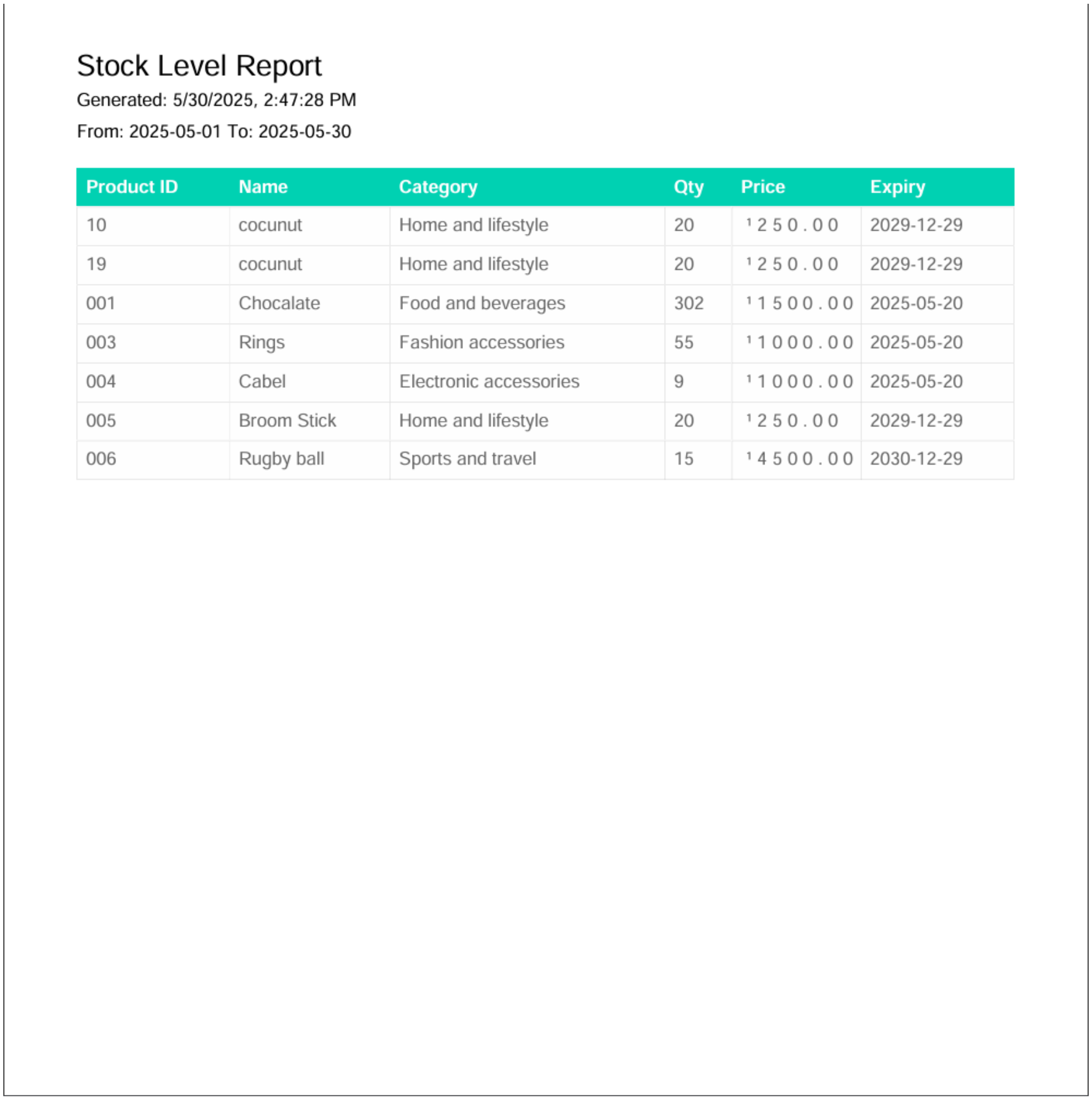
Sales Report

Generated: 5/30/2025, 2:47:41 PM

From: 2025-05-01 To: 2025-05-31

Product ID	Name	Qty	Price	Total	Date
001	asd	1	¹150000.00	¹150000.00	5/27/2025, 7:57:52 PM
001	asd	1	¹150000.00	¹150000.00	5/27/2025, 9:11:20 PM
001	Chocalate	1	¹1500.00	¹1500.00	5/29/2025, 12:08:32 AM
001	Chocalate	1	¹1500.00	¹1500.00	5/29/2025, 12:08:36 AM
001	Chocalate	1	¹1500.00	¹1500.00	5/30/2025, 2:12:29 PM
001	Chocalate	1	¹1500.00	¹1500.00	5/30/2025, 2:12:30 PM
002	asd	1	¹150000.00	¹150000.00	5/27/2025, 9:13:10 PM
002	asd	1	¹100.00	¹100.00	5/27/2025, 11:52:02 PM
003	asd	1	¹1000.00	¹1000.00	5/27/2025, 9:16:32 PM
004	asd	1	¹1000.00	¹1000.00	5/27/2025, 9:29:08 PM
004	Charger	1	¹1000.00	¹1000.00	5/29/2025, 12:53:41 AM

Figure 50 - Sales report template



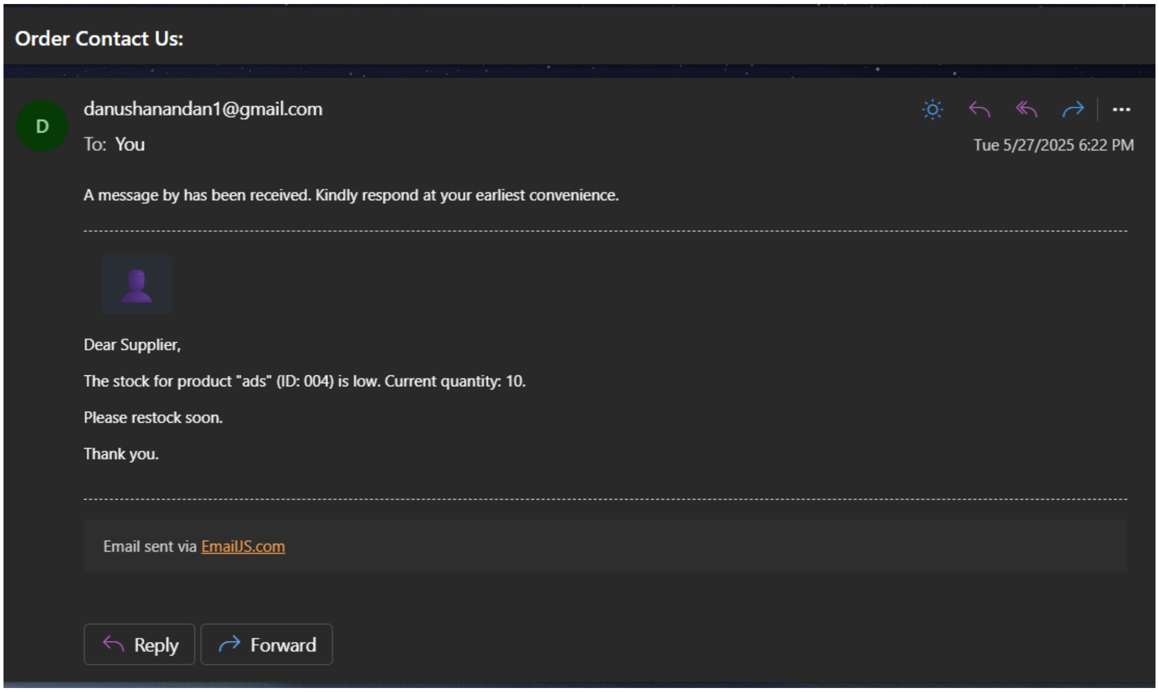
Stock Level Report

Generated: 5/30/2025, 2:47:28 PM

From: 2025-05-01 To: 2025-05-30

Product ID	Name	Category	Qty	Price	Expiry
10	cocunut	Home and lifestyle	20	¹250.00	2029-12-29
19	cocunut	Home and lifestyle	20	¹250.00	2029-12-29
001	Chocalate	Food and beverages	302	¹1500.00	2025-05-20
003	Rings	Fashion accessories	55	¹1000.00	2025-05-20
004	Cabel	Electronic accessories	9	¹1000.00	2025-05-20
005	Broom Stick	Home and lifestyle	20	¹250.00	2029-12-29
006	Rugby ball	Sports and travel	15	¹4500.00	2030-12-29

Figure 51 - Stock Report template



Order Contact Us:

D

danushanandan1@gmail.com

To: You

Tue 5/27/2025 6:22 PM

A message by has been received. Kindly respond at your earliest convenience.

Dear Supplier,

The stock for product "ads" (ID: 004) is low. Current quantity: 10.

Please restock soon.

Thank you.

Email sent via EmailJS.com

Figure 52 - Supplier auto mail template

Chapter 5: Conclusion

The journey of designing and building the Inventory Management System has been both challenging and rewarding. Through this project, we successfully transformed a traditional, manual stock-handling process into a smart, automated, and highly efficient system tailored for a modern supermarket environment.

By integrating Artificial Intelligence, real-time tracking, and predictive analytics, the system now provides accurate inventory data, minimizes human error, and helps management make faster and better-informed decisions. Features like auto-generated combo offers and automated supplier notifications ensure that the supermarket stays ahead of customer demand without overstocking or running out of essential products.

We also focused heavily on usability. A clean, user-friendly interface makes it easy for all users, from administrators to suppliers, to interact with the system smoothly. The inclusion of Augmented Reality (AR) further enhances customer experience by allowing them to view product information instantly through their mobile devices, making shopping more interactive and engaging.

Overall, this project has proven how powerful modern technologies can be in solving long-standing business problems. By replacing outdated manual methods with a smart, data-driven approach, the supermarket can now operate more efficiently, reduce costs, and better serve its customers. This system not only addresses current needs but also sets a strong foundation for future growth and digital transformation.

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Venkatesh, M. (2023) *Multiple disease prediction using machine learning and deep learning. International Research Journal of Modernization in Engineering Technology and Science (IRJMETS)*. Available at: https://www.irjmets.com/index.php (Accessed: 10 June 2025).

Appendices

Questions:

Q1: What are the main objectives of the Inventory Management System?

Q2: How does the system handle low stock scenarios, and what role does the Supplier play?

Q3: Can you explain the role of Machine Learning in this system?

Q4: What is the significance of the ER diagram in this project, and how is it structured?

Q5: How does the AR feature enhance customer experience?

Q6: Describe how the system ensures a responsive and user-friendly interface.

Q7: How would you extend the system to include a new feature, such as real-time chat support for customers?

Q8: What challenges might arise when implementing the stock prediction feature, and how would you address them?

Q9: How does the system manage combo offers, and what is the benefit for the business?

Q10: What steps would you take to optimize the database performance for real-time stock updates?

Log Sheet

Meeting Date	***Students Indices (participated***	***Supervisor Comments***	***Signature of the supervisor***

Table 2 - Log sheet

USER MANUAL

OF

INVENTORY MANAGEMENT

SYSTEM

FOR

OVERVIEW

The Inventory Management System was created for a supermarket as part of the Higher National Diploma in Software Engineering program at the National Institute of Business Management, Kandy, and this user manual offers detailed instructions on how to use its interfaces. With features like real-time stock tracking, automated alerts, AI-driven analytics, and augmented reality (AR), the system is made for efficient inventory operations. This handbook explains each interface in detail as it shows in the project documentation, including the functionalities for both admin and customer users.

1. Introduction

This Inventory Management System is a simple web tool made for supermarket staff and shoppers. It replaces old manual methods with smart features. It keeps track of stock in real time, uses AI to predict when you'll need more items, and even includes AR (Augmented Reality) to show extra product info in a fun way. This guide will walk you through every page and feature, for both admins and customers.

2. System Requirements

You need the following to use the system:

- A device such as a computer, tablet, or smartphone with a current browser (Chrome, Firefox, Safari)
- A steady internet connection to access the website and the database.
- A smartphone with a camera if you want to use the AR feature.
- No extra software - just open a browser and go online.
- A valid login account, either admin or customer

3. Accessing the System

1. Open your browser and go to the system link (for example: your Firebase URL).
2. You'll see the home page with options to explore or log in.
3. Admins and customers must log in to see their dashboards. If you're new, click to register.

4. Interface Descriptions and Usage

4.1 Landing Page (IDs 01–04)

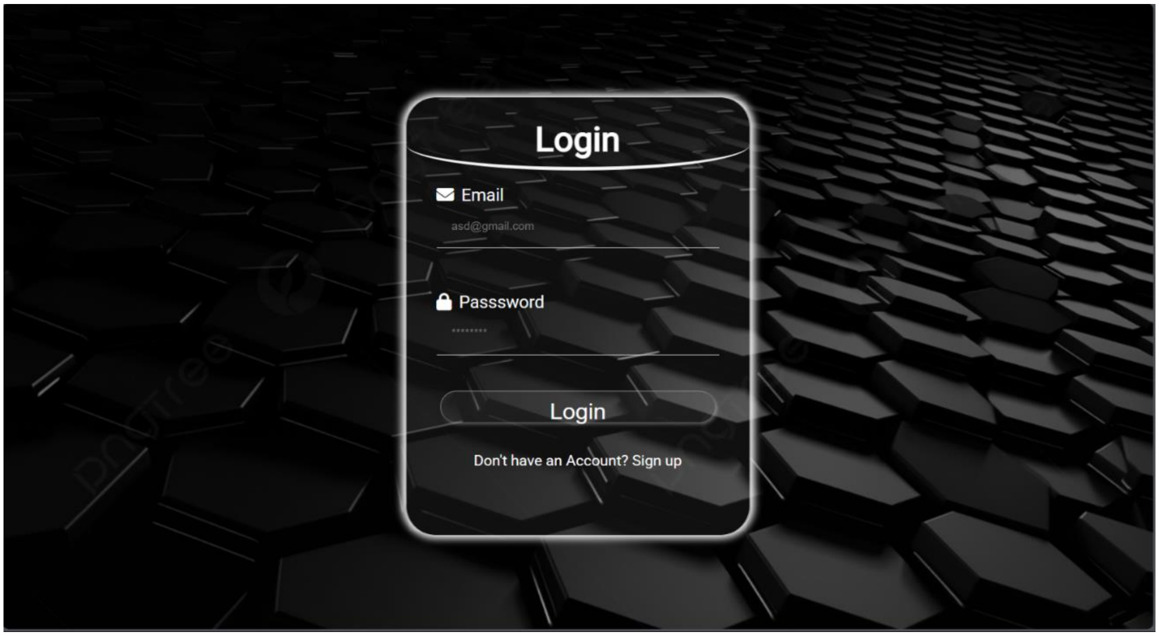
This is the first page you see. It explains the system and has buttons like **Get Started**, **Home**, **About Us**, **Features**, **Contact Us**, and **Login**.

- **Get Started/Login**: Takes you to the login page.
- **Home/About Us/Features/Contact Us**: Shows different info sections Make sure your internet is working well and use the contact section if you need help.

4.2 Login Page (ID 05)

This page lets admins and customers sign in.

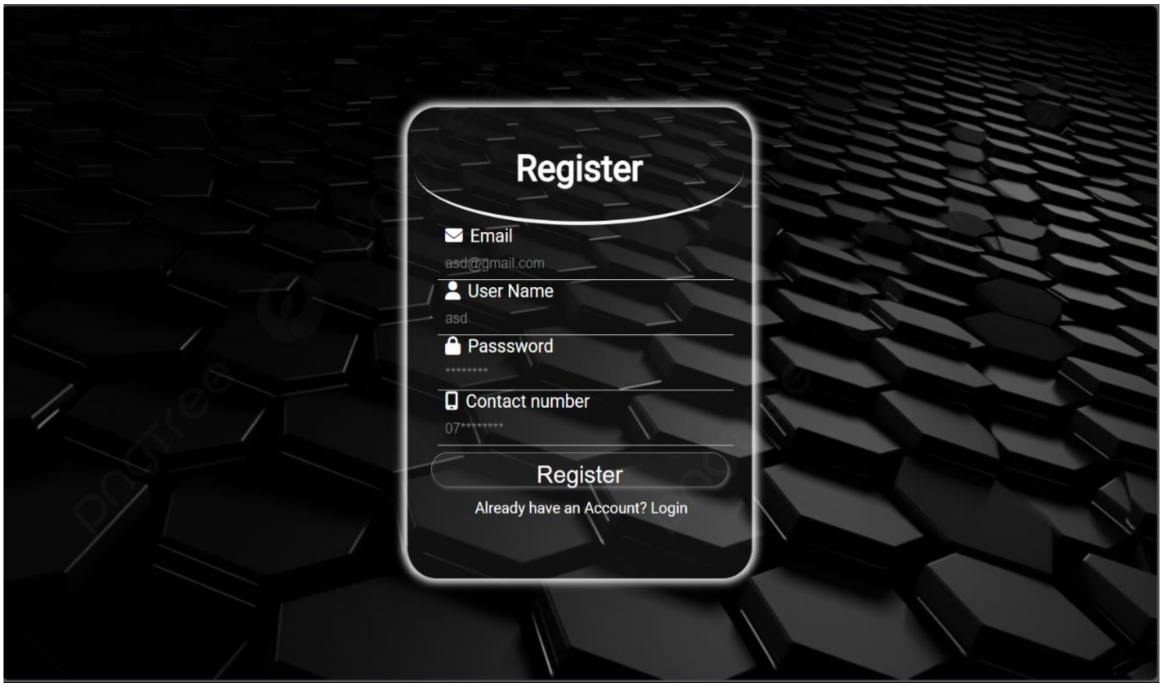
- Enter email and password, then click **Login**.
- If you’re an admin, you go to the admin dashboard. If you're a customer, you go to the customer dashboard.
- Wrong login? You’ll see: “Please enter valid credentials.”
- New users can click a link to register.



4.3 User Registration Page (ID 06)

This page lets new customers sign up.

- Click the link from the login page.
- Fill in email, password, name, and phone number, then click **Register**.
- If all info is OK, you’re redirected to the login page.
- Missing or wrong info? You’ll see: “Please enter valid details.” Choose a unique email and a strong password.



Email
asd@gmail.com
User Name
asd
Passsword
****
Contact number
07********

4.4 Admin Dashboard (ID 07)

Once an admin logs in, they reach the dashboard.

- See stock status: product cards show name, how many left, trends, progress bars
- Sales overview: a chart shows sales data.
- Combo offers: AI-suggested deals with images Use the menu to go to other admin pages.

4.5 Admin Menu Bar (ID 08)

This menu helps the admin navigate:

- **Dashboard**, **Profile**, **Report**, **Suppliers**, **Analytics**, **Notification**, **Product**, **Order**, **Logout**
  Click any option to go to that section.

4.6 Admin Report Generation (ID 09)

This page lets admins make reports.

- Stock report: choose dates and click **Generate Stock Report**
- Sales report: choose dates and click **Generate Sales Report**
- Wrong dates? You'll get an error: "Please enter valid dates."
  Always make sure the start date is before the end date.

4.7 Admin Supplier Management (IDs 10–13)

Ads, edits, removes, and finds suppliers.

- Click **Suppliers** in the menu.
- **Add Supplier**: fill in ID, name, contact, email, address, company name, then Submit.
- Similar steps to update or delete suppliers.
- **Search by ID** to find supplier info
  Do double-check everything before submitting.

4.8 Admin Analytics and Model Prediction (ID 14)

This helps train AI and forecast sales.

- Click **Analytics** in the menu.
- **Upload and Retrain**: pick your data file, then upload
- **Predict Sales**: enter a month and year, then click **Predict Sales**
- The system shows predicted sales by category and product, plus suggested deals
  Use accurate historical data in the right format.

4.9 Admin Notification and Low Stock Alerts (ID 15)

See low stock alerts and place orders.

- Click **Notification** in the menu
- On this page, see alerts with product info and quantity left
- Click **Notify Supplier** to go to the order form
- Fill in order details and click **Place Order**
- If OK, the order is saved, stock is updated, and confirmation looks like: "Order placed and product quantity updated!"

  Check order history below.

4.10 Admin Product Management (IDs 16–19)

Add, update, delete, find, filter, and purchase products.

- Click **Product** in the menu
- **Add Product**: fill in all details (ID, name, price, quantity, category, expiry date, image), then **Submit**
- **Update Product**: change details in a popup, then **Submit**
- **Delete Product**: confirm the popup
- **Search Product ID**: find individual items
- **Filter by category**: use the dropdown
- **Buy**: reduces stock if available, else shows "Product out of stock." Ensure pics are clear and expiry dates are correct.

4.11 Admin Order Management (ID 20)

View and place orders manually.

- Click **Order** in the menu
- Fill in product ID, quantity, name, supplier, and supplier email, then **Place Order**
- If it's OK, you'll see confirmation and stock updates Past orders show below.

4.12 Admin Profile (ID 21)

View or update admin details.

- Click **Profile** in the menu.
- See your name, email, contact number, and more
- If editing is allowed, change details Update contact info to stay reachable.

4.13 Customer Dashboard (ID 22)

Once a customer logs in:

- See current offers and sales
- Can click to see product details or AR view

4.14 Customer Product Details (ID 23)

See full product info:

- Product ID, name, price, category, stock, and image
- Click **Buy** to purchase if that is enabled

4.15 Customer AR Product Details (ID 24)

View products in AR:

- Click **AR** in the product view
- Use your phone to scan a marker image
- The product details appear overlaid on your camera view Make sure lighting is good and your camera is stable.

5. Troubleshooting

- **Can't log in?** Check your email, password, and role. Email admin if you forgot.
- **Pages not loading?** Check your internet or clear browser cache.
- **AR not working?** Ensure your camera and marker image are clear.
- **Database errors?** Check that the Firebase link is correct and the network is up.

- **Report errors?** Make sure dates are in the right order.
- **Supplier/order issues?** Double-check emails and IDs and look at past orders.

6. Glossary

- **AR (Augmented Reality):** Shows product info through your camera.
- **Firebase:** The database that stores system data.
- **Low Stock Alert:** Triggers when stocks falls below a set level.
- **Combo Offer:** AI-created promotional package.
- **Dashboard:** The main screen for admins or customers.