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DoseLogix: Pharmaceutical Distribution Management System

In partial fulfilment of the requirements for the degree of
Bachelor of Science in Computer Science

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Certificate



We accept the work contained in the report titled
“DoseLogix: Pharmaceutical Distribution Management System”

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as a confirmation to the required standard for the partial fulfilment of the degree of
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January 05, 2026

DECLARATION

We hereby declare that this project report is based on our original work except for citations and quotations which have been duly acknowledged. We also declare that it has not been previously and concurrently submitted for any other degree or award at Bahria University or other institutions.

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Specially dedicated to
my beloved grandmother, mother and father
(YASIR JAMIL)
my beloved grandmother, mother and father
(ALI RAZA)

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DoseLogix: Pharmaceutical Distribution Management System

ABSTRACT

The main objective of this venture is to overcome major constraints of the current Pharmaceutical Distribution Management Systems especially among the small and medium sized distributors. The existing software tends to be either old-fashioned in UI/UX, inconsistent data flow, expensive, or crippling with a deficit of certain industry-specific functional support. The key aim of DoseLogix is to develop a low-cost, contemporary, and powerful PDMS tool that can easily manage such vital functions as full inventory and detailed financial monitoring. This dedicated system is specifically designed to offer a secure authentication, the ability to support multi-tenancy, and built-in advanced analytics to support robust business expansion in the future.

The system architecture is a service-oriented system design with a modern Next.js front end and an asynchronous backend based on Express.js on the Node.js platform, and a dedicated Python micro-service to perform advanced computational functions. It uses JavaScript and TypeScript to develop the core applications, and uses Python libraries, including Scikit-learn and Pandas, to carry out the most important machine learning operations. The system uses MongoDB Atlas, a NoSQL document database that is a cloud-based system, to support data persistence across all the system modules with a high level of scalability and real-time data management of data.

The implementation successfully provided a powerful centralized application that included lean sales and purchase invoicing, real-time inventory controls with First Expiry First Out (FEFO) logic, and delivery logs. One of its major inventions is the inbuilt AI-based module, which makes correct predictions of up to seven days of future product sales based on the historical data interpreted by the best-performing models on our dataset. The system also includes a critical web scraping system to automatically gather the most recent health advices from recognized Pakistani health

advisories to help the distributors make proactive buying choices. The most important operational improvements are tracking the aging of receivables, automated stock notifications, and showing the previous three sales prices right in the sales invoice creating process.

As a concluding remark, DoseLogix is able to meet its major mandate, that is, providing an efficient, secure and modernized Pharmaceutical Distribution Management System, which is specifically designed to suit small and medium-sized enterprises. This is a specialized platform that directly addresses and overcomes key industry gaps posed by old, generalized or too expensive distribution software. The effective integration of advanced, user-centric features, including AI sales forecasting, latest health news from advisories and real-time financial tracking, significantly increases operational accuracy and supply chain responsiveness. DoseLogix is positioned as a highly reliable, scalable and industry-specific software that makes life easier and promotes sustainable growth of business among pharmaceutical vendors.

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LIST OF SYMBOLS / ABBREVIATIONS

DMS	Distribution Management System
PDMS	Pharmaceutical distribution management systems
SDLC	Agile Software Development Life Cycle
SSR	Server-Side Rendering
OTP	One Time Password
FEFO	FIRST EXPIRY FIRST OUT
UI	User Interface
UX	User Experience
JWT	JSON Web Token
LR	Linear Regression
RF	Random Forest
LSTM	Long Short Term Memory
SARIMA	Seasonal Auto-Regressive Integrated Moving Average
MAE	Mean Absolute Error
MSE	Mean Squared Error
RMSE	Root Mean Squared Error

CHAPTER 1

INTRODUCTION

1.1 Background

The pharmaceutical sector relies heavily on accurate inventory management, robust invoice management and reliable financial tracking. However, despite the critical nature of these tasks for running a business smoothly, many small or medium scale distributors, including us, have faced limitation in the capabilities of the available software.

Most of the available distribution management systems (DMS) fall into either of these three categories. One where we encounter outdated legacy applications, which offers poor data consistency, fragmented data flows and limited support. On the other hand we have full fledged DMS but they are generalized for all type of distribution systems i.e Dynamics 365. Dynamics 365, while being powerful and robust, it is not specifically tailored to cater the needs of a pharmaceutical DMS. Customizing such a generalized system is often time consuming, complex and expensive. And the last one are the applications that are updated and generalized but are so expensive for the small to medium scaled distributors to afford.

Because of all these gaps, small and medium scale distributors tend to choose outdated legacy applications with inconsistent data flow and inefficient financial tracking with an application full of bugs and flaws. This eventually affects the financials of the distributors and highly impacts the growth of the distributors.

To address these challenges, this project proposes *DoseLogix*, a specialized and modern DMS tailored specifically for the pharmaceutical setup. DoseLogix is designed to cover the shortcomings of existing solutions, covering the cons of each, being developed on the latest technology with consistent data flow and an efficient financial tracking solution that aligns with the operational reality of small and medium scale pharmaceutical distributors.

1.2 Problem Statements

Small and medium scale pharmaceutical distributors lacks an efficient, robust, affordable and industry specific DMS that aligns with their workflows. Existing solutions are either outdated with inconsistent data flow, generalized systems that are costly and difficult to customize or modern applications that are financially out of reach. These limitations hinder business growth. Therefore, there is a need for a modern, robust, specifically tailored and cost-effective DMS.

1.3 Aims and Objectives

The goals of this project are shown as following:

- i) To create a lean invoicing module to support purchase invoices and sales invoices to manage inventory quantities.
- ii) To develop an effective financial tracking system that sustains the balances and the debit and credit histories.
- iii) To incorporate AI based sales forecasting to assist distributors in making purchasing decisions.
- iv) To incorporate web scraping to deliver up-to-date news on health in Pakistan.

- v) To make it affordable and scalable, to enable it to be available to the small and medium scale distributors to facilitate future expansion.
- vi) To provide authentication, authorization and multi-tenancy simultaneously.

1.4 Scope of Project

The scope of DoseLogix is to design and develop a specialized DMS tailored exclusively for small and medium scale pharmaceutical distributors. The scope of this system is to design a centralized application handling all critical operational activities such as invoice management, inventory controlling and monitoring cash flows.

DoseLogix allows users to enlist new products, register new customers, employees and brands, and manage stock levels with their respective batch level entries.

On the purchase side, it allows user to generate purchase invoice of certain products respective to their brands and update stock at the inventory level. On the sales side, it allows the users to generate sales with the record of partial payments, credit sales and automation of stock updation in the inventory.

A complex yet critical component is integrated financial tracking mechanism that helps the distributors in maintaining the outstanding balances, debit and credit transactions, and payment histories of customers and brands. This comprehensive component help distributors in ensuring the clarity in deliverables and receivables. Delivery log is also critical as it takes care of the deliveries assigned to the employees linking their respective deliverable invoices for overall oversight of the sales invoices.

Our system incorporates AI-driven sales forecasting, which enables users to analyze historical sales and predict the future demand of coming days sales. Furthermore, DoseLogix includes a web scraping module which is specifically

designed to bring the latest health related news to the distributors. This lets distributors to plan their stock needs effectively which will ultimately improve their business growth.

Where implementing all these features were a part of scope of this project but security is also a major concern here. To tackle that we have embedded the system with authentication, authorization and multi-tenancy, ensuring data transparency and each registered user can act independently accessing only their own data.

On the whole, DoseLogix is conceived as a secure, current, and convenient DMS, which enhances the effectiveness of its operations, increases the financial accuracy and enables the pharmaceutical distributors with the means that reflect the realities of their working processes. The scope of the project includes all the key features needed to develop a stable, scalable, and industry-specific platform that will be able to sustain both long-term operational and business development.

CHAPTER 2

LITERATURE REVIEW (and/or SRS)

2.1 Pharmaceutical Distribution Management Systems: Overview

Pharmaceutical distribution management systems (PDMS) are digital designed platforms to overview and manage the distribution of medicines from distributors to retailers. These systems manage inventories, invoice management and overview of cash flows. With the complexity of medicine inventories such as batch numbers, stock expiry, bonuses, discount etc., PDMS requires a software that handles the accurate stock management, financial tracking and maximized automation i.e. delivery logs, ledgers etc.

2.1.1 Existing Solutions

Existing solutions for PDMS such as Dynamic 365, Nizisolution pharma distribution software, Softronix pharma distribution software or offline pharmaceutical inventory management tools. These softwares are either outdated or not specifically tailored for fulfilling pharmaceutical needs.

2.1.2 Current Limitations

Despite availability, most existing solutions have significant gaps that make them less suitable for pharma industry's distributors. The limitations are listed below.

- **Complex and unfriendly UI:** Most of the users are not tech savvy and using the system needs a lot of training to develop muscle memory.
- **Inconsistency in data flow:** Some of the offline available softwares have the inconsistency in data flow and aggregation.
- **No automated alerts:** Most of the locally available online apps do not have automated alerts for low stock or near expiry of medicine.
- **Latest health news:** None of the available solutions to our find updates the user with latest health related news of Pakistan.
- **Demand forecasting:** Most of the available solutions do not have the AI based forecasting that helps in predicting sales for upcoming days that affects the purchasing decision.

2.1.3 DoseLogix — Proposed Solution

DoseLogix is a PDMS which is modern and provides a user-friendly UI/UX experience covering operational in-efficiencies in current systems. DoseLogix address all the listed limitations in the available solutions.

- **User-friendly and clean interface:** The solution is designed by keeping it user-friendly and clean UI experience so that the users with minimal technical exposure can use it without extensive training.
- **Accurate inventory and batch management:** DoseLogix handles the inventory and batch management with bonuses and returns efficiently, ensuring no error or inaccuracy.

- **Automated alerts and reminders:** This system notifies the users with email notifications about low stock, near expiry, remaining balances of customers and OTPs for signup and forget password.
- **Integrated AI-based sales forecasting:** DoseLogix predicts upcoming 7 days sales helping in better purchasing decisions.
- **Latest health news integration:** This application scrapes health related news from recognized Pakistani health authorities(NIH, Chughtai Lab), and updates in our application so that distributors can stay informed about outbreaks and seasonal diseases.
- **Financial Overview:** Debit and credit payments to customers and brands are automatically reflected in the ledger and reports that gives an overview of cash flow.

2.2 Related Work

In researches, it's been documented that the external real world signals, social media trends and news from certified health advisories highly impacts the sales. These sources help distributors to being updated and be ready to meet the current need of market [1]. These external signals can help businesses to detect the requirement of market and proactively make a move, reducing the risk of stock shortage and improving supply chain responsiveness. DoseLogix's vision align with this approach and show latest news from health advisories to distributors to stock up for emerging needs.

Demand forecasting is also crucial for managing the pharmaceutical supply chain and distribution as mismatches between supply and demand can result in product spoilage, disturbing cash flows or even a bigger threat, endangering patients [2] [3]. Conventional techniques such as ARIMA and regression usually find it difficult to reflect the nonlinear nature, seasonal changes and other unforeseeable market factors in pharmaceutical sales data [2] [4].

In order to address these weaknesses, Artificial Intelligence (AI), Machine Learning (ML), and Deep Learning (DL) algorithms are widely utilized in research [3]. Prediction with the help of ML algorithms like the Random Forests (RF) and Support Vector Machines (SVM), whereas the more modern technologies of the DL (Long Short-Term Memory (LSTM) and Recurrent Neural Networks (RNNs)) are preferred due to the possibility of working with time-series data and long-term relationships [2] [4]. State-of-the-art models like such as Temporal Fusion Transformer (TFT) and TimeGPT also demonstrate high performance in capturing complex patterns [5].

The predictive model, no matter how sophisticated, has relied on the quality and integrity of the historical sales data in the time series as the fundamental basis of its sustained effectiveness. An important part of data quality is the treatment of the occurrence of outliers, set of values that are very different or inconsistent with the rest of the data. These unusual and non-repetitive events may affect historical data sets, but are either gross errors (related to processing errors that need correction when identified) or true outliers (related to particular events such as promotions or weather). When such anomalous values are incorporated in the forecast calculation, then they may compromise the model results heavily. If the presence of an outlier is detected, it should be replaced by a more appropriate and typical value, which generally improves prediction accuracy. Correction methods in outliers can involve the replacement of outliers by the mean of the directly neighbouring observations. The analytical tools and statistical techniques are also used to identify the outliers accurately. Box-plot technique is an effective statistical test and it has a rule according to which one can define outliers in terms of quartile ranges from 1.5 to 3.0 to differentiate between moderate and severe outliers. It is also noticed that for outliers detection, median should be used instead of mean. As a result, comprehensive data preprocessing is acknowledged as a crucial step towards successful time series forecasting [3].

In conclusion, the literature will indicate that the latest news highly influence the sales of coming days, so the distributors need to be readily updated so that they can fulfill their role in supply chain proactively. The current AI and ML models include incredible predictive power, thus can help distributors to predict their demand for coming days, ultimately improving the business growth and supply chain responsiveness.

2.2.1 Comparative Analysis of Existing Solutions

The Table 2.1 presents comparison between DoseLogix and some other famous existing solutions around the globe, including those available in Pakistan such as Softronix Pharma distribution software, Nizi Solution Pharma distribution software, Microsoft Dynamics 365 and locally available offline solutions.

Table 2.1: Comparative analysis of Existing Solutions

Feature	<u>DoseLogix</u>	<u>Offline Solutions</u>	Softronix[6]	<u>Nizi Solutions[7]</u>	<u>Dynamics 365[8]</u>
Accurate Data flow	✓	✓ (Partial)	✓	✓	✓
Alerts / notifications	✓		✓		✓
User-friendly UI/UX	✓		✓	✓	✓
Industry specific solution	✓	✓	✓	✓	
Demand Forecasting	✓				
Latest Health News	✓				

CHAPTER 3

DESIGN AND METHODOLOGY

3.1 Development Method

Agile Software Development Life Cycle (SDLC) has been utilized as the development method in developing DoseLogix. Agile was chosen here as it is specifically used when there is the chance that the requirements might evolve as the progress happens. As DoseLogix has so many integrated modules, each of the implemented modules needed to be developed, tested, and refined iteratively. By choosing the development method Agile, the team was able to build this system piece by piece, leveraging the continuous testing and refinement to improve the development process.

3.1.1 Why Agile Was Chosen?

Agile was chosen for DoseLogix due to its iterative nature, which allows the development to be evolved according to the evolving requirements. Unlike traditional methods like Waterfall, where the development method is rigid, sequential approach which essentially is not a suitable option for our project type. Agile allowed the team to re-prioritize the requirements after every step and update or refine the development structure accordingly.

3.2 Tools and Technologies

DoseLogix has been designed based on the latest web technologies, open-source frameworks and popular development tools to allow it to be performed, scaled, and reliable. The selected technology stack allows the seamless integration of frontend, backend, database, and AI components and the efficient development processes and the security of the data processing.

3.2.1 Programming Languages

DoseLogix was built using the following primary languages:

- JavaScript (ES6+)
- TypeScript
- Python

3.2.1.1 JavaScript and TypeScript

The main language of frontend and backend development is JavaScript. Other modules used TypeScript to support type safety, reduce runtime issue and improve the maintainability of code.

Collectively they are the key drivers of major aspects like user interfaces, API processing, authentication code and business processes.

3.2.1.2 Python

The tasks of AI-driven sales forecasting, web scraping and preprocessing of data were implemented using Python. It has vast machine learning packages, including scikit-

learn, pandas and NumPy, which allow it to be used to create valid predictive models that can be attached to the service behind the system. And the functionality of web scraping to scrape the latest news from Pakistani Health Advisories.

3.2.2 Frameworks and Libraries

The different frameworks and libraries are used in this project to develop a complete solution.

3.2.2.1 Frontend Framework

The following technology is used for the frontend development of the solution.

- **Next js:** The frontend interface was constructed with Next.js that supports server-side rendering (SSR), better performance, and optimization of search engine optimization. It has a component-based architecture that guarantees a clean and modular UI framework that can be used in scalable enterprise applications.

3.2.2.2 Backend Frameworks

The following technologies are used for the backend development.

- **Node js:** The basic node.js is a run time that has asynchronous functions.
- **Express js:** It provides a routing framework, middleware stack, which is required to handle API calls, authentication, invoice processing, and business logic.

- **Python:** it provides a vast range of libraries like pandas, NumPy, pickle, BeautifulSoup etc for AI model training and web scraping techniques.

3.2.3 Development Tools

The development tools used in the development of DoseLogix are Visual Studio Code, Postman, GitHub and MongoDB compass.

3.2.3.1 Visual Studio Code

Visual studio code served as the main development tool that helped in writing and maintaining the code in their respective file structures in frontend, node js backend and python scripts.

3.2.3.2 Postman

Postman has been used as a primary helper for testing the REST APIs, helping in validation requests and responses.

3.2.3.3 GitHub

GitHub was used for the version control, team collaboration and streamlining development workflow.

3.2.3.4 MongoDB Compass

MongoDB compass was used to visually interact and inspect data, schema verification and querying.

3.3 Architectural Design

DoseLogix is a service-based architecture, scalable, and modular ecosystem, which incorporates a modern Next.js frontend, a Node.js back-end, and an AI-driven python server. All user communications, such as form submissions, data visualizations and reporting processes are managed in the frontend (Next.js). These requests are handled by the backend (Node.js) with the business logic and API endpoints and is in charge of all communication between the user interface, database, and the AI server. Without any complex data structures, the backend stores and retrieves data in the form of structured data, including inventory, customers, users, and news insight, using MongoDB to provide an efficient and flexible data handling approach. Meanwhile, an autonomous Python server will do the AI-guided sales forecasting and retrieve the most recent certified news about health matters so that distributors learn in advance about the necessity in various medicine in the season. The Python service exposes its services to the backend, which in turn sends the processed insights to the frontend and communicates with the AI to get the results of the news trends and trends. The Figure 3.1 shows the architecture of DoseLogix.

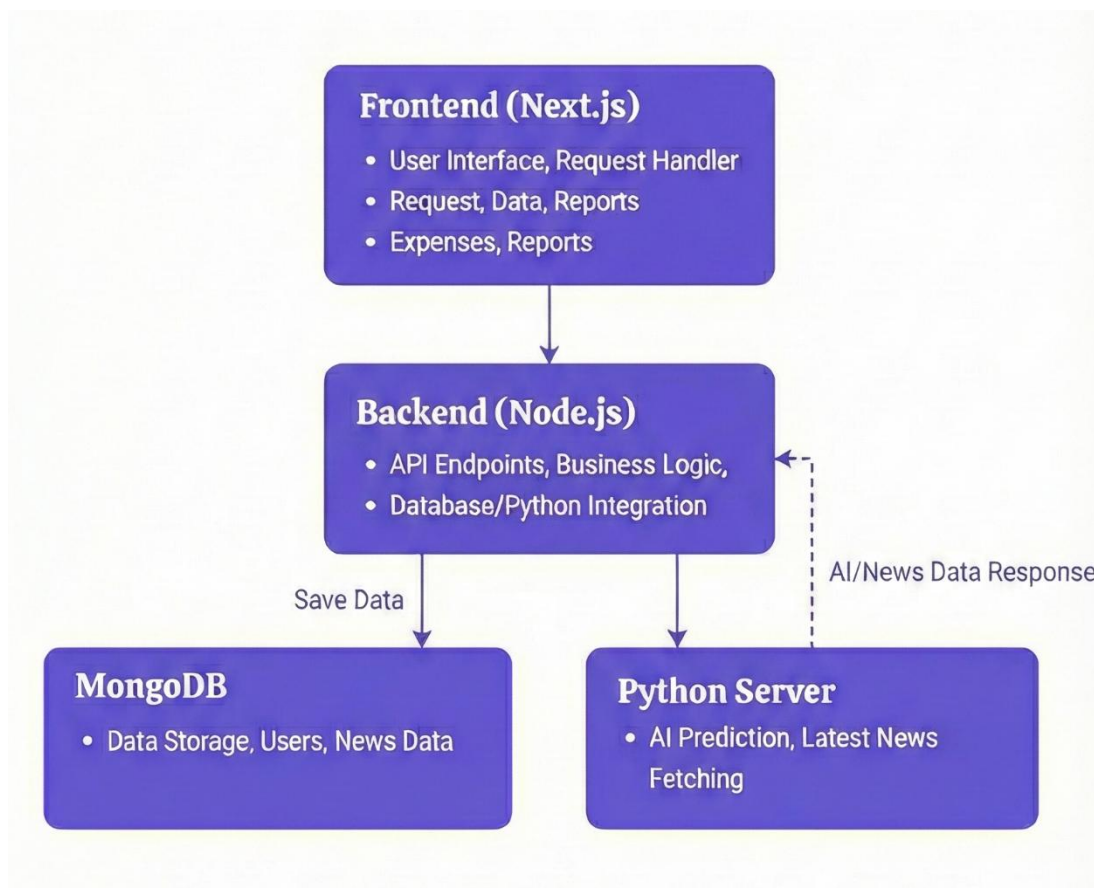


Figure 3.1: Architectural Design of DoseLogix

3.4 Database Technology

MongoDB was selected as the main database based on its flexibility, scalability and document architecture. It is an effective storage of all system modules. The modules are listed below.

- Brands
- Customers
- Employees
- Products
- Inventory
- Purchase invoices
- Sales invoices

- Ledger

3.4.1 MongoDB Atlas

MongoDb's database storage platform Atlas is utilized here for secure and encrypted cloud storage.

3.5 Use Case Diagrams

Use case diagrams is the general view of interactions between users and DoseLogix system. It indicates the actors and their interaction and accessibility within the application.

Users may use the application for managing customers, brands, employees, products, area/sub-area, group/sub-group, sales invoices, purchase invoices and profile information. The system will manage the dashboard, inventory, reports, delivery logs and ledger. These interactions are illustrated in the diagram to determine the functional requirements of the actors.

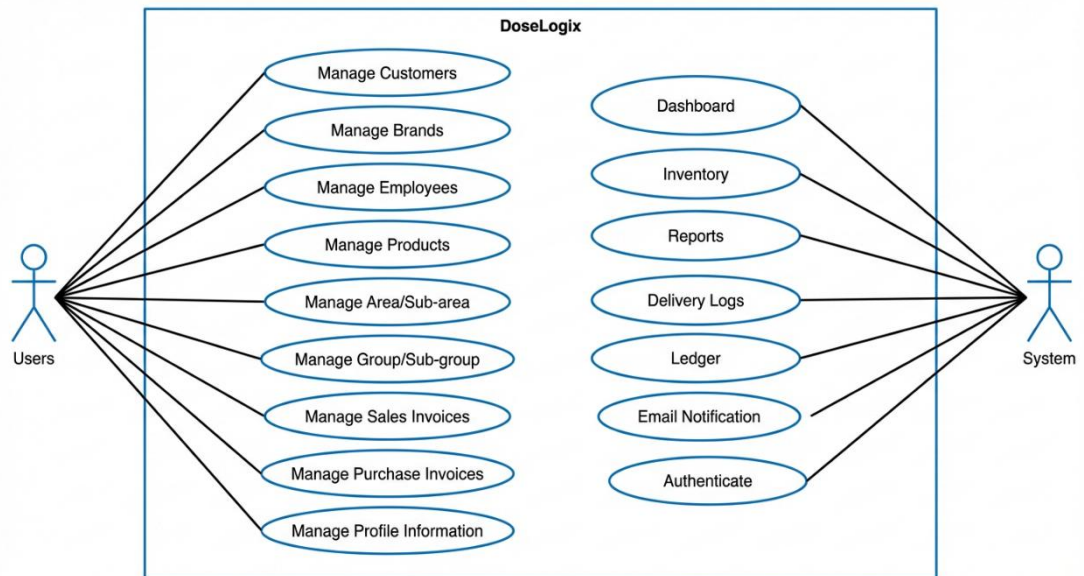


Figure 3.2: Use Case Diagram

3.5.1 Use Cases

Table 3.1: Use Case 1

USE CASE ID	UC-01
USE CASE NAME	DASHBOARD
Actors	User
Description	<ul style="list-style-type: none"> • Comprehensive insights for your pharmaceutical distribution. • Brand-Wise Sales Performance • Area-Wise Sales Distribution chart • Inventory Alerts • Latest News And Predictive Analytics
Trigger	User logs in or navigates to “Dashboard” page.
Preconditions	User is logged in and authenticated.
Post conditions	The Dashboard page loads successfully and shows important summary data to the user.
Normal Flow	The user Successfully login and see the dashboard page.
Exceptions	N/A
Includes	Filters
Special Requirement	N/A
Assumptions	Core metrics, such as Total Sales, cash sales and credit sales.
Notes And Issues	N/A

Table 3.2: Use Case 2

USE CASE ID	UC-02
USE CASE NAME	MANAGE CUSTOMERS
Actors	User
Description	<ul style="list-style-type: none"> • Create new User • Search Customer • Edit customer Details • ON/OFF Customer Status
Trigger	User navigates to the "Customers" page.
Preconditions	User is logged in and authenticated.
Post conditions	Customer Records is successfully added, updated, or viewed with applied filters.
Normal Flow	<ul style="list-style-type: none"> • User navigates to customers page. • User Add or Update records.
Includes	Search/Filter Customers.

Table 3.3: Use Case 3

USE CASE ID	UC-03
USE CASE NAME	MANAGE BRANDS
Actors	User
Description	<ul style="list-style-type: none"> • Add new Brands • Search Brands • Edit/Manage Brands Details • ON/OFF Brands Status
Trigger	User navigates to the "Brands" page.
Preconditions	User is logged in and authenticated.
Post conditions	Brands Records is successfully added, updated, or viewed with applied filters.
Normal Flow	<ul style="list-style-type: none"> • User navigates to Brands page. • User Add or Update records.
Exceptions	User attempts to add a brand with a name that already exists, the System blocks the creation and displays an error.
Includes	Search/Filter Brands.
Assumptions	N/A
Notes and Issues	N/A

Table 3.4: Use Case 4

USE CASE ID	UC-04
USE CASE NAME	MANAGE EMPLOYEES
Actors	User
Description	<ul style="list-style-type: none"> • User Add New Employee • User Assign Designation To the Employee • Search Employee Details • Edit/Manage Employee Details • ON/OFF Brands Status
Trigger	User navigates to the "Employees" page.
Preconditions	User is logged in and authenticated.
Post conditions	An Employee record is successfully created, updated, or its status is modified.
Normal Flow	<ul style="list-style-type: none"> • User navigates to Employee page. • User Add or Update records.
Alternative Flow	N/A
Assumptions	N/A
Notes and Issues	N/A

Table 3.5: Use Case 5

USE CASE ID	UC-05
USE CASE NAME	MANAGE PRODUCTS
Actors	User
Description	<ul style="list-style-type: none"> • User Add New Product • Search Product Details • Edit/Manage Product Details • ON/OFF Brands Status
Trigger	User navigates to the "Products" page.
Preconditions	User is logged in and authenticated.
Post conditions	A Product record is successfully created, updated, or its status is modified in the database.
Normal Flow	<ul style="list-style-type: none"> • User navigates to Products page. • User Add or Update records.
Assumptions	N/A
Notes and Issues	N/A

Table 3.6: Use Case 6

USE CASE ID	UC-06
USE CASE NAME	MANAGE SALES INVOICES
Actors	User
Description	<ul style="list-style-type: none"> • User Generates New Sales Invoice • Search Sales Invoice Details • Track payment • View Details of sales Invoice
Trigger	User navigates to the "Sales Invoices" page.
Preconditions	User is logged in and authenticated.
Post conditions	A new Sales Invoice is successfully created and recorded, Inventory is reduced, delivery log is created and the Ledger is updated.
Normal Flow	<ul style="list-style-type: none"> • User navigates to Sales Invoices page. • User Add or Update records.
Alternative Flow	N/A
Special Requirement	Inventory must be updated immediately upon invoice finalization (deduction of stock).
Assumptions	N/A
Notes and Issues	N/A

Table 3.7: Use Case 7

USE CASE ID	UC-07
USE CASE NAME	MANAGE PURCHASE INVOICES
Actors	User
Description	<ul style="list-style-type: none"> • User Generates New Purchase Invoice • Search Purchase Invoice Details • Track Purchase History • View Details of Purchase Invoice
Trigger	User navigates to the "Purchase Invoices" page.
Preconditions	User is logged in and authenticated.
Post conditions	A new Purchase Entry is successfully recorded, and Inventory stock levels are increased.
Normal Flow	<ul style="list-style-type: none"> • User navigates to Purchase Invoices page. • User Add or Update records.
Special Requirement	Inventory must be increased immediately upon purchase entry finalization.
Assumptions	N/A
Notes and Issues	N/A

Table 3.8: Use Case 8

USE CASE ID	UC-08
USE CASE NAME	INVENTORY
Actors	User, System
Description	<ul style="list-style-type: none"> • User to monitor current stock levels • Search for Inventory Details • System Update Level • View Details of batch Information • Stock Status
Trigger	User navigates to the "Inventory" page or a stock level changes (System).
Preconditions	User is logged in and authenticated.
Post conditions	N/A
Normal Flow	<ul style="list-style-type: none"> • User requests the Inventory page. • System retrieves real-time stock levels, batch details, and calculated inventory value. Data is displayed to the User.
Alternative Flow	N/A
Includes	N/A
Special Requirement	Inventory updates must be real-time as they are linked to core UC-06 (Sales) and UC-07 (Purchase).
Assumptions	N/A
Notes and Issues	N/A

Table 3.9: Use Case 9

USE CASE ID	UC-09
USE CASE NAME	LEDGER
Actors	User, System
Description	<ul style="list-style-type: none"> • User to review all historical financial transactions (sales, purchases, expenses) • System maintains the ledger • System stores daily snapshots • Provides filtering • Export capabilities for analysis
Trigger	<ul style="list-style-type: none"> • User navigates to the "Ledger" page. • A new/update record happened in sales, purchases and expenses.
Preconditions	User is logged in and authenticated.
Post conditions	Ledger data and summaries, filtered by user criteria, are successfully displayed OR the data is exported.
Normal Flow	<ul style="list-style-type: none"> • User navigates the Ledger page. • System aggregates and retrieves the requested financial transactions from the database. System renders the transaction list and calculates financial summaries (e.g., total income, total expenses). User reviews the data.
Alternative Flow	N/A
Includes	N/A
Special Requirement	<ul style="list-style-type: none"> • Ledger must be tamper-proof, with automated daily snapshots managed by the System.

	<ul style="list-style-type: none">• A Sync button to sync records in case something is missing.
--	---

Table 3.10: Use Case 10

USE CASE ID	UC-010
USE CASE NAME	REPORTS
Actors	User, System
Description	<ul style="list-style-type: none"> • User to access and analyze various detailed business reports (such as Sales by Customer, Product and Brands). • System aggregates data, generates the reports, displays them
Trigger	User navigates to the "Reports" section.
Preconditions	User is logged in and authenticated.
Post conditions	N/A
Normal Flow	<ul style="list-style-type: none"> • User navigates to Reports page. • User Add or Update records.
Alternative Flow	User selects the "Export" button; the System compiles the displayed data into a file (e.g., Excel/PDF) for download.
Exceptions	N/A
Includes	N/A
Special Requirement	Reports must be secure and strictly adhere to the User's multi-tenancy access rules.
Assumptions	N/A
Notes and Issues	N/A

Table 3.11: Use Case 11

USE CASE ID	UC-11
USE CASE NAME	MANAGE EXPENSES
Actors	User
Description	<ol style="list-style-type: none"> 1. Add new Expenses 2. Search Expenses 3. Edit/Manage Expense Details 4. ON/OFF Expense Status
Trigger	User navigates to the "Expenses" page.
Preconditions	User is logged in and authenticated.
Post conditions	A new Expense record is successfully created, the Ledger is updated, and the expense is available for reporting.
Normal Flow	<ul style="list-style-type: none"> • User navigates to Expenses page. • User Add or Update records.
Alternative Flow	N/A
Exceptions	N/A
Includes	N/A
Special Requirement	N/A
Assumptions	N/A
Notes and Issues	N/A

CHAPTER 4

DATA AND EXPERIMENTS (and/or IMPLEMENTATION)

4.1 Frontend

The frontend of DoseLogix is developed using Next.js [9], a modern framework of React. The primary software used for development is visual studio code [10].

The general aim of DoseLogix frontend to provide a user friendly, responsive experience and majorly for distributors who are not tech enthusiasts. All the screens are carefully designed, keeping in mind about the targeted audience. The interface is designed using professional UI principles, using modular structures and dialog based forms. Toast is used to update users about the completion or failure of task.

The application on start opens a login page, asking the user to log in as shown in Figure 4.1. This system only allow authenticated users to enter their dedicated profile and access their data.

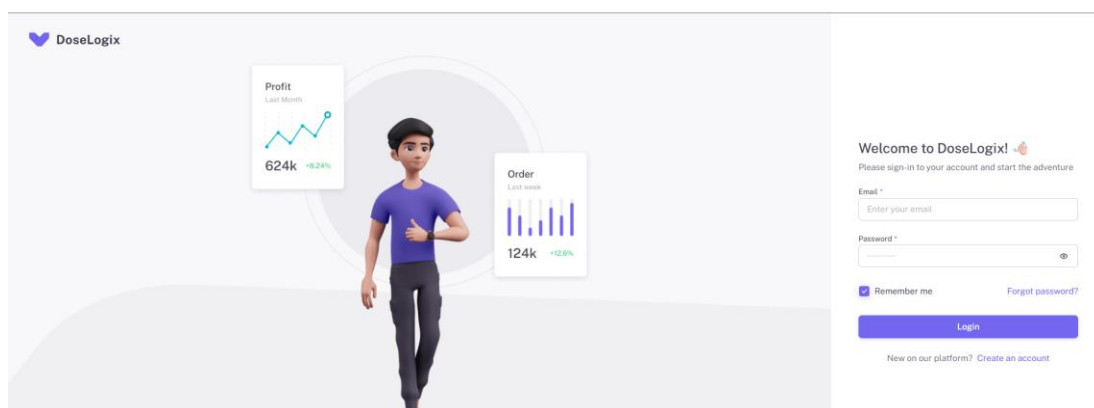


Figure 4.1: Login Screen

Once logged in, the users are presented with dashboard and quick vertical side bar menu for navigation as shown in Figure 4.2.

The side bar menu is consisted of multiple modules listed in the following bullets.

- Customer management
- Brands management
- Employees management
- Products management
- Purchase invoices
- Sales invoices
- Inventory tracking
- Reports
- Delivery logs
- Expenses management
- Ledger and basic finance tracking

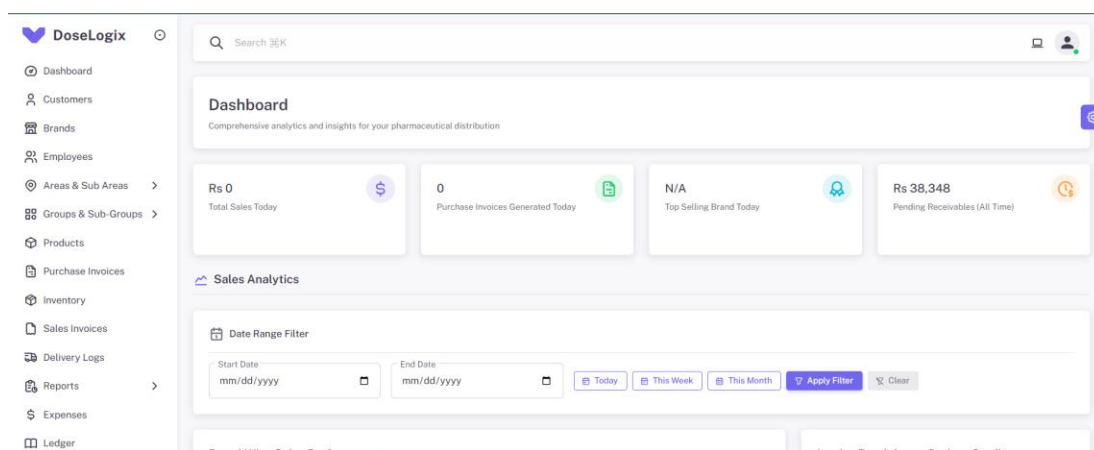


Figure 4.2: Dashboard and Navigation

The side bar menu ensures that the user can navigate anywhere quickly.

The records listing of components like registered customer, brands, employees, products, inventory and invoices, all of these are implemented in a tabular layouts with

filters and consistency throughout the application. There is a notification through e-mail system that notifies users with low stock, expiry of medicines and OTPs for account registration and forgot password.

The invoice generation screens are designed in a way, its easy for use and provides a reactive response experience. It has seamless creation, editing and viewing of invoices. The sales invoice screen is shown in Figure 4.3.

Figure 4.3: Sales Invoice Screen

Key UI features include:

- Searchable product dropdowns
- Automatic and intelligent batch selection
- Last three sales of the selected products
- Auto-calculation of bonuses, discounts
- Dynamic invoice rows
- Running totals and grand totals
- Customer credit display

Once saved, invoices can be previewed or printed.

The system automatically aggregates data into certain pages and show to distributors, such as Ledger, Inventory, Reports and Delivery Logs. Ledger show all

the in-out cash flows. Inventory is to track the stock of each medicine respective to their batches. Reports are to check the sales of products, customers remaining balances and brands remaining balances. Delivery logs are to track deliveries that are assigned against employees, shows all invoices and their respective data in delivery logs.

4.1.1 Highlighting Features

The key highlighting features that make our project more user-friendly and shine from the rest of other solutions are Latest Health news, Demand forecasting, old prices of medicines, Last invoice details, a below minimum sale price check, intelligent batch selection, User-interactive UI of dashboard analytics and export options.

4.1.1.1 Latest Health Related News

The project has introduced novelty in PDMS industry with incorporating latest health related news in DoseLogix. The reason for this is keeping distributors updated from our end, so that they might keep up with their stock requirements on emerging needs of specific medicines. For example, usually in December and January flu might spread exponentially. The Latest health news representation is shown in Figure 4.4.

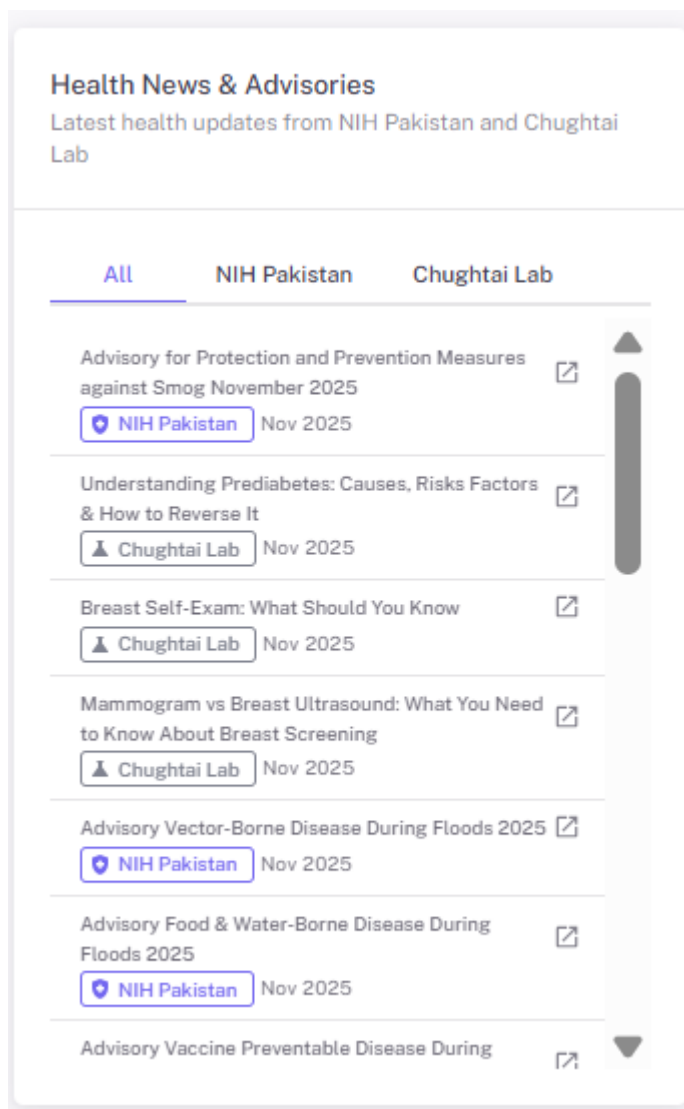


Figure 4.4: Latest Health News for emerging needs

4.1.1.2 Demand Forecasting

Another novelty of our project is Demand Forecasting. Most of the existing solutions have AI integrated but for tasks like customers or brands insights and Microsoft's Copilot integration. But none of the softwares to our knowledge has demand forecasting implemented in it. Our solution provides AI based predictive analysis for Demand forecasting. The prediction for demand forecasting can be seen in Figure 4.5.

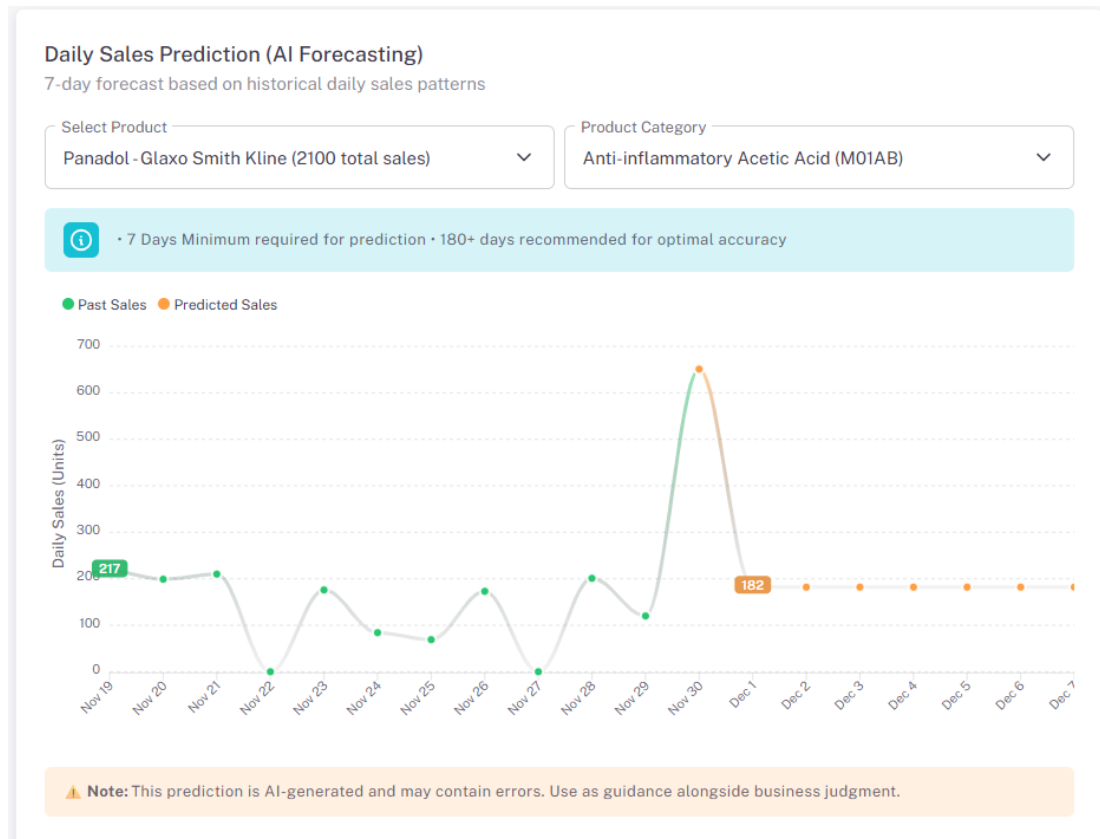


Figure 4.5: Next 7 Days Sales Prediction of selected medicines

4.1.1.3 Last Invoice Details

Another highlighting feature of DoseLogix, we show the distributors the last invoice number and last invoice price, so that the distributor can see the loyalty of customers according to their last order. The last invoice number and last invoice price are shown in Figure 4.6.

The screenshot shows a web form titled "Add New Purchase Entry" with the subtitle "Create a new purchase entry for inventory management". The form is divided into sections. The "Basic Information" section contains fields for "Brand" (GlaxoSmithKline), "Invoice Number" (INV-2024-001), "Invoice Date" (mm/dd/yyyy), and "Purchase Date" (11/28/2025). Below these is a table with two columns: "Last Invoice Number" (inv-2025-28111) and "Last Invoice Price" (Rs11,500). A "Remarks" section with a text area "Additional notes..." is at the bottom.

Figure 4.6: Last Invoice Details

4.1.1.4 Old Prices of Medicines

While creating sales invoices, when selecting a product, the distributors faced an issue where they need to open another extra tab to overlook the last prices of selected medicines to this specific customers, so that they can offer selective prices to the customers. We have addresses this issue and highlights the last three prices of selected medicines to this specific customer. We can see that in Figure 4.7.

The screenshot shows a web form titled "Products" with the subtitle "Add Product". The form contains several input fields: "Product" (Panadol (150)), "Inventory Batch" (b1), "Stock" (20000), and "Expiry Date" (11/11/2030). Below these are fields for "Quantity", "Bonus" (0), "Total Quantity", "Price" (Rs 22), "Discount" (0 %), and "Discount Type" (Percentage (%)). A section titled "Last 3 Prices to this Customer" displays three price entries: "Rs22 12/24/2024", "Rs22 1/24/2025", and "Rs22 2/24/2025". There is a checkbox "Allow below min Rs21.3" and buttons "Clear Form" and "Add Product" at the bottom right.

Figure 4.7: Old Prices of Selected Medicines

4.1.1.5 Below Minimum Sale Price

Another highlight feature is that our project allow users to set a Minimum Sale Price threshold while saving purchase invoice. This threshold is set on run time by distributors to keep a safe profit or sale at no profit to customers. Distributors sale products below minimum price on some internal factors such as the product has been in inventory for a long time and the distributor wants to sell it to clear up inventory and storage area. The functionality of the sale below minimum price is shown in Figure 4.8 and 4.9.

The screenshot shows the 'Add Product' form with the following details:

- Product: Panadol (150)
- Inventory Batch: b1
- Stock: 20000
- Expiry Date: 11/11/2030
- Quantity: (empty)
- Bonus: 0
- Total Quantity: (empty)
- Price: Rs 20
- Discount: 0 %
- Discount Type: Percentage (%)
- Last 3 Prices to this Customer: Rs22 12/24/2024, Rs22 1/24/2025, Rs22 2/24/2025
- Allow below min Rs21.3:

Figure 4.8: Sale price below Min Sale Price UnChecked

The screenshot shows the 'Add Product' form with the following details:

- Product: Panadol (150)
- Inventory Batch: b1
- Stock: 20000
- Expiry Date: 11/11/2030
- Quantity: (empty)
- Bonus: 0
- Total Quantity: (empty)
- Price: Rs 20
- Discount: 0 %
- Discount Type: Percentage (%)
- Last 3 Prices to this Customer: Rs22 12/24/2024, Rs22 1/24/2025, Rs22 2/24/2025
- Allow below min Rs21.3:

At the bottom of the form, it says "No products added yet".

Figure 4.9: Sale price below Min Sale Price Checked

4.1.1.6 Intelligent Batch selection

In sales invoices, the inventory batches are selected automatically. The intelligent workflow of project allows the auto batch selection in FIRST EXPIRY FIRST OUT (FEFO) order. So the batch with first expiry of selected medicine is automatically selected. However, the user can override this functionality for obvious reasons, by changing the selected batch.

4.1.1.7 Dashboard Analytics

The dashboard of DoseLogix is specially designed with a user interactive and user friendly UI/UX experience which gives the user quick access to features such as Brands-wise Sales Performance, Invoice Breakdown - Cash vs Credit, Top Selling Products, Area-wise Sales Distribution, Recievables Aging Analysis, Inventory Alerts, Sales Prediction and Health Related News.

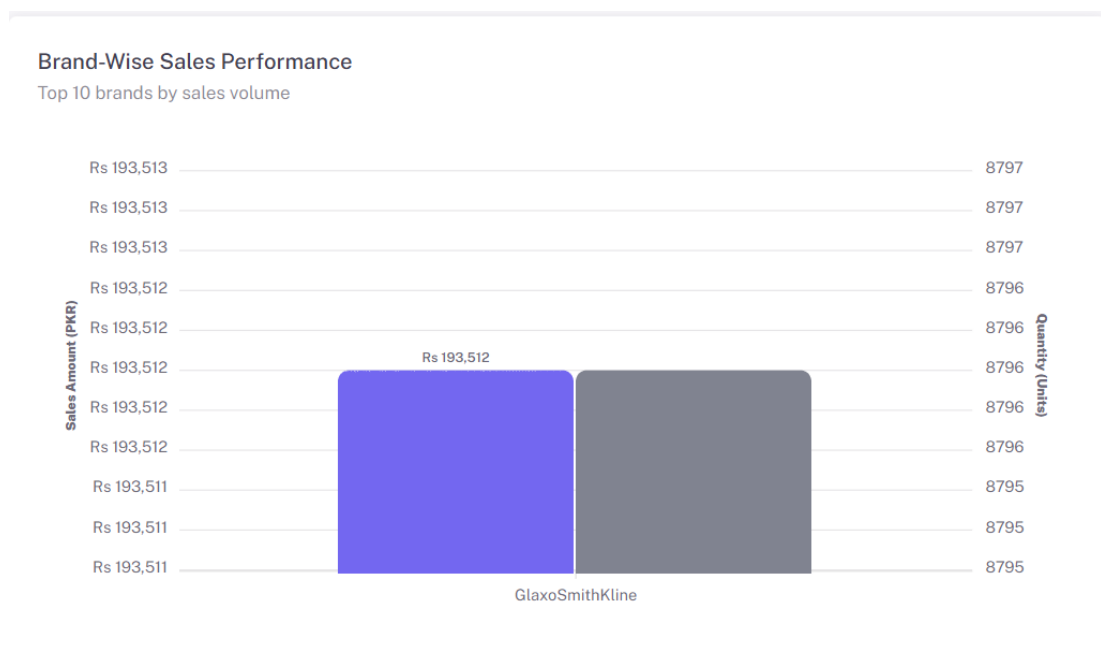


Figure 4.10: Brand-wise Sales performances of Distributors

Invoice Breakdown - Cash vs Credit

Payment method distribution

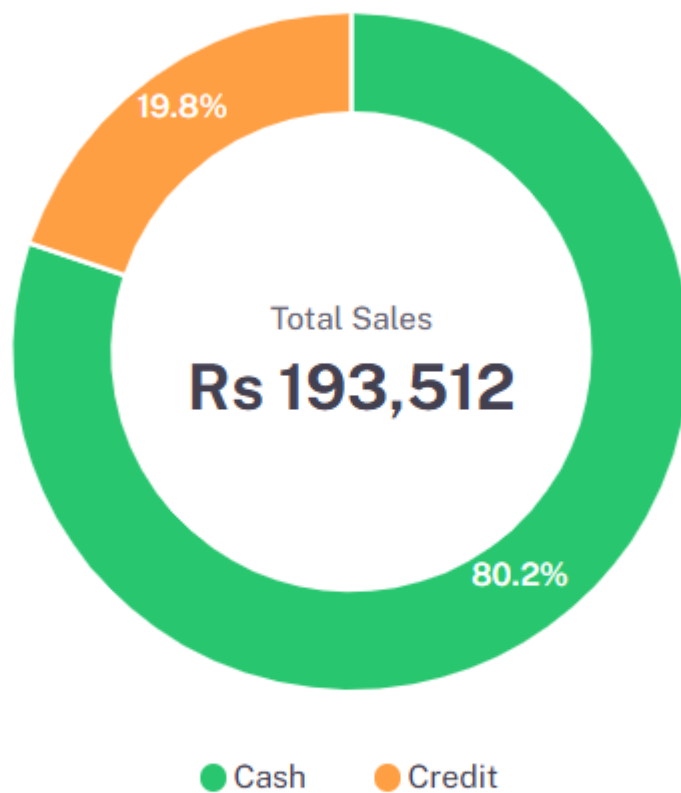


Figure 4.11: Cash vs Credit Invoice Breakdown

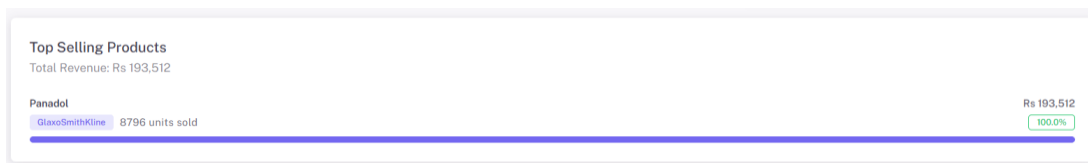


Figure 4.12: Top Selling Products

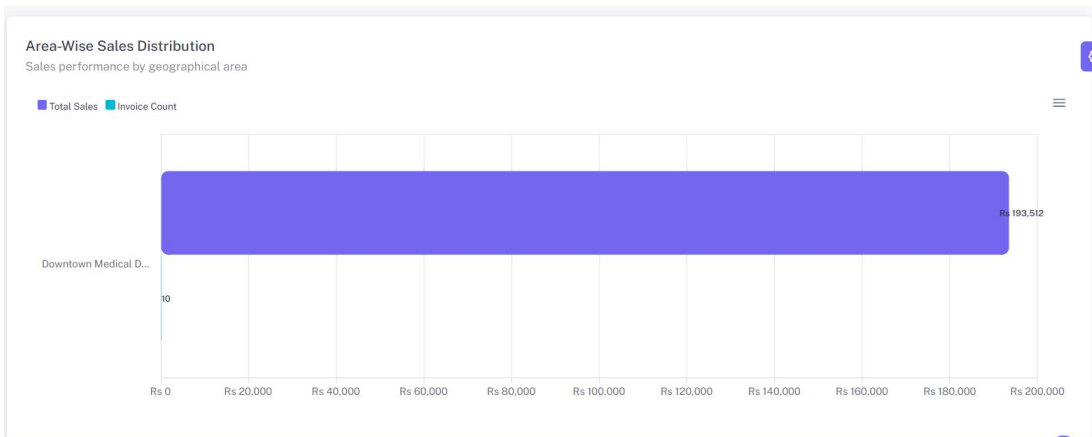


Figure 4.13: Area wise Sales of Distributors

Receivables Aging Analysis
4 invoices with outstanding credit - Total: Rs 38,348

Search by invoice or customer... Credit Age: All Ages

Showing 4 of 4 invoices with outstanding credit

Invoice Number	Customer Name	Credited Amount	Credit Age (Days)	Status
SINV-25-0424-000004 Apr 24, 2025	City General Hospital	Rs 7,656 of Rs 7,656	218 days	90+ days
SINV-25-0824-000004 Aug 24, 2025	City General Hospital	Rs 28,028 of Rs 28,028	96 days	90+ days
SINV-25-0924-000001 Sep 24, 2025	City General Hospital	Rs 1,032 of Rs 21,032	65 days	61-90 days
SINV-25-1008-000002 Oct 8, 2025	City General Hospital	Rs 1,632 of Rs 16,632	51 days	31-60 days

Figure 4.14: Age of Recievables Analysis

Stock Alerts
Products requiring immediate attention

🔍 Search by product or brand...

Alert Level
All Alerts


All Stock Levels Healthy
No products require restocking at this time

Figure 4.15: Stock Alerts of medicines

Products Near Expiry
Products expiring within 6 months (≤ 180 days)

🔍 Search by product, brand, or batch...

Urgency Level
All Products



No Products Near Expiry
All products have sufficient shelf life

Figure 4.16: Expiry status of medicines

4.2 Backend

The backend has two parts. One is where we have the backend for Node js server and the other is where we have python backend server.

4.2.1 NodeJs Server

The backend server for the business logic is designed in NodeJs [11] with ExpressJs [12] framework. MongoDB [13] is used for the database management. MongoDB Atlas [14] is used as a primary cloud database storage. The backend is responsible for authentication/authorization, API endpoints, data consistency and pathway to connect Python server.

4.2.1.1 Project Structure

The NodeJs server is developed by following market structure for a modular and scalable approach. This approach can help to maintain and scale the application for future advancements. The directory structure can be seen in the Figure 4.17.

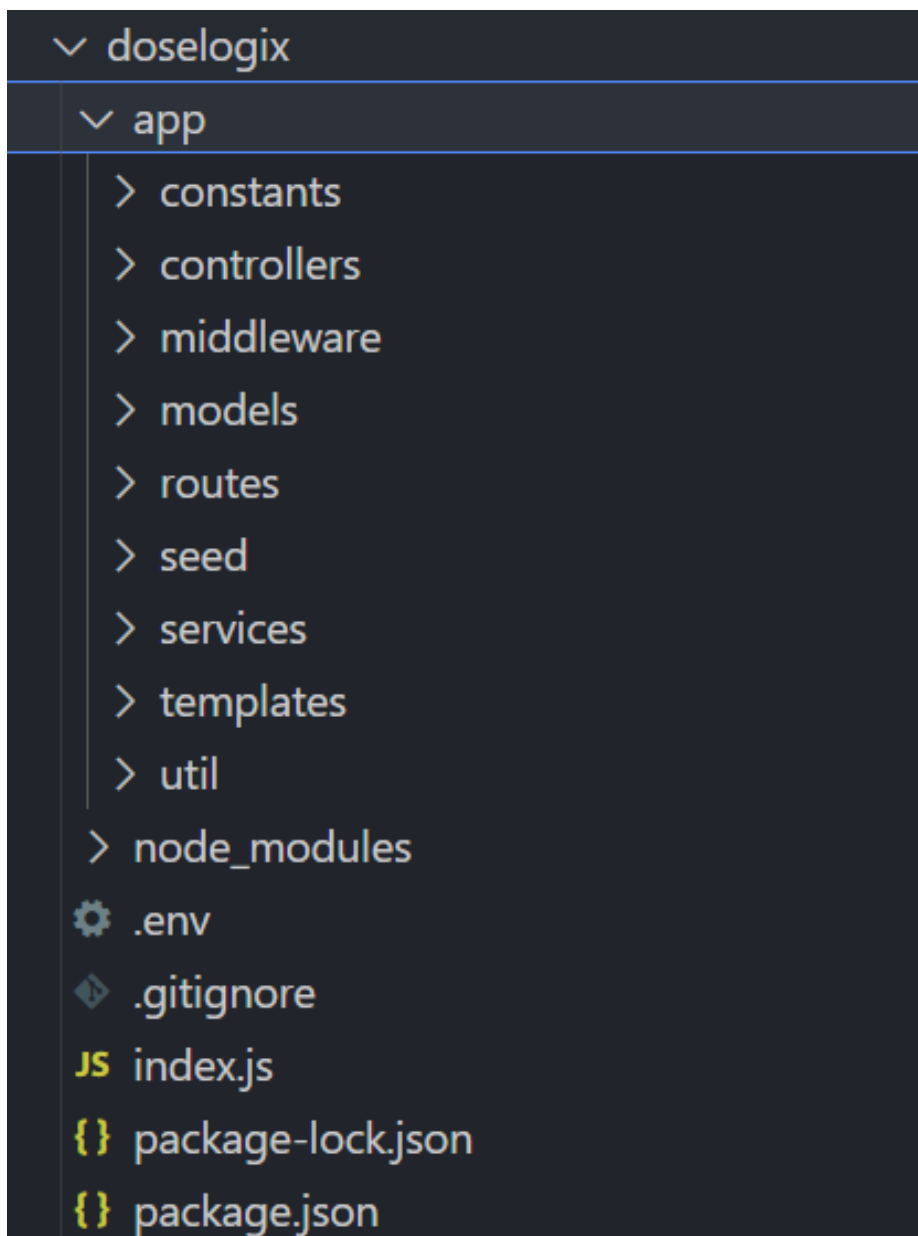
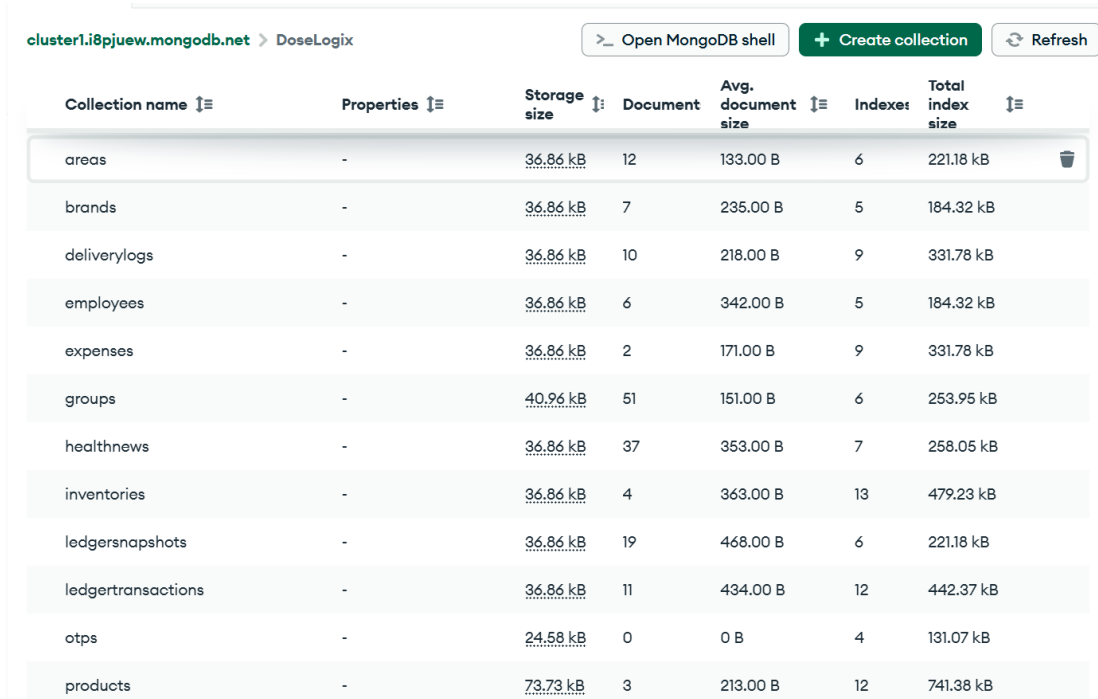


Figure 4.17: Node.js Project Structure

Here each folder follows their respective tasks and functionalities. This separation enables the unit testing easy and clear ownership of functionality. This makes the debugging and bugs resolving much easier.

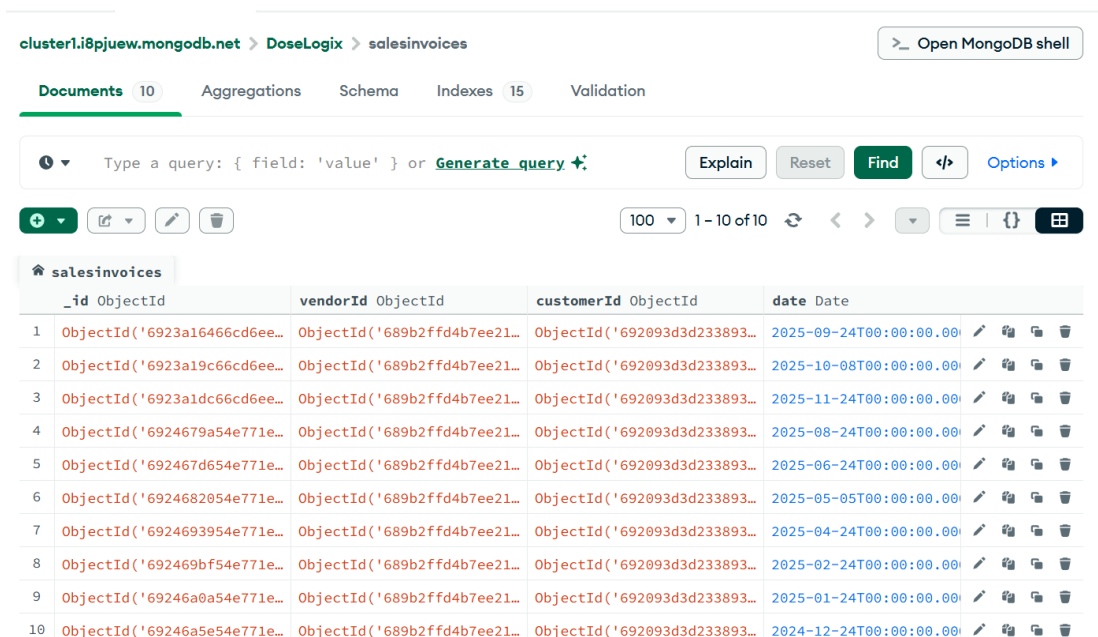
4.2.1.2 MongoDB Atlas

The data is stored in JSON format in MongoDB Atlas. Indexing has also been implemented to fasten up the query results.



Collection name	Properties	Storage size	Document	Avg. document size	Indexes	Total index size
areas	-	36.86 kB	12	133.00 B	6	221.18 kB
brands	-	36.86 kB	7	235.00 B	5	184.32 kB
deliverylogs	-	36.86 kB	10	218.00 B	9	331.78 kB
employees	-	36.86 kB	6	342.00 B	5	184.32 kB
expenses	-	36.86 kB	2	171.00 B	9	331.78 kB
groups	-	40.96 kB	51	151.00 B	6	253.95 kB
healthnews	-	36.86 kB	37	353.00 B	7	258.05 kB
inventories	-	36.86 kB	4	363.00 B	13	479.23 kB
ledgersnapshots	-	36.86 kB	19	468.00 B	6	221.18 kB
ledgertransactions	-	36.86 kB	11	434.00 B	12	442.37 kB
otps	-	24.58 kB	0	0 B	4	131.07 kB
products	-	73.73 kB	3	213.00 B	12	741.38 kB

Figure 4.18: Collections in Database



_id	vendorId	customerId	date
1	ObjectID('6923a16466cd6ee...	ObjectID('689b2ffd4b7ee21...	ObjectID('692093d3d233893...
2	ObjectID('6923a19c66cd6ee...	ObjectID('689b2ffd4b7ee21...	ObjectID('692093d3d233893...
3	ObjectID('6923a1dc66cd6ee...	ObjectID('689b2ffd4b7ee21...	ObjectID('692093d3d233893...
4	ObjectID('6924679a54e771e...	ObjectID('689b2ffd4b7ee21...	ObjectID('692093d3d233893...
5	ObjectID('692467d654e771e...	ObjectID('689b2ffd4b7ee21...	ObjectID('692093d3d233893...
6	ObjectID('6924682054e771e...	ObjectID('689b2ffd4b7ee21...	ObjectID('692093d3d233893...
7	ObjectID('6924693954e771e...	ObjectID('689b2ffd4b7ee21...	ObjectID('692093d3d233893...
8	ObjectID('692469bf54e771e...	ObjectID('689b2ffd4b7ee21...	ObjectID('692093d3d233893...
9	ObjectID('69246a0a54e771e...	ObjectID('689b2ffd4b7ee21...	ObjectID('692093d3d233893...
10	ObjectID('69246a5e54e771e...	ObjectID('689b2ffd4b7ee21...	ObjectID('692093d3d233893...

Figure 4.19: Records of Sales Invoices

Name & Definition	Type	Size	Usage	Properties	Status
> _id_	REGULAR	36.9 kB	Usage data unavailable	UNIQUE	READY
> vendorId_1	REGULAR	36.9 kB	Usage data unavailable		READY
> customerId_1	REGULAR	36.9 kB	Usage data unavailable		READY
> deliverBy_1	REGULAR	36.9 kB	Usage data unavailable		READY
> bookedBy_1	REGULAR	36.9 kB	Usage data unavailable		READY
> vendorId_1_date_-1	REGULAR	36.9 kB	Usage data unavailable	COMPOUND	READY
> vendorId_1_customerId_1	REGULAR	36.9 kB	Usage data unavailable	COMPOUND	READY
> deliveryLogNumber_text	TEXT	36.9 kB	Usage data unavailable		READY
> vendorId_1_isActive_1	REGULAR	36.9 kB	Usage data unavailable	COMPOUND	READY
> vendorId_1_deliverBy_1	REGULAR	36.9 kB	Usage data unavailable	COMPOUND	READY

Figure 4.20: Indexes of Sales Invoices

4.2.1.3 Authorization and Authentication

The login/signup is secured by bcrypt [15] for hashing the password. And JWT [16] is used for session tokens. The middleware ensures multi-tenancy that only authenticated users can access tenant-specific data.

4.2.1.4 Background Jobs & Scheduling

The backend hold scheduled job that ensures the backup of reccurent tasks. In backend we have created a cron jobs using node-cron [17] to run a scheduled job that calls an external Python service to fetch health news and upserts it into MongoDB and to create daily snapshots for vendors to overview their ledger.

4.2.1.5 Testing & API Verification

Postman known for API testing has been used while creating and tracking API requests and responses. These tests helped ensuring the consistency of data flow between REST APIs. The flowchart is shown in Figure 4.21.

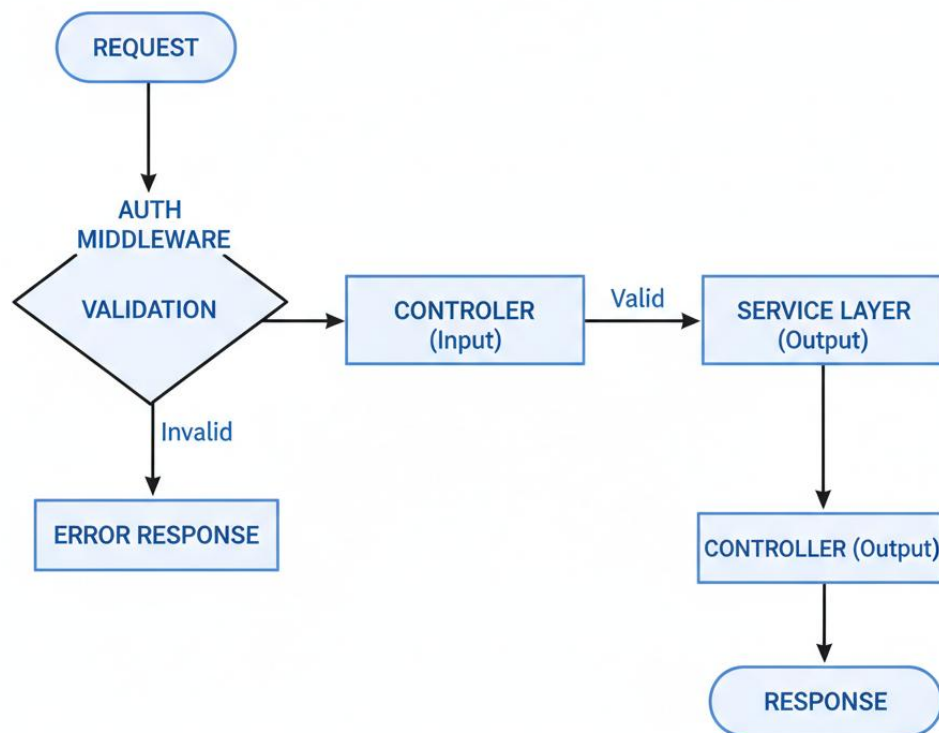


Figure 4.21: Flow Chart of Backend

4.2.2 Python Server

The python micro-service in this project is used for two purposes. One is the web scraper that scrapes latest news from NIH Pakistan and Chughtai Lab's official website. The other is forecasting of coming days sales data.

4.2.2.1 Demand Forecasting

The python micro-service is also responsible for predicting values on past daily sales. If the data for prediction is less than 30 days. It would predict moving average of the available data. If the data records are more than 30 than we will have the pickle file to predict upcoming sales for 7 days.

As the dataset we have used is contains 8 categories of medicines. Each category describes their fundamentals. The categories are listed below.

- M01AB - Anti-inflammatory and antirheumatic products, non-steroids, Acetic acid derivatives and related substances
- M01AE - Anti-inflammatory and antirheumatic products, non-steroids, Propionic acid derivatives
- N02BA - Other analgesics and antipyretics, Salicylic acid and derivatives
- N02BE/B - Other analgesics and antipyretics, Pyrazolones and Anilides
- N05B - Psycholeptics drugs, Anxiolytic drugs
- N05C - Psycholeptics drugs, Hypnotics and sedatives drugs
- R03 - Drugs for obstructive airway diseases
- R06 - Antihistamines for systemic use

We have separated each category and trained models on each of them separately.

4.2.2.1.1 Models Selection

For the training of demand forecasting for upcoming sales, we used different models to train on our dataset and evaluated their performance. The models we used are Linear Regression (LR), Random Forest (RF), XGBoost, LSTM, Prophet and SARIMA. The evaluation metrics used are MAE, MSE and RMSE.

We ran the all the models and evaluated their performance, and came to an ultimatum picking best performing models on each category and discarding others. The best performing models on each category are listed in the Table 4.1.

Table 4.1: Best Performing Models in Each Category

Category	Model Type	MAE	MSE	RMSE
M01AB	LR	1.922236	5.974565	2.444292
M01AE	LR	1.382081	3.138336	1.771535
N02BA	LR	1.385464	3.207793	1.791031
N02BE	RF	8.155147	115.626387	10.752971
N05B	XGBoost	2.871582	13.168474	3.628839
N05C	LR	0.752474	0.991992	0.995988
R03	LR	5.200283	49.284202	7.020271
R06	LR	1.411158	3.522264	1.876770

4.2.2.2 Latest Health News Scraper

Both of these mentioned websites are scraped through custom scripts. When the python server runs, it automatically run the custom scripsts to fetch latest news and details.

The Chughtai Lab's script scrape the available latest news. The scraped data is source, dates, titles and links [18]. The NIH Pakistan's script also scrapes the available latest news. The scraped data here is also source, dates, titles and links [19].

The scraped data from both of these websites are standardized in one generalized structure and then is sent to NodeJs backend, where we save the data in the database. When the python server runs for the first time, it scrapes the data from these sites. But NodeJs server also has a cron job that hits an HTTP request to the python server. The python server runs the script and scrapes the data. The scraped data is then sent to the NodeJs server.

CHAPTER 5

User Manual

5.1 Login Page

Allows users to sign in using their email and password. Integrates with backend authentication and displays error messages for invalid credentials.

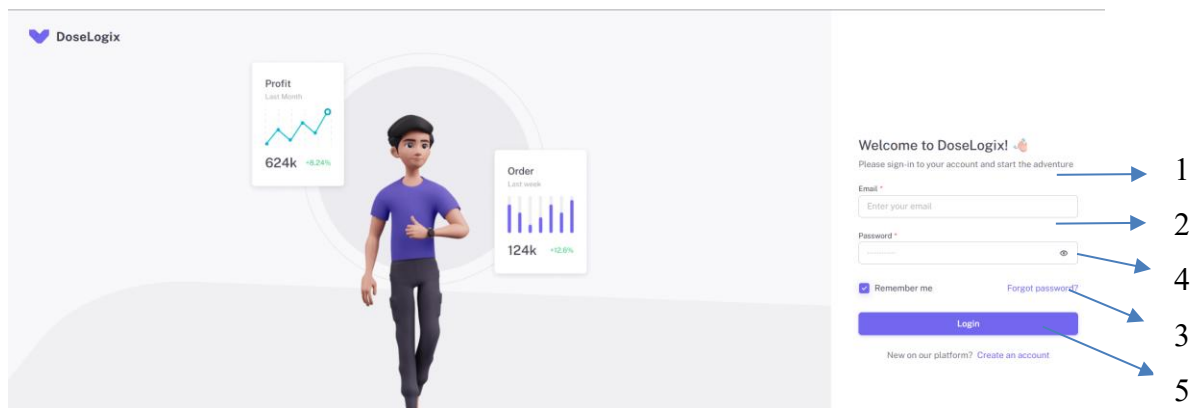



Figure 5.1: Login Page

1. Enter Email
2. Enter Password
3. Sign-in Button To Login
4. Click If You Forgot Password
5. Click If You Are a New User

5.2 Signup Page

Enables new users (vendors) to create an account by providing business and contact details. Validates required fields and password strength

DoseLogix

Adventure starts here 
Make your app management easy and fun!

Sessions
This Month
45.1k +15.8%

Sales
Last Year
175k +8.2%

Username *
Enter your username

Phone *
Enter phone number

Business Name *
Enter business name

Address *
Enter your address

Business License Number *
Enter business license number

License Issue Date * **License Expiry Date ***

Email *
Enter your email

1
2
3
4
5
6
7

Figure 5.2: Signup Page

1. Enter Your Username
2. Enter You Valid Phone
3. Enter a Bussiness Name
4. Enter Adress
5. Enter Licence Name
6. Select Date
7. Enter valid Email

5.3 Forget Password Page

Lets users request a password reset link by entering their registered email. Sends instructions to email if the account exists.

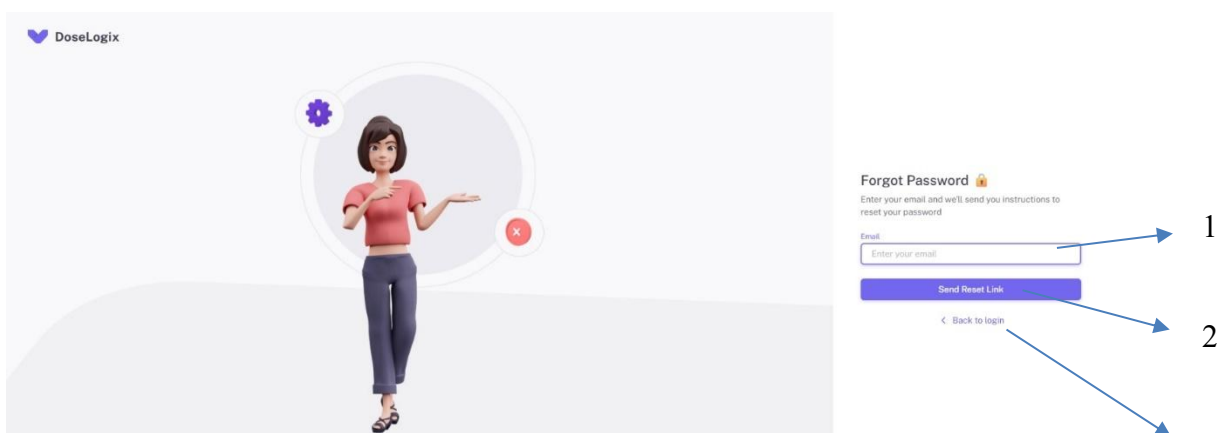


Figure 5.3: Forgot Password Page

1. Enter your Email
2. Submit Button
3. Return to Login Page

5.4 Dashboard Page

Main landing page after login. Shows business KPIs, summary cards, charts, and quick links to key modules.

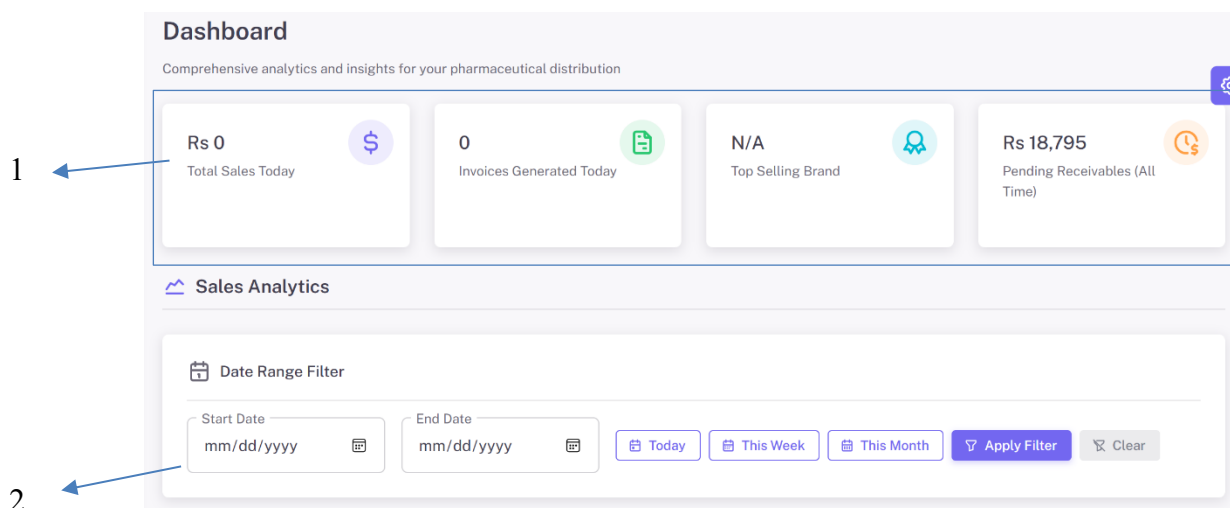


Figure 5.4: Dashboard Page 1

1. Summary Cards
2. Date Range Filter

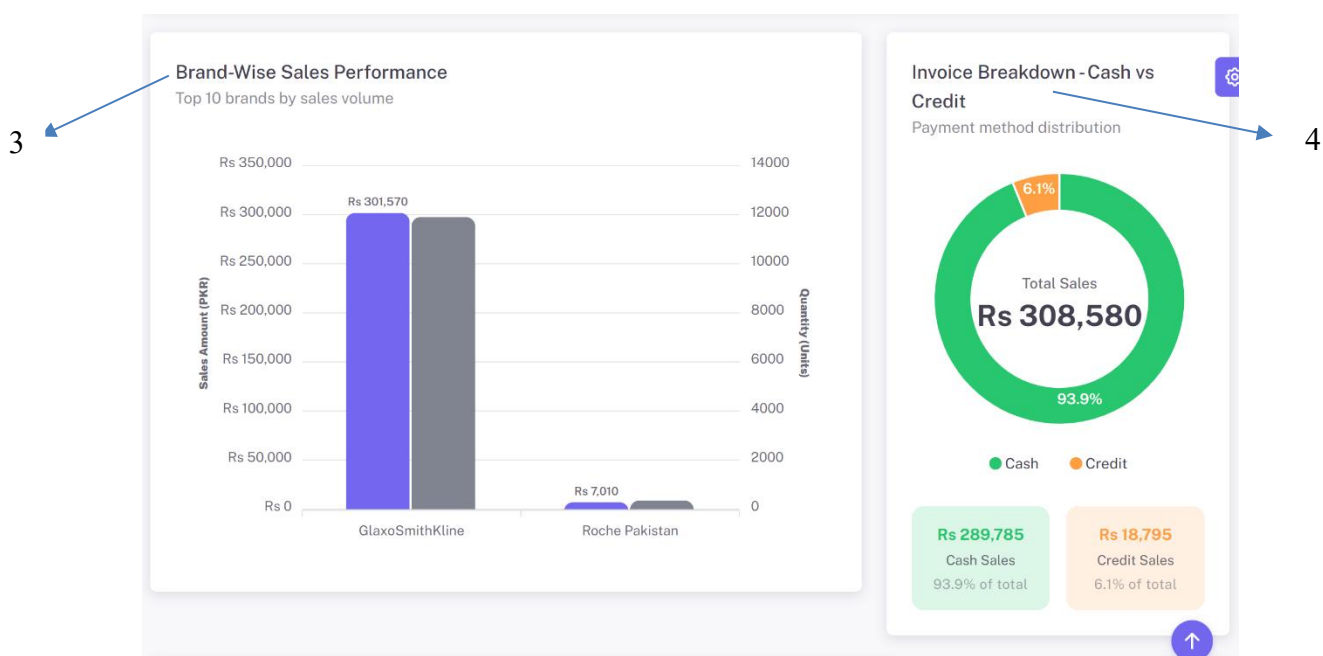


Figure 5.5: Dashboard Page 2

3. Brand Wise Performance

4. Invoice Breakdown Cash VS Credit

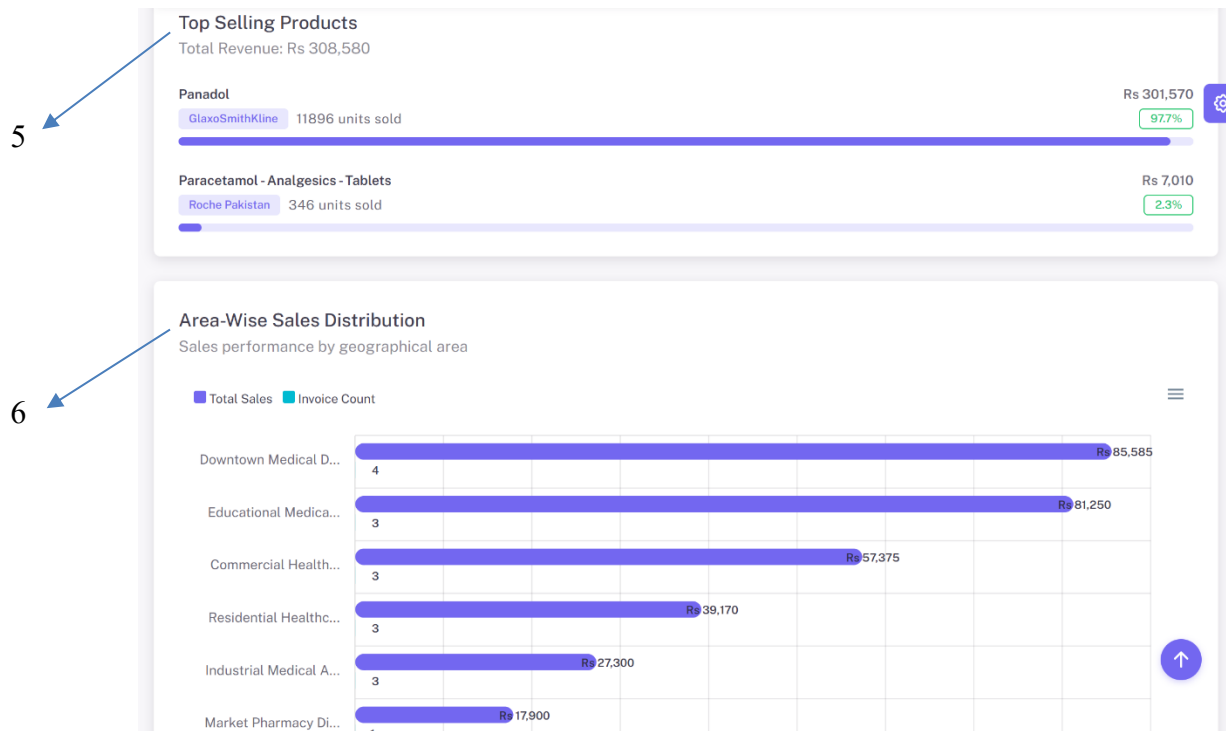


Figure 5.6: Dashboard Page 3

5. Top Selling Product

6. Area Wise Sales Distribution

7

Financial Management

Receivables Aging Analysis
4 invoices with outstanding credit - Total: Rs 18,795

Search by invoice or customer...

Credit Age
All Ages

8

Showing 4 of 4 invoices with outstanding credit

Invoice Number	Customer Name	Credited Amount	Credit Age (Days)	Status
SINV-25-0918-000007 Sep 18, 2025	Medicare Pharmacy	Rs 450 of Rs 9,725	64 days	61-90 days
SINV-25-1112-000004 Nov 12, 2025	Health Plus Pharmacy	Rs 800 of Rs 4,800	9 days	0-30 days
SINV-25-1116-000005 Nov 16, 2025	Medicare Pharmacy	Rs 2,445 of Rs 15,445	5 days	0-30 days
SINV-25-1117-000006 Nov 17, 2025	University Medical Center	Rs 15,100 of Rs 17,900	4 days	0-30 days

8

Figure 5.7: Dashboard Page 3

7. Financial Management
8. Credit Age Filter (Days)

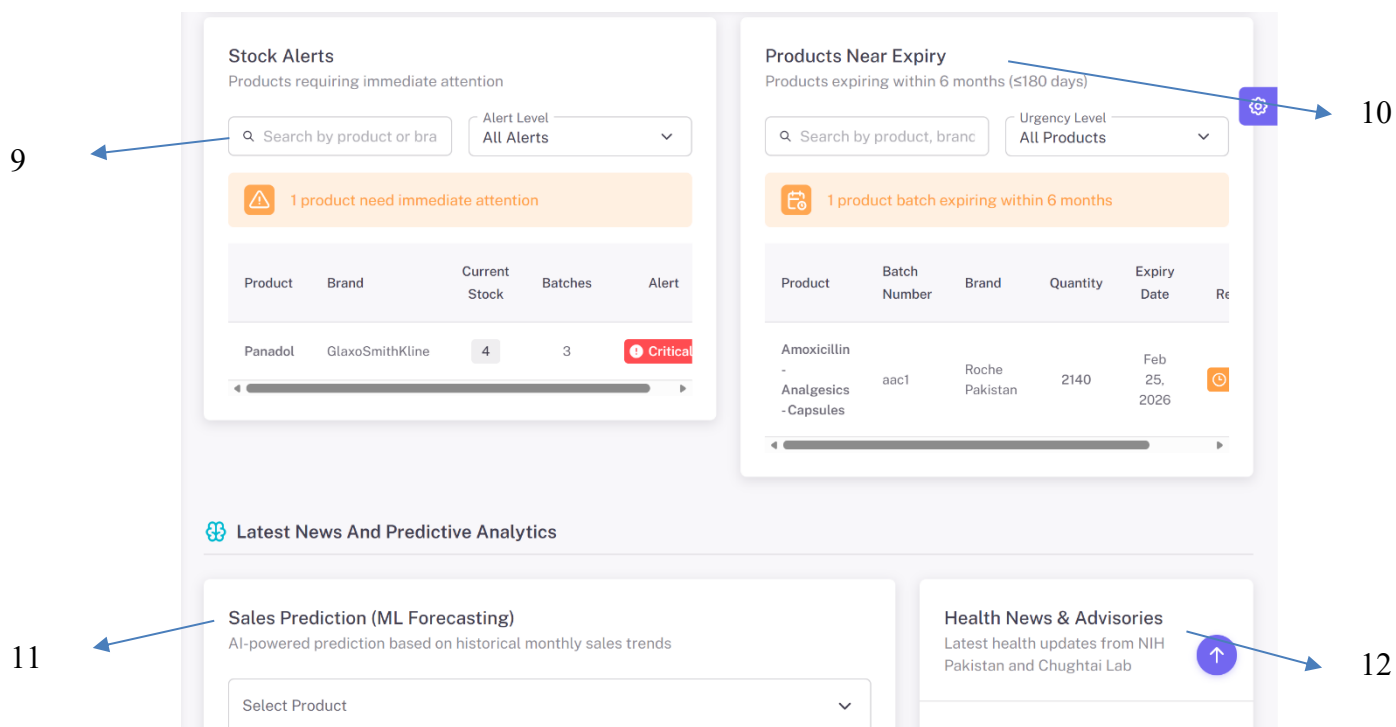


Figure 5.8: Dashboard Page 4

9. Stock Alerts

10. Products Near Expiry

11. Sales Prediction (ML Forecasting)

12. Health News & Advisories

5.5 Theme Customizer

Change Accent color, theme of application, skin and layouts.

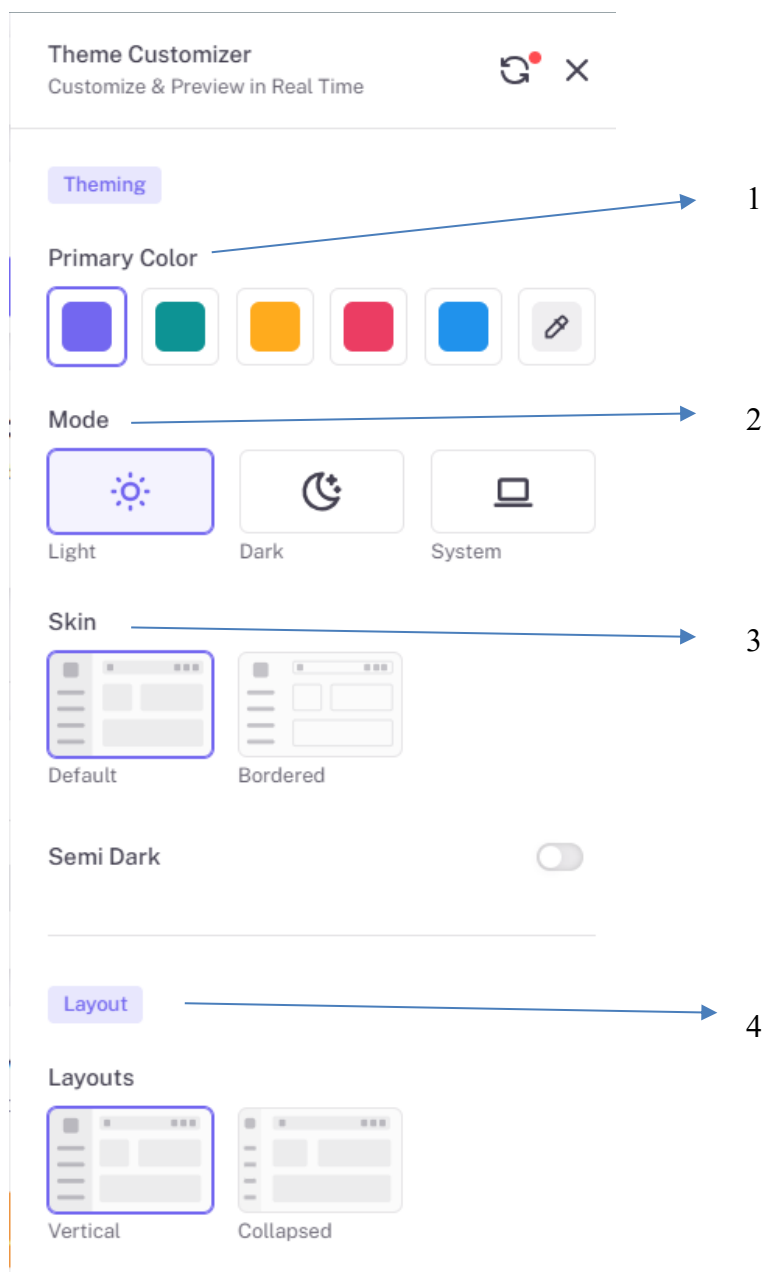


Figure 5.9: Theme Customization

- 1) Primary color for app
- 2) Mode
- 3) Skin
- 4) Layout

5.6 Profile Information

User can view and edit their profile information from here.

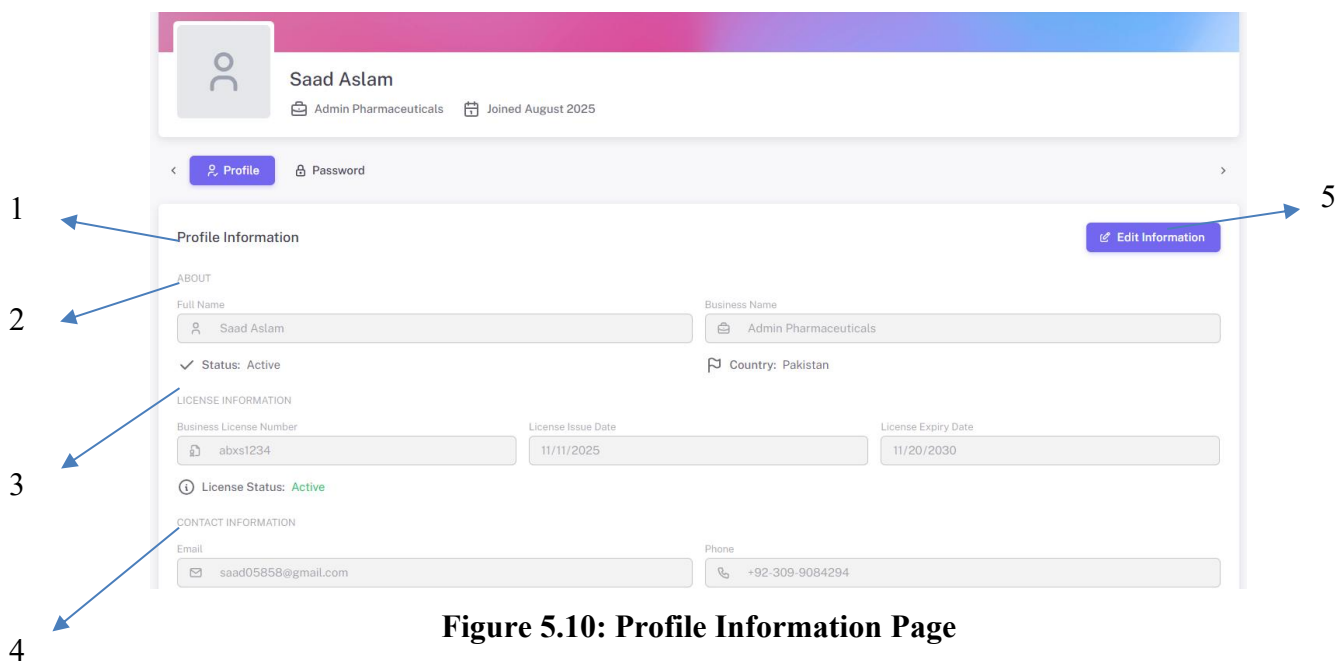


Figure 5.10: Profile Information Page

- 1) Profile information fields
- 2) About section
- 3) License Information section
- 4) Contact information section
- 5) Edit information button

5.7 Change Password

User can change their password from here.

The screenshot shows a user profile for Saad Aslam, Admin Pharmaceuticals, who joined in August 2025. The 'Password' tab is selected. The 'Change Password' section contains three input fields: 'Current Password', 'New Password', and 'Confirm New Password'. Below these fields are two buttons: 'Change Password' and 'Reset'. A 'Password Requirements' section lists the following rules:

- Minimum 6 characters long
- New password must be different from current password
- Confirm password must match new password

Three blue arrows point to the form elements: arrow 1 points to the input fields, arrow 2 points to the 'Change Password' button, and arrow 3 points to the 'Reset' button.

Figure 5.11: Change Password Page

- 1) Password Changing Fields
- 2) Change password button
- 3) Reset button

5.8 Customer Page

Manage customer records: add, edit, view details, filter by category/location, and toggle active status.

CUSTOMER	CATEGORY	LOCATION	CONTACT	LICENSE STATUS	CREATED DATE	STATUS	ACTION
CGH City General Hospital	Hospital	Lahore, Punjab	+92-42-1111111	VALID (358 Days)	11/21/2025	<input checked="" type="checkbox"/>	Edit
MP Medicare Pharmacy	Pharmacy	Karachi, Sindh	+92-21-2222222	VALID (358 Days)	11/21/2025	<input checked="" type="checkbox"/>	Edit
HPP Health Plus Pharmacy	Pharmacy	Peshawar, Khyber Pakhtunkhwa	+92-91-3333333	VALID (358 Days)	11/21/2025	<input checked="" type="checkbox"/>	Edit
UMC University Medical Center	Hospital	Faisalabad, Punjab	+92-41-4444444	VALID (358 Days)	11/21/2025	<input checked="" type="checkbox"/>	Edit
CHW Community Health Wholesaler	Wholesaler	Quetta, Balochistan	+92-81-5555555	VALID (358 Days)	11/21/2025	<input checked="" type="checkbox"/>	Edit
MRS MediCare Retail Store	Retailer	Hyderabad, Sindh	+92-22-6666666	VALID (358 Days)	11/21/2025	<input checked="" type="checkbox"/>	Edit

Figure 5.12: Customer Page

1. Add New Customer
2. Filter

5.9 Brands Page

List and manage product brands. Add new brands, edit details, and toggle brand status.

The screenshot shows the 'Brands' management page. At the top right, there is a '+ Add New Brand' button (callout 1). Below the header, there is a 'Filters' section with a 'Select Status' dropdown (callout 2) and a '10' per page selector. A search bar is located to the right of the per page selector. The main content is a table with columns: BRAND, ADDRESS, CONTACT, CREATED DATE, STATUS, and ACTIONS. The table lists five brands: Novartis Pakistan, Sanofi Aventis, Roche Pakistan, Pfizer Pharmaceuticals, and GlaxoSmithKline. Each row has a status toggle and an edit icon (callout 3). At the bottom left, it says 'Showing 1 to 5 of 5 entries'. At the bottom right, there is a pagination control showing '1'.

BRAND	ADDRESS	CONTACT	CREATED DATE	STATUS	ACTIONS
NP Novartis Pakistan	789 Pharma Plaza, Islamabad	+92-51-3456789 +92-51-3456790	11/21/2025	<input type="checkbox"/>	
SA Sanofi Aventis	321 Medicine Street, Faisalabad	+92-41-4567890 +92-41-4567891	11/21/2025	<input checked="" type="checkbox"/>	
RP Roche Pakistan	654 Health Center, Rawalpindi	+92-51-5678901 +92-51-5678902	11/21/2025	<input checked="" type="checkbox"/>	
PP Pfizer Pharmaceuticals	123 Medical District, Karachi	+92-21-1234567 +92-21-1234568	11/21/2025	<input checked="" type="checkbox"/>	
G GlaxoSmithKline	456 Healthcare Avenue, Lahore	+92-42-2345678 +92-42-2345679	11/21/2025	<input checked="" type="checkbox"/>	

Figure 5.13: Brands Page

1. Add New Brand
2. Filter
3. Edit Brands

5.10 Edit Brands Page

View, add, and edit products. Includes filters by brand/group/subgroup, and product status toggling.

The screenshot displays the 'Edit Brands Page' interface. On the left, there is a search bar with the placeholder 'Search %K'. Below it is a 'Brands' section with a 'Filters' area containing a 'Select Status' dropdown menu and a '10' dropdown menu. A table lists several brands with columns for 'BRAND', 'ADDRESS', and 'CONTACT'. The table data is as follows:

BRAND	ADDRESS	CONTACT
NP Novartis Pakistan	789 Pharma Plaza, Islamabad	+92-51-34567 +92-51-3456790
SA Sanofi Aventis	321 Medicine Street, Faisalabad	+92-41-45678 +92-41-4567891
G GlaxoSmithKline	456 Healthcare Avenue, Lahore	+92-42-23456 +92-42-2345678
RP Roche Pakistan	654 Health Center, Rawalpindi	+92-51-56789 +92-51-5678901
PP Pfizer Pharmaceuticals	123 Medical District, Karachi	+92-21-12345 +92-21-1234568

On the right, a modal window titled 'Edit Brand' is open, showing the details for 'Novartis Pakistan'. The form includes the following fields:

- Brand Name ***: Novartis Pakistan
- Address ***: 789 Pharma Plaza, Islamabad
- Primary Contact**: +92-51-3456789
- Secondary Contact**: +92-51-3456790

An 'Update' button is located at the bottom of the modal.

Figure 5.14: Edit Brands Page

1. Edit Brand Details

5.11 Employee Page

Add and manage employee records, assign roles, and track activity.

The screenshot shows the 'Employees' management page. At the top right, there is a '+ Add New Employee' button (labeled 1). Below it, a 'Filters' section contains two dropdown menus: 'Select Designation' and 'Select Status' (labeled 2). A table below the filters displays employee records with columns: EMPLOYEE, DESIGNATION, LOCATION, CONTACT, SALARY, CREATED DATE, STATUS, and ACTION. The table contains six rows of employee data. In the 'ACTION' column of the third row (Ahmed Ali), there is an edit icon (labeled 3).

EMPLOYEE	DESIGNATION	LOCATION	CONTACT	SALARY	CREATED DATE	STATUS	ACTION
a ali	Technician	Lahore	03254184585	Rs. 50,000	11/25/2025	<input checked="" type="checkbox"/>	
US Usman Sheikh	Technician	Rawalpindi	+92-51-0000000	Rs. 170,000	11/21/2025	<input checked="" type="checkbox"/>	
AA Ahmed Ali	Manager	Lahore	+92-42-6666666	Rs. 150,000	11/21/2025	<input checked="" type="checkbox"/>	
FK Fatima Khan	Supervisor	Karachi	+92-21-7777777	Rs. 180,000	11/21/2025	<input checked="" type="checkbox"/>	
MH Muhammad Hassan	Admin	Islamabad	+92-51-8888888	Rs. 200,000	11/21/2025	<input checked="" type="checkbox"/>	
AM Ayesha Malik	Salesman	Faisalabad	+92-41-9999999	Rs. 160,000	11/21/2025	<input checked="" type="checkbox"/>	

Figure 5.15: Employees Page

1. Add New Employee
2. Filter
3. Edit Employees

5.12 Edit Employee Page

The screenshot displays the 'Edit Employee' interface. On the left, a table lists five employees. The selected employee, Ayesha Malik, is highlighted. The right panel shows the 'Edit Employee' form with the following details:

EMPLOYEE	DESIGNATION	LOCATION	CONTACT	SALARY	CREATE
<input type="checkbox"/> AM Ayesha Malik	<input type="checkbox"/> Salesman	Faisalabad	+92-41-9999999	Rs. 160,000	10/20/2
<input type="checkbox"/> US Usman Sheikh	<input type="checkbox"/> Technician	Rawalpindi	+92-51-0000000	Rs. 170,000	10/20/2
<input type="checkbox"/> MH Muhammad Hassan	<input type="checkbox"/> Admin	Islamabad	+92-51-8888888	Rs. 200,000	10/20/2
<input type="checkbox"/> AA Ahmed Ali	<input type="checkbox"/> Manager	Lahore	+92-42-6666666	Rs. 150,000	10/20/2
<input type="checkbox"/> FK Fatima Khan	<input type="checkbox"/> Supervisor	Karachi	+92-21-7777777	Rs. 180,000	10/20/2

Showing 1 to 5 of 5 entries

Edit Employee [X]

Employee Name *
Ayesha Malik

City *
Faisalabad

Address *
321 Employee Lane, Faisalabad

Primary Contact *
+92-41-9999999

Secondary Contact
+92-41-9999990

CNIC *
35201-4444444-4

Reference Person
Reference Person Name

Reference Person Contact
Reference Person Contact

Reference Person Address
Reference Person Address

Salary *
160000

Designation *
Salesman

[Update] [Cancel]

Figure 5.16: Edit Employees Page

1. Edit Employee Details

5.13 Areas Page

Define and manage geographic areas and subareas for customer and sales segmentation.

AREA	CREATED DATE	STATUS	ACTION
University Medical Area	11/21/2025	<input checked="" type="checkbox"/>	Edit
Shopping Medical District	11/21/2025	<input checked="" type="checkbox"/>	Edit
Educational Medical Zone	11/21/2025	<input checked="" type="checkbox"/>	Edit
Clinic Zone	11/21/2025	<input checked="" type="checkbox"/>	Edit
Commercial Healthcare Area	11/21/2025	<input checked="" type="checkbox"/>	Edit
Market Pharmacy District	11/21/2025	<input checked="" type="checkbox"/>	Edit

Figure 5.17: Areas Page

1. Add New Area
2. Filter
3. Edit Areas

5.14 Sub-Area Page

The screenshot shows the 'Sub Areas' management interface. At the top right, there is a blue button labeled '+ Add New Sub Area' with callout 1. Below this is a 'Filters' section with two dropdown menus: 'Select Area' and 'Select Status', with callout 2 pointing to the 'Select Area' dropdown. Under the filters, there is a pagination control showing '10' and a search input field. The main content is a table with the following columns: SUB AREA, AREA, CREATED DATE, STATUS, and ACTION. The table contains six rows of data. Callout 3 points to the 'ACTION' column of the third row.

SUB AREA	AREA	CREATED DATE	STATUS	ACTION
University Medical Area - East	University Medical Area	11/21/2025	ON	
University Medical Area - South	University Medical Area	11/21/2025	ON	
Shopping Medical District - North	Shopping Medical District	11/21/2025	ON	
University Medical Area - West	University Medical Area	11/21/2025	ON	
Clinic Zone - Central	Clinic Zone	11/21/2025	ON	
University Medical Area - Central	University Medical Area	11/21/2025	ON	

Figure 5.18: Sub-Area Page

1. Add New Sub-Area
2. Filter
3. Edit Sub-Areas

5.15 Edit Sub-Area Page

Edit Sub Area ✕

Area *

Sub Area Name *

Figure 5.19: Edit Sub-Area Page

1. Edit Sub-Area Details

5.16 Group Page

Organize products into groups and subgroups for easier management and reporting

The screenshot shows a web interface for managing product groups. At the top right, there is a purple button labeled '+ Add New Group' (callout 1). Below this is a 'Filters' section with two dropdown menus: 'Select Brand' and 'Select Status' (callout 2). A pagination control shows '10' items per page, and a search bar is located to the right. The main content is a table with the following columns: GROUP, CREATED DATE, BRAND, STATUS, and ACTION. The table lists six groups, all created on 11/21/2025 and associated with 'Roche Pakistan'. Each row has a status toggle (all are turned on) and an edit icon (callout 3).

GROUP	CREATED DATE	BRAND	STATUS	ACTION
Respiratory	11/21/2025	Roche Pakistan	On	Edit
Antidiabetics	11/21/2025	Roche Pakistan	On	Edit
Dermatological	11/21/2025	Roche Pakistan	On	Edit
Gastrointestinal	11/21/2025	Roche Pakistan	On	Edit
Analgesics	11/21/2025	Roche Pakistan	On	Edit
Neurological	11/21/2025	Roche Pakistan	On	Edit

Figure 5.20: Groups Page

1. Add New Group
2. Filter
3. Edit Group Details

5.17 Edit Group Page

Edit Group ✕

Brand ^{*}

Roche Pakistan ▾

Group Name ^{*}

Respiratory

Update Cancel

Figure 5.21: Edit Group Page

1. Edit Group Details

5.18 Sub Group Page

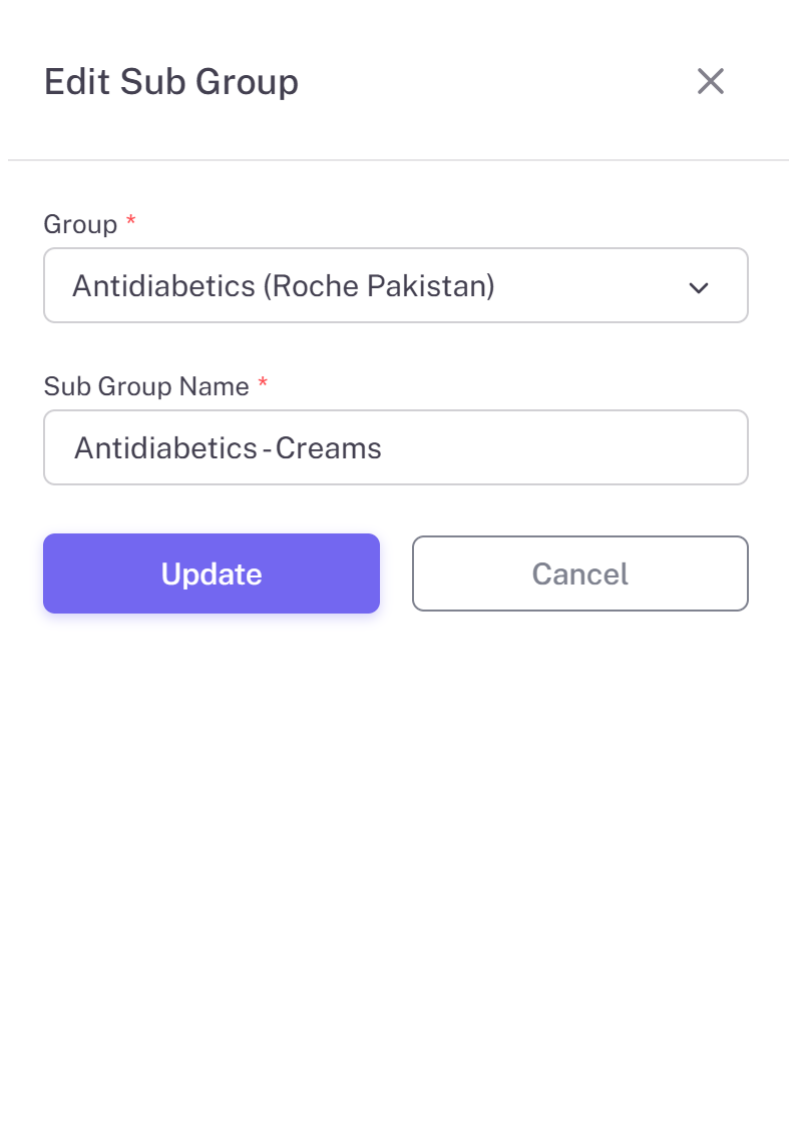
The screenshot shows the 'Sub Groups' management interface. At the top right, there is a blue button labeled '+ Add New Sub Group' (callout 1). Below this is a 'Filters' section with three dropdown menus: 'Select Brand', 'Select Group', and 'Select Status' (callout 2). A '10' dropdown and a 'Search...' input field are also present. The main content is a table with columns: SUB GROUP, GROUP, BRAND, CREATED DATE, STATUS, and ACTION. The table lists six sub-groups, all created on 11/21/2025, with status toggles and edit icons (callout 3).

SUB GROUP	GROUP	BRAND	CREATED DATE	STATUS	ACTION
Cardiovascular - Injections	Cardiovascular	Roche Pakistan	11/21/2025	<input checked="" type="checkbox"/>	Edit
Cardiovascular - Capsules	Cardiovascular	Roche Pakistan	11/21/2025	<input checked="" type="checkbox"/>	Edit
Antidiabetics - Tablets	Antidiabetics	Roche Pakistan	11/21/2025	<input checked="" type="checkbox"/>	Edit
Cardiovascular - Syrups	Cardiovascular	Roche Pakistan	11/21/2025	<input checked="" type="checkbox"/>	Edit
Analgesics - Creams	Analgesics	Roche Pakistan	11/21/2025	<input checked="" type="checkbox"/>	Edit
Cardiovascular - Creams	Cardiovascular	Roche Pakistan	11/21/2025	<input checked="" type="checkbox"/>	Edit

Figure 5.22: Sub-Group Page

1. Add New Sub Group
2. Filter
3. Edit Sub Group Details

5.19 Edit Sub Group Page



Edit Sub Group ×

Group *

Antidiabetics (Roche Pakistan) ▼

Sub Group Name *

Antidiabetics - Creams

Update Cancel

Figure 5.23: Edit Sub-Group Page

- 1) Edit Sub Group Details

5.20 Product Page

View, add, and edit products. Includes filters by brand/group/subgroup, and product status toggling

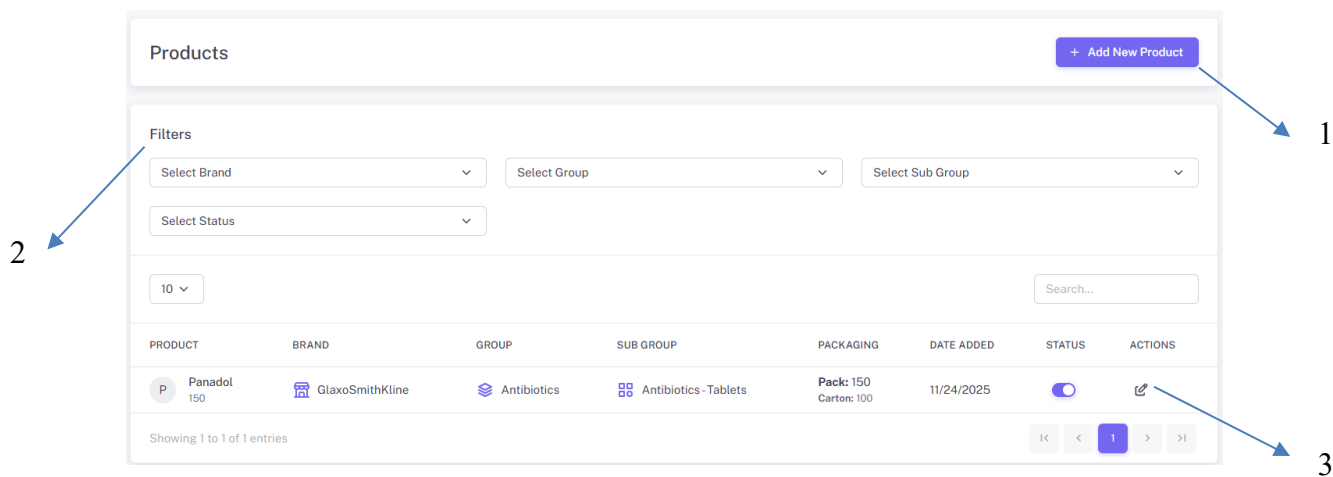


Figure 5.24: Product Page

- 1) Add New Product
- 2) Filters
- 3) Edit Product

5.21 Edit Product Page

Edit Product ✕

Product Name ^{*}

Brand ^{*}

 ▼

Group

 ▼

Sub Group

 ▼

Packing Size ^{*}

Carton Size ^{*}

[Update Product](#)

Figure 5.25: Edit Product Page

1. Edit Product Details

5.22 Purchase Invoice Page

Manage purchase records, supplier invoices, and track incoming stock.

The screenshot shows the 'Purchase Invoices' page. At the top right, there is a blue button labeled '+ Add New Purchase Entry' (callout 1). Below this is a 'Filters' section (callout 2) containing three dropdown menus: 'Select Brand', 'Select Payment Status', and 'Select Status', along with 'Start Date' and 'End Date' input fields. A table below the filters displays a list of invoices with columns: INVOICE #, BRAND, GRAND TOTAL, OUTSTANDING BALANCE, PAYMENT STATUS, INVOICE DATE, STATUS, and ACTION (callout 3). The table contains four rows of invoice data.

INVOICE #	BRAND	GRAND TOTAL	OUTSTANDING BALANCE	PAYMENT STATUS	INVOICE DATE	STATUS	ACTION
inv-2025-2811 11/28/2025	GlaxoSmithKline	Rs23,000	-Rs23,000	Unpaid	11/28/2025	On	✎ 👁 🗑
inv-2025-28111 11/28/2025	GlaxoSmithKline	Rs11,500	-Rs500	Partial	11/28/2025	On	✎ 👁 🗑
inv-1128-2025 11/27/2025	GlaxoSmithKline	Rs19,000	Rs0	Paid	11/27/2025	On	✎ 👁 🗑
inv-2024-2411 10/1/2024	GlaxoSmithKline	Rs360,000	Rs0	Paid	10/1/2024	On	✎ 👁 🗑

Figure 5.26: Purchase Invoice Page

1. Add New Purchase Invoice
2. Filter
3. Multiple Actions on Invoice Details

5.23 Edit Purchase Invoice Page

1 ← Basic Information

Brand * GlaxoSmithKline Invoice Number * inv-1113-25-gsk Invoice Date * 11/13/2025 Purchase Date * 11/13/2025

Last Invoice Number inv-123-2024 Last Invoice Price Rs221,100

Remarks Additional notes...

2 ← Products

Product * Select Product Batch Number * BATCH001 Expiry Date * mm/dd/yyyy

Cartons * 0 Pieces * 0 Total Quantity 0 Bonus 0

Net Price * 0 Sale Price * 0 Min Sale Price * 0 Retail Price * 0 Invoice Price * 0 Discount 0 Discount Type Percentage

3 ← + Add Product

4 ← Added Products

Check Return Products

Product	Batch	Expiry	Cartons	Pieces	Quantity	Bonus	Return Qty	Return Date	Net Price	Sale Price	Min Sale	Retail Price	Invoice Price	Discount
Panadol	p30	11/14/2028	1	0	100	0	0	mm/dd/yyyy	Rs22	Rs25	Rs24.5	Rs29	Rs27	-

5 ← Financial Details

Freight 0 Flat Discount 0 Special Discount 0

Payment Records

Payment Date 11/21/2025 Payment Amount 0 + Add Payment

Payment History

11/13/2025	Rs2,100
11/13/2025	Rs80
11/13/2025	Rs20

Summary

Products: 1

Gross Total: Rs2,200

+ Freight: Rs0

- Discounts: Rs0

Grand Total: Rs2,200

Additional Payments: Rs2,200

Total Paid: Rs2,200

Credit Amount: Rs0

6 ← Cancel Update

Figure 5.27: Edit Purchase Invoice Page

1. Edit Basic Information
2. Add/Edit Product
3. Add/Update Product button
4. Added Products
5. Edit Financial Details with Payment history
6. Update Button

5.24 Inventory Management Per Batch Details Page

The screenshot displays the 'Batch Details - Amoxicillin - Analgesics - Capsules' page. At the top right, there is an 'Export Report' button (labeled 1). Below this are three summary cards: 'Total Quantity' (2,140), 'Reserved Quantity' (0), and 'Available Quantity' (2,140). A search and filter section (labeled 2) includes a search bar, a 'Stock Status' dropdown, an 'Expiry Status' dropdown, and a 'Sort By' dropdown. Below this is a table titled 'Batch Details' (labeled 3) with the following data:

BATCH NUMBER	EXPIRY DATE	QUANTITY	AVAILABLE	STOCK STATUS	EXPIRY STATUS	PRICING
aac1	2/25/2026 96 days remaining	2,140	2,140	In Stock	Valid	Sale: Rs25 Retail: Rs28 Cost: Rs21,794

Figure 5.28: Per Batch Details of Inventory

1. Export Report
2. Filters
3. Batch details

5.25 Sales Invoice Page

Create, view, and manage sales invoices. Includes payment tracking, analytics, and customer history.

The screenshot displays the 'Sales Invoices' management interface. At the top right, there is a blue button labeled '+ Add New Sales Invoice' with an arrow pointing to the number '1'. Below this, a 'Filters' section contains four dropdown menus: 'Select Customer', 'Select Payment Status', 'Select Employee', and 'Select Status'. An arrow labeled '2' points to the 'Select Customer' dropdown. Below the filters, there is a '10' dropdown for pagination and a 'Search...' input field. The main content is a table with the following columns: INVOICE #, DELIVERY LOG #, CUSTOMER, DATE, TOTAL AMOUNT, DELIVERED BY, CASH PAID (TOTAL PAID), BALANCE (CREDIT), and PAYM. The table contains four rows of data for invoices from City General Hospital.

INVOICE #	DELIVERY LOG #	CUSTOMER	DATE	TOTAL AMOUNT	DELIVERED BY	CASH PAID (TOTAL PAID)	BALANCE (CREDIT)	PAYM
SINV-25-1124-000003	DLV-25-1124-d681	City General Hospital LIC-HOSP-001	11/24/2025	Rs22,242	Ahmed Ali	Rs22,242	Rs0	Paid
SINV-25-1008-000002	DLV-25-1008-d681	City General Hospital LIC-HOSP-001	10/8/2025	Rs16,632	Ahmed Ali	Rs15,000	Rs1,632	Part
SINV-25-0924-000001	DLV-25-0924-d681	City General Hospital LIC-HOSP-001	9/24/2025	Rs21,032	Ahmed Ali	Rs20,000	Rs1,032	Part
SINV-25-0824-000004	DLV-25-0824-d681	City General Hospital LIC-HOSP-001	8/24/2025	Rs28,028	Ahmed Ali	Rs0	Rs28,028	Unp

Figure 5.29: Sales Invoice Page

1. Add New Sales Invoice
2. Filter

5.26 Edit Sales InvoicePage

The screenshot shows the 'Edit Sales Invoice' interface with the following sections and callouts:

- 1:** Basic Information section, including Customer (Medicare Pharmacy), Invoice Date (11/16/2025), Sales Invoice Number (SINV-25-1116-000005), Delivery Log Number (DLV-25-1116-68aa), Delivered By (Ahmed Ali), Booked By (Fatima Khan), License Number (LIC-PHARM-002), and License Expiry Date (10/20/2026).
- 2:** Products section, including Product (Select Product), Inventory Batch (Select product first), Stock, Expiry Date (mm/dd/yyyy), Quantity, Bonus (0), Total Quantity, Price (Rs), Discount (0%), and Discount Type (Percentage (%)).
- 3:** Last 3 Prices to this Customer section, including a 'Select product' dropdown and an 'Allow below min price' checkbox.
- 4:** 'Add Product' button in the Products section.
- 5:** Added Products table with columns: Product Name, Batch No., Qty, Bonus, Total Qty, Unit Price, Discount, Total, Return Qty, Return Date, and Actions. The table contains two rows: Panadol (50) and Paracetamol - Analgesics - Tablets (500mg x 20 tablets).
- 6:** Financial Details section, including Total Discount (315.2), Payment Records (Payment Date: 11/21/2025, Payment Amount: 0), and Payment History (11/16/2025, Rs13,000).
- 7:** 'Update' button at the bottom right of the page.

Figure 5.30: Edit Sales Invoice

1. Edit Basic Information
2. Add/Edit Product
3. Last 3 times Prices of same medicine to same customer
4. Add/Update Product Button
5. Added Products List
6. Edit Financial Details with financial history
7. Update Button

5.27 Delivery Logs Page

Log and track product deliveries, shipments, and sync with invoices.

The screenshot shows the 'Delivery Logs' page interface. At the top right, there is a button labeled 'Sync Missing Invoices' (1). Below it is a 'Filters' section (2) containing dropdown menus for 'Select Salesman' and 'Select Status', and input fields for 'Start Date' and 'End Date'. A table below the filters displays delivery logs with columns: LOG NUMBER, DATE, SALESMAN, INVOICES, TOTAL AMOUNT, UPDATED DATE, STATUS, and ACTIONS (3). The table contains five rows of data for deliveries by 'Ahmed Ali Manager'.

LOG NUMBER	DATE	SALESMAN	INVOICES	TOTAL AMOUNT	UPDATED DATE	STATUS	ACTIONS
DLV-25-1124-d681	Nov 24, 2025	Ahmed Ali Manager	1 Invoice	Rs22,242	11/24/2025	On	View, Print
DLV-25-1008-d681	Oct 8, 2025	Ahmed Ali Manager	1 Invoice	Rs16,632	11/24/2025	On	View, Print
DLV-25-0924-d681	Sep 24, 2025	Ahmed Ali Manager	1 Invoice	Rs21,032	11/24/2025	On	View, Print
DLV-25-0824-d681	Aug 24, 2025	Ahmed Ali Manager	1 Invoice	Rs28,028	11/24/2025	On	View, Print
DLV-25-0624-d681	Jun 24, 2025	Ahmed Ali Manager	1 Invoice	Rs10,758	11/24/2025	On	View, Print

Figure 5.31: Delivery Log Page

1. Sync Missing Invoice Button
2. Filters
3. Multiple Actions

5.28 Delivery Logs Details Page

The screenshot shows the 'Delivery Log Details' page. At the top right, there are two buttons: 'Recalculate Total' (labeled 1) and 'Print' (labeled 2). The main content area displays delivery log information: Log Number (DLV-25-1117-68aa), Date (November 17, 2025), Salesman (Ahmed Ali Employee), Total Amount (Rs17,900), Vendor (Saad Aslam), and Number of Invoices (1 Invoice, labeled 3). Below this is a section for 'Linked Invoices' (labeled 4), which shows details for 'Invoice 1' (Invoice Number: SINV-25-1117-000006, Invoice Date: Nov 17, 2025). The invoice details include Customer (University Medical Center), Area (Faisalabad), Payment Status (Partial), Total Amount (Rs17,900), and Credit Amount (Rs0). A table of medicines is provided below the invoice details.

#	Product Name	Batch #	Quantity	Bonus	Price	Discount	Total
1	Panadol	p20	100	0	Rs28	Rs0	Rs2,800
2	Panadol	p20	430	0	Rs28	Rs0	Rs12,040
3	Panadol	p20	20	0	Rs28	Rs0	Rs560
4	Panadol	p30	100	0	Rs25	Rs0	Rs2,500

Grand Total: Rs17,900 Paid: Rs2,800.00 Balance: Rs15,100.00

Figure 5.32: Delivery Log's Detail Page

1. Recalculate Total Button syncing it with Sales Invoices DB
2. Print Button
3. Delivery Log Details
4. Linked Invoices

5.29 Product Reports Page

The screenshot displays the 'Product Reports' interface. At the top, the title 'Product Reports' is followed by the subtitle 'Product-wise sales summary and analysis'. Below this is a 'Filters' section containing several dropdown menus: 'Select Product', 'Select Brand', 'Select Group', 'Select Subgroup', 'Select Customer', 'Select Area', 'Select Subarea', 'Start Date', and 'End Date'. A '10' dropdown and a 'Search...' input field are also present. The main data table has columns for 'PRODUCT', 'CUSTOMER', 'GROUP', 'SUBGROUP', 'SOLD QTY', 'RETURN QTY', 'NET QTY', 'TOTAL BONUS', 'INVOICES', and 'ACTIO'. A single row is visible for 'Panadol' by 'City General Hospital'. A blue arrow labeled '1' points to the filters, and another blue arrow labeled '2' points to the eye icon in the 'ACTIO' column.

PRODUCT	CUSTOMER	GROUP	SUBGROUP	SOLD QTY	RETURN QTY	NET QTY	TOTAL BONUS	INVOICES	ACTIO
Panadol GlaxoSmithKline	City General Hospital Downtown Medical District - Downtown Medical District - North	Antibiotics	Antibiotics - Tablets	8796	0	8796	0	10	

Showing 1 to 1 of 1 entries

Figure 5.33: Product Report Page

1. Filters
2. View Product report

5.30 Brand Report Page

The screenshot displays the 'Brand Reports' page, which provides a brand-wise purchase summary and analysis. The page includes a 'Filters' section with dropdown menus for 'Select Brand' and 'Select Status', and input fields for 'Start Date' and 'End Date'. Below the filters, there is a table with columns for BRAND, TOTAL INVOICES, GROSS PURCHASE, FREIGHT, TOTAL DISCOUNT, GRAND TOTAL, TOTAL PAID, OUTSTANDING, and ACTIONS. The table lists three brands: GlaxoSmithKline, Novartis Pakistan, and Roche Pakistan. The 'OUTSTANDING' column for Roche Pakistan shows a value of Rs39,900 in red. A search bar is located to the right of the table. The page also features a pagination control at the bottom right, showing '1' as the current page.

1

2

BRAND	TOTAL INVOICES	GROSS PURCHASE	FREIGHT	TOTAL DISCOUNT	GRAND TOTAL	TOTAL PAID	OUTSTANDING	ACTIONS
GlaxoSmithKline	3	Rs246,400	Rs0	Rs0	Rs246,400	Rs246,400	Rs0	👁
Novartis Pakistan	1	Rs33,264	Rs0	Rs0	Rs33,264	Rs33,264	Rs0	👁
Roche Pakistan	3	Rs118,580	Rs0	Rs0	Rs118,580	Rs78,600	Rs39,900	👁

Showing 1 to 3 of 3 entries

Figure 5.34: Brand Report Page

1. Filter
2. View brand report

5.31 Brand Report Detail Page

The screenshot displays the 'Brand Report Detail Page' for 'GlaxoSmithKline'. The page is divided into several sections:

- Brand Information:** Includes Brand Name (GlaxoSmithKline), Address (456 Healthcare Avenue, Lahore), Primary Contact (+92-42-2345678), Secondary Contact (+92-42-2345679), and Status (Active).
- Summary Statistics:** A dashboard showing key metrics:
 - Total Invoices: 3
 - Gross Purchases: Rs246,400
 - Total Freight: Rs0
 - Total Discount: Rs0
 - Grand Total: Rs246,400
 - Total Paid: Rs246,400
 - Outstanding Amount: Rs0
- Filters:** Includes input fields for Start Date and End Date, a dropdown for Select Status, a page size selector (10), and a search bar.
- Table:** A table with columns: INVOICE #, INVOICE DATE, GROSS AMOUNT, FREIGHT, FLAT DISCOUNT, SPECIAL DISCOUNT, GRAND TOTAL, PAID, BALANCE, STATUS, and REMARKS. The first row shows an invoice for 'inv-1113-25-gsk' dated '13 Nov 2025' with a gross amount of 'Rs2,200' and a status of 'Paid'.

Numbered callouts in the image point to specific elements:

1. Export Button
2. Summary Statistics
3. Filters
4. List of brand's Cash/Credit records against invoices

Figure 5.35: Brand Report's Detail Page

1. Export Button
2. Summary Stactics
3. Filters
4. List of brand's Cash/Credit records against invoices

5.32 Customer Report Page

Customer Reports
Customer-wise sales summary and analysis

Filters

Select Customer Select Status Start Date

End Date

10 Search...

CUSTOMER	TOTAL INVOICES	GROSS SALES	TOTAL DISCOUNT	GRAND TOTAL	TOTAL PAID	OUTSTANDING	ACTIONS
City General Hospital	4	Rs85,585.1	Rs0	Rs85,585.1	Rs85,585.1	Rs0	
Community Health Wholesaler	3	Rs81,250	Rs0	Rs81,250	Rs81,250	Rs0	
Health Plus Pharmacy	3	Rs27,300	Rs0	Rs27,300	Rs26,500	Rs900	
MediCare Retail Store	3	Rs57,375	Rs0	Rs57,375	Rs57,375	Rs0	
Medicare Pharmacy	3	Rs39,169.8	Rs315.2	Rs39,169.8	Rs36,275	Rs2,894.8	
University Medical Center	1	Rs17,900	Rs0	Rs17,900	Rs2,800	Rs15,100	

Showing 1 to 6 of 6 entries

<< < 1 > >>

2

Figure 5.36: Customer Report Page

1. Filter
2. Actions

5.33 Customer Report Detail Page

City General Hospital
Detailed sales report for City General Hospital

Export

Customer Information

Customer Name City General Hospital	Primary Contact +92-42-1111111	Status Active
Address 123 Hospital Road, Lahore	Secondary Contact +92-42-1111112	
Category Hospital		

Summary Statistics

4 Total Invoices	Rs85,585.1 Gross Sales	Rs0 Total Discount	Rs85,585.1 Grand Total
Rs85,585.1 Total Paid	Rs0 Outstanding Amount		

Filters

Start Date: End Date: Select Status:

10 Search...

INVOICE #	DATE	GROSS AMOUNT	TOTAL DISCOUNT	GRAND TOTAL	PAID	BALANCE	STATUS	REMARKS
SINV-25-1108-000002	8 Nov 2025	Rs5,285.1	Rs0	Rs5,285.1	Rs5,285.1	Rs0	Paid	-
SINV-25-0618-000007	18 Jun 2025	Rs5,300	Rs0	Rs5,300	Rs5,300	Rs0	Paid	-
SINV-24-1218-000004	18 Dec 2024	Rs52,500	Rs0	Rs52,500	Rs52,500	Rs0	Paid	-
SINV-24-1018-000002	18 Oct 2024	Rs22,500	Rs0	Rs22,500	Rs22,500	Rs0	Paid	-

Showing 1 to 4 of 4 entries

1

Figure 5.37: Customer Report's Details Page

1. Export Button
2. Customer Information
3. Summary Stactics
4. Filters
5. List of customer's cash/credit record against invoices

5.34 Expenses Page

Record and categorize business expenses. View expense history, filter by category/date, and generate reports.

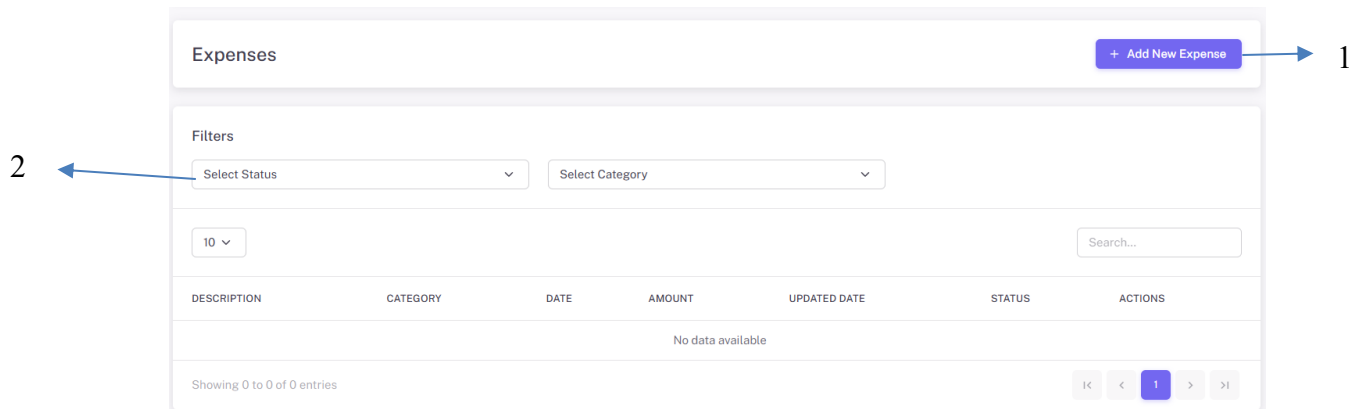


Figure 5.38: Expenses Page

1. Add New Expense Button

2. Filter

5.35 Ledger Page

The Ledger page provides a comprehensive view of all financial transactions and balances for the business. It aggregates data from sales, purchases, expenses, and other sources to present a unified financial record

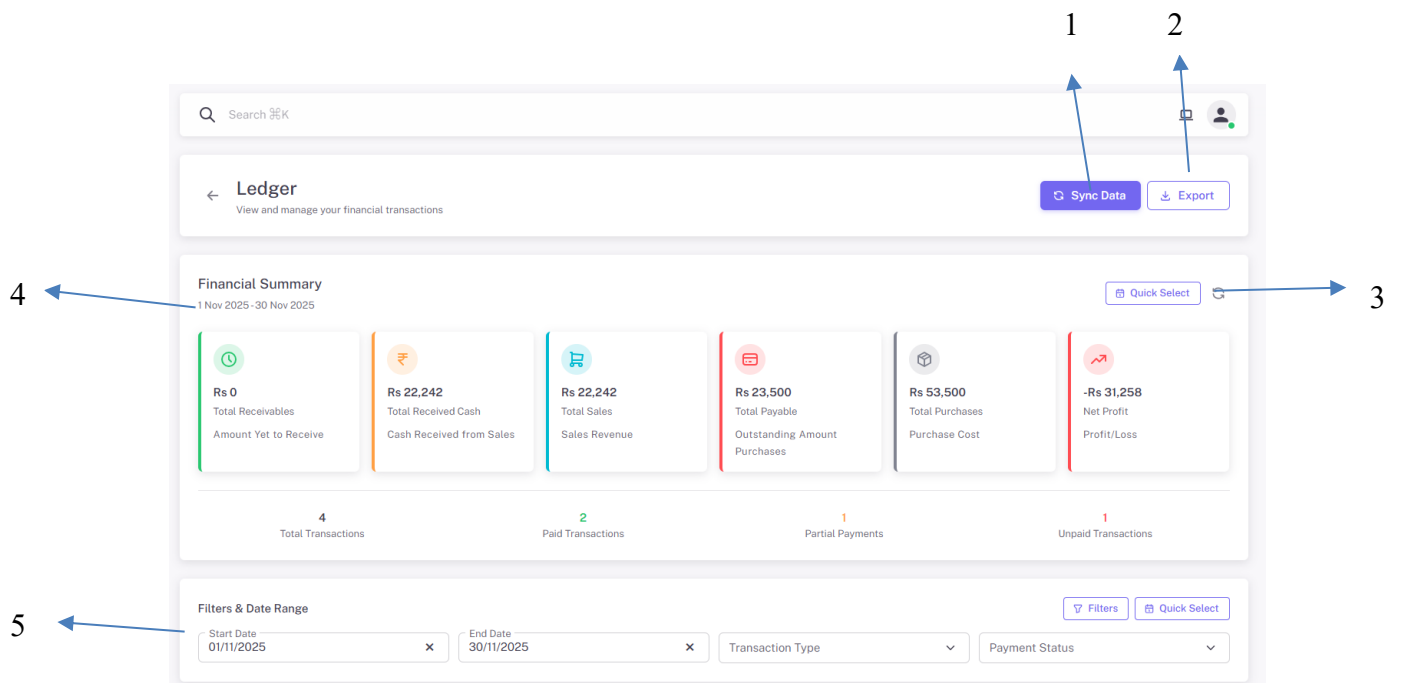


Figure 5.39: Ledger Page

1. Sync Button
2. Export Button
3. Quick select (Date)
4. Financial Summary
5. Filter & Date Range

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The development of DoseLogix successfully addressed the dire need of an efficient, robust and low cost and industry specific Pharmaceutical Distribution Management System (PDMS) designed to meet the needs of small and medium scale distributors.

This project was designed in such a manner that it fills the gaps that exist in the current solutions, which are in most cases either out of date, provide inconsistent data flow, or are costly and generalized systems that cannot be customized. DoseLogix meets its main objective of offering a secure, modern, and convenient platform that is meant to conform to the operational conditions of pharmaceutical distribution.

The developed system has a centralized application that controls the necessary operations which include a lean invoicing module to deal with both purchase and sales records, full inventory control and cash flow monitoring. It has successfully made a critical financial tracking system to sustain outstanding balances, debit/ credit transactions and payment history of customers and brands and thus the receivables and deliverables are clear. DoseLogix is a majorly differentiated product with its novel, integrated capabilities: AI-powered sales forecasting, which relies on past data to forecast upcoming demand, helping distributors make well-informed buying choices. More so, the service is further equipped with an exclusive web scraping system to provide the most recent news in health-related matters of the acknowledged Pakistani

health authorities (NIH and Chughtai Lab) so that distributors could anticipate in advance in meeting new market demands.

DoseLogix has been developed on the basis of a solid architecture with Next.js, Node.js, Python, and MongoDB that guarantee user-friendly interface/user experience (UI/UX), as well as the essential functions such as authentication, authorization, multi-tenancy, and alerts on low stocks or medicine expiry date. Through these goals, DoseLogix will have the ability to offer a scalable and faithful industry-specific platform that will increase the efficiency of operations and improve business expansion in the pharmaceutical industry.

6.2 Future Prospects

Although at its present capacity, DoseLogix offers a thorough and efficient DMS to small and medium-scale enterprises, there are future developments that are to be enhanced to give it an improved capacity and market presence. The main areas of future development and recommendations involve such features as multi brand support, e pharmacy integration with POS Systems.

6.2.1 Multi-branch support for large distributors and chain networks

This expansion aims to scale the DoseLogix infrastructure to successfully accommodate the more complex organizational structures and geographical distribution requirements of larger distributors and chain networks.

6.2.2 Automated billing and reporting

Future development will focus on incorporating enhanced administrative automation features, specifically automating billing processes, calculating taxes, and generating compliance reports. This will streamline financial operations and ensure adherence to evolving regulatory standards.

6.2.3 Integration with e-pharmacy platforms and POS systems

To increase the system's utility within the wider pharmaceutical ecosystem, a key prospect is the integration of DoseLogix with external retail environments, including various e-pharmacy platforms and Point of Sale (POS) systems.

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