

Chapter 1: Introduction

1.1 Brief overview of the work:

EasyTreat is a web-based Healthcare Analytics system designed to streamline and automate various hospital operations, including appointment scheduling, patient records management, medical inventory tracking, billing system. The system ensures efficient hospital administration, improved patient experience, and real-time data access, enhancing overall healthcare service delivery.

1.2 Objective:

Here are the objectives:

- 1 Enable users (doctors, admin, patient, supplier) to manage patient records, appointments, and medical histories seamlessly.
- 2 Provide real-time updates on patient status, and ongoing treatments for efficient hospital operations.
- 3 Implement a Billing and payment system for accurate invoicing and financial tracking.
- 4 Allow hospital administrators to manage medical inventory, ensuring stock levels are monitored and restocked on time.
- 5 Deliver comprehensive analytics and reporting features to assist hospital management in decision-making and improving operational efficiency.
- 6 Also super admin can Manage multiple hospitals at one place.

1.3 Project Scope:

The scope of EasyTreat – Healthcare Analytics system is to streamline patient management, appointments, billing, inventory through a web-based solution. It enables doctors and administrators to efficiently handle records, automate workflows, and generate reports. With a user-friendly interface and secure data management, EasyTreat enhances hospital efficiency while minimizing errors and paperwork.

1.4 Project modules

1.4.1 User Management Module

Ensures secure access with a two-step verification system, allowing users to register and log in to their accounts safely. It also manages user roles (patient, doctor, supplier, admin, superadmin) and permissions.

1.4.2 Appointment Module

Allows patients to book, modify, and cancel appointments with doctors. Provides real-time updates on appointment status and notifications for upcoming consultations.

1.4.3 Medical Product Management Module

Enables hospitals to manage medical supplies, track inventory, and handle purchases from suppliers. Ensures that required medicines and equipment are always available.

1.4.4 Bill & payment Management Module

Handles patient billing, including consultation fees and medical product purchases. Supports multiple payment methods and provides invoice generation and payment tracking.

1.4.5 Analytics Module

Generates reports on hospital performance, doctor efficiency, patient treatment history, and financial insights. Provides data-driven recommendations for better decision-making

1.5 Project Basic Requirements:

1.5.1 Hardware Requirements:

- Server or hosting service
- Domain name and SSL certificate
- Storage solution for user and product data also storage for products
- desktop device for testing and development

1.5.2 Software Requirements:

- Backend framework such as Node.js or Python In Django
- Front-end development with React.js for Website
- Database management system (e.g., SQL,Json)
- Development environments like VS code
- Power BI (Analytical Tool)
- User authentication and authorization system
- Version control system (e.g., Git)

Chapter 2 : Literature Review

Modern HMS Overview:

The Modern Hospital Management System (HMS) is a critical component of healthcare organizations, integrating patient administration, financial management, clinical documentation, and human resources to improve operational efficiency. Research highlights that HMS adoption leads to enhanced patient care, reduced costs, and optimized workflow automation, ensuring better hospital management.

Methodology

The methodology adopted in the project emphasizes a structured and user-centric approach to developing the Hospital Management System. It begins with a clear system flow where users (patients and doctors) log in via email and interact with a secure web interface. The process of booking appointments, managing patient records, and accessing dashboards is designed to be intuitive. The system differentiates between three core modules: Admin, Doctor, and Patient, each with distinct functionalities. Admins have full control, including managing doctors and viewing hospital data. Doctors can update their availability and track appointments. Patients can book slots, edit details, and access their health records. Data handling is efficient, with MySQL Workbench used for robust backend management. The model ensures adaptability, secure access, and easy recovery through data backups. Overall, the methodology supports streamlined operations and error reduction in hospital workflows.

Technology Used:

The Modern Hospital Management System (HMS) described in the Paper is developed using JSP (JavaServer Pages) for the frontend, Java for backend processing, and MySQL for database management. The system is designed as a web-based application, enabling seamless access to patient records, appointments, and billing processes. It incorporates secure authentication mechanisms and data encryption to ensure patient confidentiality and compliance with healthcare regulations. This technology stack provides a scalable, efficient, and secure solution for hospital administration, enhancing workflow automation and improving patient care.

The figure displays a dual-screen setup for a hospital management system. The left screen shows a user interface titled 'User Appointment' with fields for Full Name, Gender, Age, Appointment Date, Email, Phone No., Diseases, Doctor selection, and Full Address, all set against a green header labeled 'APPOINTMENT'. The right screen is a database management tool showing the 'user_dtls' table from the 'hospital_management' schema. The table contains the following data:

ID	full_name	email	password
1	Angyl	as@gmail.com	1234
2	Sandeep	Sandeep@gmail.com	2345
3	Gaurav	g@gmail.com	3456
4	Arijit	a@gmail.com	4567
5	harsh	harsh166@gmail.com	12345
6	Amritpal	3232@gmail.com	23456
7	pabla	pabla@gmail.com	123456
8	Abhiram Singh Rajput	Abhiram@gmail.com	12345
9	Shivam	shivam@gmail.com	1234
10	Shivam	shivam@gmail.com	1234

Figure 2: Modern Hospital Management System Review

Chapter 3: System Analysis & Design

3.1 Comparison of Existing Applications with your Project with merits and demerits

Merits

- All-in-One System: Combines appointment booking, prescription management, medicine inventory, and payment into a unified system.
- Modular Role Access: Doctors, patients, suppliers, and admins have clearly defined access and functionality.
- Integrated Stock Management: Streamlines medicine and equipment tracking, restocking, and requests.
- Email Automation: Prescriptions and notifications are shared via email, enhancing user communication.

Demerits

- Custom Email Setup Requires Paid Services: To create user@hms.com, external services like Zoho or Google Workspace are needed, which involve cost.
- No Native Mobile Application: Current system is browser-based; a mobile app could increase accessibility.
- Limited AI Integration: No AI-based suggestions for doctors or chatbot for user support.

3.2 Project Feasibility Study

3.2.1 Technical Feasibility

The Healthcare Analytics System will be developed using React for the frontend and Django for the backend, ensuring scalability and efficiency. The system will utilize MongoDB for data storage. RESTful APIs will handle communication between the frontend and backend, which may be used for real-time appointment updates. Security measures such as encryption and data validation will be implemented to protect sensitive information. Given the available technology and infrastructure, the project is technically feasible and can be developed within the planned time frame.

3.2.2 Financial Feasibility

The financial feasibility of the System involves initial costs for development, server infrastructure, and API integrations, along with recurring expenses for database storage, and customer support. Revenue streams may include subscription-based models for hospitals, licensing fees for clinics, and monetization through API access. A cost-benefit analysis will help determine profitability and break-even points. With proper budgeting and financial planning, the project is financially viable and can achieve long-term sustainability.

3.2.3 Market Feasibility

To establish the System in the market, a strategic approach will include digital marketing, direct outreach to hospitals, partnerships with healthcare providers, and participation in medical tech conferences. The system's benefits, such as improved patient management, streamlined operations, and enhanced data security, will be emphasized. With the growing demand for digital healthcare solutions, the project has strong market potential and is expected to gain adoption with effective promotional efforts.

3.2.4 Operational Feasibility

The System will integrate smoothly into hospital workflows, offering user-friendly interfaces, automation, and role-based access to reduce manual effort. Training sessions will ensure ease of use among doctors and administrative staff. Customer support and maintenance services will be in place for issue resolution, ensuring smooth operations. With efficient implementation and adoption, the project is operationally feasible and will significantly improve hospital management efficiency.

3.3 Timeline chart

Task ID	Task Name	Start Date	End Date	Duration (in Days)	1/4/2025	1/8/2025	1/11/2025	1/14/2025	1/18/2025	1/24/2025	1/26/2025	1/29/2025	2/1/2025	2/12/2025	3/1/2025	3/11/2025	3/19/2025	3/31/2025	4/1/2025	4/20/2025	4/24/2025	4/25/2025	4/26/2025	31-04-2025	5/3/2025	5/1/2025
TS01	Idea Proposal	1/4/2025	1/8/2025	4 Days																						
TS02	Topic Presentation	1/8/2025	1/11/2025	3 Days																						
TS03	Research and Development of Module	1/11/2025	1/18/2025	8 Days																						
TS04	Module identification	1/14/2025	1/18/2025	5 Days																						
TS05	Progress Documentation	1/11/2025	1/24/2025	14 Days																						
TS06	Progress Report Submition	1/25/2025	1/25/2025	1 Day																						
TS07	Working on Front End	1/26/2025	2/12/2025	18 Days																						
TS08	Templete Editing	2/10/2025	2/11/2025	2 Days																						
TS09	Working on Back End	2/12/2025	3/1/2025	15 Days																						
TS10	Generating API and integration	3/1/2025	3/17/2025	17 Days																						
TS11	Progress Report 2 Submition	3/25/2025	3/25/2025	1 Day																						
TS12	Testing and Modifying Back end	3/19/2025	3/31/2025	12 Days																						
TS13	Project Expo	4/11/2025	4/11/2025	1 Days																						
TS14	Progress Documentation	4/20/2025	4/24/2025	5 Days																						
TS15	First Presentation	4/25/2025	4/25/2025	1 Day																						
TS16	Testing and Debugging	4/26/2025	31-04-2025	6 Days																						
TS17	Final Presentation	5/3/2025	5/3/2025	1 Days																						
TS18	Final Submition	5/1/2025	5/1/2025	1 Days																						

Figure 3.3: timeline chart

3.4 Detailed Modules Description

3.4.1. User Management Module:

Functions:

- **User Registration:** Enable new users to create an account with necessary details.
- **User Login:** Allow users to securely log in to their accounts.
- **User Profile Management:** Let users view and edit their profile information, including name, email, and contact details.

3.4.2. Appointment Module:

Functions:

- **Appointment Booking:** Allow patients to book appointments with doctors based on availability.
- **Appointment Scheduling:** Enable doctors to schedule consultations and manage appointments.
- **Appointment Notifications:** Send reminders for upcoming appointments to users and doctors.
- **Appointment Prescription & Invoice:** doctor give Prescription according to patient disease and medicine suggest also prescription sent to patient mail.

3.4.3. Medical Product Management Module

Functions:

- **Product Listing:** List medical products (e.g., medicines, equipment) available for purchase.
- **Product Purchase:** Patient purchases medicine as doctor suggested.
- **Inventory Management:** Track the stock levels of medical products and request for low stock products.
- **Supplier Management:** Manage supplier details for product supply.

3.4.4 Billing and Payment Management Module:

Functions:

- **Bill Generation:** Automatically generate medical bills based on services provided (e.g., doctor visits, medical products).
- **Payment Processing:** Allow users to make payments for medical bills using different methods (e.g., cash, card, insurance).
- **Payment Status:** Track and display the payment status (Paid, Pending, Cancelled).
- **Invoice Generation:** Generate invoices after successful payments.

3.4.5 Analytics Module:

Functions:

- **User Activity Tracking:** Track user activities (appointments, purchases, etc.) to generate insights.
- **Health Analytics:** Analyze patient health data for insights into treatments and outcomes.
- **Medical Product Analytics:** Track product purchase trends and inventory levels.
- **Billing Analytics:** Provide billing insights and trends based on user data.

3.5 Project SRS

3.5.1 Use Case Diagram

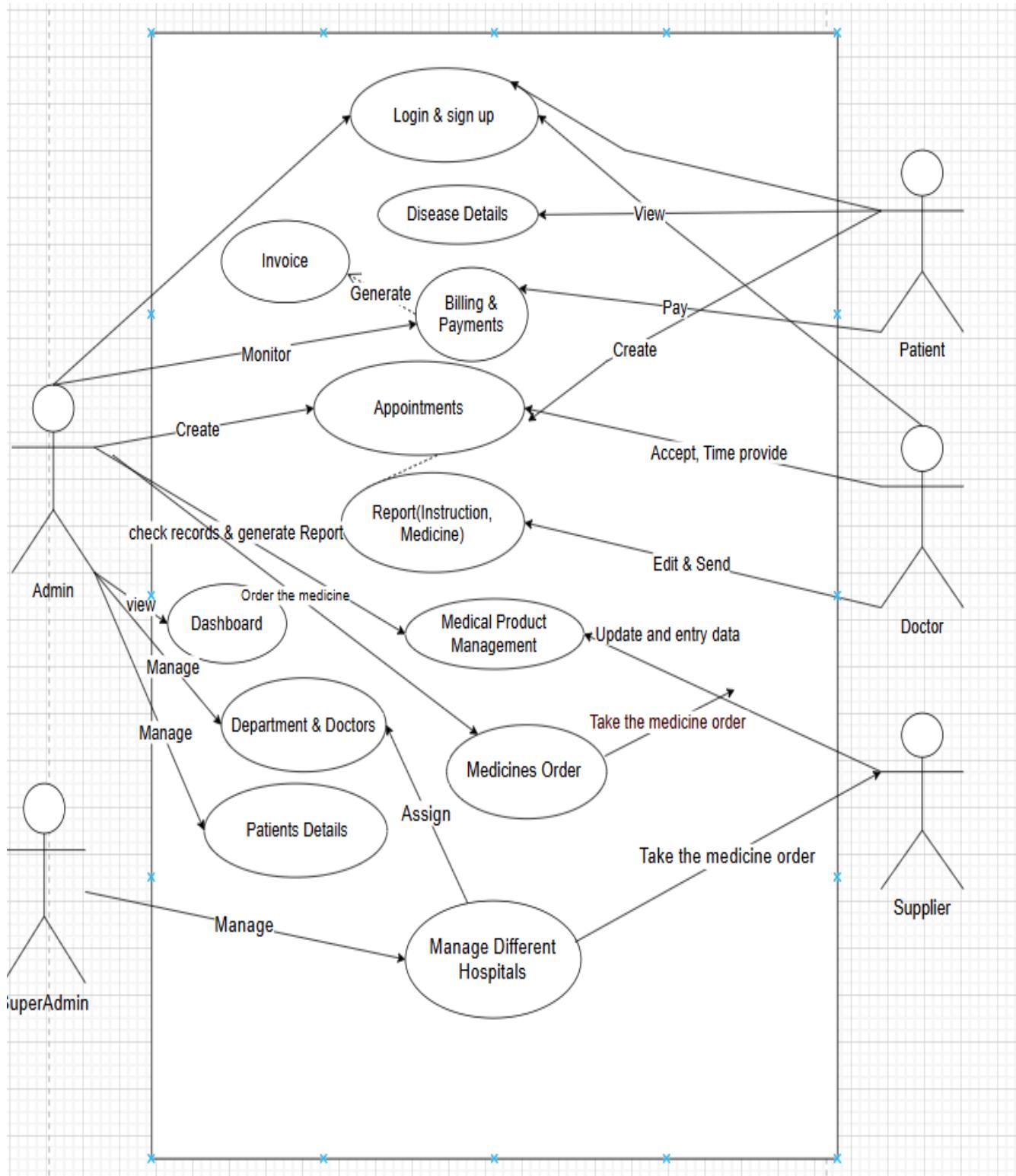


Figure 3.5.1: use case diagram

3.5.2 Data Flow Diagrams

Dfd level 0

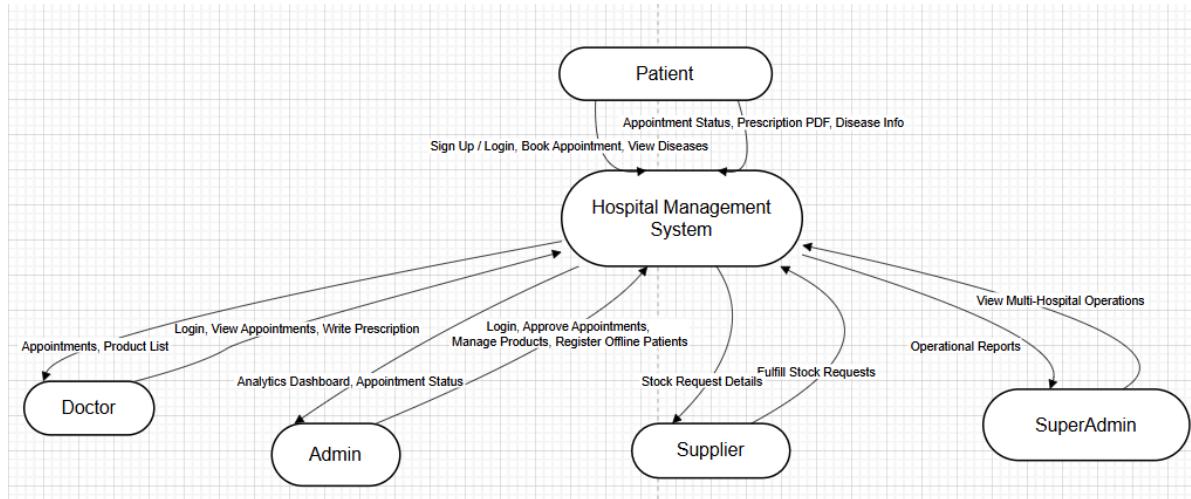


Figure 3.5.2.1: Data Flow level 0

Dfd level 1

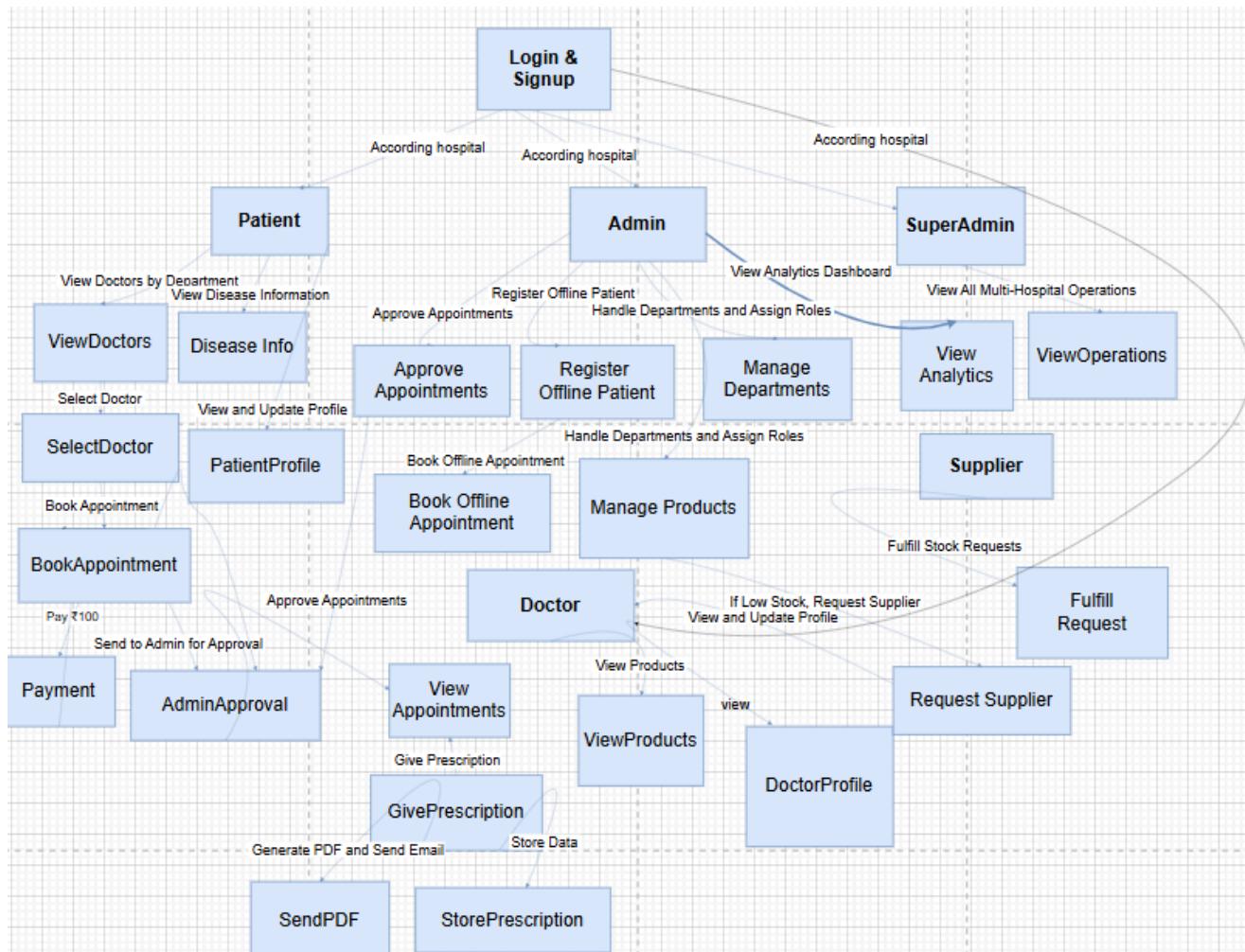


Figure 3.5.2.2: Data Flow level 1

3.5.3 Class Diagram

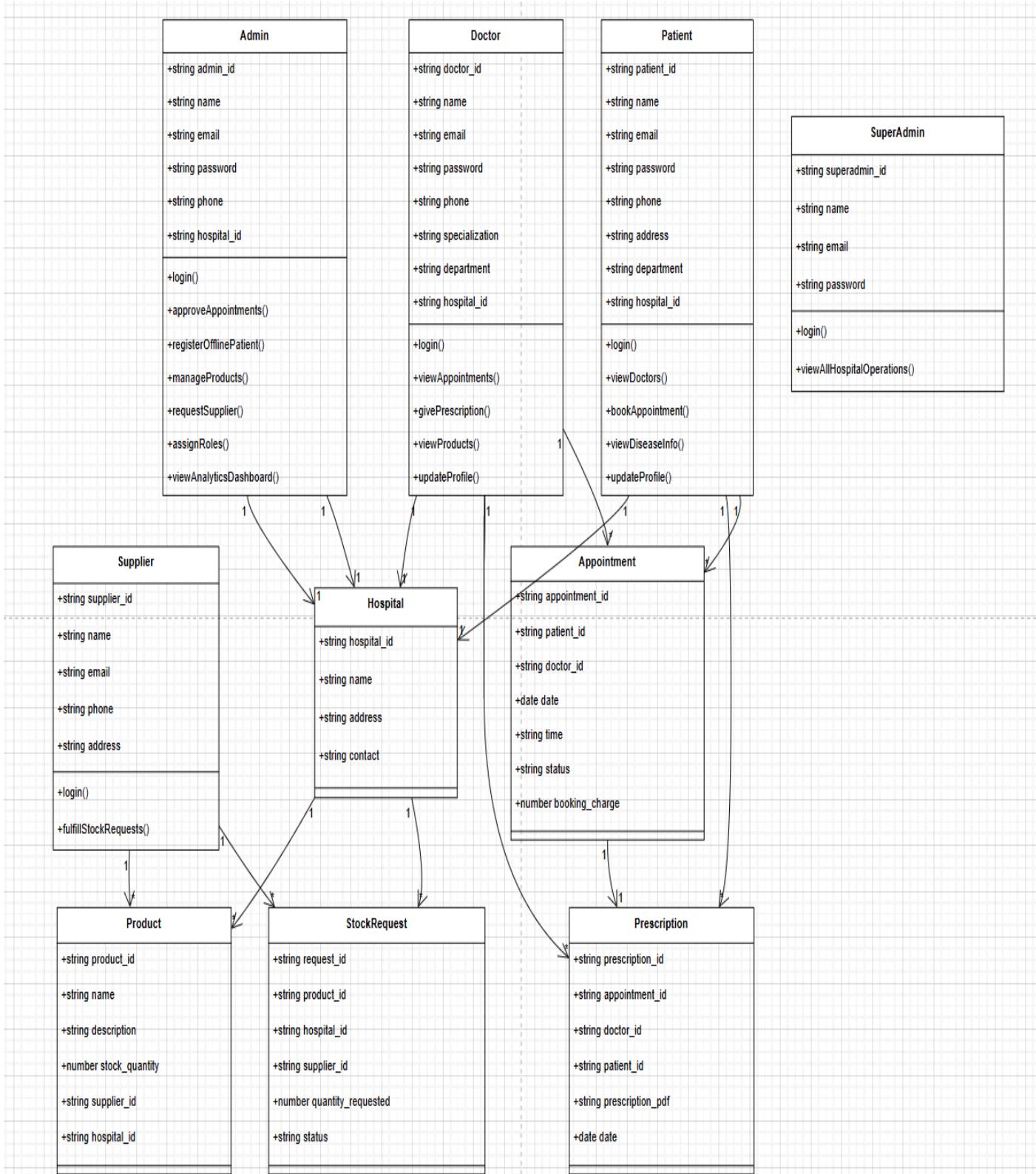


Figure 3.5.3: class diagram

3.5.4 Entity Relationship Diagram

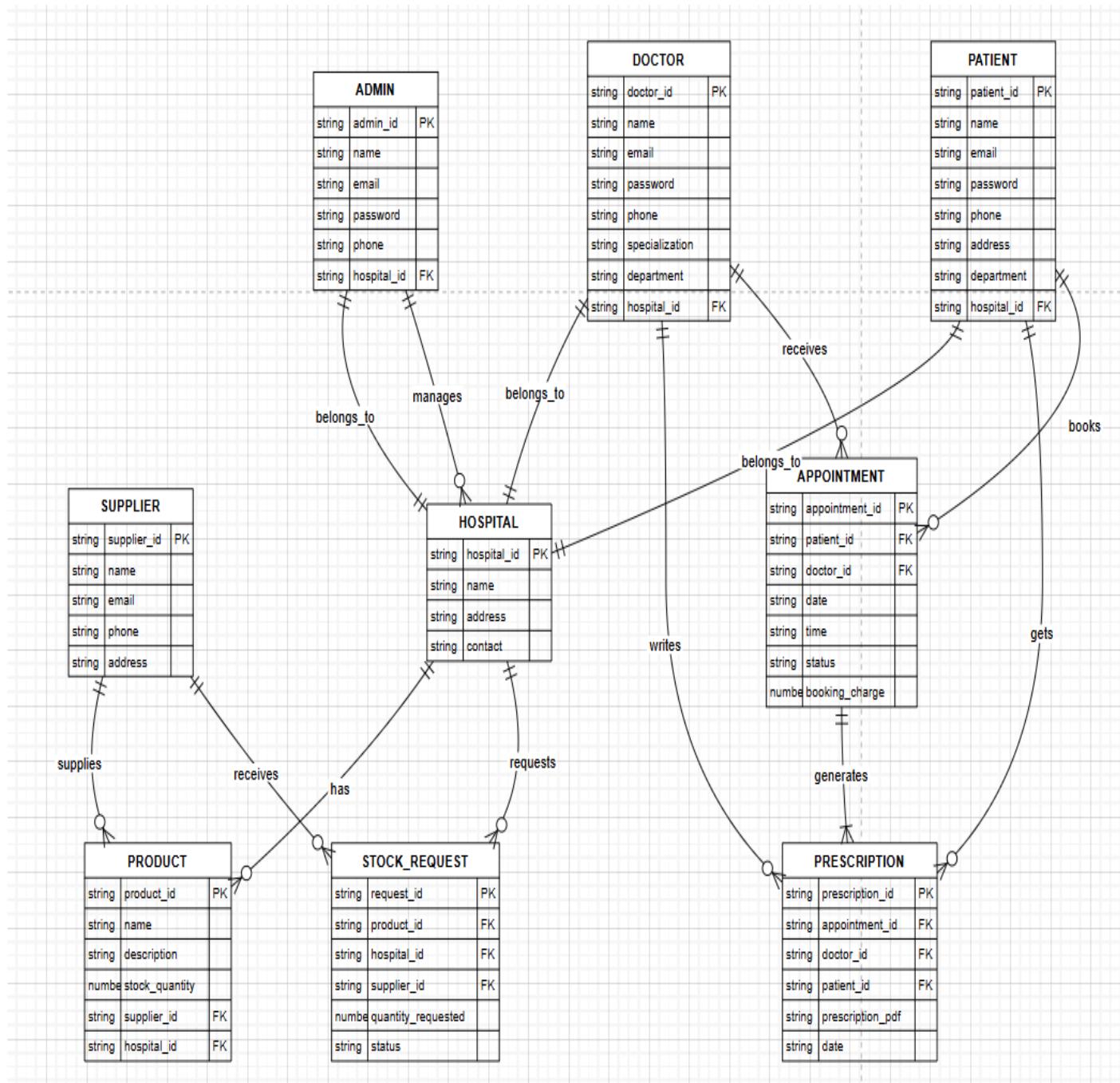


Figure 3.5.4: ER diagram

3.5.5 Sequence Diagram

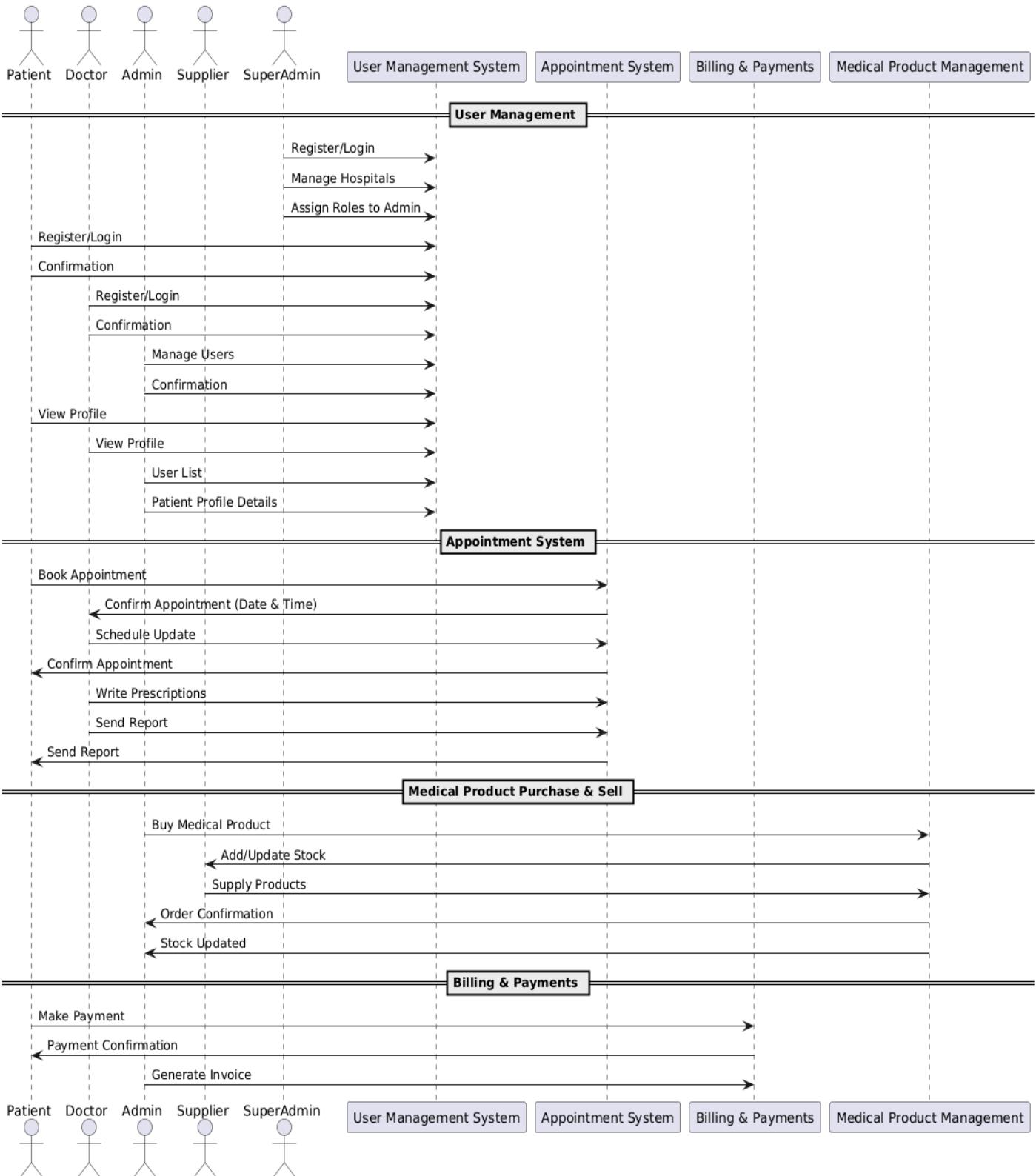


Figure 3.5.5: sequence diagram

3.5.6 State Diagram:

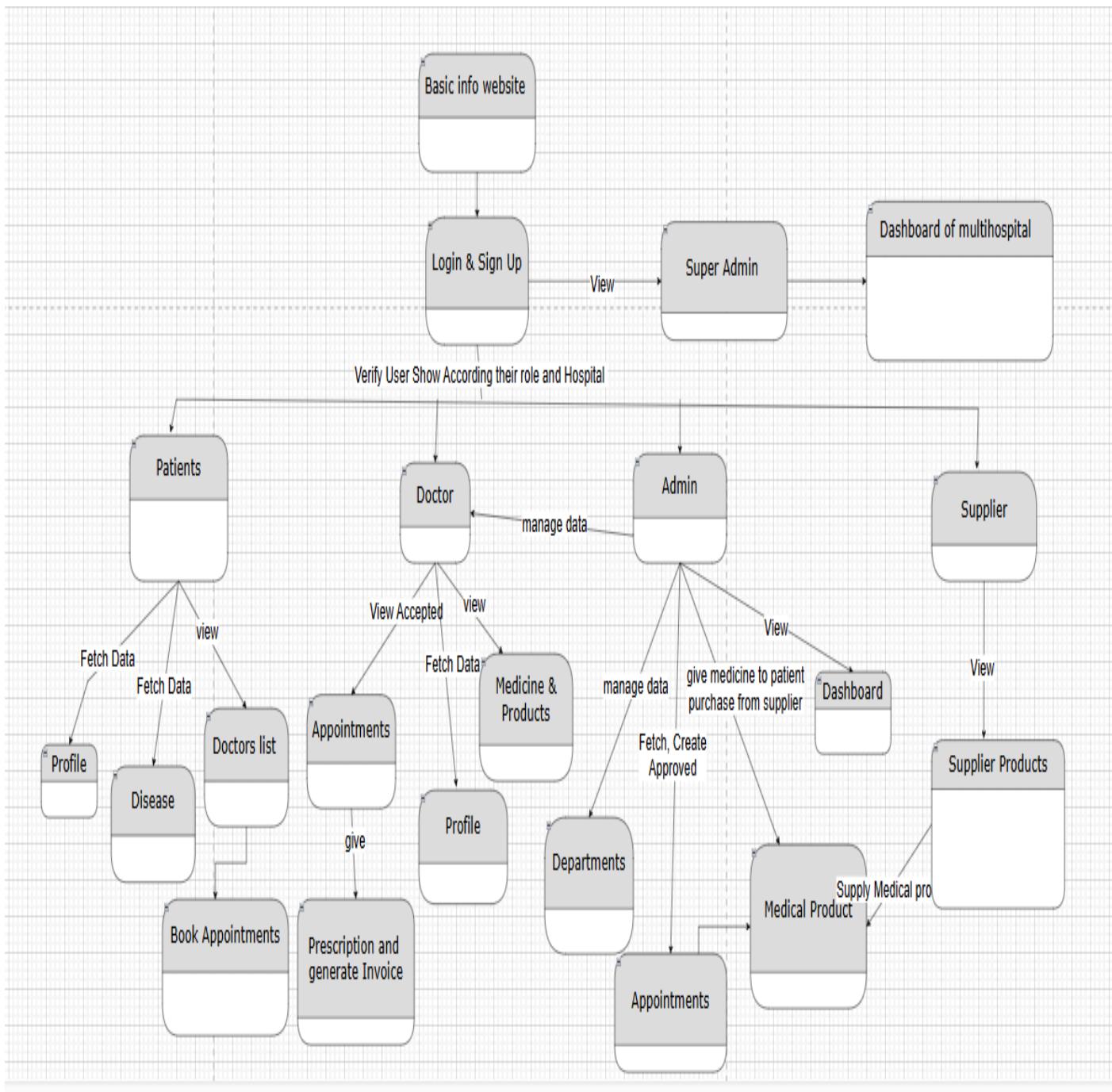


Figure 3.5.6: State Diagram

3.6 Data Dictionary

Table 1: User

Attribute	Data Type	Constraint	Description
ID	Integer	Primary Key	Unique identifier for the user
Name	String	Not Null	User's chosen username
Email	String	Not Null	User's email address
Dob	Date	Not Null	User's birth date
Password	String	Not Null	Encrypted password
Ph No.	Integer	Not Null	User's phone number
Gender	String	Not Null	User's age
Address	String		User's address
Hospital Name	String	Not Null	Hospital which user Login

Table 3.6.1: User table

Table 2: Approve Doctors

Attribute	Data Type	Constraint	Description
Doctor_id	Integer	Primary Key	Unique identifier for the doctor
Name	String	Not Null	Full name of the doctor
Dob	Integer	Not Null	doctor's birth date
Qualification	String	Not Null	Doctor qualification
specialization	String	Not Null	Doctor's area of expertise (e.g., Cardiology)
Ph No.	String	Not Null	Contact number of the doctor
Email	String	Not Null	Doctor's email address
Password	String	Not Null	Encrypted password
Address	String	Not Null	Address of the patient
Certification	Pdf		

Table 3.6.2: Doctors table

Table 3: Appointments

Attribute	Data Type	Constraint	Description
appointment_id	Integer	Primary Key	Unique identifier for the appointment
patient_email	Integer	Foreign Key	References Patients table (patient_email)
patient_name	String	Not Null	patient name
doctor_email	Integer	Foreign Key	References Doctors table (doctor_email)
Doctor_name	String	Not Null	Doctor Name
appointment_date	Date	Not Null	Date of the appointment
appointment_time	String	Not Null	Time of the appointment
symptoms	String		Symptoms of patients
status	String	Not Null	Status of the appointment (Scheduled, Completed, Cancelled)

Table 3.6.3: Appointments table**Table 4: Products**

Attribute	Data Type	Constraint	Description
product_id	Integer	Primary Key	Unique identifier for the product
name	String	Not Null	Name of the medical product
category	String	Not Null	Category (e.g., Medicine, Equipment)
price	Float	Not Null	Price of the product
quantity	Integer	Not Null	Available stock
supplier_company	Integer	Foreign Key	References Supplier table (supplier_company)
hospital_name	String	Not Null	hospital name required

Table 3.6.4: Products table

Table 5: Payments

Attribute	Data Type	Constraint	Description
order_id	varchar	Primary Key	Unique identifier for the bill
patient_email	Integer	Foreign Key	References Patients table (patient_email)
total_amount	Float	Not Null	Total bill amount
payment_status	String	Not Null	Status of payment (Paid, Pending, Cancelled)
payment_id	varchar	Not Null	payment id
payment_met	String	Not Null	Mode of payment (Cash, Card, Insurance)
hod			
hospital_name	String	Not Null	in which hospital payment execute

Table 3.6.5: Payments table**Table 6: Suppliers**

Attribute	Data Type	Constraint	Description
supplier_comp any	Integer	Primary Key	Unique identifier for the supplier

name	String	Not Null	Supplier's name
contact	String	Not Null	Contact number of the supplier
email	String	Not Null	Email of the supplier
address	String	Not Null	Supplier's address
company_licen se	PDF	Not Null	license for supplier
DOB	Integer	Not Null	date of Birth of supplier

Table 3.6.6: Suppliers table**Table 7: Prescriptions**

Attribute	Data Type	Constraint	Description
prescription_id	Integer	Primary Key	Unique identifier for the prescription
patient_email	String	Foreign Key	References Patient table (email)

doctor_email	String	Foreign Key	References Doctor table (email)
date_issued	Date	Not Null	Date the prescription was issued
medicines	Array	Not Null	List of medicines prescribed
diagnosis	String	Not Null	Diagnosis or notes from the doctor
hospital_name	String	Not Null	Hospital where the prescription was issued

Table 3.6.7: Prescription**Table 8: Invoices**

Attribute	Data Type	Constraint	Description
invoice_id	Integer	Primary Key	Unique identifier for the invoice
patient_email	String	Foreign Key	References Patient table (email)
hospital_name	String	Not Null	Hospital that issued the invoice
amount	Float	Not Null	Total amount billed
date_of_invoice	Date	Not Null	Date when the invoice was generated
services_rendered	String	Not Null	Services or medicines billed
status	String	Not Null	Payment status (Paid, Pending, Cancelled)

Table 3.6.8: Invoices**Table 9: Departments**

Attribute	Data Type	Constraint	Description
department_id	Integer	Primary Key	Unique identifier for the department
department_name	String	Not Null	Name of the department (e.g., Cardiology)
hospital_name	String	Not Null	Hospital the department belongs to
head_doctor_email	String	Foreign Key	References Doctor table (email)

Table 3.6.9: Departments

Table 10: Hospitals

Attribute	Data Type	Constraint	Description
hospital_id	Integer	Primary Key	Unique identifier for the hospital
hospital_name	String	Not Null, Unique	Name of the hospital
address	String	Not Null	Address of the hospital
contact_number	String	Not Null	Hospital's contact phone number
email	String	Not Null	Hospital official email
registration_no	String	Not Null, Unique	Government registration/license number

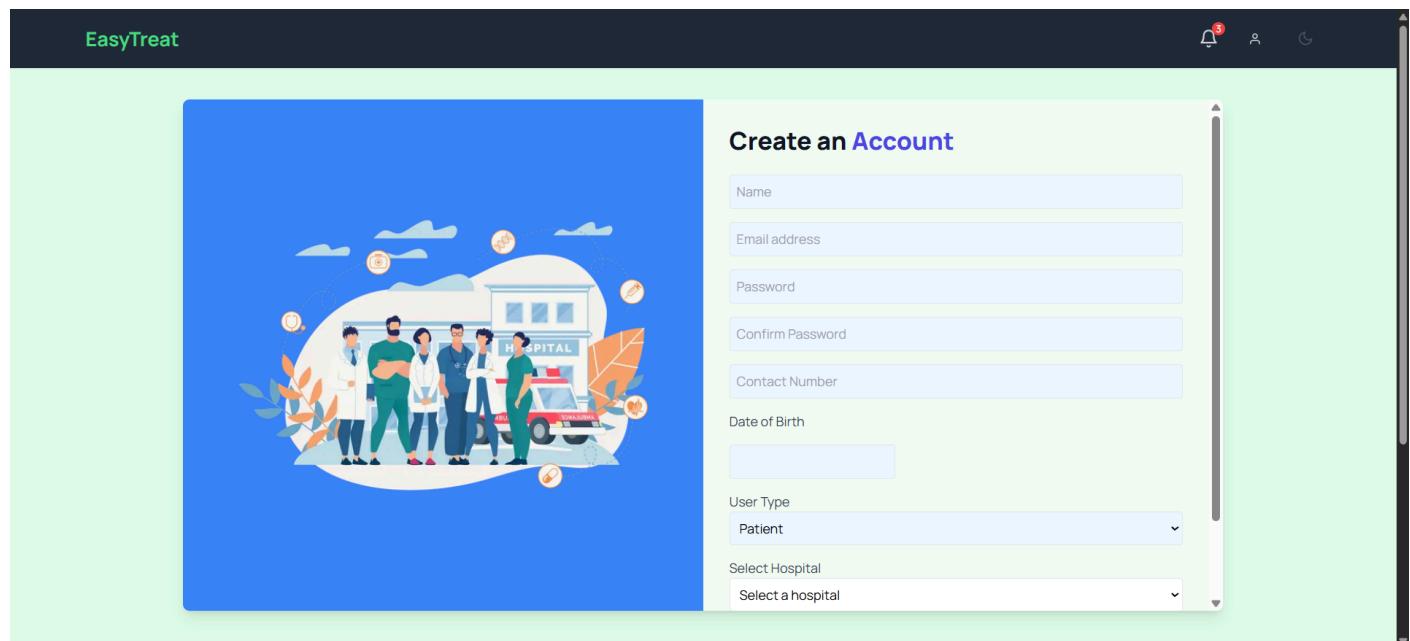
Table 3.6.10: hospitals

Chapter 4: Implementation and Testing

4.1 User Interface and Snapshot

4.1.1 User Authentication

In the authentication module, users can create an account by selecting their user type (Doctor, Patient, Admin, Supplier) and associating it with a hospital. During login, users must authenticate with their email, password, user type, and hospital name. Successful authentication generates a secure session ID with a 4-hour expiry, ensuring safe access management.



Create an Account

Name

Email address

Password

Confirm Password

Contact Number

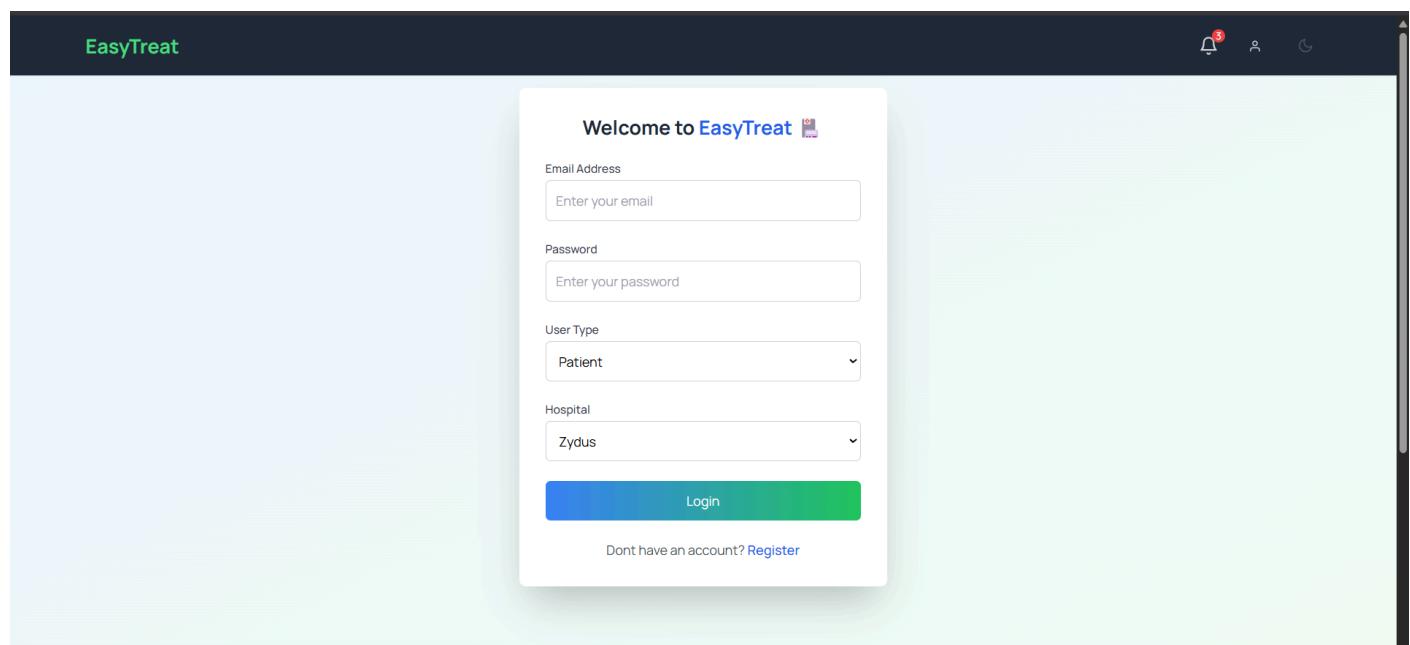
Date of Birth

User Type

Patient

Select Hospital

Select a hospital



Welcome to EasyTreat

Email Address

Enter your email

Password

Enter your password

User Type

Patient

Hospital

Zydus

Login

Dont have an account? [Register](#)

Figure 4.1.1: login & sign up

4.1.2 Appointment booking For the patient and disease Info

After login, patients can view available doctors categorized by department and hospital. By selecting a doctor, patients can book appointments easily. Additionally, patients can access disease information along with symptoms to better understand their health concerns.

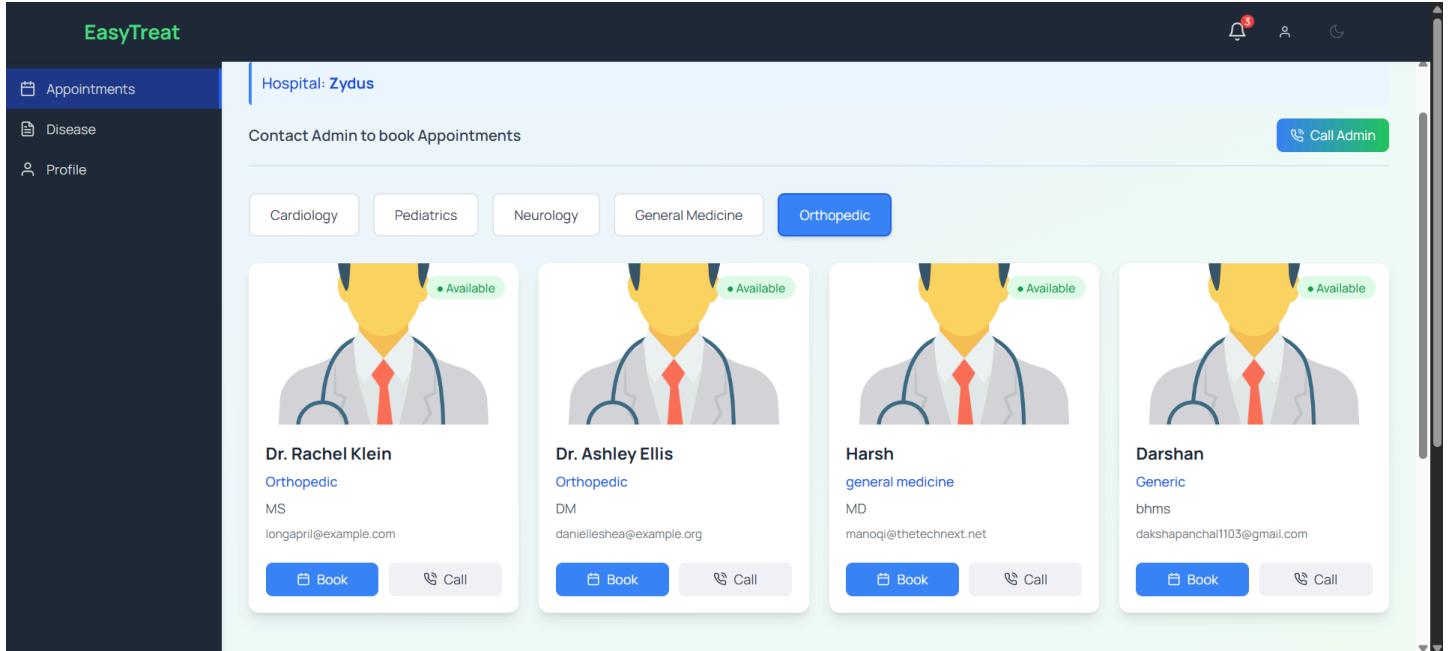


Figure 4.1.2.1 Appointments Booking

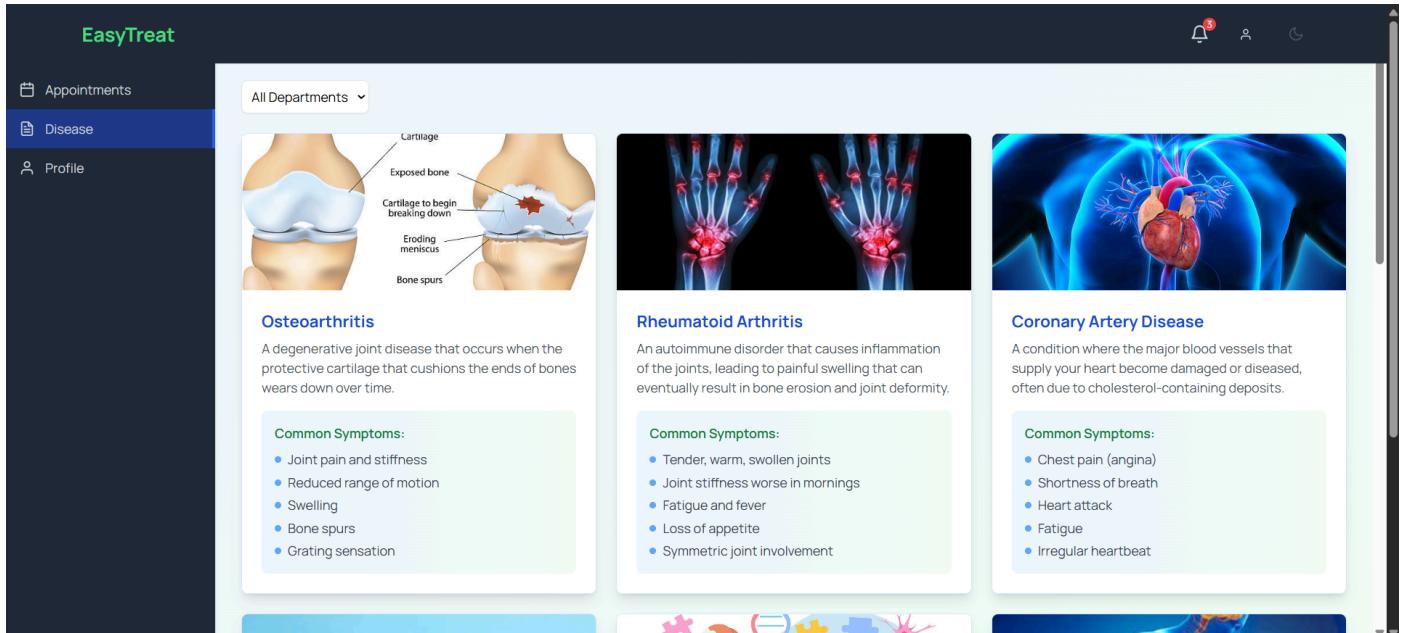


Figure 4.1.2.2 Diseases Info

4.1.3 Admin approved and Doctor Prescription

Once a patient books an appointment, the admin reviews and approves it. Approved appointments are then visible to doctors, who provide prescriptions after consultation. The prescription is generated as a PDF, sent to the patient's email, and securely stored in the backend database.

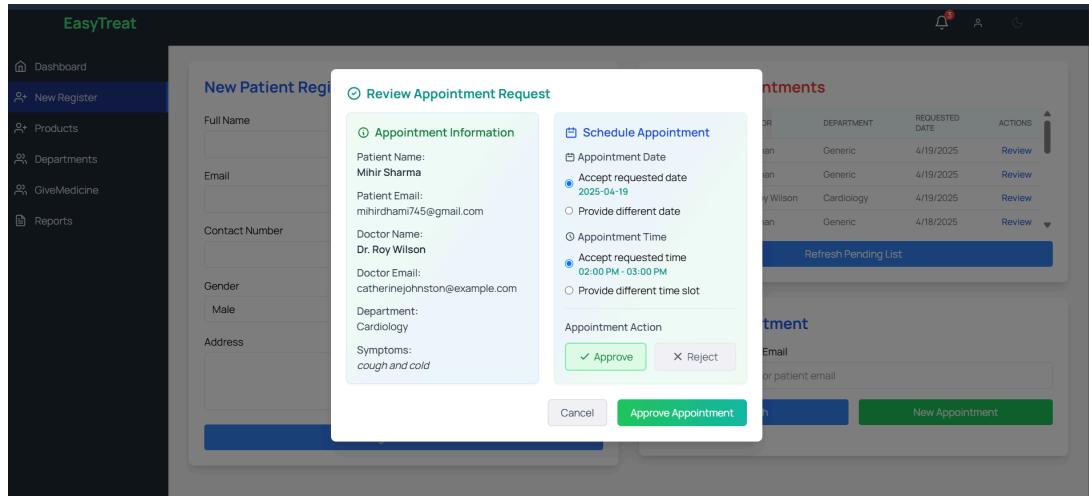


Figure 4.1.3.1: approved Appointments

This screenshot shows the 'Appointments' section of the dashboard. It has two main sections: 'Pending Appointments' and 'Completed Appointments'. In the 'Pending Appointments' section, there is a table for 'Appointments Requiring Prescription' with one row for 'Mihir Sharma' with a status of 'Pending Prescription' and a 'Write Prescription' button. In the 'Completed Appointments' section, there is a table for 'Appointments With Prescriptions' with three rows for 'Mihir Sharma' all marked as 'Completed' with a status of 'Completed' and a 'View Prescription' button. The left sidebar includes links for 'Appointments', 'Profile', and 'Medical Products'.

This screenshot shows a detailed patient summary for 'Mihir Sharma'. The 'Summary' section includes 'Patient Information' (Name: Mihir Sharma, Age: 21, Date of Birth: 6/13/2003, Address: AM Naik Hostel, VV Nagar, Anand, Gujarat, 388120), 'Vital Signs' (Temperature: 37, Blood Pressure: Not recorded, Weight: 74, Heart Rate: Not recorded, Oxygen Level: Not recorded, Respiratory Rate: Not recorded), 'Reports' (Department: Generic, Report Type: in-house), 'Prescribed Medicines' (Medicine: Zinc Syrup, Frequency: 1time/day, Duration: 7 days), and 'Doctor Suggestions'. The left sidebar includes links for 'Appointments', 'Profile', and 'Medical Products'.

Figure 4.1.3.2: Doctor's Prescription

4.1.4 Admin Manage products and supply medicine to patient

The admin manages all medical products and monitors stock levels. When stock is low, the admin sends a request to the supplier, who fulfills it by updating the inventory. Admins can then supply medicines to patients based on doctor prescriptions and maintain sales records.

The screenshot shows the 'Admin Products' page. On the left sidebar, 'Products' is selected. The main area displays a table of products with columns: Name, Type, Supplier, Price, Stock, Status, and Actions. A search bar and filters for 'All Types' and 'All Status' are at the top. Below the table is a section titled 'Pending Stock Requests' with a table showing product, supplier, requested quantity, price, request date, and status.

Name	Type	Supplier	Price	Stock	Status	Actions
Syringe	Equipment	Sun Pharma	₹4293	72	In Stock	<button>Request More</button>
Zinc Syrup	Medicine	Apollo Healthcare	₹385	137	In Stock	<button>Request More</button>
Medtech Stethoscope	Equipment	MedPlus Supply	₹1498	137	In Stock	<button>Request More</button>
Paracetamol Syrup	Medicine	Sun Pharma	₹446	26	Low Stock	<button>Request Stock</button>
Donepezil	Medicine	Apollo Healthcare	₹283	153	In Stock	<button>Request More</button>

PRODUCT	SUPPLIER	REQUESTED QUANTITY	PRICE (PER STRIP)	REQUEST DATE	STATUS
Paracetamol Syrup	Sun Pharma	50	446	4/24/2025, 1:23:54 PM	Requested

Figure 4.1.4.1 Admin Products Page

The screenshot shows the 'Supplier Portal'. The sidebar has 'Products' selected. The main area includes a summary box with 'Total Products: 24', 'Pending Requests: 3', 'Orders: 0', and 'Revenue: ₹0'. Below is a 'Stock Requests' table with columns: Product Name, Hospital, Requested Quantity, Price per Strip, Request Date, Status, and Actions.

PRODUCT NAME	HOSPITAL	REQUESTED QUANTITY	PRICE PER STRIP	REQUEST DATE	STATUS	ACTIONS
Dolo-650	Zydus	50 units	261	4/24/2025	Processing	In progress
Dan P	Zydus	50 units	70	4/24/2025	Requested	<button>✓ Fulfill</button>
Surgical Mask	Zydus	30 units	2982	4/24/2025	Processing	In progress
Surgical Scissors	Zydus	100 units	652	4/24/2025	Requested	<button>✓ Fulfill</button>
Nebulizer	Zydus	2 units	3035	4/24/2025	Requested	<button>✓ Fulfill</button>

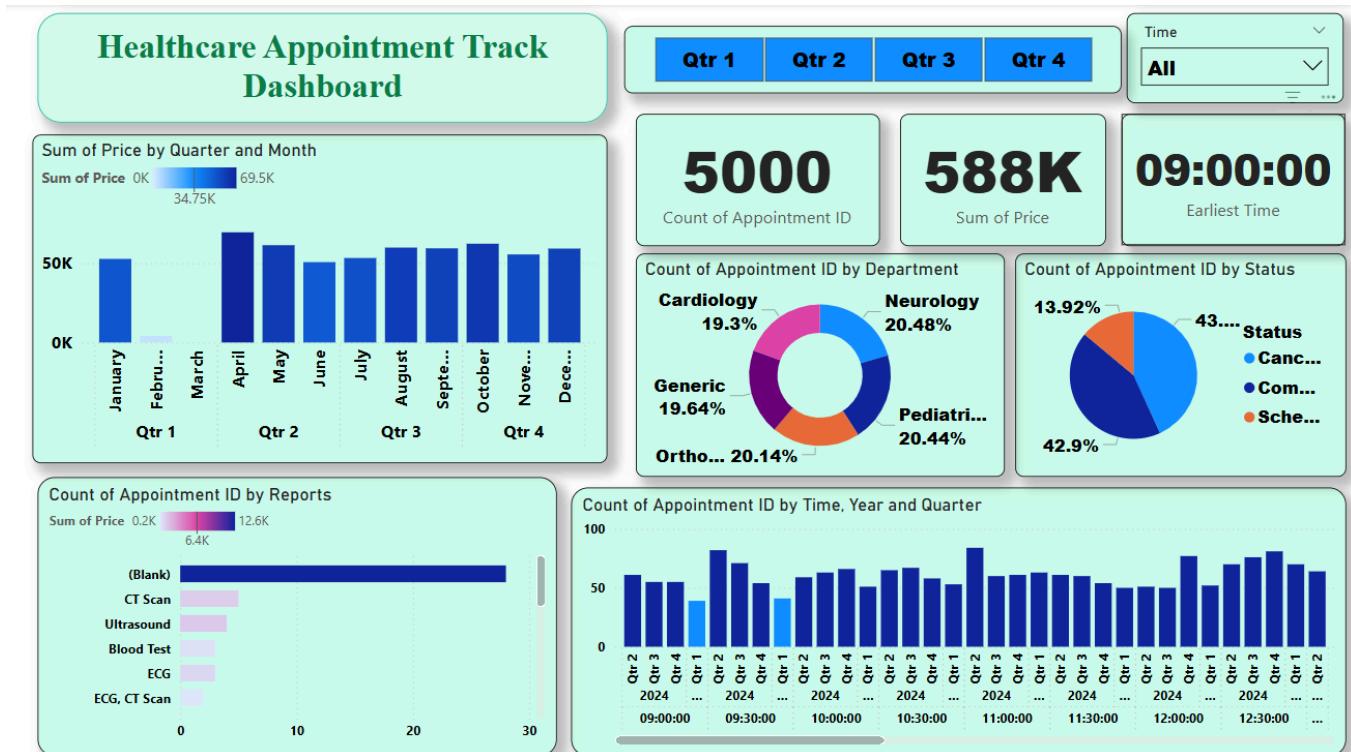
Figure 4.1.4.2: Supplier Portal

4.1.5 Departments and Analytics Dashboard

The system maintains multiple medical departments like Cardiology, Neurology, Pediatrics, and more for organized doctor and appointment management. An analytics dashboard provides real-time insights into appointments, prescriptions, sales, and patient visits, helping admins monitor overall hospital performance.

The screenshot shows the 'Department Management' section of the EasyTreat dashboard. On the left sidebar, 'Departments' is selected. The main area displays 'Cardiology' details. It includes a description of the department's services, the department head (Priya Reddy), available roles (Department Head, Resident Doctor, Senior Consultant), and a card for Dr. Roy Wilson with a rating of 4.9. Other departments listed are Pediatrics, Neurology, General Medicine, and Orthopedic.

Figure 4.1.5.1: Department of hospital



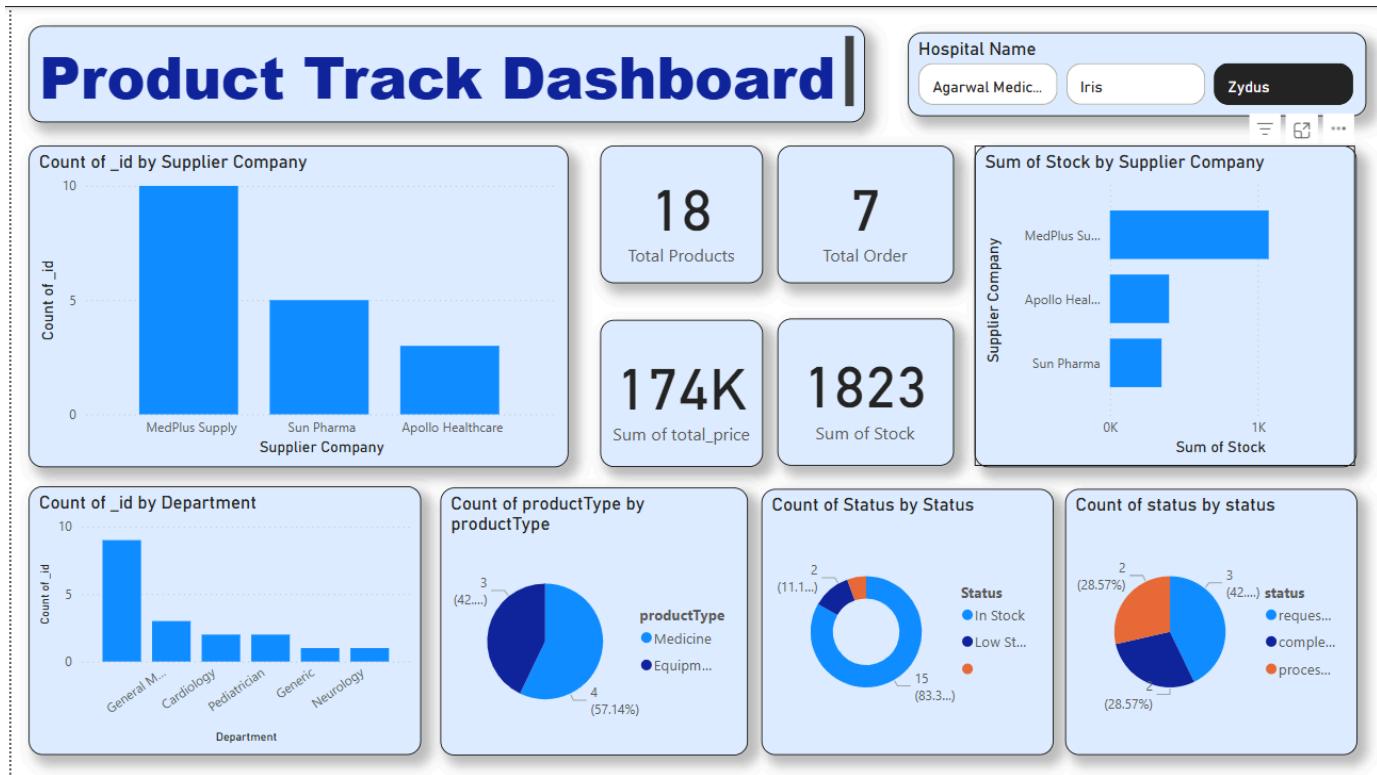


Figure 4.1.5.2 Analytics Dashboard

4.2 Result Analysis

In our Hospital Management System (HMS), healthcare analytics played an essential role in improving operational efficiency and decision-making.

The system tracked key metrics such as:

- Total Appointments Booked (online and offline)
- Appointment Approval Rates (admin actions)
- Department-wise Patient Visits (Cardiology, Neurology, Orthopedics, etc.)
- Top Prescribed Medicines (doctor prescription patterns)
- Stock Usage and Replenishment Trends (admin stock management)
- Supplier Fulfillment Rates (response to stock requests)
- Patient Feedback and Updates (profile changes, appointment history)
- Revenue Analytics (payment collection from appointment bookings and medicine sales)

These analytics enabled admins and super admins to:

- Monitor hospital operations across departments.
- Identify high-demand medicines and prepare stock in advance.
- Improve doctor assignment and optimize appointment handling.
- Predict future supply needs based on usage history.
- Maintain transparency between admin, doctors, and suppliers.

The healthcare analytics dashboard provided real-time visualizations (charts, graphs) that helped the management make data-driven decisions for better hospital performance and patient care.

4.3 Testing using Use Cases

Use case 1: Testing of appointment

In the Hospital Management System, patients can book appointments by first selecting a doctor, then choosing a date and time based on the doctor's availability, entering their symptoms, and paying a ₹100 booking fee to submit the request for approval. The admin reviews each appointment, verifies the doctor's actual availability, and either approves the booking or suggests a new time and date if needed. Once approved, the appointment becomes visible to the doctor in their portal. During the offline consultation, the doctor diagnoses the patient and provides a prescription, which is automatically emailed to the patient along

with the prescribed medicines. Finally, the admin supplies the medicines to the patient as per the doctor's prescription.

The screenshot shows the EasyTreat mobile application interface. On the left, there's a sidebar with 'Appointments', 'Disease', and 'Profile' options. Below that is a list of doctors: Dr. Alicia George (Neurology, MBBS, gellis@example.com) and Dr. Devon Morgan (Neurology, MS, jaredmatthews@example.org). Dr. Devon Morgan has a 3.7 rating. A modal window for Dr. Devon Morgan is open, displaying his profile picture, name, specialty, and contact information. It also shows his availability: Monday through Friday from 9:00 AM to 1:00 PM. Below this, there are fields to select the booking date and time slot. At the bottom of the modal, there are buttons for 'Book', 'Call', and 'Email'. The background shows other doctor profiles and booking buttons.

The screenshot shows a Postman API testing interface. A POST request is made to `http://127.0.0.1:8000/api/book_appointment/`. The response status is `200 OK`, time taken is `5.36 s`, and the response size is `781 B`. The response body is a JSON object:

```

1 {
2     "status": "success",
3     "message": "Appointment booked successfully!",
4     "appointment_data": {
5         "patientName": "John Doe",
6         "patientEmail": "johndoe@example.com",
7         "department": "Cardiology",
8         "appointmentDate": "2025-05-01",
9         "requestedTime": "10:00 AM",
10        "symptoms": "Chest pain",
11        "doctorEmail": "drsmith@example.com",
12        "doctorName": "Dr. Smith",
13        "hospitalName": "Zydus Hospital",
14        "status": "pending",
15        "paymentId": "PAY12345",
16        "create_at": "2025-04-28T13:25:14.740",
17        "_id": "680f34625c87ad451ce02c1d"
18    }
19 }

```

Figure 4.3.1.1: book appointment and api testing

Patient details loaded successfully

Patient Information

Name: Mihir Sharma **Age:** 21 **Gender:** Male

Date of Birth: 6/13/2003 **Email:** mihirdhami745@gmail.com **Phone:** 9726462089

Address: AM Naik Hostel, VV Nagar, Anand yyienerr, Gujarat, 388120

Patient Vitals

Temperature Enter temperature	Blood Pressure Enter bloodPressure	Weight Enter weight	Heart Rate Enter heartRate
Oxygen Level Enter oxygenLevel	Respiratory Rate Enter respiratoryRate		

Department & Reports

Figure 4.3.1.2: prescription for patient

Prescription Details

Patient Information
 Name: Mihir Sharma
 Email: mihirdhami745@gmail.com

Doctor Information
 Name: Dr. Darshan
 Department: Generic

Available Medicines
 Search medicines...

Doctor Suggested Medicines
 Paracetamol Syrup
 Ramipril

Selected Medicines
 Ramipril 1 ₹124

Paracetamol Syrup 1 ₹446

Figure 4.3.1.3: Provide medicine to patient

Use case 2: Products Ordering

The product **Surgical Scissors** is priced at ₹652 per unit. When the stock becomes low, the admin raises a stock request for **50 units** through the system. The supplier receives this request and processes it by fulfilling the required quantity. Once fulfilled, the admin can view the request status as "**Processing**" and verify the stock received. After confirmation, the admin proceeds with the payment to the supplier.

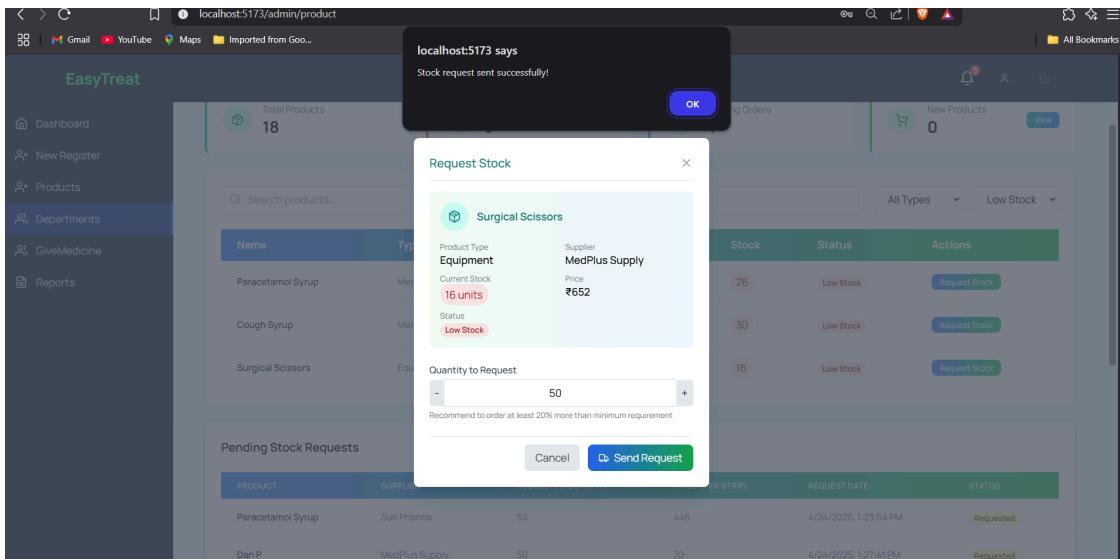


Figure 4.3.2.1: Request stock

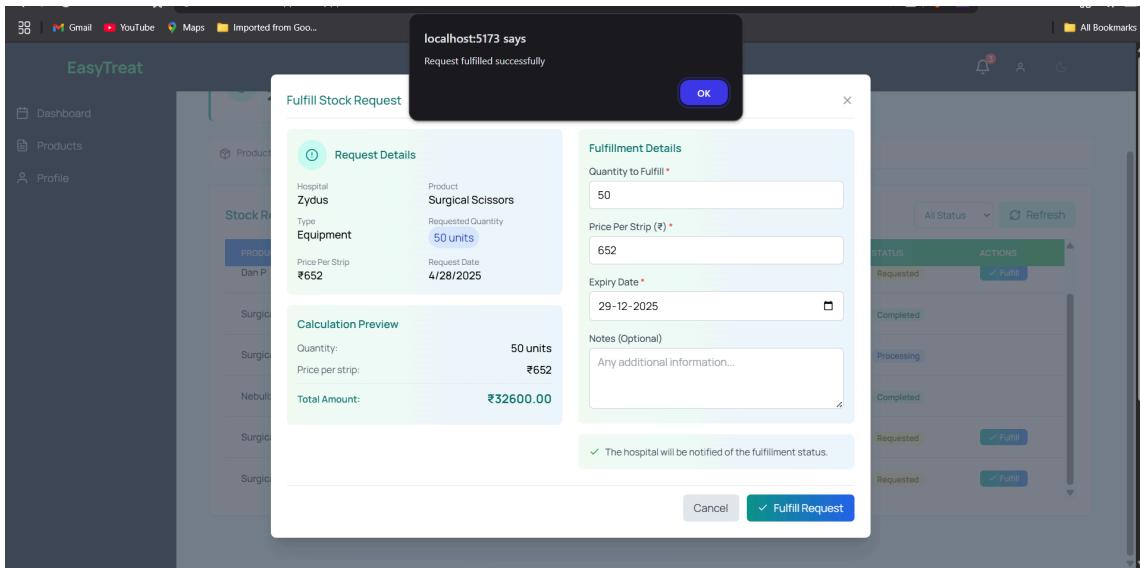


Figure 4.3.2.2: Fulfill Request

Order Tracking							
PRODUCT	SUPPLIER	REQUESTED QTY	FULFILLED QTY	TOTAL AMOUNT	UPDATE DATE	STATUS	ACTION
Dolo-650	MedPlus Supply	50	50	₹12789.00	4/24/2025, 4:58:41 PM	Completed	
Surgical Mask	MedPlus Supply	30	30	₹89460.00	4/24/2025, 5:38:14 PM	Completed	
Surgical Scissors	MedPlus Supply	100	100	₹65200.00	4/27/2025, 12:30:43 PM	Processing	Complete Order
Nebulizer	MedPlus Supply	2	2	₹6070.00	4/28/2025, 3:34:30 AM	Completed	
Surgical Scissors	MedPlus Supply	50	50	₹32600.00	4/28/2025, 9:06:32 PM	Processing	Complete Order

Figure 4.3.2.1: Order Tracking

Chapter 5: Conclusion & Future work

Conclusion

The developed Healthcare Management System (HMS) successfully integrates core hospital operations into a single, user-friendly platform. It facilitates seamless interaction between patients, doctors, administrators, and suppliers through well-defined role-based access.

Key features such as appointment booking, prescription generation and email delivery, inventory and medicine management, and payment integration via Razorpay offer an efficient and digitized alternative to traditional healthcare workflows. The system's use of MongoDB for flexible data handling, along with React-based front-end and Django backend, allows for dynamic and scalable development.

The incorporation of session-based authentication, QR code utilities, and a plan for custom domain email services further enhances the system's security, usability, and professional appeal.

Overall, this HMS demonstrates a strong foundation for a real-time, end-to-end digital health management ecosystem tailored for clinics, medium-sized hospitals, or academic institutions.

Future Work

While the HMS meets current functional requirements, several enhancements and expansions are planned for future development:

- Mobile Application
 - Develop a cross-platform mobile app (using React Native or Flutter) for easier access by patients and doctors.
- Custom Domain Email Integration
 - Implement Google Workspace or Zoho Mail to offer professional emails like doctor@hms.com or admin@hospital.org.
- AI-Powered Suggestions
 - Integrate machine learning models to suggest possible diagnoses, medicines, or alerts based on patient history.

Chapter 6: References

Literature Review:

https://www.researchgate.net/publication/375497520_MODERN_HOSPITAL_MANAGEMENT_SY_STEM

Other References:

Poster:

https://www.canva.com/design/DAGkCi7WMbY/aI5G_rxEYQuk1boHpDQRYO/edit?utm_content=DAGkCi7WMbY&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton