Real-Time Bus ID Verification and Tracking

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BACHELOR OF SCIENCE IN COMPUTER SCIENCE

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Certification

This is to certify that this project titled "**Real-Time Bus ID Verification and Tracking**" was found to satisfy the requirement for the award of a "**Bachelor of Sciences in Software Engineering**" degree by the Department of Computer Science, National Textile University.

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Declaration

We hereby declared that this document is completely written by us, and it is totally our effort and none of anyone from outside of our group has copied it. This Report is purely written technically in accordance with our project.

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Acknowledgement

First of all, In the Name of Allah, the Most Beneficent, the Most Merciful. All the praises and thanks be to Allah. A lot of love for our beloved Holy Prophet MUHAMMAD (S.A.W), his guidance always helps us to get the right path. After that, the preparation of this Software Requirements Specification (SRS) document was a collaborative effort involving Abubakar, Imran, and Huzaifa. The author would like to acknowledge and express gratitude to all individuals who directly or indirectly contributed to the completion of this document. Special thanks are extended to our Supervisor Zahid Javed and our Co-Supervisor Muhammad Naeem, who provided invaluable guidance and support throughout the SRS preparation process. The author would also like to acknowledge the invaluable support and suggestions provided by Zahid Javed. This SRS document would not have been possible without the support and cooperation of all involved individuals. The author is confident that this document will serve as a comprehensive guide for the development and implementation of the Real-Time Bus ID Verification and Tracking.

Signed by:

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00/00/2025

Abstract

Efficient and secure transportation is vital for educational institutions, where thousands of students rely on daily commutes. However, current systems face significant challenges, including inefficiencies, security vulnerabilities, and a lack of real-time tracking and communication. Issues such as overcrowding, unauthorized access, and poor resource utilization arise when students board buses without proper verification. Additionally, the absence of real-time bus monitoring and effective communication channels leads to confusion, delays, and suboptimal transport management.

The *Real-Time Bus ID Verification and Tracking* system addresses these challenges by integrating advanced technologies like RFID-based ID verification, live GPS tracking, and automated communication tools. The system ensures only authorized students access transport services, provides real-time visibility of bus locations for students, parents, and administrators, and enables timely updates regarding delays, route changes, or emergencies. It also tracks driver performance, monitors bus occupancy, and generates insights for optimizing route planning and capacity utilization.

By modernizing transport operations, the *Real-Time Bus ID Verification and Tracking* system enhances safety, boosts operational efficiency, and delivers a reliable and user-friendly commuting experience. This solution is an ideal choice for educational institutions aiming to transform their transportation infrastructure with secure and efficient technology.

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List of Abbreviations

RT-BIVT	Real-Time Bus ID Verification and Tracking
RFID	Radio Frequency Identification
RT-BIVT system	Admin Panel, Driver and Student App’s

CHAPTER 1

1 Introduction

Efficient and secure transportation systems are crucial for educational institutions of all sizes, where thousands of students rely on daily commutes. However, many institutions face significant challenges, including inefficiencies, security vulnerabilities, and a lack of real-time tracking and communication. Students often board buses without proper verification, leading to overcrowding, unauthorized access, and inequitable usage of transport resources. Additionally, the absence of real-time monitoring for buses and driver performance, coupled with ineffective communication channels, results in confusion, delays, and poor management of transport operations.

To address these challenges, we propose a RT-BIVT system tailored for educational institutions. This system combines advanced technologies like RFID-based ID verification, live GPS tracking, and automated communication tools to streamline transportation management. It ensures that only authorized students access transportation services, provides real-time visibility of bus locations for students, parents, and administrators, and facilitates timely updates on delays, route changes, or emergencies. Additionally, the system tracks driver performance, monitors bus occupancy, and generates alerts to optimize route planning and capacity utilization.

This innovative solution goes beyond solving existing challenges—it transforms transportation management into a secure, efficient, and user-friendly ecosystem. By integrating modern technologies, the RT-BIVT system enhances safety, improves operational efficiency, and delivers a reliable transportation experience, making it an ideal choice for any educational institution seeking to modernize its transport infrastructure.

1.1 Real-Time Bus ID Verification and Tracking System

The RT-BIVT system is an innovative solution designed to enhance transportation efficiency and safety for educational institutions. It integrates cutting-edge technologies like RFID for ID verification, live GPS tracking, and an advanced communication framework to create a streamlined, user-friendly transportation management ecosystem. This system empowers institutions to optimize bus routes, manage capacity, and monitor driver performance, ensuring a secure and efficient transport experience for students, parents, and administrators.

1.2 Reason to Develop

The development of the RT-BIVT system is driven by several compelling factors, despite the existence of other transportation solutions:

1.2.1 Addressing Unique Institutional Needs

Educational institutions often face specific challenges like unauthorized access, overcrowding, and inefficient communication. Generic transport management systems fail to meet these tailored needs, prompting the creation of a solution that directly addresses the unique requirements of such environments.

1.2.2 Enhancing Safety and Security

Ensuring that only authorized students use transport facilities is crucial for security and fairness. RFID-based verification provides a reliable, real-time solution to mitigate misuse and enhance safety for students and drivers.

1.2.3 Bridging Communication Gaps

A lack of effective communication between transport departments, parents, and students leads to confusion and inefficiency. The proposed system integrates real-time notifications for updates like delays, route changes, and emergencies, ensuring timely and clear communication.

1.2.4 Optimizing Resource Management

Overcrowding or underutilization of buses is a common issue. By integrating occupancy monitoring and route optimization, this system helps administrators allocate resources more efficiently, reducing costs and enhancing comfort.

1.2.5 Scalability and Adaptability

The system is designed to adapt to the specific challenges of any educational institution, whether managing a small fleet or a large-scale transport network. It is scalable, ensuring that institutions can continue to benefit as their transportation needs evolve.

This project is more than a technological upgrade; it is a strategic initiative to modernize transport systems, improve safety, and deliver a seamless experience for all stakeholders in an educational environment.

1.3 Problem Statement

Educational institutions face significant challenges in managing their transportation systems effectively. Common issues include overcrowded or underutilized buses, unauthorized access, inefficient communication, and a lack of real-time tracking. These problems result in confusion, operational inefficiencies, and safety concerns for students, parents, and administrators. Existing solutions often lack the integration and adaptability required to address these specific institutional needs.

1.4 Purpose

The primary purpose of the RT-BIVT system is to provide a seamless, all-in-one solution for transportation management in educational institutions. By combining secure access verification, live GPS tracking, and advanced communication tools, the system aims to improve operational efficiency, enhance student safety, and streamline communication among all stakeholders.

1.5 Project Goals

- Implement secure ID verification to prevent unauthorized access.
- Provide live bus location tracking for real-time visibility and improved coordination.
- Enable real-time notifications for updates such as delays, route changes, or emergencies.
- Track key metrics like speed, stop intervals, and adherence to schedules.
- Streamline bus scheduling, capacity management, and route planning.
- Ensure an intuitive interface for administrators, parents, and students.

1.6 Objectives

Objectives of the project are as follows:

- Integrate RFID-based ID verification to ensure only authorized users board the buses.
- Provide GPS-enabled tracking for buses accessible to students, parents, and administrators.
- Enable alerts for overcrowding or underutilization to optimize bus capacity.
- Monitor driver behaviour to ensure adherence to safety and efficiency standards.
- Develop a mobile app for notifications and updates to keep all stakeholders informed.

1.7 Project Scope

Although designed for educational institutions, this system can be extended to other domains such as corporate transport, public transit, or private bus fleets. Its modular design allows for customization and scalability, making it suitable for varying transportation requirements and operational complexities.

1.8 Proposed Solution

The system offers a modular and comprehensive approach to transportation management. It features real-time ID verification using RFID, live GPS tracking for buses, occupancy alerts, driver performance monitoring, and mobile apps for seamless communication. By adopting this system, institutions can significantly enhance operational efficiency, reduce resource wastage, and ensure a safer, more reliable transport experience for all users.

1.9 Project Scheduling

Here is the Gantt chart for the RT-BIVT project. This chart visually represents the project timeline, including the start and end dates for each activity. It provides a high-level overview of how the project tasks are scheduled over time, aiding in effective project management and tracking. The timeline of the project is shown by the Gantt chart in Figure 1.1.

Figure 1.1 Gantt Chart

CHAPTER 2

2 System Requirements

In this chapter, all the functional requirements of the RT-BIVT system, along with the overall requirements of the stakeholders, are documented, as they are crucial to meeting the needs and expectations of all parties involved. This section outlines the system requirements, functional requirements, software development process, and the selected methodologies for the project.

The system requirements are designed to ensure that the RT-BIVT system delivers an efficient, secure, and user-friendly transportation solution. These requirements include both the hardware and software specifications necessary for the system to function properly. The section also describes the software development methodology chosen for this project and provides a detailed flow of the system and application.

By establishing clear system and functional requirements, this chapter helps ensure that the RT-BIVT project meets the stakeholders' expectations and addresses the core challenges of transportation management within educational institutions.

2.1 Functional Requirements:

3.1.1 Dashboard Management:

Display real-time health facility operations metrics and critical notifications. Provide a summary view of each day appointments, admissions, and discharges.

3.1.2 Patient Management:

Enable complete seek capability for patient records. Facilitate appointment scheduling, monitoring, and updates. Manage designated affected person come across histories inclusive of go to notes and treatment records.

3.1.3 Medical Records Management:

Securely upload and store patient files and medical documents. Ensure quick retrieval of patient encounter reports and medical histories.

3.1.4 Nursing Station Functionality:

Record and monitor patient vitals with alert structures for abnormal readings. Manage and log nursing sports consisting of injections, dressings, and procedures. Handle requisitions for medical substances and song inventory.

3.1.5 Physician and Clinical Services:

Support outpatient clinic operations with scheduling and patient waft management. Facilitate the creation of virtual patient stumble upon reviews. Integrate with laboratory and radiology statistics systems for check ordering and result retrieval.

3.1.6 Laboratory Information System:

Manage incoming test requests and track pending orders. Record and disseminate laboratory outcomes to applicable departments. Provide functionalities for take a look at reporting, management, and categorization.

3.1.7 Radiology Department Integration:

Track radiology requests including X-rays, CT scans, ultrasounds, and ECGs. Manage the workflow from take a look at requests to end result reporting.

3.1.8 Pharmacy and Dispensary Operations:

Oversee outpatient and inpatient dispensary features. Manage pharmacy inventory inclusive of drug expiry and utilization reports. Handle buy orders and affirm receipt of medicine.

3.1.9 Financial Transactions Handling:

Process billing for healthcare services and generate comprehensive reviews. Manage cashier operations together with deposits, costs, and sales tracking.

3.1.10 Disease Diagnostics:

Implement AI algorithms to analyse affected person data for diagnostics and remedy guidelines.

3.1.11 Predictive Analytics:

Utilize AI for predictive analytics to get better diagnostic consequences.

2.2 Non-Functional Requirements

2.2.1 Security:

Implement robust authentication and authorization checks.

2.2.2 Availability:

The system should be available 24/7.

2.2.3 Scalability:

The system must be scalable to handle an increasing number of users and data.

2.2.4 Usability:

User interface should be intuitive and easy to navigate.

2.2.5 Maintainability:

The system should be easy to maintain and update with minimal downtime.

2.3 Use Case Diagram

For graphical visualization of actor interaction with the components of the systems, the most appropriate approach is to use case diagrams that graphically represent which actor may perform or access which functionality or component of the system.

2.3.1 Use Case of Sign In

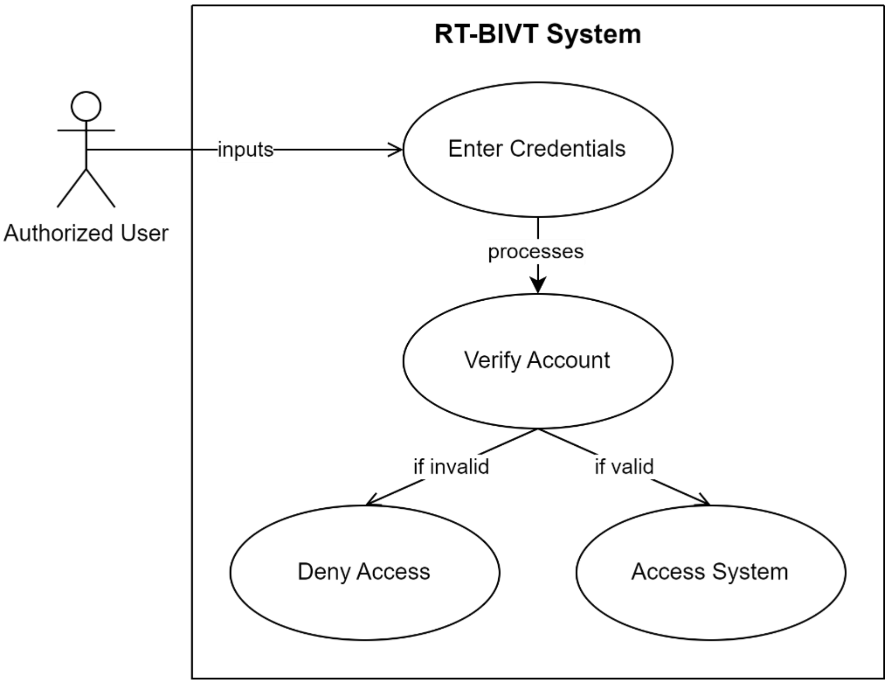


Figure 3.3.1 Use Case of Sign In

2.3.2 Use Case of Sign Up

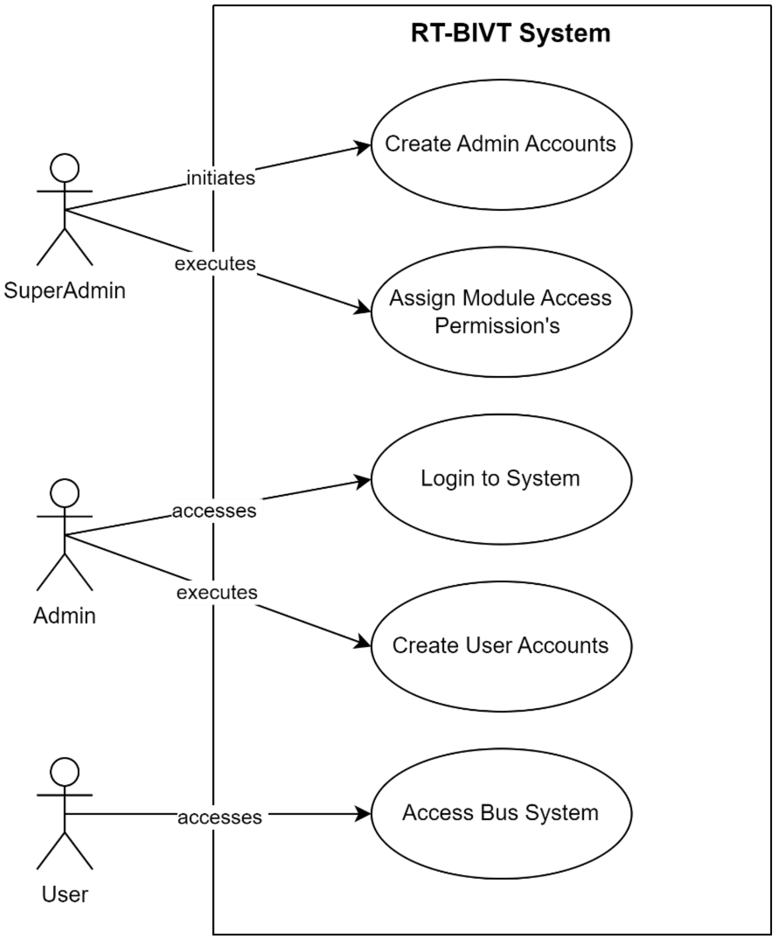


Figure 3.3.2 Use Case of Sign Up

2.3.3 Use Case of Bus and Route Management

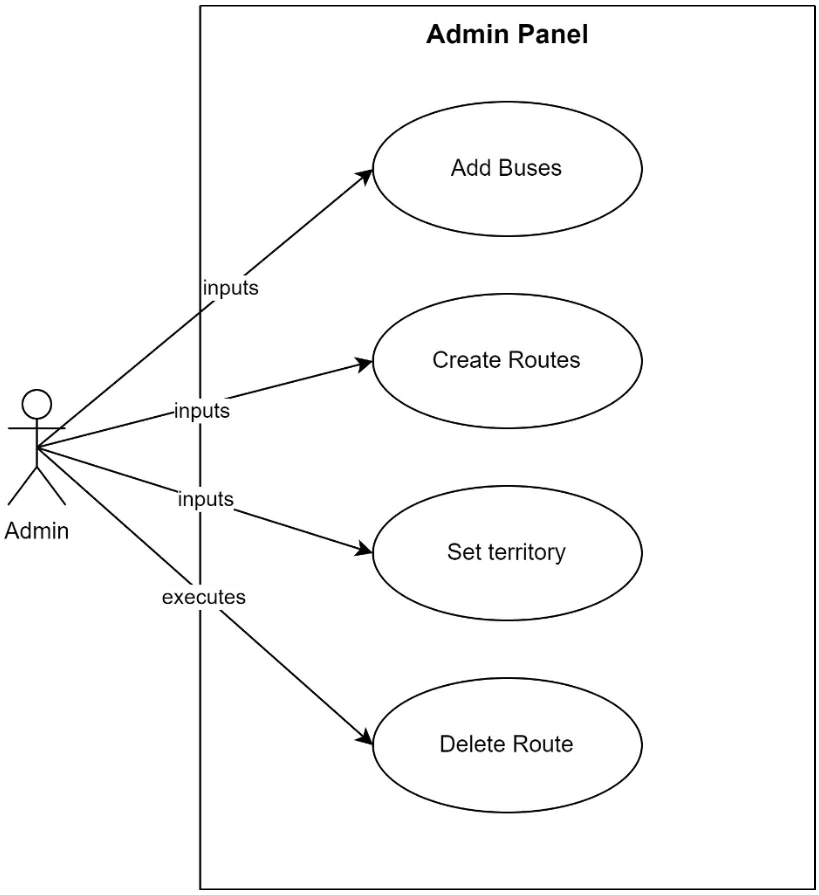


Figure 3.3.3 Use Case of Bus and Route Management

2.3.4 Use Case of Journey Management

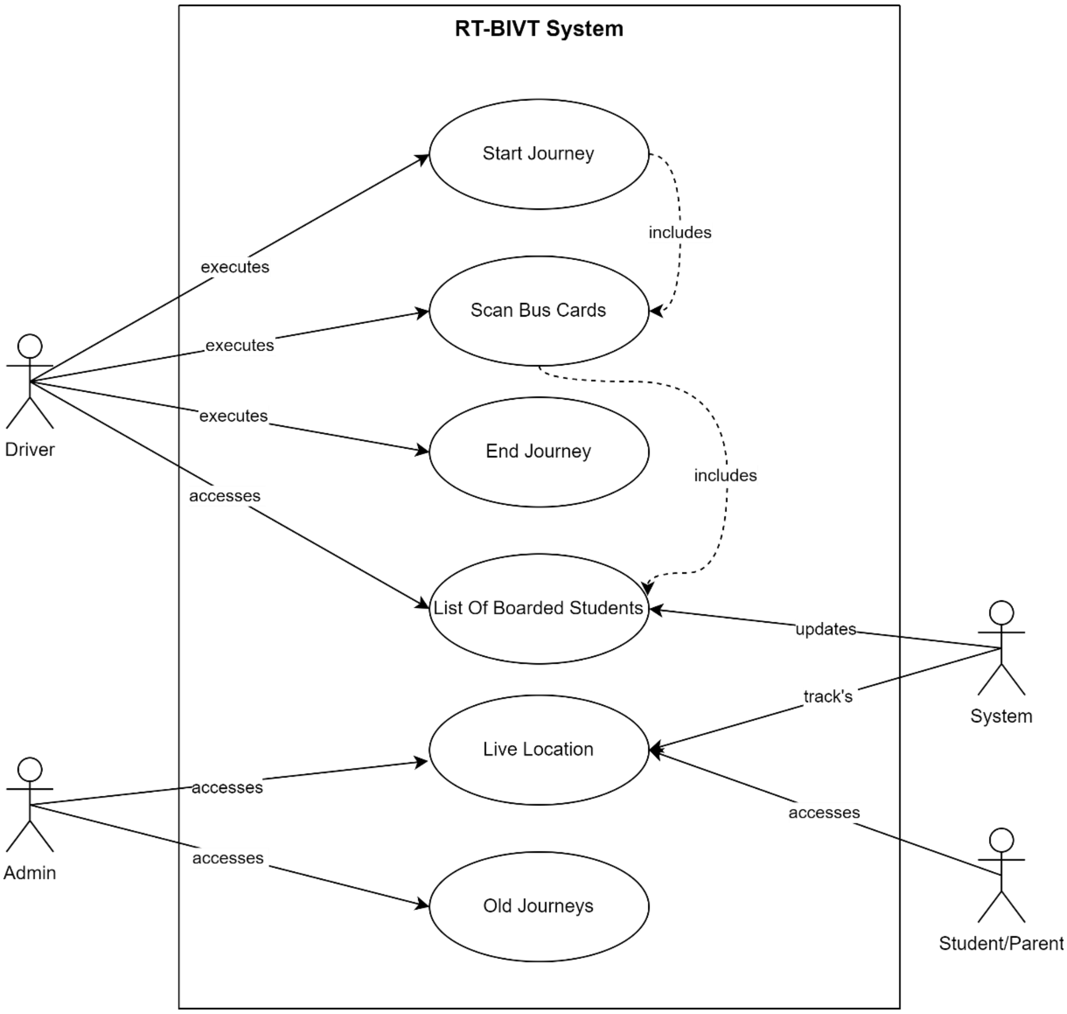


Figure 3.3.4 Use Case of Journey Management

2.3.5 Use Case of Bus card Management

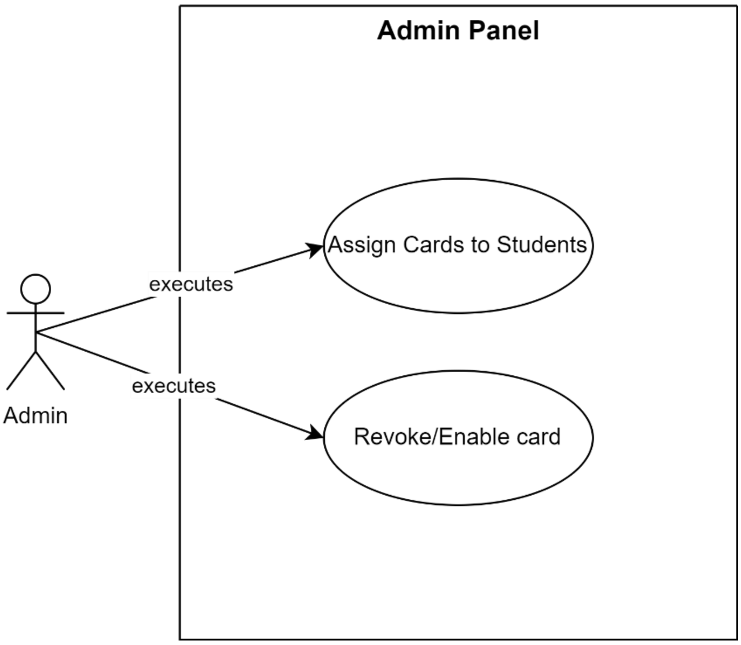


Figure 3.3.5 Use Case of Bus Card Management

2.3.6 Use Case of Student & Session Management

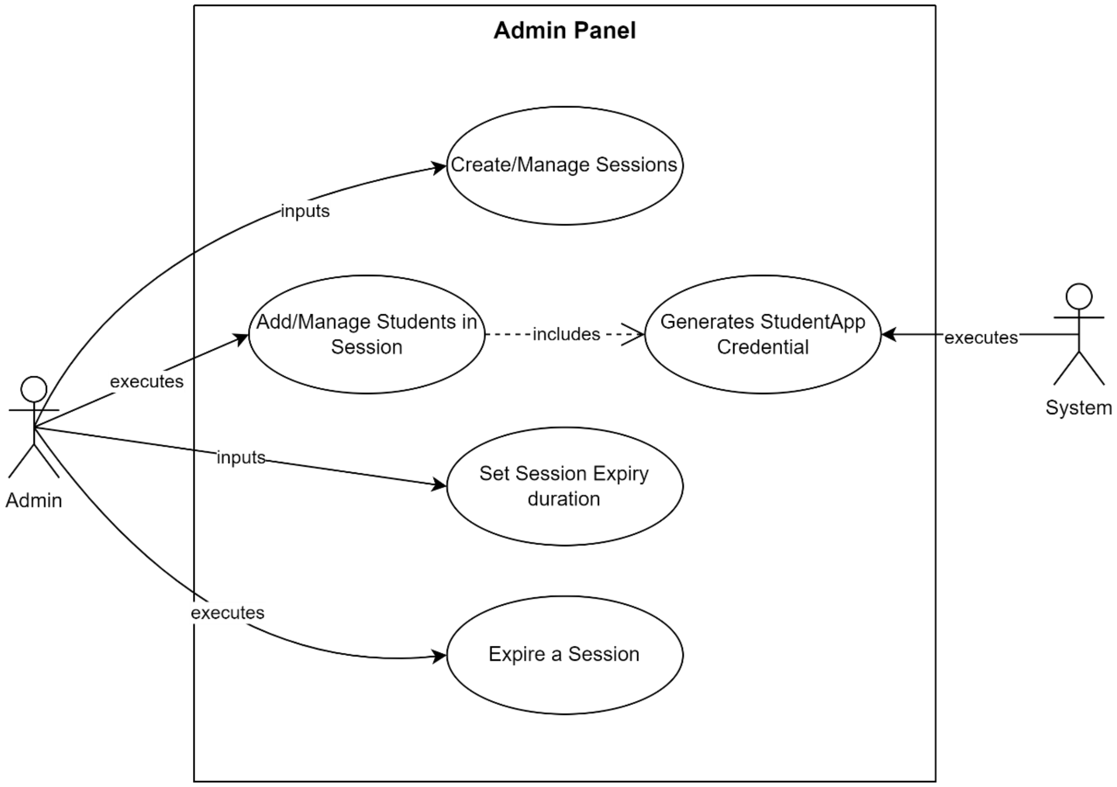


Figure 3.3.6 Use Case of Student & Session Management

2.3.7 Use Case of Bus Staff Management

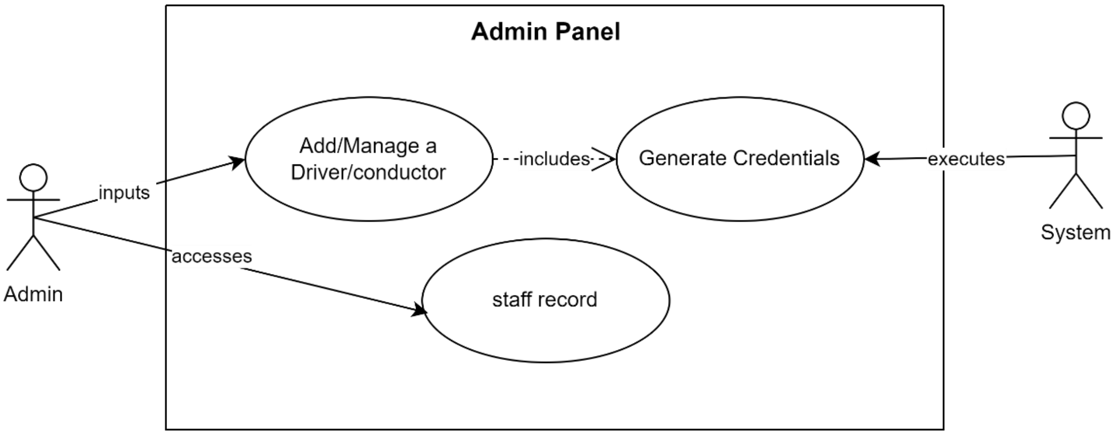


Figure 3.3.7 Use Case of Bus Staff Management

2.3.8 Use Case of Complaint Management

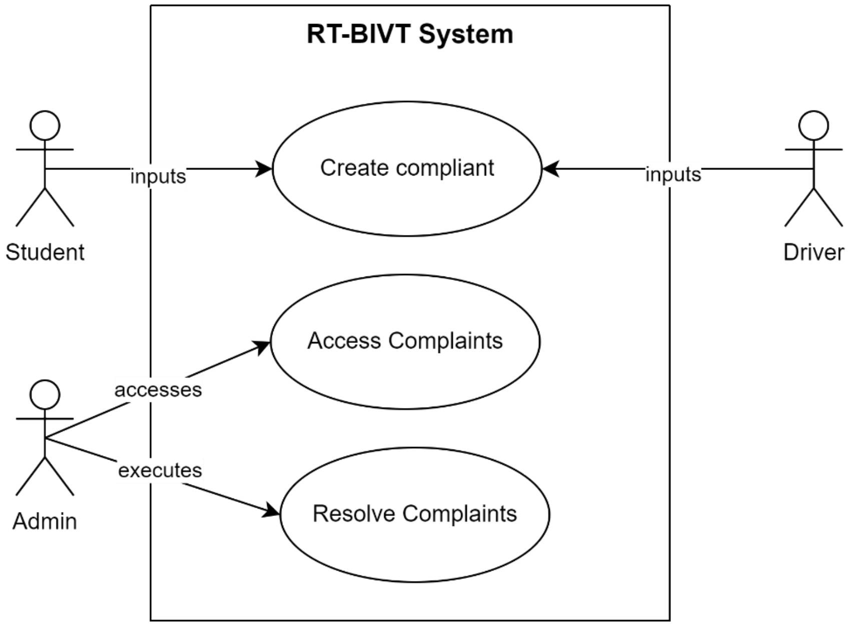


Figure 3.3.8 Use Case of Complaint Management

2.3.9 Use Case of Report and Analysis

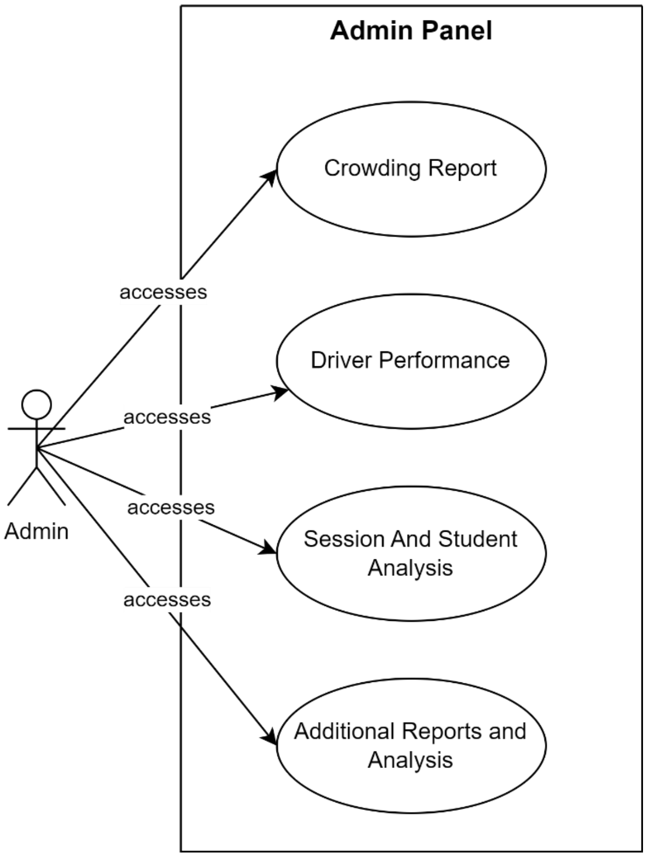


Figure 3.3.9 Use Case of Report and Analysis

2.3.10 Use Case of Announcement Management

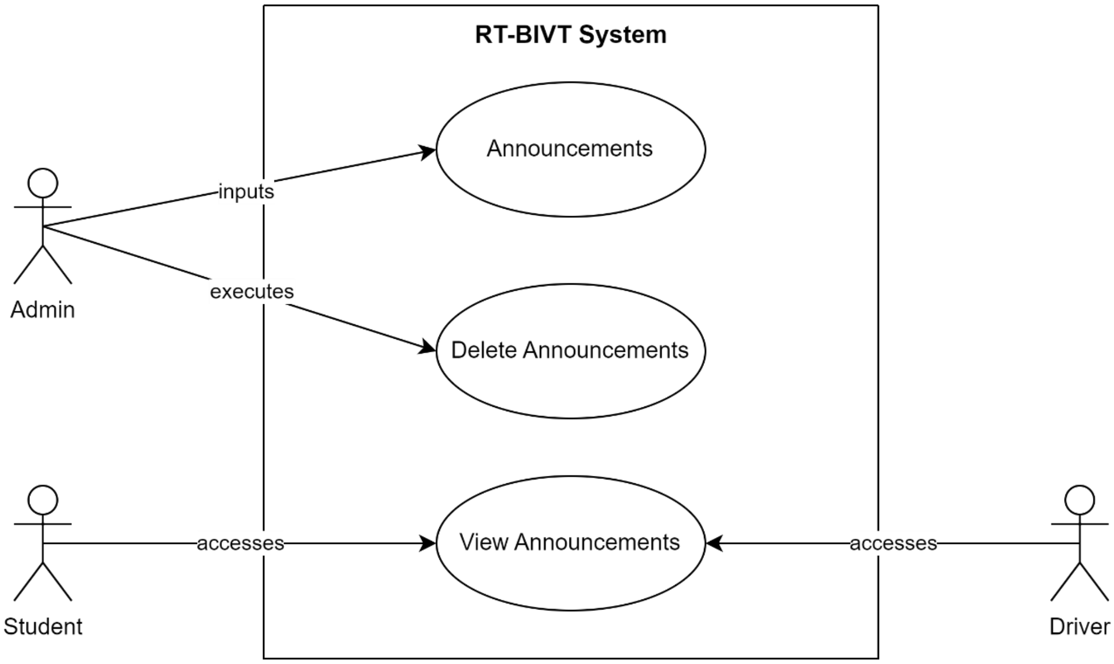


Figure 3.3.10 Use Case of Announcement Management

2.3.11 Use Case of Complete System

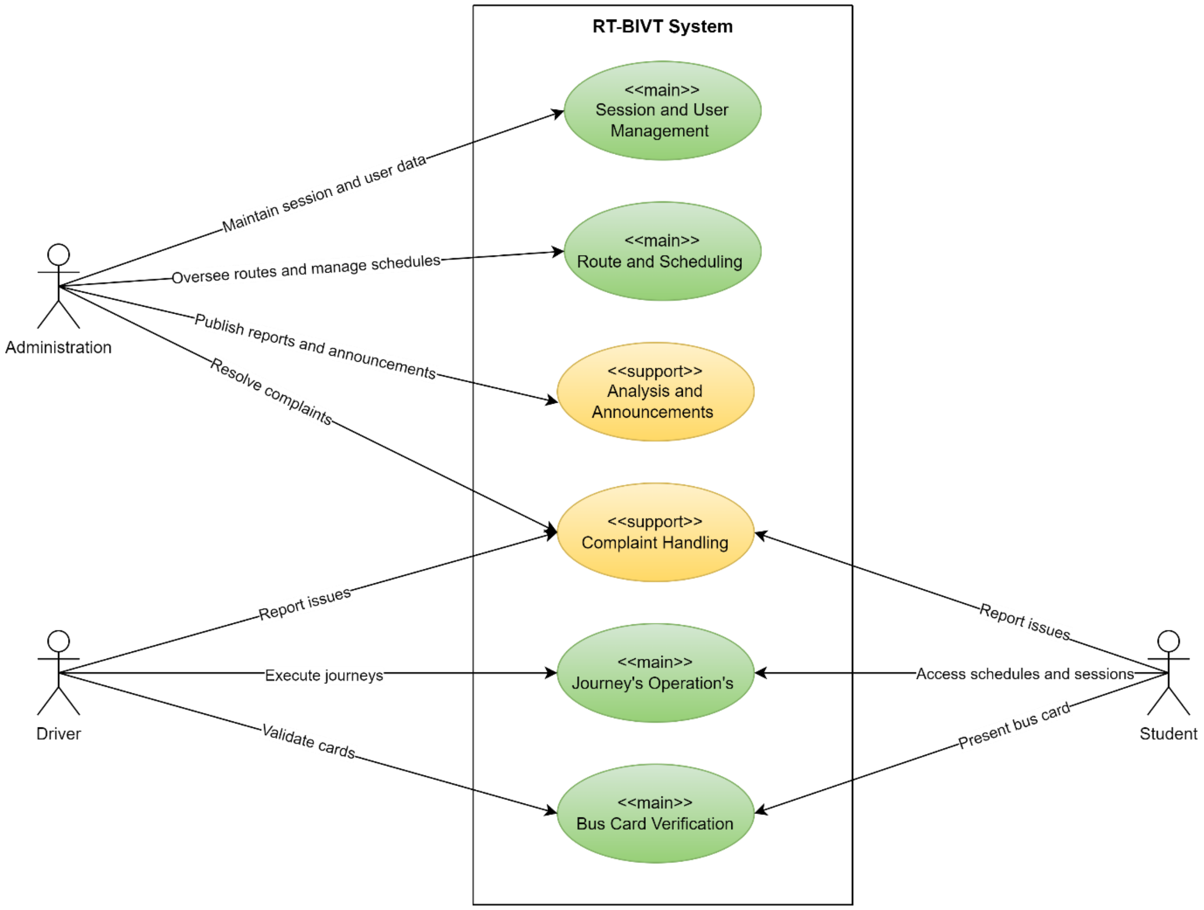


Figure 3.3.12 Use Case of Complete System

2.4 Use Case Description.

Use case description contains every piece of information (use case id, use case name, description, pre- and post-conditions) of each use case.

2.4.1 Description of Sign In:

Table: 3.4.1 Description of Sign In

Field	Details
Use Case Id	01
Use Case Name	Sign In
Actors	Authorized User
Description	Authorized users log in to the HME application. Access is denied if the user does not have an account or proper credentials.
Pre-condition	User must have an account and credentials.

Post-condition	User logs into the HME application or is denied access.

2.4.2 *Description of Sign In:*

Table: 3.4.2 Description of Sign In

Field	Details
Use Case Id	02
Use Case Name	Sign In
Actors	Authorized User
Description	Authorized users log in to the HME application. Access is denied if the user does not have an account or proper credentials.
Pre-condition	User must have an account and credentials.
Post-condition	User logs into the HME application or is denied access.

2.4.3 *Description of Patient Account Creation:*

Table: 3.4.3 Description of Patient Account Creation

Field	Details
Use Case Id	03
Use Case Name	Patient Account Creation
Actors	Authorized User (e.g., Front Desk)
Description	Authorized users create accounts for patients, generate QR codes, and create encounters and billings. They can also reactivate expired accounts.
Pre-condition	Authorized user has permission for patient account management.
Post-condition	Patient account created with encounters and billing setup. QR code generated.

2.4.4 *Description of Doctor Management:*

Table: 3.4.4 Description of Doctor Management

Field	Details
Use Case Id	04
Use Case Name	Doctor Management
Actors	Doctor
Description	Doctors receive notifications of patient encounters, attend to patients, view past history, and provide prescriptions or admissions. Auto discharge or send to dispensary based on the action taken.
Pre-condition	Patient encounter is created and assigned to the doctor.
Post-condition	Doctor attends to the patient, updates the system with actions taken.

2.4.5 *Description of Patient Admission:*

Table: 3.4.5 Description of Patient Admission

Field	Details
Use Case Id	05
Use Case Name	Patient Admission Management
Actors	Authorized User (Admission Management)
Description	Manage patient admissions by assigning beds and rooms and performing CRUD operations on them.
Pre-condition	Patient is admitted.
Post-condition	Patient is assigned a bed and room in the hospital.

2.4.6 *Description of Nursing and Patient Care:*

Table: 3.4.6 Description of Nursing and Patient Care

Field	Details
Use Case Id	06
Use Case Name	Nursing and Patient Care
Actors	Nurse
Description	Nurses add patient vitals, manage injections, dressings, and immunizations. They redirect patients to doctors if needed.
Pre-condition	Patient is admitted under nursing care.
Post-condition	Nursing care provided, and relevant updates made to the patient's record.

2.4.7 Description of Laboratory and Radiology:

Table: 3.4.7 Description of Laboratory and Radiology

Field	Details
Use Case Id	07
Use Case Name	Laboratory and Radiology
Actors	Doctor, Laboratory/Radiology Technicians
Description	Doctors send patients for lab tests. Technicians conduct tests and upload results. AI models predict bone fractures from X-rays.
Pre-condition	Doctor refers a patient to laboratory/radiology.
Post-condition	Tests conducted and results uploaded for doctor and nurse access.

2.4.8 Description of Dispensary and Drugs Management:

Table: 3.4.8 Description of Dispensary and Drugs Management

Field	Details
Use Case Id	08
Use Case Name	Dispensary and Drug Management
Actors	Dispensary Staff
Description	After patient discharge, the patient is sent to the dispensary where prescribed medicines are provided. A smooth supply chain from the pharmacy to various departments ensures medication availability.
Pre-condition	Patient is discharged and requires medication.
Post-condition	Medicines provided to the patient and sent for payment.

2.4.9 *Description of Patient Payment System:*

Table: 3.4.9 Description of Patient Payment System

Field	Details
Use Case Id	09
Use Case Name	Patient Payment System
Actors	Cashier
Description	Patients are directed for payment post-discharge. HMO authorized patients are discharged directly, while others are sent to the cashier for payment processing. Discounts and wallet system for future use are available.
Pre-condition	Patient completes treatment and needs to settle bills.
Post-condition	Payment processed, discount applied if applicable, and patient discharged.

2.4.10 *Description of Drug and Inventory Management:*

Table: 3.4.10 Description of Drug and Inventory Management

Field	Details
Use Case Id	11
Use Case Name	Drug and Inventory Management
Actors	Admin, Authorized Users
Description	Admin or authorized users add and manage drugs, dressings, and other medical supplies in the pharmacy store. They create requisitions, handle inventory, and manage stock levels, including low stock alerts. They also handle purchasing from suppliers and update expiry dates.
Pre-condition	User has admin or relevant permissions.
Post-condition	Inventory updated, requisitions made, and stock levels managed.

2.4.11 Description of General Functionalities:

Table: 3.4.11 Description of General Functionalities

Field	Details
Use Case Id	10
Use Case Name	General Functionalities
Actors	Users
Description	The app sends automated birthday wishes to users. It also facilitates real-time chat among users, database and chat backup, and options for forced patient discharge and comprehensive reporting.
Pre-condition	Users registered in the app.
Post-condition	Effective communication maintained, and app functionalities utilized for hospital management.

Chapter 4

4.1 Agile Software Development Methodology

Agile methodology is an iterative and incremental approach to software development that emphasizes flexibility, collaboration, and customer feedback. Unlike traditional methodologies like the Waterfall model, Agile allows for adaptive planning, evolutionary development, and continual improvement, enabling rapid and flexible responses to change. It is particularly effective in managing the complexity and unpredictability of software projects.

4.2 Selected Methodology: Agile

A software development methodology is a way to improve development work with the help of dividing the development process into distinct phases to make a system with better productivity. It also helps to structure and control the whole system. It involves different methodologies, also called the Software Development Life Cycle, that are stages for software development with a certain set of rules. Generically, we categorized the methodologies into Rapid application development and planned-driven. Waterfall, spiral is planned driven while agile is Rad based.

4.3 Reasons for Selecting Agile Methodology

1. **Flexibility and Adaptability**: Agile allows the project to adapt to changes in requirements and technology swiftly.

2. **Customer Collaboration**: Regular feedback from users ensures that the development aligns with the user's needs and expectations.

3. **Incremental Delivery**: Agile facilitates the delivery of small, workable segments of the project, ensuring a faster time-to-market and continuous improvement.

4. **Risk Management**: Regular reviews and iterations help in early identification and resolution of issues, reducing the overall risk.

4.4 Agile Project Planning and Execution for HME

Agile project planning and execution involve the division of the project into sprints, with each sprint aimed at delivering a potentially shippable product increment. The key phases include:

1. **Product Backlog Creation**: Gather and prioritize necessities for the HME undertaking, growing a product backlog.
2. **Sprint Planning**: At the start of every dash, pick a hard and fast of capabilities from the product backlog and plan their delivery.
3. **Daily Stand-ups**: Conduct day by day meetings to speak about development, demanding situations, and plan the day's paintings.
4. **Sprint Execution**: Develop, take a look at, and combine features inside the dash.
5. **Sprint Review**: At the quit of every sprint, reveal the finished paintings to stakeholders and collect comments.
6. **Sprint Retrospective**: Reflect at the sprint to identify successes and regions for development.
7. **Release Planning**: Plan releases based totally at the undertaking progress, stakeholder comments, and marketplace situations.

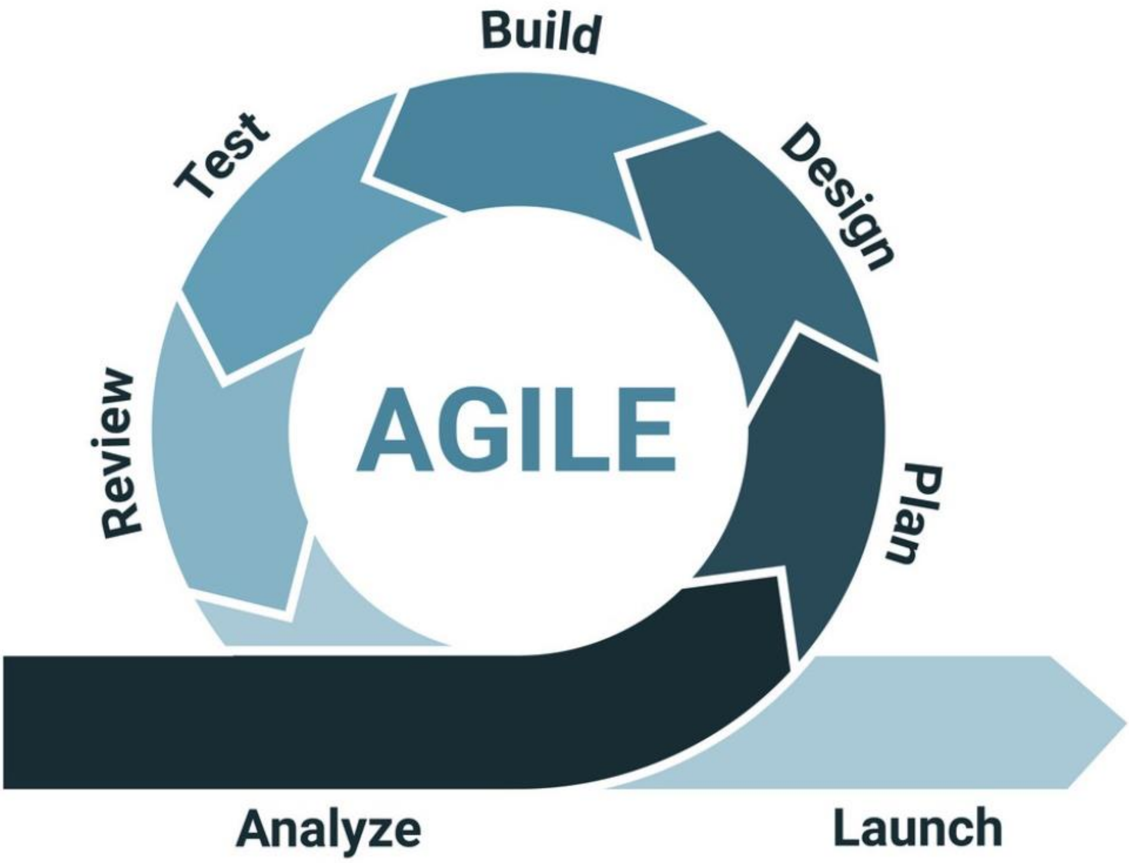


Figure 4.2 Agile Model

Chapter 5

5 System Architecture

5.1 Architecture

In widespread, structure is the manner of product planning, layout, and construction. The design section of the structure comes in the solution phase of the lifestyles cycle as it defines the machine because the primary software program components.
For our task, we've got decided on a Model-View-Template (MVT) structure, appropriate for applications the use of Django and React. This architecture is defined as follows:

- **Model**: Represents the application's information structures, normally mapped to database tables. It is liable for managing facts, processing user inputs, and managing interactions with the database or other statistics assets.

- **View (Django)**: In Django, perspectives handle the enterprise common sense and interact with the version to carry statistics and render a template. They act as a bridge among the Model and the Template.
- **Template (React)**: Templates are liable for rendering the records acquired from the views in a layout suitable for interaction with the user. In our challenge, this position is fulfilled via React, where components are used to create the user interface. These components may consist of HTML, CSS, and JavaScript documents, creating a dynamic and interactive consumer in revel.

By MVT architecture in this way, the undertaking benefits from improved modularity, maintainability, and scalability. It enables less complicated collaboration between developers, as every element - Model, View, and Template - can be advanced independently. Additionally, keeping apart the user interface (React Templates) from the underlying business common sense and data (Django Model and View) makes the utility extra adaptable to special platforms and technology.

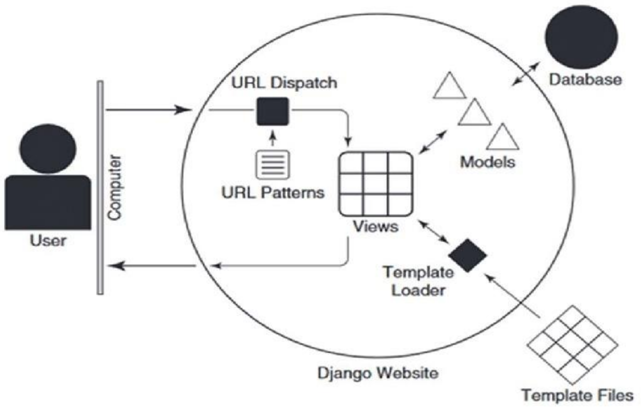


Figure 5.1 Model, View and Template

5.2 Activity Diagram

Activity Diagram shows the flow of the system from one activity to another. An activity is any set of action or set of actions that compare needs to perform any specific task, so mapping the overall actions of the system we can easily estimate the overall flow of the system, and that's where activity diagrams are applicable.

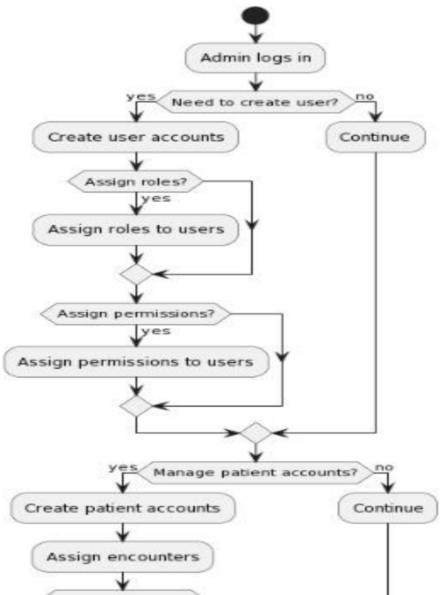


Figure 5.2.1 Activity of Admin Control

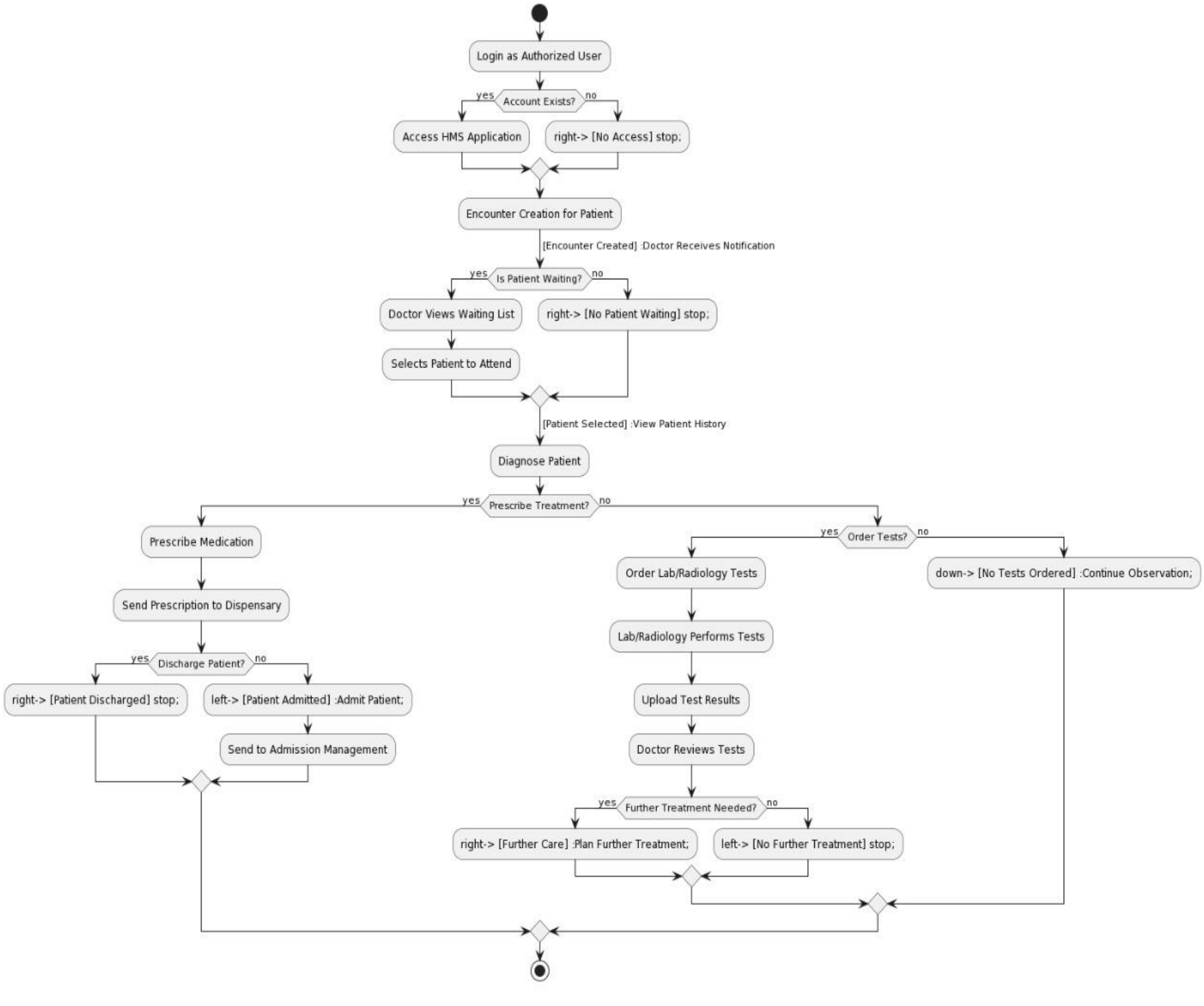

Login as Authorized User
yes
Account Exists?
no
Access HMS Application
right-> [No Access] stop;
Encounter Creation for Patient
[Encounter Created] :Doctor Receives Notification
yes
Is Patient Waiting?
no
Doctor Views Waiting List
right-> [No Patient Waiting] stop;
Selects Patient to Attend
[Patient Selected] :View Patient History
Diagnose Patient
yes
Prescribe Treatment?
no
Prescribe Medication
Send Prescription to Dispensary
yes
Discharge Patient?
no
right-> [Patient Discharged] stop;
left-> [Patient Admitted] :Admit Patient;
Send to Admission Management
yes
Order Tests?
no
Order Lab/Radiology Tests
down-> [No Tests Ordered] :Continue Observation;
Lab/Radiology Performs Tests
Upload Test Results
Doctor Reviews Tests
yes
Further Treatment Needed?
no
right-> [Further Care] :Plan Further Treatment;
left-> [No Further Treatment] stop;

Figure 5.2.2 Activity of Doctor, Nursing, Laboratory and Radiology Centre

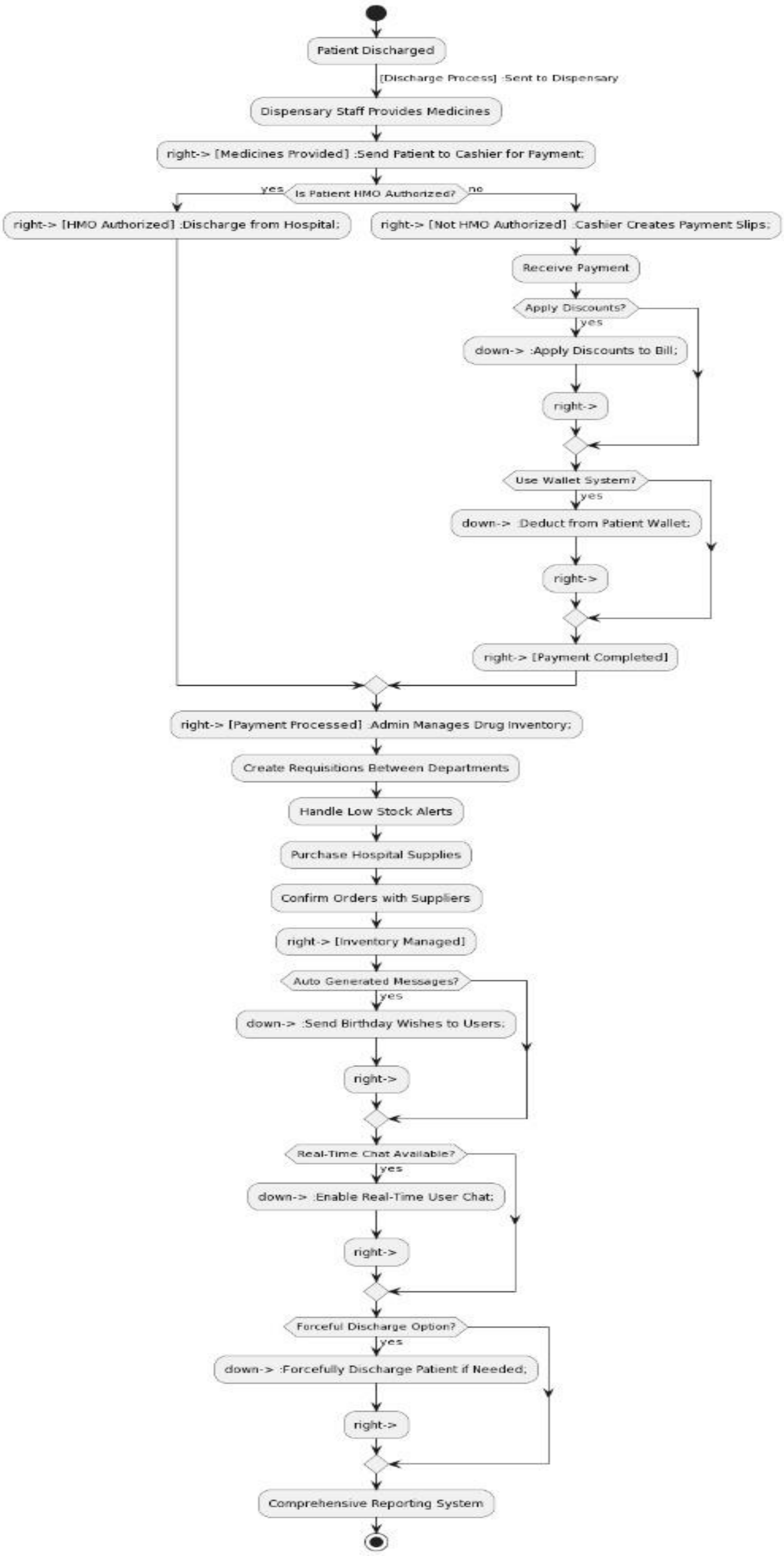

Patient Discharged
[Discharge Process] :Sent to Dispensary
Dispensary Staff Provides Medicines
right-> [Medicines Provided] :Send Patient to Cashier for Payment;
yes
Is Patient HMO Authorized?
no
right-> [HMO Authorized] :Discharge from Hospital;
right-> [Not HMO Authorized] :Cashier Creates Payment Slips;
Receive Payment
Apply Discounts?
yes
down-> :Apply Discounts to Bill;
right->
Use Wallet System?
yes
down-> :Deduct from Patient Wallet;
right->
right-> [Payment Completed]
right-> [Payment Processed] :Admin Manages Drug Inventory;
Create Requisitions Between Departments
Handle Low Stock Alerts
Purchase Hospital Supplies
Confirm Orders with Suppliers
right-> [Inventory Managed]
Auto Generated Messages?
yes
down-> :Send Birthday Wishes to Users;
right->
Real-Time Chat Available?
yes
down-> :Enable Real-Time User Chat;
right->
Forceful Discharge Option?
yes
down-> :Forcefully Discharge Patient if Needed;
right->
Comprehensive Reporting System

Figure 5.2.3 Activity of Dispensary, Pharmacy, HMO Authorization, Cashier

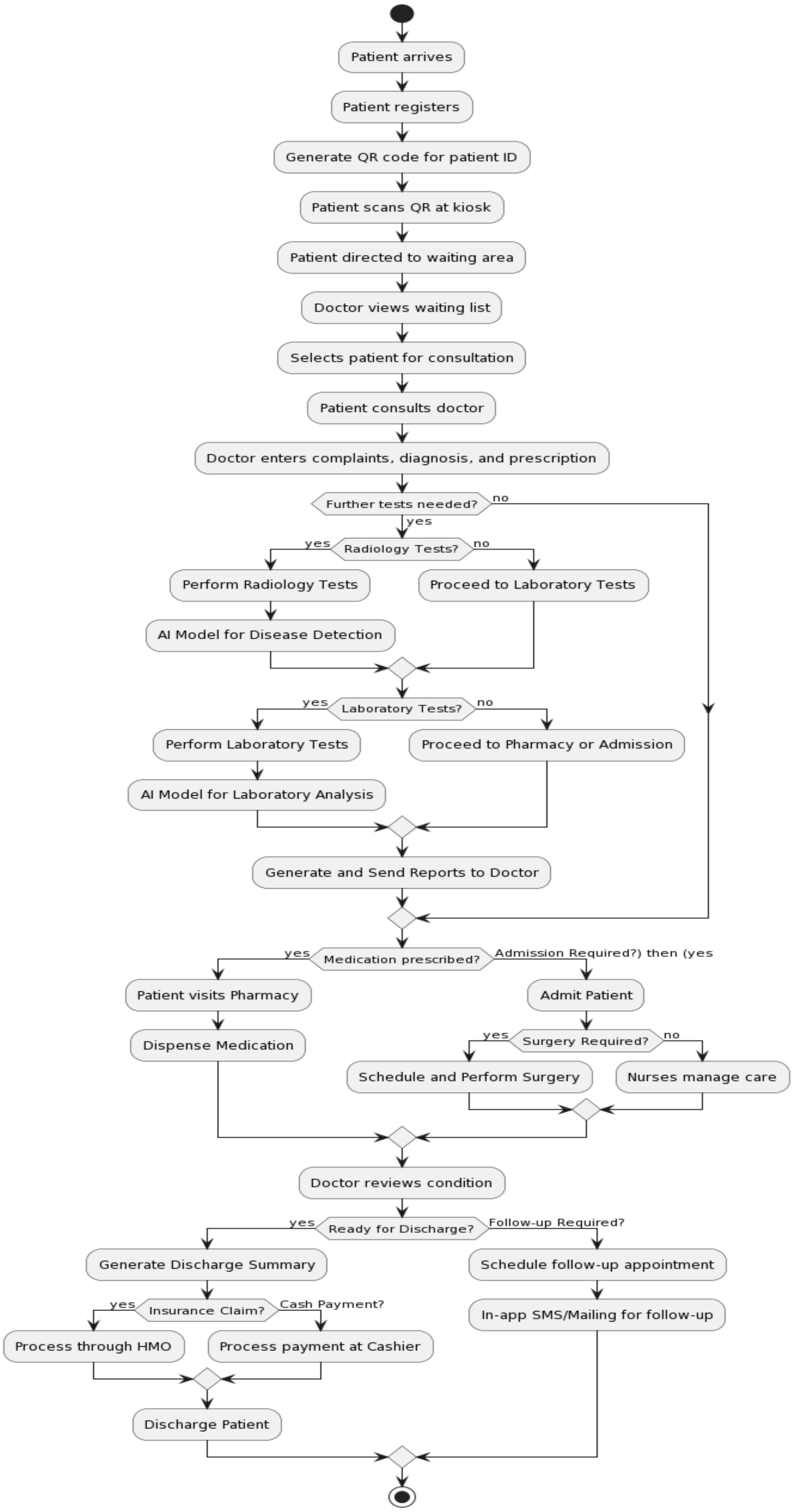

Patient arrives
Patient registers
Generate QR code for patient ID
Patient scans QR at kiosk
Patient directed to waiting area
Doctor views waiting list
Selects patient for consultation
Patient consults doctor
Doctor enters complaints, diagnosis, and prescription
Further tests needed?
no
yes
yes
Radiology Tests?
no
Perform Radiology Tests
Proceed to Laboratory Tests
AI Model for Disease Detection
yes
Laboratory Tests?
no
Perform Laboratory Tests
Proceed to Pharmacy or Admission
AI Model for Laboratory Analysis
Generate and Send Reports to Doctor
yes
Medication prescribed?
Admission Required?) then (yes
Patient visits Pharmacy
Admit Patient
Dispense Medication
yes
Surgery Required?
no
Schedule and Perform Surgery
Nurses manage care
Doctor reviews condition
yes
Ready for Discharge?
Follow-up Required?
Generate Discharge Summary
Schedule follow-up appointment
yes
Insurance Claim?
Cash Payment?
In-app SMS/Mailing for follow-up
Process through HMO
Process payment at Cashier
Discharge Patient

Figure 5.2.4 Activity of Complete System

5.3 Sequence Diagram

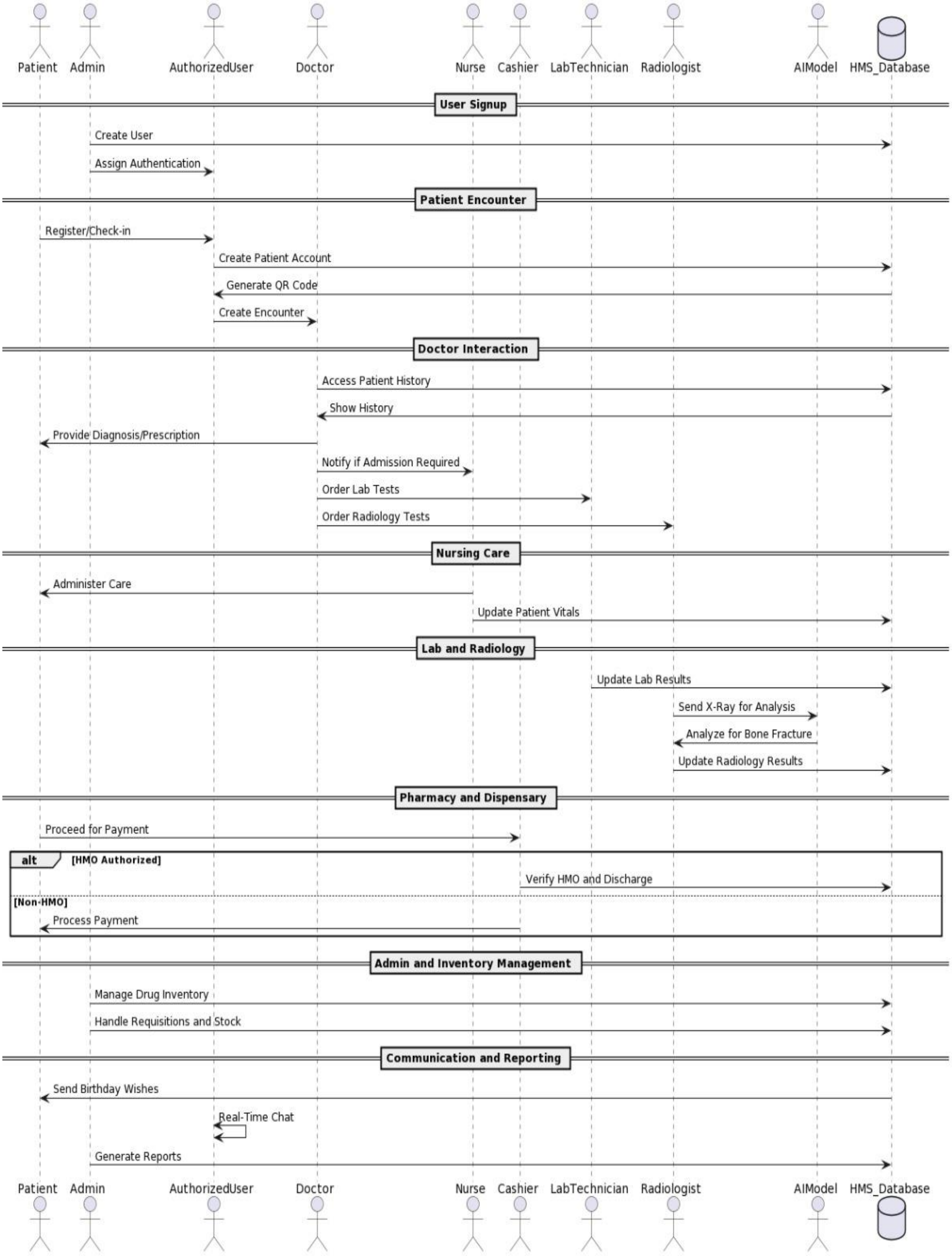


Figure 5.3.1 Sequence of whole system

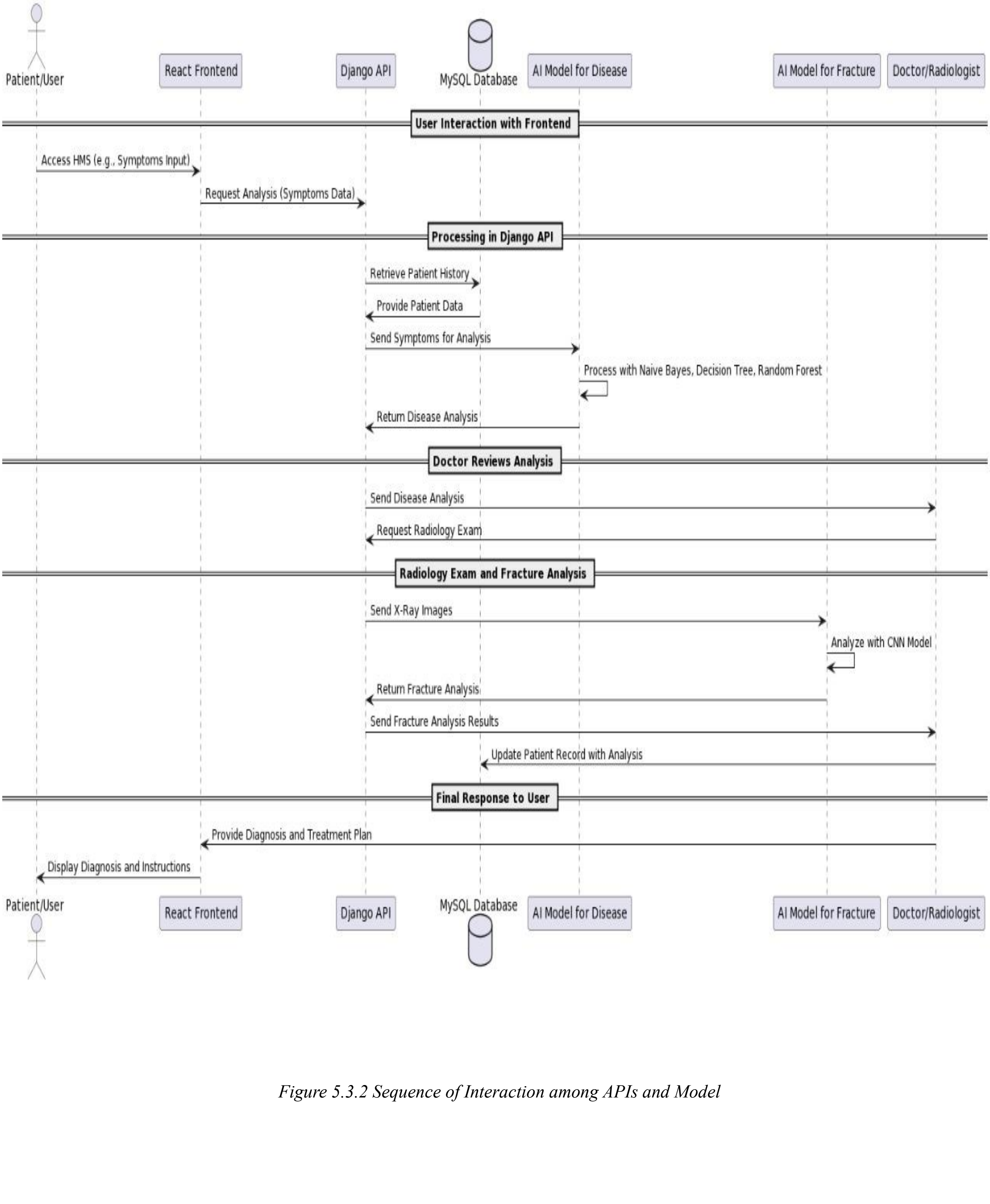


Figure 5.3.2 Sequence of Interaction among APIs and Model

Chapter 6

6 AI-Model and Algorithms

6.1 General Disease Detection:

We integrate the disease detection application that is primarily based at the system learning algorithm that is decision tree. We integrate this matching software for the assist of docs. Doctor will ask the signs and symptoms from patients and supply to that application a good way to are expecting the sickness from the given dataset.

A Decision Tree is a famous system gaining knowledge of set of rules used for classification and regression duties. Here is an in depth clarification of the way a selection tree works, including the important thing standards, steps, and attributes concerned in constructing and the use of a choice tree.

6.1.1 Key Concepts of Decision Tree:

1. **Node**: Each point of decision in the tree.
    - **Root Node**: The topmost node, representing the entire dataset.
    - **Internal Node**: Nodes that represent decisions based on attributes.
    - **Leaf Node**: Terminal nodes that represent the output of the decision.
2. **Edge**: Connects nodes, representing the outcome of a decision.
3. **Attribute/Feature**: A characteristic of the data used to split the nodes.
4. **Gini Index / Entropy**: Measures used to determine the quality of a split. Lower values indicate a better split.
    - **Gini Index**: Measures the impurity of a dataset. Used in CART (Classification and Regression Trees).
    - **Entropy**: Used in ID3 and C4.5 algorithms to measure the disorder in the dataset.

6.1.2 Steps in Building a Decision Tree

1. **Selecting the Best Attribute**:
    - The process begins at the root node. The algorithm evaluates all possible features and selects the one that best splits the data into subsets with the most homogeneous target variable (class label).
    - This selection is based on the impurity measures such as Gini Index, Entropy, or Information Gain.
2. **Splitting the Dataset**:

- Once the best attribute is selected, the dataset is split into subsets. Each subset corresponds to a unique value or range of values of the selected attribute.

3. **Creating Sub-nodes**:
    - Each subset created from the split becomes a new node in the tree. This node will be further split using the same process recursively.
4. **Stopping Criteria**:
    - The splitting process stops when one of the following criteria is met:
        - All the data in the node belongs to a single class.
        - There are no remaining attributes to split the data.
        - A predefined stopping condition such as maximum depth of the tree or minimum number of samples per node is reached.
5. **Pruning**:
    - Pruning is done to improve the tree's generalization ability by reducing its size. It removes branches that have little importance and can lead to overfitting.
    - **Pre-pruning**: Stops the tree growth early.
    - **Post-pruning**: Removes branches from a fully grown tree.

6.1.3 Training Epochs

During an epoch, the learning algorithms updates the model's parameters based on data. It took approximately 80 epochs to train.

6.1.4 Architecture

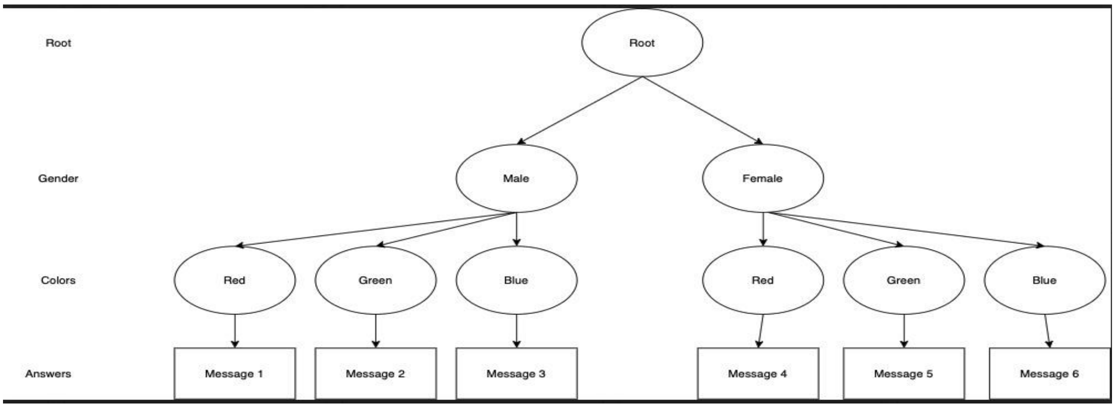


Figure 6.1.4.1 Architecture Diagram of Decision Tree

6.1.5 *Confusion Matrix*

Figure 6.1.5.1 Confusion Matrix of G.D.D

	Predicted Positive	Predicted Negative
Actual Positive	700	40
Actual Negative	60	635

Accuracy = (700 + 635) / (700 + 635 + 60 + 40)

Accuracy = 0.89

Accuracy = 0.89 x 100

Accuracy = 89 %

6.1.6 *Accuracy*

Model accuracy is 89 %.

6.1.7 Activity diagram of program

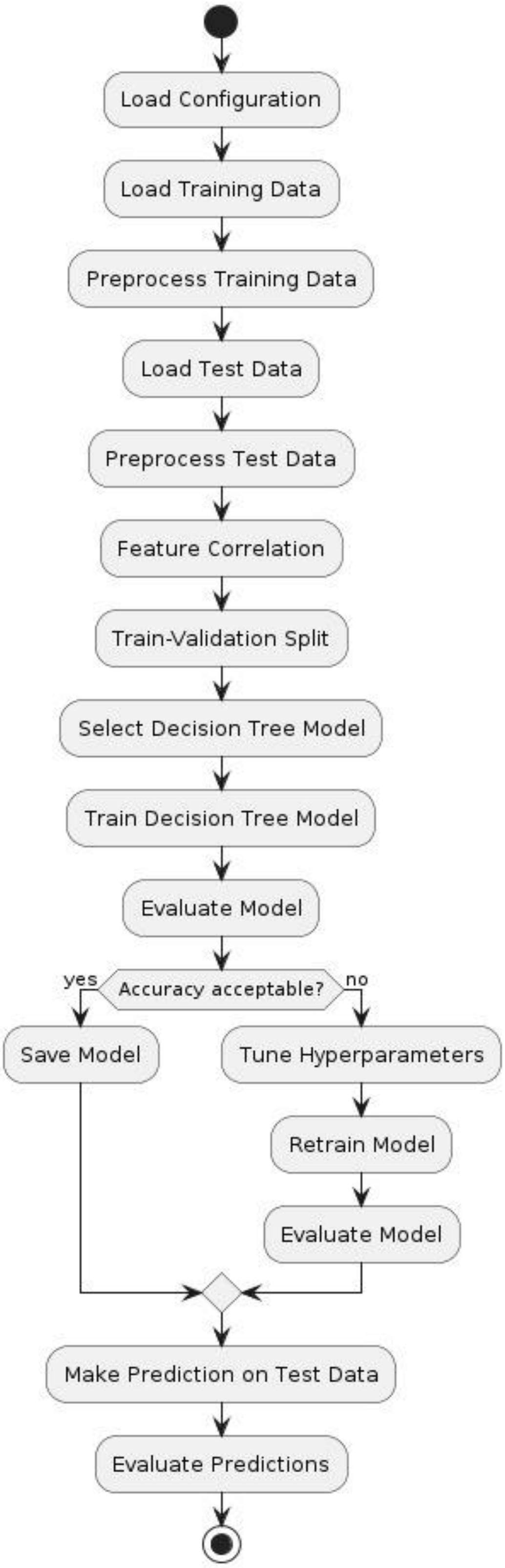


Figure 6.1.1 Activity diagram of program

6.2 Fractured Bone Detection:

We have additionally integrate AI model for detection of fractured bones of wrists. This is done with the help of YOLO set of rules this is used for the detection of objects. Doctor will give the X-Ray image as enter to the model then model will predict, it's far fractured or now not as output.

6.2.1 Dataset

The GRAZPEDWRI-DX is an open dataset containing 20327 annotated pediatric trauma wrist radiograph images of 6091 patients, treated at the Department for Pediatric Surgery of the University Hospital Graz between 2008 and 2018. Several pediatric radiologists annotated the images by placing bounding boxes to mark 9 different classes:

- boneanomaly (276 boxes),
- bonelesion (45 boxes),
- foreignbody (8 boxes),
- fracture (18090 boxes),
- metal (818 boxes),
- periostealreaction (3453 boxes),
- pronatorsign (567 boxes),
- softtissue (464 boxes),
- text (23722 boxes).

6.2.2 YOLO Working and Explanation

YOLO (You Only Look Once) is an object detection algorithm that has gained significant popularity in the field of computer vision. It is both an algorithm and a model architecture designed for real-time object detection tasks. YOLO stands out for its speed and accuracy in detecting objects in images and videos.

1. **Algorithm/Model**: YOLO is both an algorithm and a model architecture. The YOLO algorithm applies a deep convolutional neural network (CNN) model to perform object detection tasks.
2. **Real-Time Object Detection**: YOLO is designed for actual-time item detection, that means it could system pictures or video frames swiftly and hit upon gadgets within them with excessive accuracy.
3. **Single Pass**: Unlike conventional object detection techniques that apply a sliding window approach or vicinity notion networks, YOLO takes a single

bypass thru the enter photograph or frame and without delay predicts bounding packing containers and class probabilities for all items detected.

YOLO Working

1. **Grid-based Detection**:
    - YOLO divides the input image into a grid of cells. Each cellular is chargeable for predicting bounding boxes and sophistication possibilities for objects that fall inside it.
2. **Bounding Box Prediction**:
    - Each grid cell predicts multiple bounding containers (with predefined sizes and styles) along with self belief scores that imply the chance of each box containing an object.
3. **Class Prediction**:
    - Each bounding field predicts elegance chances for the items it incorporates. YOLO makes use of softmax activation to are expecting the opportunity distribution across more than one training.
4. **Non-Maximum Suppression (NMS)**:
    - YOLO applies non-maximum suppression to remove redundant or overlapping bounding boxes with decrease self belief rankings, retaining only the maximum assured detections.

6.2.3 Training Epochs

During an epoch, the learning algorithms updates the model's parameters based on data. It took approximately 120 epochs to train.

6.2.4 Architecture Diagram:

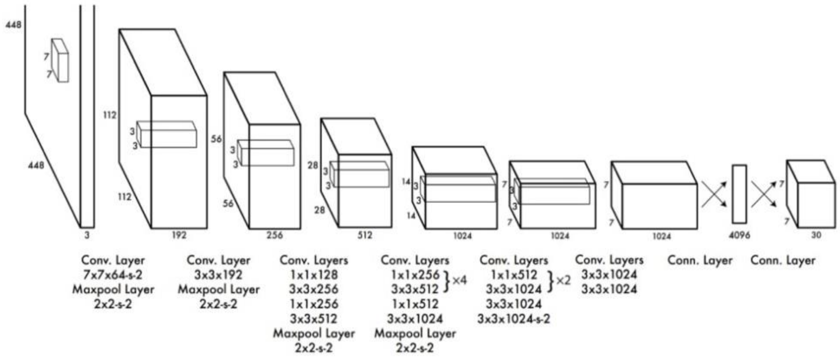


Figure 6.2.1 Architecture Diagram

6.2.5 Confusion Matrix:

Figure 6.2.5.1 Confusion Matrix of Yolo Model

	Predicted Positive	Predicted Negative
Actual Positive	2800	200
Actual Negative	300	2060

Accuracy = (2800 + 2060) / (2800 + 2060 + 300 + 200)

Accuracy = 0.81

Accuracy = 0.81 x 100

Accuracy = 81 %

6.2.1 Accuracy

Model Accuracy is 81%.

6.2.2 Activity Diagrams

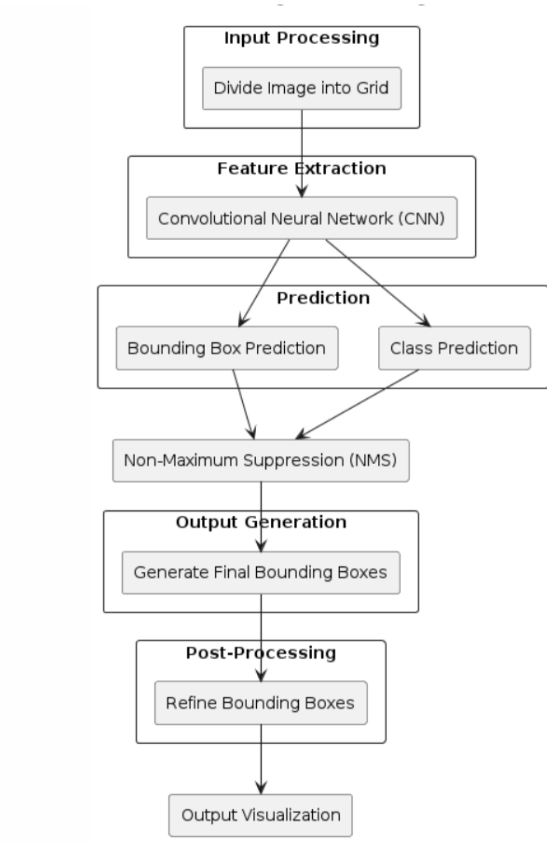


Figure 6.2.2 Activity diagram of working of YOLO

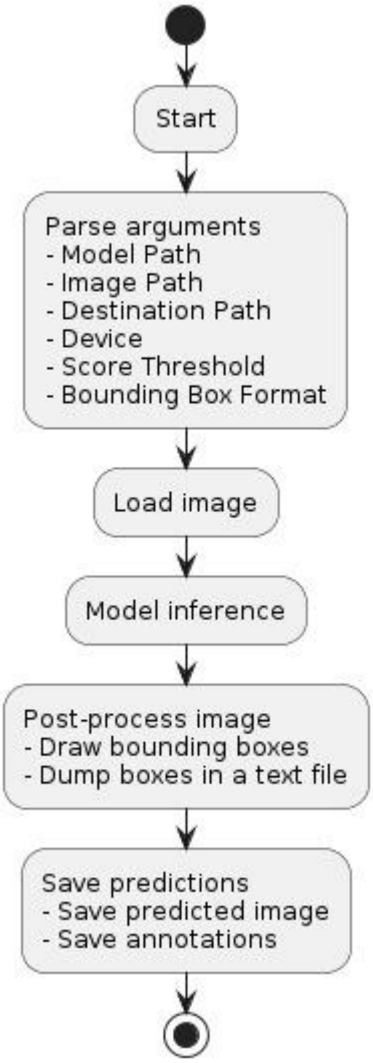


Figure 6.2.3 Activity diagram of program

Chapter 7: System Implementation

After successfully completing the initial phases of development, including requirement analysis, design, and planning, we now proceed to the final stage: the actual implementation of the hospital management system. This chapter provides a comprehensive overview of the tools, technologies, and processes involved in the development of the system. We will detail each module and component, as well as the integration of an AI model for disease detection.

7.1 System Tools and Technology

The tools and technologies used in this project are as follows:

- **Django**: A high-level Python web framework that encourages rapid development and clean, pragmatic design.
- **React**: A JavaScript library for building user interfaces, particularly single-page applications.
- **MySQL**: An open-source relational database management system.
- **VS Code**: A source-code editor made by Microsoft with support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git.
- **AI Model (Decision Tree)**: Used for disease detection based on user input.

7.1.1 Django

Django is a excessive-stage Python web framework that lets in fast improvement and clean, pragmatic layout. It takes care of much of the problem of net improvement, so developers can cognizance on writing their programs while not having to reinvent the wheel.

- **Routing**: Django's URL dispatcher allows clean, readable URLs.
- **Templating**: The Django template engine facilitates the separation of presentation and business logic.
- **ORM**: Django's Object-Relational Mapping (ORM) system makes it easy to interact with the database.
- **Security**: Django provides built-in protection against many security threats, including SQL injection, cross-site scripting, and cross-site request forgery.

7.1.2 React

React is a JavaScript library for building user interfaces. It enables developers to build complex UIs from small, isolated pieces of code called "components."

- **Component-Based**: React promotes the development of reusable components.
- **Virtual DOM**: React uses a virtual DOM to optimize rendering and improve performance.
- **JSX**: A syntax extension for JavaScript that looks similar to HTML, making it easier to write and understand components.

7.1.3 MySQL

MySQL is a widely used relational database management system. It is known for its reliability, high performance, and ease of use.

- **Data Storage**: MySQL stores data in tables, which are efficient for storing structured data.
- **Query Language**: MySQL uses Structured Query Language (SQL) for accessing and managing data.
- **Transactions**: MySQL supports transactions, ensuring data integrity and consistency.

7.1.4 VS Code

Visual Studio Code, commonly known as VS Code, is a source-code editor developed by Microsoft. It includes support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git.

- **Extensions**: VS Code has a rich ecosystem of extensions that enhance its functionality.
- **Terminal**: The terminal allows running commands and scripts directly within the editor.
- **IntelliSense**: Provides smart completions based on variable types, function definitions, and imported modules.

7.2 Module Implementation

7.2.1 Dashboard

The Dashboard module provides an overview of the hospital's operations. It includes various sub-modules for different departments and functionalities.

7.2.1.1 Front-Desk

- Allows searching for patient records.
- Manages patient appointments.
- Displays the history of patient encounters.
- Allows uploading patient-related documents.
- Tracks the number of patient encounters.
- Generates reports on patient registrations.
- Provides reports on ward activities.
- Generates reports on patient encounters.

7.2.1.2 Nursing

- Records patient vital signs.
- Manages injection administration.
- Handles dressing and medical procedures.
- Manages immunization records.
- Manages antenatal clinic activities.
- Handles requisitions for medical supplies.
- Manages nursing inventory.
- Manages patient admissions.
- Generates reports on antenatal care.
- Provides reports on pregnancy cases.

7.2.1.3 Doctors / Department

- Manages outpatient department clinics.
- Handles patient admissions.

- Generates reports on patient encounters.
- Provides reports on patient diagnoses.

7.2.1.4 Laboratory

- Manages pending lab requests.
- Records lab results.
- Manages parameters for test reporting.
- Handles administration of lab tests.
- Manages categories of lab tests.
- Handles requisition of consumables.
- Manages lab inventory.
- Tracks the count of lab tests.
- Records lab test results.

7.2.1.5 Radiology

- Manages pending X-ray requests.
- Manages pending CT scan requests.
- Manages pending ultrasound requests.
- Manages pending ECG requests.
- Records radiology test results.
- Manages parameters for radiology test reporting.
- Handles administration of radiology tests.
- Tracks the count of radiology tests.

7.2.1.6 Dispensary

- Manages outpatient dispensary.
- Manages inpatient dispensary.
- Handles purchase orders.
- Manages requisition for drugs and supplies.
- Manages dispensary inventory.
- Generates reports on dispensary activities.
- Manages the pharmacy store.

- Handles management of drugs.
- Manages consumables inventory.
- Manages store operations.
- Manages vendor information.
- Handles drug purchases.
- Confirms receipt of purchased drugs.
- Generates reports on drug expiry.
- Manages overall inventory.
- Manages consumables inventory.
- Confirms purchases.

7.2.1.7 HMO Authorization

- Manages pending authorizations.
- Generates approval reports.
- Provides summaries of bills.
- Generates payment reports.
- Manages patient bills.
- Manages company-related information.
- Reviews patient bills.
- Generates patient bill reports.
- Manages admissions and discharges.
- Manages hospital services.

7.2.1.8 Cashier

- Manages cashier activities.
- Handles deposits.
- Manages expenses.
- Generates daily cashier reports.
- Provides revenue reports.
- Generates payment reports.

7.2.1.9 Reports

- Generates lab result reports.
- Provides appointment reports.
- Generates diagnosis reports.
- Manages drug inventory reports.
- Manages consumable inventory reports.
- Generates reports on admissions and discharges.
- Tracks patient SMS history.
- Provides payment reports.
- Generates encounter reports.
- Provides dispensary reports.
- Generates revenue reports.
- Manages ward reports.
- Provides antenatal care reports.
- Generates pregnancy reports.
- Tracks birth reports.
- Manages immunization reports.
- Tracks patient encounter count.
- Tracks laboratory test count.
- Tracks radiology test count.
- Provides registration reports.
- Manages expense reports.
- Confirms purchase reports.
- Tracks user login logs.

7.2.1.10 User Management

- Manages vaccine information.
- Handles ward management.
- Manages bed availability.
- Manages user accounts.
- Controls user access permissions.
- Configures patient information.

- Manages patient discharge.
- Handles admissions and discharges.
- Manages admissions.
- Handles database backups.

7.2.1.11 SMS

- Composes SMS messages.
- Tracks SMS history.
- Manages SMS settings.
- Generates SMS reports.

7.2.1.12 Administration

- Manages administrative activities.
- Configures encounter settings.
- Handles database backups.
- Manages antenatal care settings.

7.3 System Integration and Deployment

The health center management system is built the usage of Django for the backend, React for the frontend, and MySQL for the database. The integration of those technology ensures a seamless and efficient workflow.

7.3.1 Frontend-Backend Communication

React additives speak with the Django backend thru RESTful APIs. These APIs cope with diverse requests inclusive of fetching patient data, updating records, and processing bills.

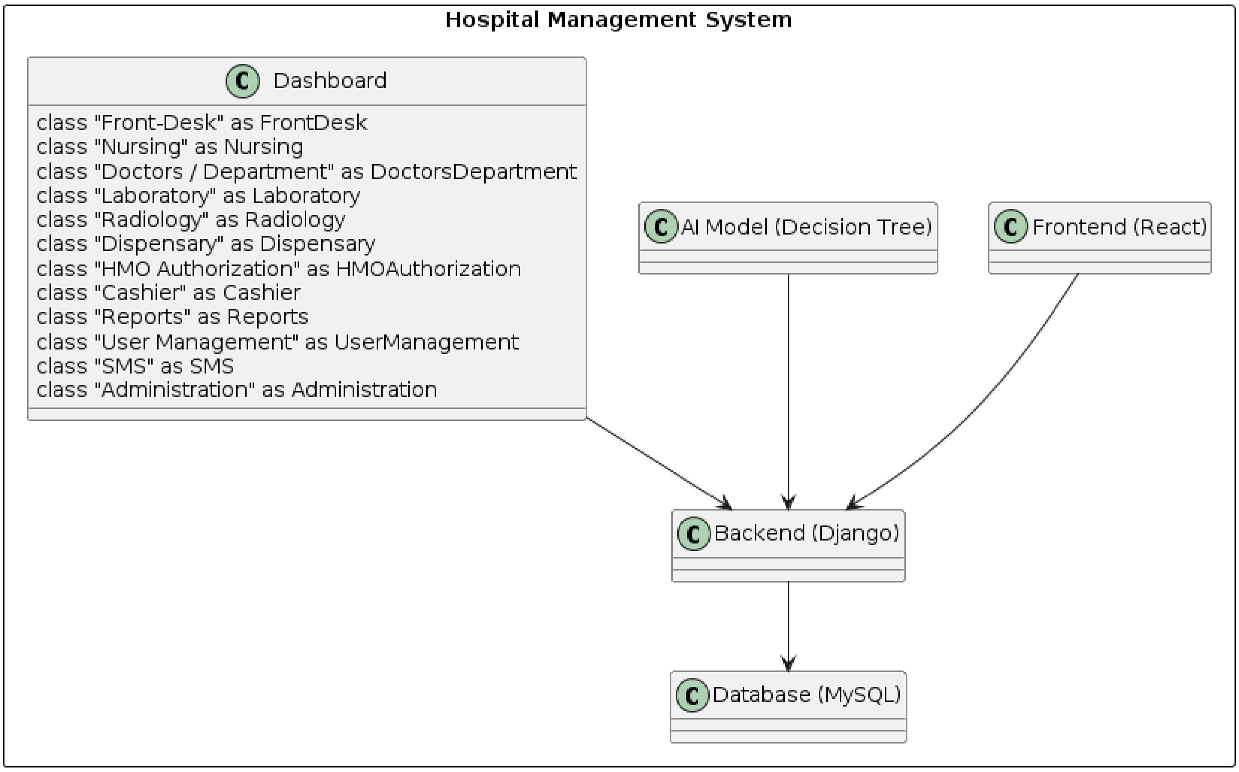

Hospital Management System
Dashboard
class "Front-Desk" as FrontDesk
class "Nursing" as Nursing
class "Doctors / Department" as DoctorsDepartment
class "Laboratory" as Laboratory
class "Radiology" as Radiology
class "Dispensary" as Dispensary
class "HMO Authorization" as HMOAuthorization
class "Cashier" as Cashier
class "Reports" as Reports
class "User Management" as UserManagement
class "SMS" as SMS
class "Administration" as Administration
AI Model (Decision Tree)
Frontend (React)
Backend (Django)
Database (MySQL)

Figure 7.3.1.1 Class Diagram of Hospital Management System

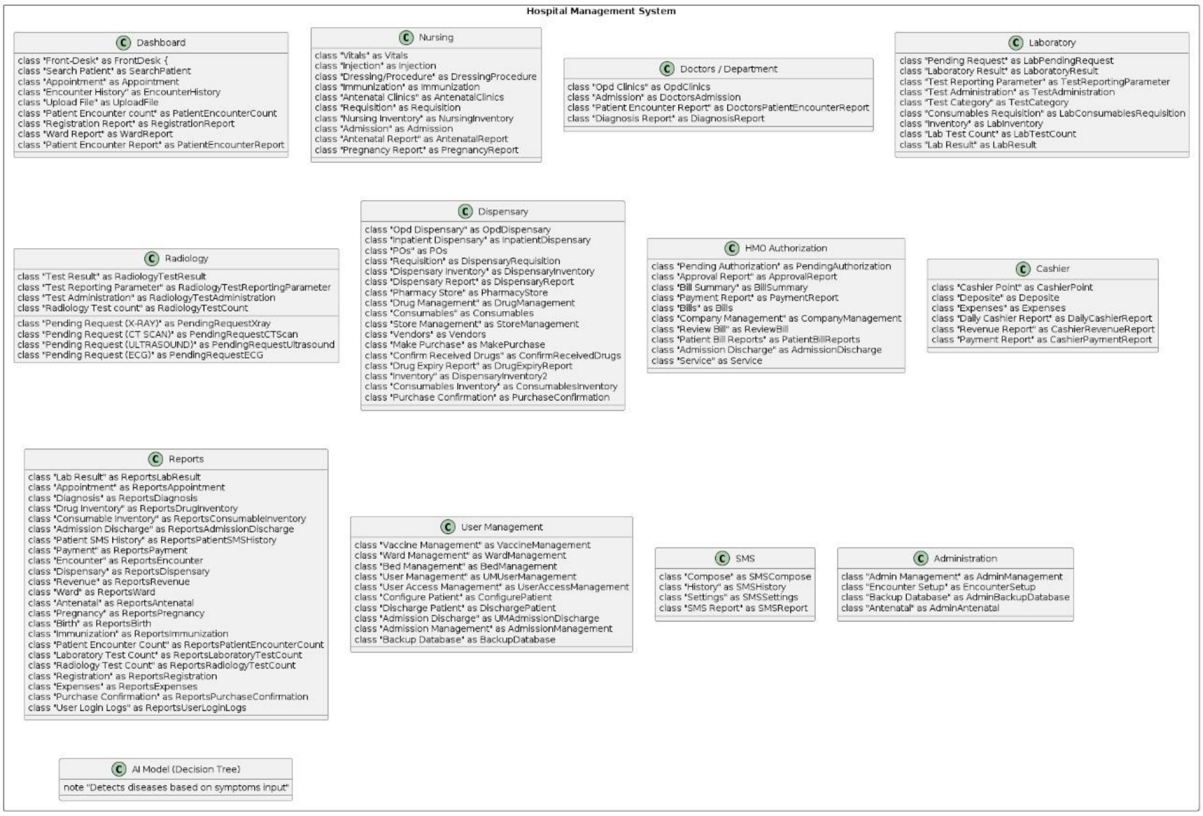

Hospital Management System
Dashboard
class "Front-Desk" as FrontDesk {
class "Search Patient" as SearchPatient
class "Appointment" as Appointment
class "Encounter History" as EncounterHistory
class "Upload File" as UploadFile
class "Patient Encounter count" as PatientEncounterCount
class "Registration Report" as RegistrationReport
class "Ward Report" as WardReport
class "Patient Encounter Report" as PatientEncounterReport
Nursing
class "Vitals" as Vitals
class "Injection" as Injection
class "Dressing/Procedure" as DressingProcedure
class "Immunization" as Immunization
class "Antenatal Clinics" as AntenatalClinics
class "Requisition" as Requisition
class "Nursing Inventory" as NursingInventory
class "Admission" as Admission
class "Antenatal Report" as AntenatalReport
class "Pregnancy Report" as PregnancyReport
Doctors / Department
class "Opd Clinics" as OpdClinics
class "Admission" as DoctorsAdmission
class "Patient Encounter Report" as DoctorsPatientEncounterReport
class "Diagnosis Report" as DiagnosisReport
Laboratory
class "Pending Request" as LabPendingRequest
class "Laboratory Result" as LaboratoryResult
class "Test Reporting Parameter" as TestReportingParameter
class "Test Administration" as TestAdministration
class "Test Category" as TestCategory
class "Consumables Requisition" as LabConsumablesRequisition
class "Inventory" as LabInventory
class "Lab Test Count" as LabTestCount
class "Lab Result" as LabResult
Radiology
class "Test Result" as RadiologyTestResult
class "Test Reporting Parameter" as RadiologyTestReportingParameter
class "Test Administration" as RadiologyTestAdministration
class "Radiology Test count" as RadiologyTestCount
class "Pending Request (X-RAY)" as PendingRequestXray
class "Pending Request (CT SCAN)" as PendingRequestCTScan
class "Pending Request (ULTRASOUND)" as PendingRequestUltrasound
class "Pending Request (ECG)" as PendingRequestECG
Dispensary
class "Opd Dispensary" as OpdDispensary
class "Inpatient Dispensary" as InpatientDispensary
class "POs" as POs
class "Requisition" as DispensaryRequisition
class "Dispensary Inventory" as DispensaryInventory
class "Dispensary Report" as DispensaryReport
class "Pharmacy Store" as PharmacyStore
class "Drug Management" as DrugManagement
class "Consumables" as Consumables
class "Store Management" as StoreManagement
class "Vendors" as Vendors
class "Make Purchase" as MakePurchase
class "Confirm Received Drugs" as ConfirmReceivedDrugs
class "Drug Expiry Report" as DrugExpiryReport
class "Inventory" as DispensaryInventory2
class "Consumables Inventory" as ConsumablesInventory
class "Purchase Confirmation" as PurchaseConfirmation
HMO Authorization
class "Pending Authorization" as PendingAuthorization
class "Approval Report" as ApprovalReport
class "Bill Summary" as BillSummary
class "Payment Report" as PaymentReport
class "Bills" as Bills
class "Company Management" as CompanyManagement
class "Review Bill" as ReviewBill
class "Patient Bill Reports" as PatientBillReports
class "Admission Discharge" as AdmissionDischarge
class "Service" as Service
Cashier
class "Cashier Point" as CashierPoint
class "Deposite" as Deposite
class "Expenses" as Expenses
class "Daily Cashier Report" as DailyCashierReport
class "Revenue Report" as CashierRevenueReport
class "Payment Report" as CashierPaymentReport
Reports
class "Lab Result" as ReportsLabResult
class "Appointment" as ReportsAppointment
class "Diagnosis" as ReportsDiagnosis
class "Drug Inventory" as ReportsDrugInventory
class "Consumable Inventory" as ReportsConsumableInventory
class "Admission Discharge" as ReportsAdmissionDischarge
class "Patient SMS History" as ReportsPatientSMSHistory
class "Payment" as ReportsPayment
class "Encounter" as ReportsEncounter
class "Dispensary" as ReportsDispensary
class "Revenue" as ReportsRevenue
class "Ward" as ReportsWard
class "Antenatal" as ReportsAntenatal
class "Pregnancy" as ReportsPregnancy
class "Birth" as ReportsBirth
class "Immunization" as ReportsImmunization
class "Patient Encounter Count" as ReportsPatientEncounterCount
class "Laboratory Test Count" as ReportsLaboratoryTestCount
class "Radiology Test Count" as ReportsRadiologyTestCount
class "Registration" as ReportsRegistration
class "Expenses" as ReportsExpenses
class "Purchase Confirmation" as ReportsPurchaseConfirmation
class "User Login Logs" as ReportsUserLoginLogs
User Management
class "Vaccine Management" as VaccineManagement
class "Ward Management" as WardManagement
class "Bed Management" as BedManagement
class "User Management" as UMUserManagement
class "User Access Management" as UserAccessManagement
class "Configure Patient" as ConfigurePatient
class "Discharge Patient" as DischargePatient
class "Admission Discharge" as UMAdmissionDischarge
class "Admission Management" as AdmissionManagement
class "Backup Database" as BackupDatabase
SMS
class "Compose" as SMSCompose
class "History" as SMSHistory
class "Settings" as SMSSettings
class "SMS Report" as SMSReport
Administration
class "Admin Management" as AdminManagement
class "Encounter Setup" as EncounterSetup
class "Backup Database" as AdminBackupDatabase
class "Antenatal" as AdminAntenatal
AI Model (Decision Tree)
note "Detects diseases based on symptoms input"

Figure 7.3.1.2 Component Diagram of System

7.3.2 Database Management

MySQL is used to save all the records related to the health facility's operations. Django's ORM makes it smooth to have interaction with the database, ensuring information integrity and consistency.

7.3.3 Deployment

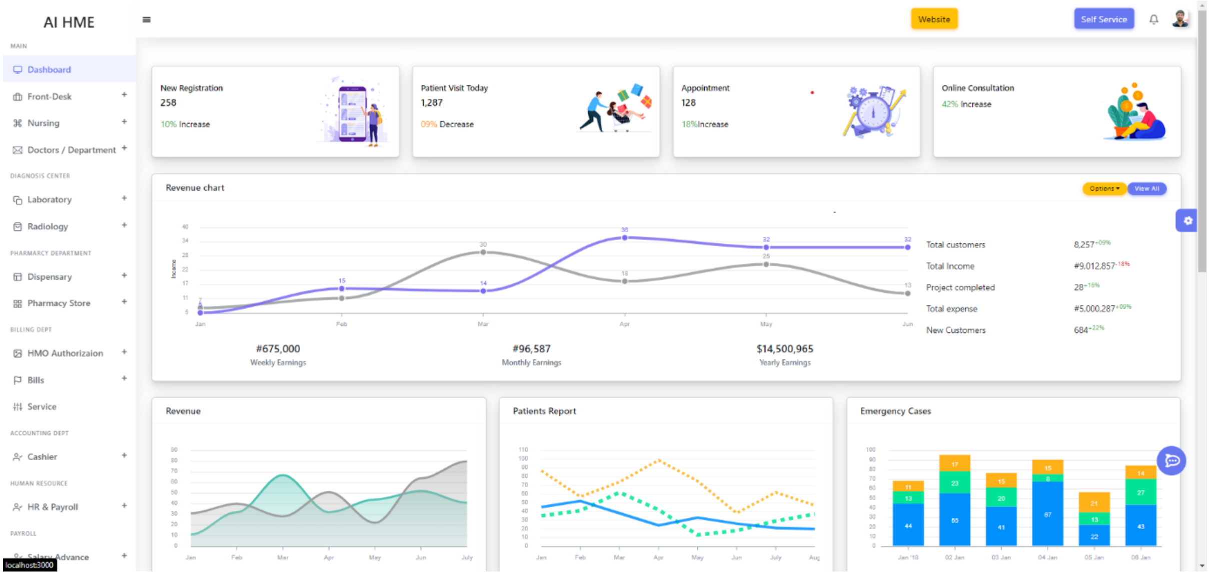
The system is deployed on a cloud platform, making sure excessive availability and scalability. Regular backups are taken to prevent statistics loss, and security features are carried out to shield touchy data.

Conclusion

The implementation of the medical institution management machine entails the integration of numerous tools and technologies to create a complete answer for managing hospital operations. Each module and component is carefully designed and advanced to ensure a seamless and efficient workflow. The integration of an AI model for sickness detection adds a precious function to the device, supplying accurate and timely diagnoses primarily based on affected person input. This chapter provides an in depth assessment of the implementation method, highlighting the important thing components and capabilities of the machine.

Chapter 8

8 Screenshots



New Registration
258
10% Increase

Patient Visit Today
1,287
09% Decrease

Appointment
128
18%Increase

Online Consultation
42% Increase

Revenue chart

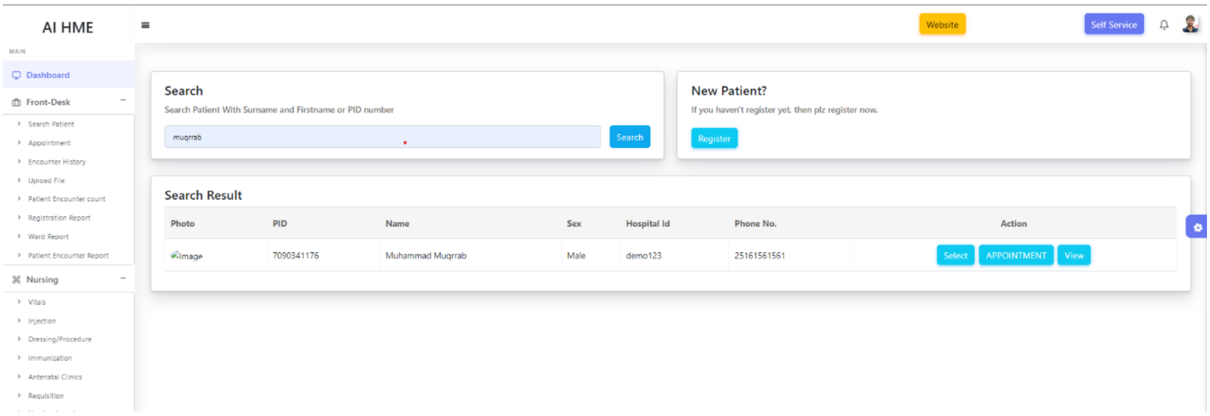
#675,000
Weekly Earnings

#96,587
Monthly Earnings

$14,500,965
Yearly Earnings

Total customers	8,257+09%
Total Income	#9,012,857-18%
Project completed	28+16%
Total expense	#5,000,287+09%
New Customers	684+22%

Figure 8.1 Main Dashboard



Search

Search Patient With Surname and Firstname or PID number

muqrrab

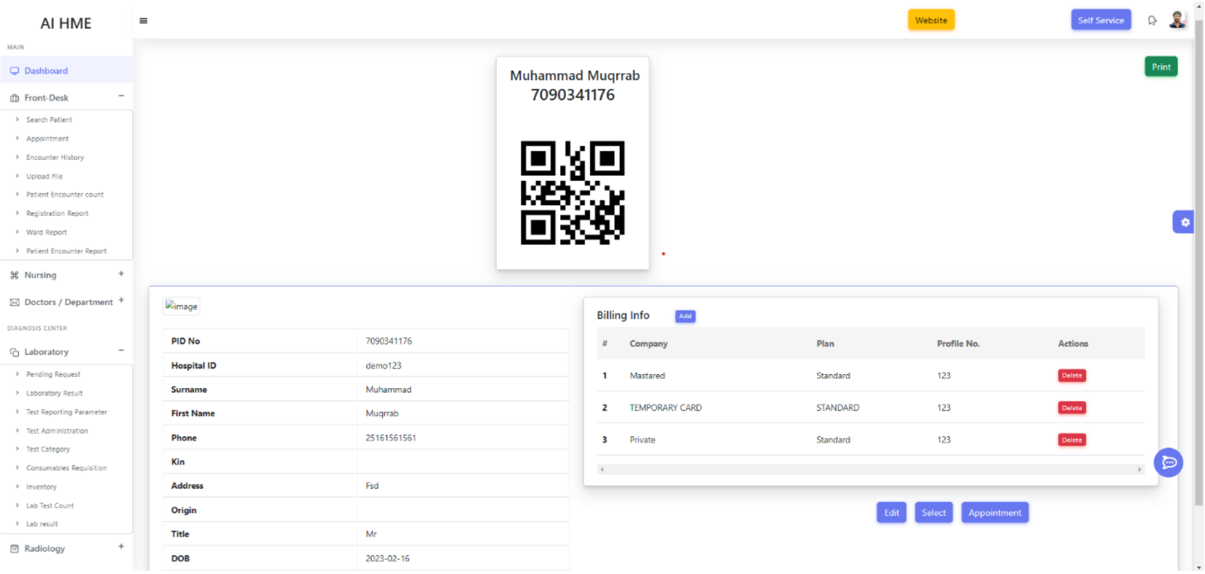
New Patient?

If you haven't register yet, then plz register now.

Search Result

Photo	PID	Name	Sex	Hospital Id	Phone No.	Action
Image	7090341176	Muhammad Muqrrab	Male	demo123	25161561561	Select APPOINTMENT View

Figure 8.2 Patient Dashboard



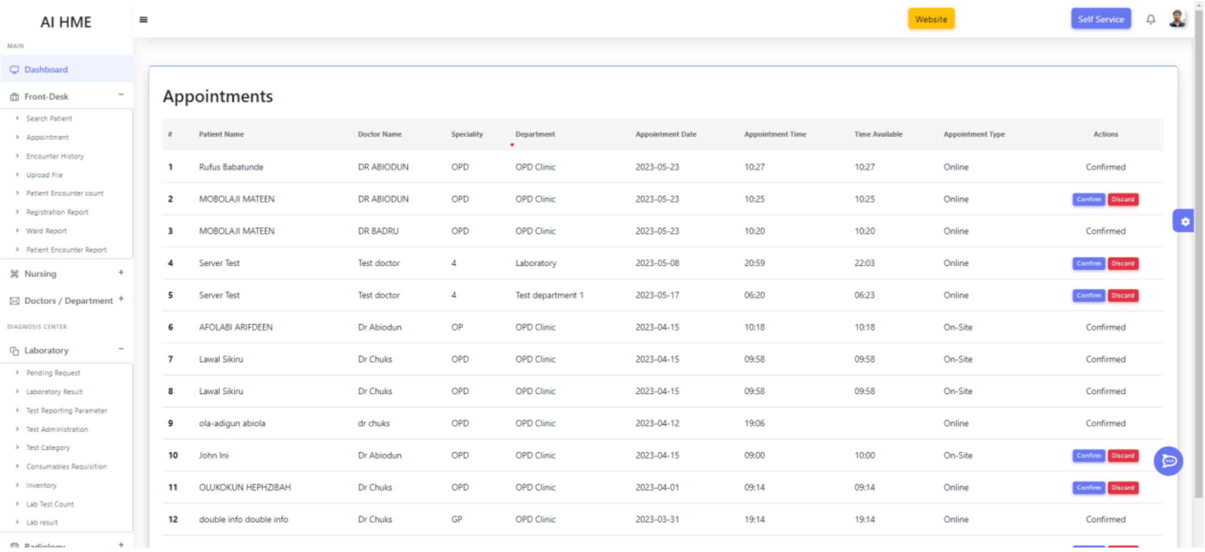
Muhammad Muqrrab
7090341176

PID No	7090341176
Hospital ID	demo123
Surname	Muhammad
First Name	Muqrrab
Phone	25161561561
Kin	
Address	Fsd
Origin	
Title	Mr
DOB	2023-02-16

Billing Info

#	Company	Plan	Profile No.	Actions
1	Mastared	Standard	123	Delete
2	TEMPORARY CARD	STANDARD	123	Delete
3	Private	Standard	123	Delete

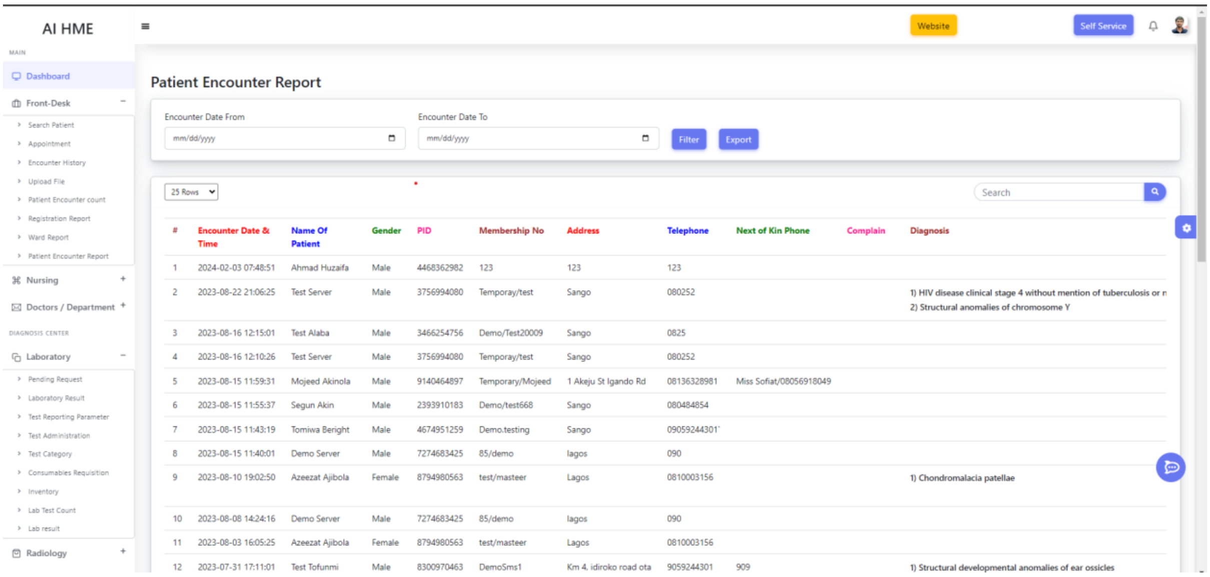
Figure 8.3 Patient Detail



Appointments

#	Patient Name	Doctor Name	Speciality	Department	Appointment Date	Appointment Time	Time Available	Appointment Type	Actions
1	Rufus Babatunde	DR ABIODUN	OPD	OPD Clinic	2023-05-23	10:27	10:27	Online	Confirmed
2	MOBOLAJI MATEEN	DR ABIODUN	OPD	OPD Clinic	2023-05-23	10:25	10:25	Online	Confirm Discard
3	MOBOLAJI MATEEN	DR BADRU	OPD	OPD Clinic	2023-05-23	10:20	10:20	Online	Confirmed
4	Server Test	Test doctor	4	Laboratory	2023-05-08	20:59	22:03	Online	Confirm Discard
5	Server Test	Test doctor	4	Test department 1	2023-05-17	06:20	06:23	Online	Confirm Discard
6	AFOLABI ARIFDEEN	Dr Abiodun	OP	OPD Clinic	2023-04-15	10:18	10:18	On-Site	Confirmed
7	Lawal Sikiru	Dr Chuks	OPD	OPD Clinic	2023-04-15	09:58	09:58	On-Site	Confirmed
8	Lawal Sikiru	Dr Chuks	OPD	OPD Clinic	2023-04-15	09:58	09:58	On-Site	Confirmed
9	ola-adigun abiola	dr chuks	OPD	OPD Clinic	2023-04-12	19:06		Online	Confirmed
10	John Ini	Dr Abiodun	OPD	OPD Clinic	2023-04-15	09:00	10:00	On-Site	Confirm Discard
11	OLUKOKUN HEPHZIBAH	Dr Chuks	OPD	OPD Clinic	2023-04-01	09:14	09:14	Online	Confirm Discard
12	double info double info	Dr Chuks	GP	OPD Clinic	2023-03-31	19:14	19:14	Online	Confirmed

Figure 8.4 Patient Appointment



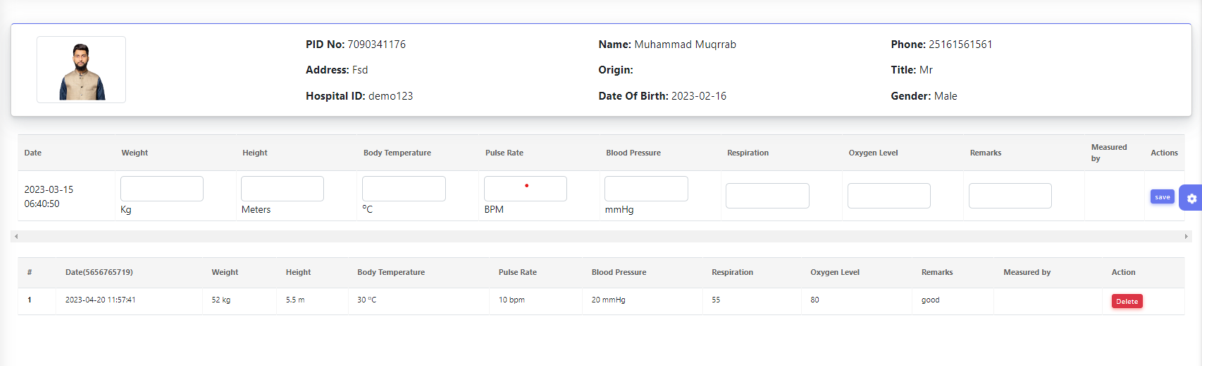
Patient Encounter Report

Encounter Date From: mm/dd/yyyy

Encounter Date To: mm/dd/yyyy

#	Encounter Date & Time	Name Of Patient	Gender	PID	Membership No	Address	Telephone	Next of Kin Phone	Complain	Diagnosis
1	2024-02-03 07:48:51	Ahmad Huzaifa	Male	4468362982	123	123	123			
2	2023-08-22 21:06:25	Test Server	Male	3756994080	Temporay/test	Sango	080252			1) HIV disease clinical stage 4 without mention of tuberculosis or n 2) Structural anomalies of chromosome Y
3	2023-08-16 12:15:01	Test Alaba	Male	3466254756	Demo/Test20009	Sango	0825			
4	2023-08-16 12:10:26	Test Server	Male	3756994080	Temporay/test	Sango	080252			
5	2023-08-15 11:59:31	Mojeed Akinola	Male	9140464897	Temporary/Mojeed	1 Akeju St Igando Rd	08136328981	Miss Sofiat/08056918049		
6	2023-08-15 11:55:37	Segun Akin	Male	2393910183	Demo/test668	Sango	080484854			
7	2023-08-15 11:43:19	Tomiwa Beright	Male	4674951259	Demo.testing	Sango	09059244301`			
8	2023-08-15 11:40:01	Demo Server	Male	7274683425	85/demo	lagos	090			
9	2023-08-10 19:02:50	Azeezat Ajibola	Female	8794980563	test/masteer	Lagos	0810003156			1) Chondromalacia patellae
10	2023-08-08 14:24:16	Demo Server	Male	7274683425	85/demo	lagos	090			
11	2023-08-03 16:05:25	Azeezat Ajibola	Female	8794980563	test/masteer	Lagos	0810003156			
12	2023-07-31 17:11:01	Test Tofunmi	Male	8300970463	DemoSms1	Km 4, idiroko road ota	9059244301	909		1) Structural developmental anomalies of ear ossicles

Figure 8.5 Patient Report



PID No: 7090341176 **Name:** Muhammad Muqrrab **Phone:** 25161561561

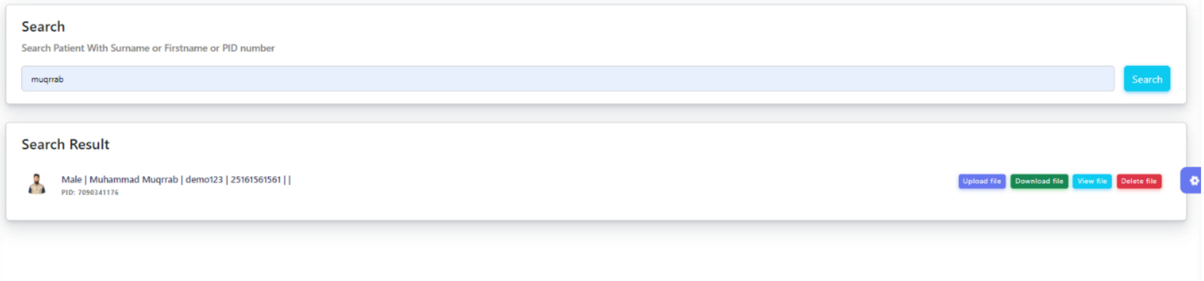
Address: Fsd **Origin:** **Title:** Mr

Hospital ID: demo123 **Date Of Birth:** 2023-02-16 **Gender:** Male

Date	Weight	Height	Body Temperature	Pulse Rate	Blood Pressure	Respiration	Oxygen Level	Remarks	Measured by	Actions
2023-03-15 06:40:50	Kg	Meters	°C	BPM	mmHg					

#	Date(5656765719)	Weight	Height	Body Temperature	Pulse Rate	Blood Pressure	Respiration	Oxygen Level	Remarks	Measured by	Action
1	2023-04-20 11:57:41	52 kg	5.5 m	30 °C	10 bpm	20 mmHg	55	80	good		

Figure 8.6 Nurse Vital



Search

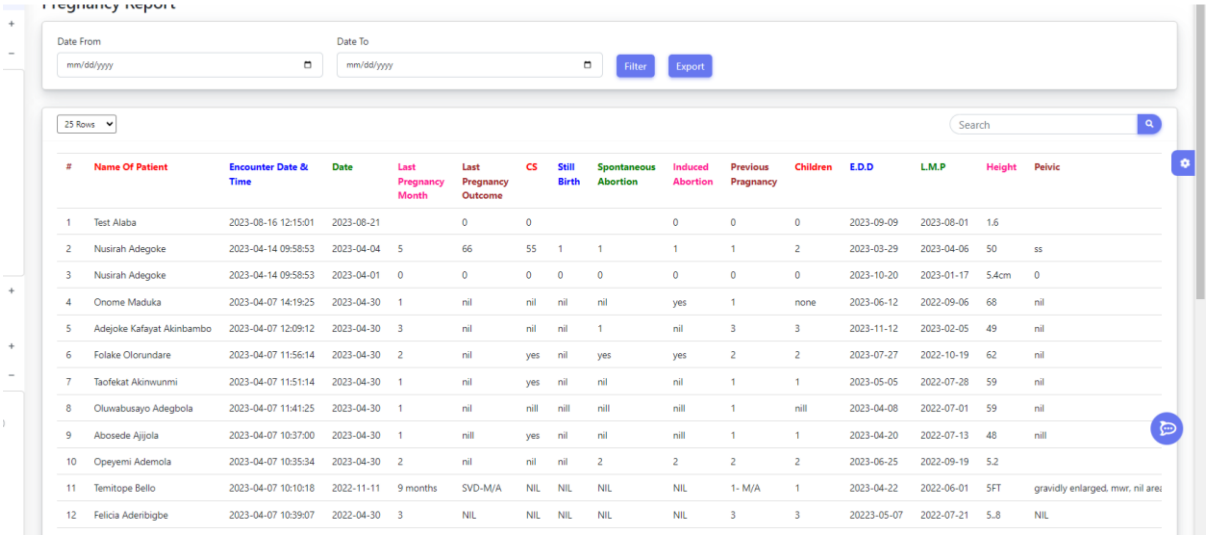
Search Patient With Surname or Firstname or PID number

muqrrab

Search Result

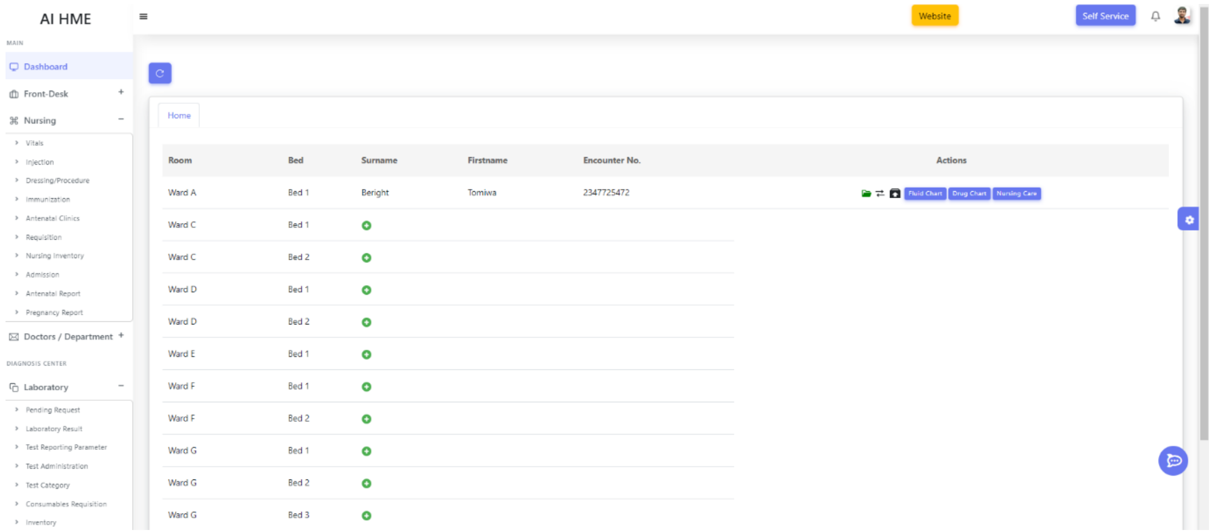
Male | Muhammad Muqrrab | demo123 | 25161561561 | |
PID: 7090341176

Figure 8.7 Patient Data Update



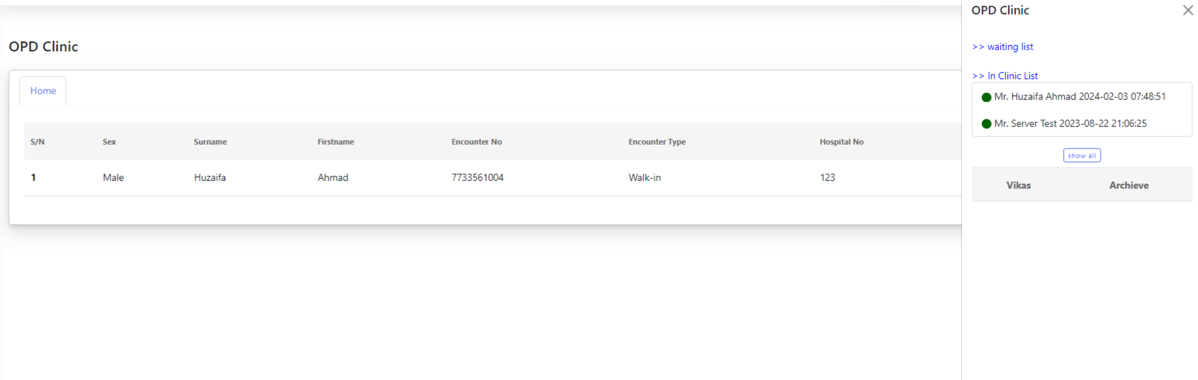
#	Name Of Patient	Encounter Date & Time	Date	Last Pregnancy Month	Last Pregnancy Outcome	CS	Still Birth	Spontaneous Abortion	Induced Abortion	Previous Pragnancy	Children	E.D.D	L.M.P	Height	Peivic
1	Test Alaba	2023-08-16 12:15:01	2023-08-21		0	0			0	0	0	2023-09-09	2023-08-01	1.6	
2	Nusirah Adegoke	2023-04-14 09:58:53	2023-04-04	5	66	55	1	1	1	1	2	2023-03-29	2023-04-06	50	ss
3	Nusirah Adegoke	2023-04-14 09:58:53	2023-04-01	0	0	0	0	0	0	0	0	2023-10-20	2023-01-17	5.4cm	0
4	Onome Maduka	2023-04-07 14:19:25	2023-04-30	1	nil	nil	nil	nil	yes	1	none	2023-06-12	2022-09-06	68	nil
5	Adejoke Kafayat Akinbambo	2023-04-07 12:09:12	2023-04-30	3	nil	nil	nil	1	nil	3	3	2023-11-12	2023-02-05	49	nil
6	Folake Olorundare	2023-04-07 11:56:14	2023-04-30	2	nil	yes	nil	yes	yes	2	2	2023-07-27	2022-10-19	62	nil
7	Taofekat Akinwunmi	2023-04-07 11:51:14	2023-04-30	1	nil	yes	nil	nil	nil	1	1	2023-05-05	2022-07-28	59	nil
8	Oluwabusayo Adegbola	2023-04-07 11:41:25	2023-04-30	1	nil	nill	nill	nill	nill	1	nill	2023-04-08	2022-07-01	59	nil
9	Abosede Ajijola	2023-04-07 10:37:00	2023-04-30	1	nill	yes	nil	nil	nill	1	1	2023-04-20	2022-07-13	48	nill
10	Opeyemi Ademola	2023-04-07 10:35:34	2023-04-30	2	nil	nil	nil	2	2	2	2	2023-06-25	2022-09-19	5.2	
11	Temitope Bello	2023-04-07 10:10:18	2022-11-11	9 months	SVD-M/A	NIL	NIL	NIL	NIL	1- M/A	1	2023-04-22	2022-06-01	5FT	gravidly enlarged, mwr, nil area
12	Felicia Aderibigbe	2023-04-07 10:39:07	2022-04-30	3	NIL	NIL	NIL	NIL	NIL	3	3	20223-05-07	2022-07-21	5..8	NIL

Figure 8.8 Pregnancy Reports



Room	Bed	Surname	Firstname	Encounter No.	Actions
Ward A	Bed 1	Beright	Tomiwa	2347725472	Fluid Chart Drug Chart Nursing Care
Ward C	Bed 1	⊕			
Ward C	Bed 2	⊕			
Ward D	Bed 1	⊕			
Ward D	Bed 2	⊕			
Ward E	Bed 1	⊕			
Ward F	Bed 1	⊕			
Ward F	Bed 2	⊕			
Ward G	Bed 1	⊕			
Ward G	Bed 2	⊕			
Ward G	Bed 3	⊕			

Figure 8.9 Rooms and Bed Allocation


OPD Clinic

Home

S/N	Sex	Surname	Firstname	Encounter No	Encounter Type	Hospital No
1	Male	Huzaifa	Ahmad	7733561004	Walk-in	123

OPD Clinic

>> waiting list

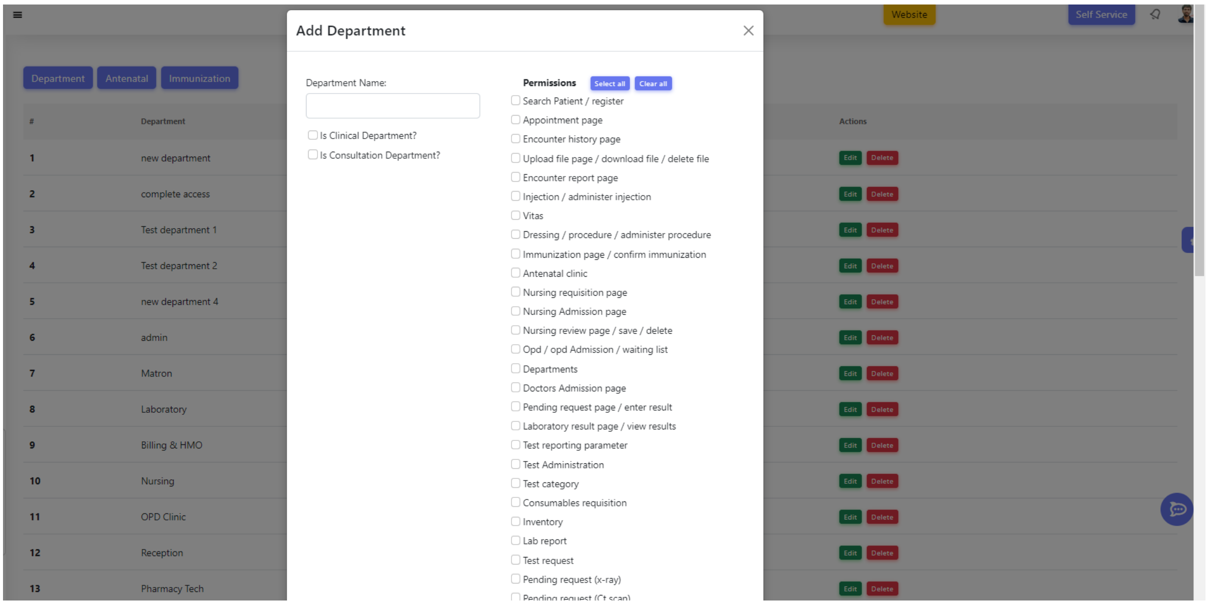
>> In Clinic List

● Mr. Huzaifa Ahmad 2024-02-03 07:48:51

● Mr. Server Test 2023-08-22 21:06:25

Vikas	Archieve

Figure 8.10 OPD Clinic



#	Department	Actions
1	new department	Edit Delete
2	complete access	Edit Delete
3	Test department 1	Edit Delete
4	Test department 2	Edit Delete
5	new department 4	Edit Delete
6	admin	Edit Delete
7	Matron	Edit Delete
8	Laboratory	Edit Delete
9	Billing & HMO	Edit Delete
10	Nursing	Edit Delete
11	OPD Clinic	Edit Delete
12	Reception	Edit Delete
13	Pharmacy Tech	Edit Delete

Add Department

Department Name:

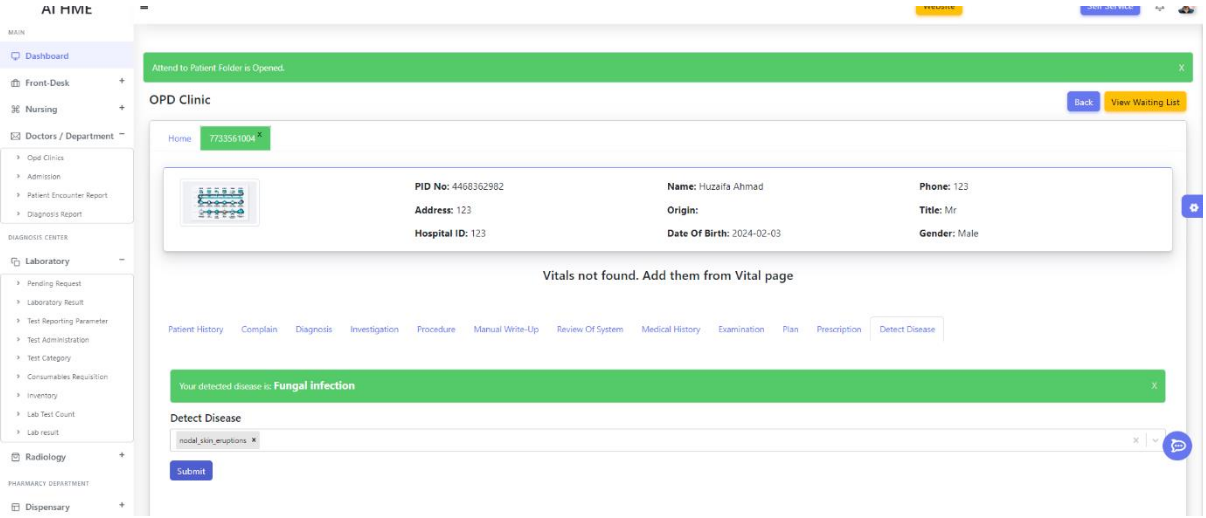
□ Is Clinical Department?

□ Is Consultation Department?

Permissions

□ Search Patient / register
□ Appointment page
□ Encounter history page
□ Upload file page / download file / delete file
□ Encounter report page
□ Injection / administer injection
□ Vitas
□ Dressing / procedure / administer procedure
□ Immunization page / confirm immunization
□ Antenatal clinic
□ Nursing requisition page
□ Nursing Admission page
□ Nursing review page / save / delete
□ Opd / opd Admission / waiting list
□ Departments
□ Doctors Admission page
□ Pending request page / enter result
□ Laboratory result page / view results
□ Test reporting parameter
□ Test Administration
□ Test category
□ Consumables requisition
□ Inventory
□ Lab report
□ Test request
□ Pending request (x-ray)
□ Pending request (Ct scan)

Figure 8.11 Authorization



Attend to Patient Folder is Opened.

OPD Clinic

PID No: 4468362982 **Name:** Huzaifa Ahmad **Phone:** 123

Address: 123 **Origin:** **Title:** Mr

Hospital ID: 123 **Date Of Birth:** 2024-02-03 **Gender:** Male

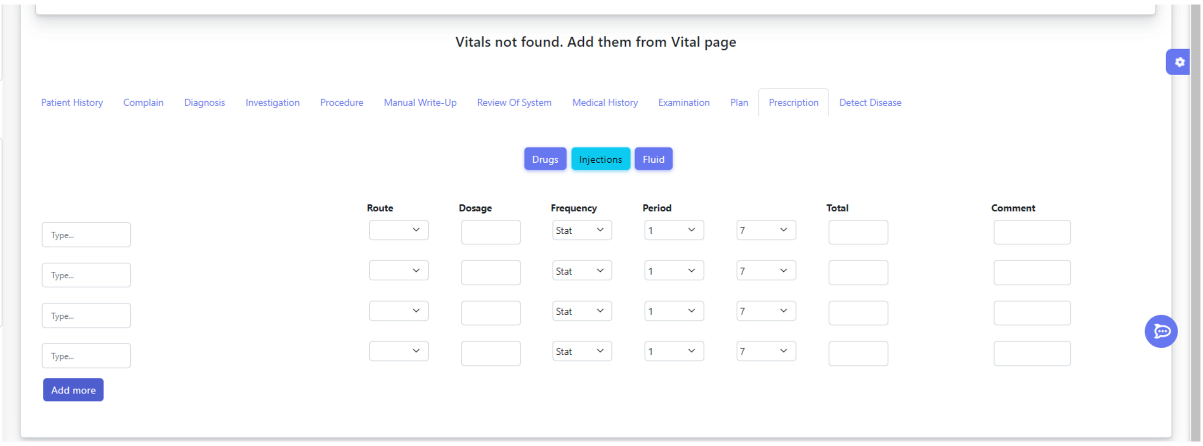
Vitals not found. Add them from Vital page

Your detected disease is: **Fungal infection**

Detect Disease

nodal_skin_eruptions

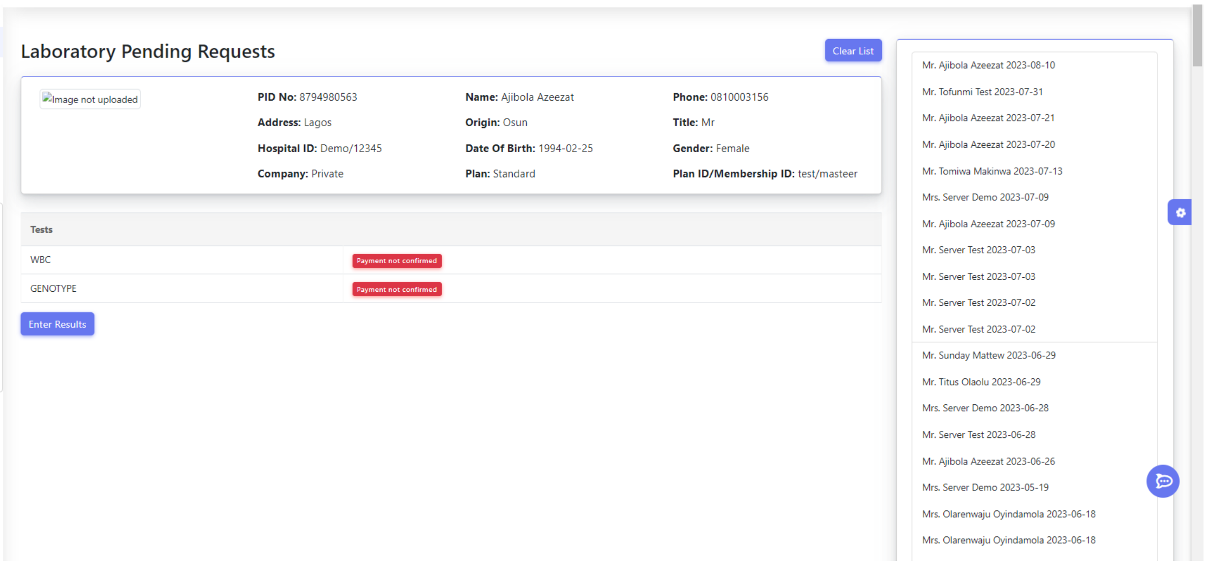
Figure 8.12 General Disease AI Model



Vitals not found. Add them from Vital page

	Route	Dosage	Frequency	Period		Total	Comment
Type...			Stat	1	7		
Type...			Stat	1	7		
Type...			Stat	1	7		
Type...			Stat	1	7		

Figure 8.13 Patient Vitals Details



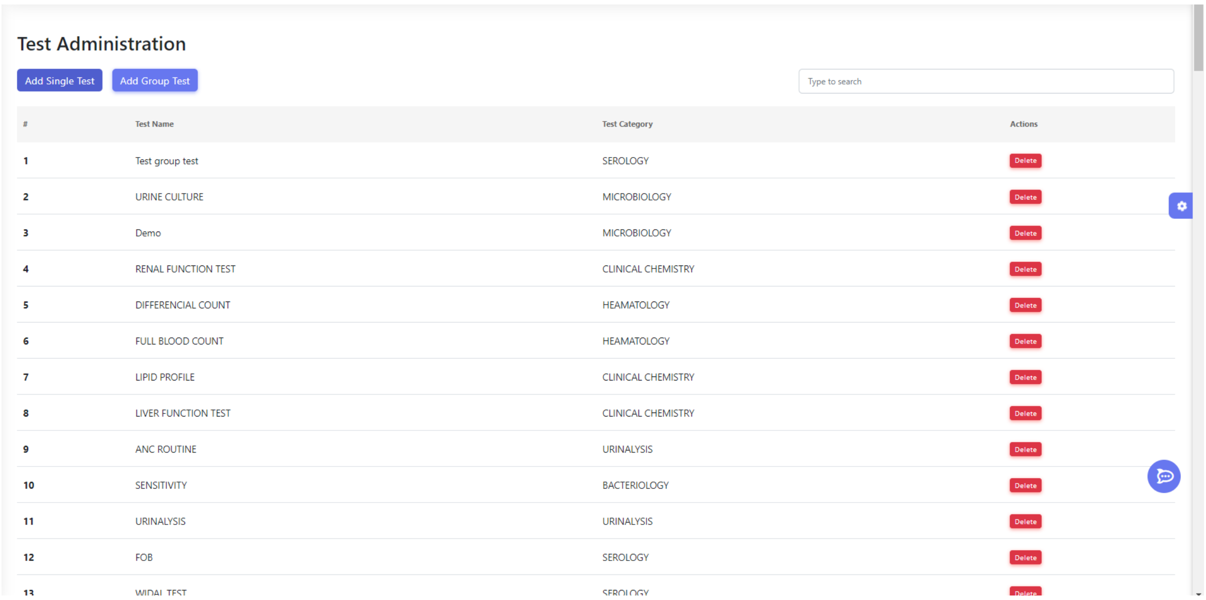
Laboratory Pending Requests

PID No: 8794980563	**Name:** Ajibola Azeezat	**Phone:** 0810003156
Address: Lagos	**Origin:** Osun	**Title:** Mr
Hospital ID: Demo/12345	**Date Of Birth:** 1994-02-25	**Gender:** Female
Company: Private	**Plan:** Standard	**Plan ID/Membership ID:** test/masteer

Tests	
WBC	Payment not confirmed
GENOTYPE	Payment not confirmed

- Mr. Ajibola Azeezat 2023-08-10
- Mr. Tofunmi Test 2023-07-31
- Mr. Ajibola Azeezat 2023-07-21
- Mr. Ajibola Azeezat 2023-07-20
- Mr. Tomiwa Makinwa 2023-07-13
- Mrs. Server Demo 2023-07-09
- Mr. Ajibola Azeezat 2023-07-09
- Mr. Server Test 2023-07-03
- Mr. Server Test 2023-07-03
- Mr. Server Test 2023-07-02
- Mr. Server Test 2023-07-02
- Mr. Sunday Mattew 2023-06-29
- Mr. Titus Olaolu 2023-06-29
- Mrs. Server Demo 2023-06-28
- Mr. Server Test 2023-06-28
- Mr. Ajibola Azeezat 2023-06-26
- Mrs. Server Demo 2023-05-19
- Mrs. Olarenwaju Oyindamola 2023-06-18
- Mrs. Olarenwaju Oyindamola 2023-06-18

Figure 8.14 Laboratory



Test Administration

#	Test Name	Test Category	Actions
1	Test group test	SEROLOGY	Delete
2	URINE CULTURE	MICROBIOLOGY	Delete
3	Demo	MICROBIOLOGY	Delete
4	RENAL FUNCTION TEST	CLINICAL CHEMISTRY	Delete
5	DIFFERENCIAL COUNT	HEAMATOLOGY	Delete
6	FULL BLOOD COUNT	HEAMATOLOGY	Delete
7	LIPID PROFILE	CLINICAL CHEMISTRY	Delete
8	LIVER FUNCTION TEST	CLINICAL CHEMISTRY	Delete
9	ANC ROUTINE	URINALYSIS	Delete
10	SENSITIVITY	BACTERIOLOGY	Delete
11	URINALYSIS	URINALYSIS	Delete
12	FOB	SEROLOGY	Delete
13	WIDAL TEST	SEROLOGY	Delete

Figure 8.15 Laboratory Tests

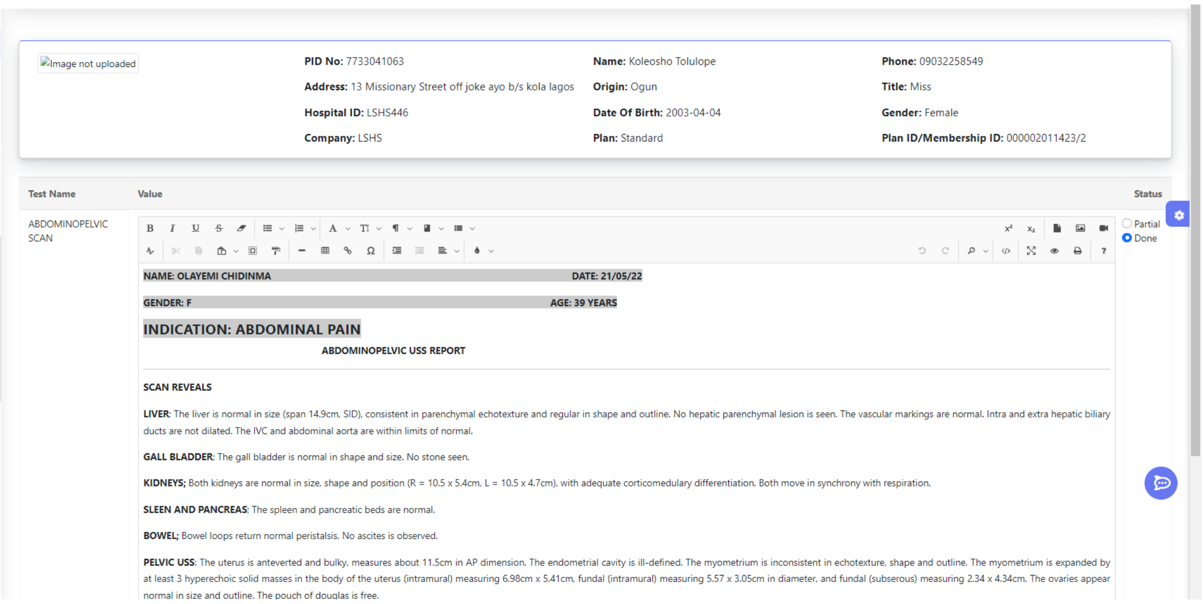


Image not uploaded

PID No: 7733041063 **Name:** Koleosho Tolulope **Phone:** 09032258549

Address: 13 Missionary Street off joke ayo b/s kola lagos **Origin:** Ogun **Title:** Miss

Hospital ID: LSHS446 **Date Of Birth:** 2003-04-04 **Gender:** Female

Company: LSHS **Plan:** Standard **Plan ID/Membership ID:** 000002011423/2

Test Name	Value	Status
ABDOMINOPELVIC SCAN	(report below)	○ Partial ● Done

NAME: OLAYEMI CHIDINMA DATE: 21/05/22

GENDER: F AGE: 39 YEARS

INDICATION: ABDOMINAL PAIN

ABDOMINOPELVIC USS REPORT

SCAN REVEALS

LIVER; The liver is normal in size (span 14.9cm, SID), consistent in parenchymal echotexture and regular in shape and outline. No hepatic parenchymal lesion is seen. The vascular markings are normal. Intra and extra hepatic biliary ducts are not dilated. The IVC and abdominal aorta are within limits of normal.

GALL BLADDER; The gall bladder is normal in shape and size. No stone seen.

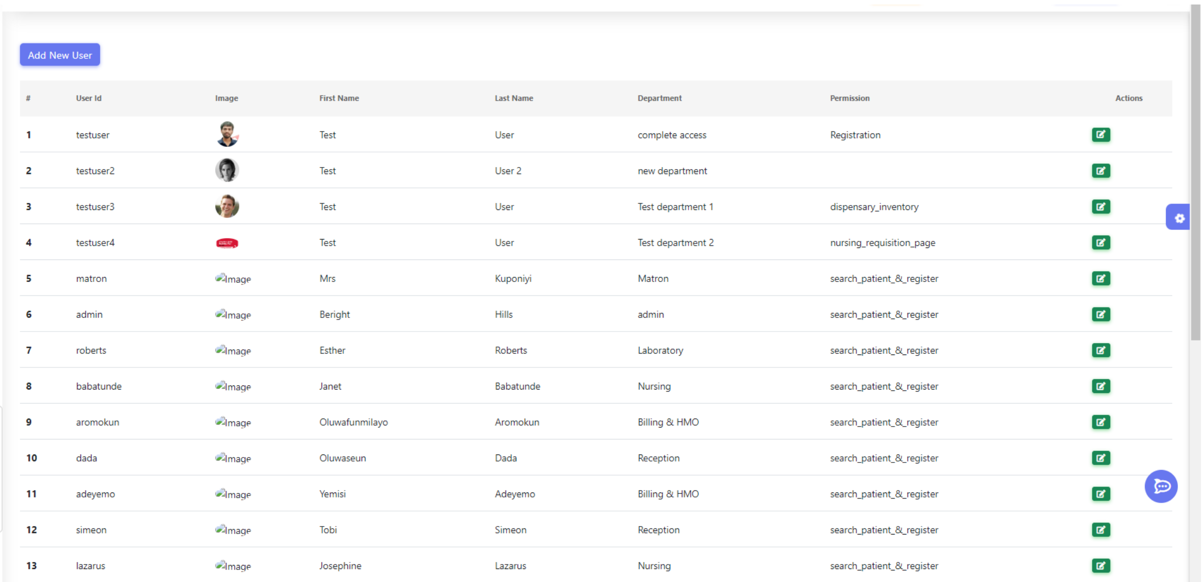
KIDNEYS; Both kidneys are normal in size, shape and position (R = 10.5 x 5.4cm, L = 10.5 x 4.7cm), with adequate corticomedulary differentiation. Both move in synchrony with respiration.

SLEEN AND PANCREAS; The spleen and pancreatic beds are normal.

BOWEL; Bowel loops return normal peristalsis. No ascites is observed.

PELVIC USS: The uterus is anteverted and bulky, measures about 11.5cm in AP dimension. The endometrial cavity is ill-defined. The myometrium is inconsistent in echotexture, shape and outline. The myometrium is expanded by at least 3 hyperechoic solid masses in the body of the uterus (intramural) measuring 6.98cm x 5.41cm, fundal (intramural) measuring 5.57 x 3.05cm in diameter, and fundal (subserous) measuring 2.34 x 4.34cm. The ovaries appear normal in size and outline. The pouch of douglas is free.

Figure 8.16 Laboratory Test Reports



#	User Id	Image	First Name	Last Name	Department	Permission	Actions
1	testuser		Test	User	complete access	Registration	✎
2	testuser2		Test	User 2	new department		✎
3	testuser3		Test	User	Test department 1	dispensary_inventory	✎
4	testuser4		Test	User	Test department 2	nursing_requisition_page	✎
5	matron	Image	Mrs	Kuponiyi	Matron	search_patient_&_register	✎
6	admin	Image	Beright	Hills	admin	search_patient_&_register	✎
7	roberts	Image	Esther	Roberts	Laboratory	search_patient_&_register	✎
8	babatunde	Image	Janet	Babatunde	Nursing	search_patient_&_register	✎
9	aromokun	Image	Oluwafunmilayo	Aromokun	Billing & HMO	search_patient_&_register	✎
10	dada	Image	Oluwaseun	Dada	Reception	search_patient_&_register	✎
11	adeyemo	Image	Yemisi	Adeyemo	Billing & HMO	search_patient_&_register	✎
12	simeon	Image	Tobi	Simeon	Reception	search_patient_&_register	✎
13	lazarus	Image	Josephine	Lazarus	Nursing	search_patient_&_register	✎

Figure 8.17 User Management

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21. https://reactjs.org/docs/getting-started.html
22. https://reactjs.org/docs/getting-started.html
23. https://stackoverflow.com/
24. https://www.youtube.com/watch?v=8Q_QQVQ1HZA&list=PLfFghEzKVmjuhQwKhYXvdU94GSU-6Jcjr
25. https://www.youtube.com/watch?v=8kv_njhOeZ0&pp=ygUaQUkgYmFzZSBkaXNlYXNlIHByZWRpY3Rpb24%3D
26. www.kaggle.com
27. www.chat.openai.com
28. www.youtube.com
29. Collaborations with Doctors and related staffs