# GUJARAT TECHNOLOGICAL UNIVERTY





# SHREE SWAMINARAYAN INSTITUTE OF TECHNOLOGY

#### A REPORT ON -

#### **HEALTHCARE**

B.E SEMESTER -2 (CSE BRANCH)

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(FACULTY GUIDE)

### CONTENTS

- INTRODUCTION
- AEIOU FRAME WORK AND SUMMERY
- MIND MAPPING
- EMPATHY CANVAS
- IDEATION CANVAS
- PRODUCT DEVELOPMENT CANVAS
- CONCLUSION

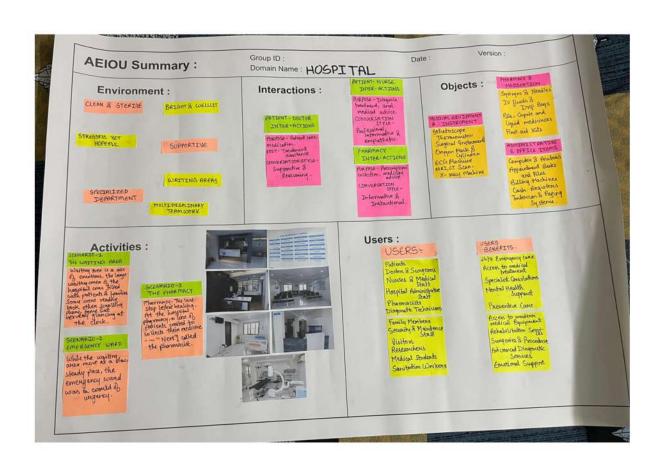
# **INTRODUCTION**

In today's data-driven healthcare environment, hospitals generate vast amounts of data on a daily basis through patient admissions, diagnoses, treatments, medical tests, and administrative records. Effectively analyzing this historical data can play a crucial role in enhancing patient care, optimizing hospital operations, and supporting data-informed decision-making. With the rising demand for accurate forecasting, resource allocation, and service quality improvement, the use of data analytics in the hospital domain has become increasingly essential. This project focuses on utilizing past hospital data to identify patterns, predict trends, and uncover actionable insights that can aid in improving both clinical outcomes and operational efficiency. By leveraging statistical techniques and data visualization tools, this analysis aims to support hospital administrators and healthcare professionals in making better decisions that contribute to a more responsive and efficient healthcare system.

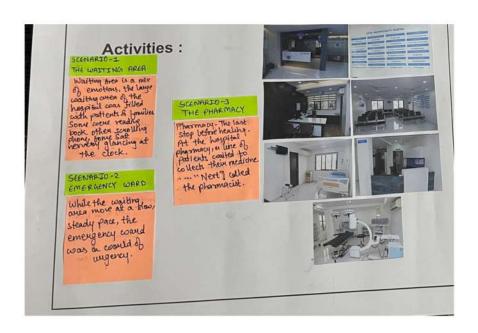


### **AEIOU SHEET**

A- ACTIVITIES **E - ENVIRONMENT** I - INTERACTIONS O - OBJECTS **U - USERS** 

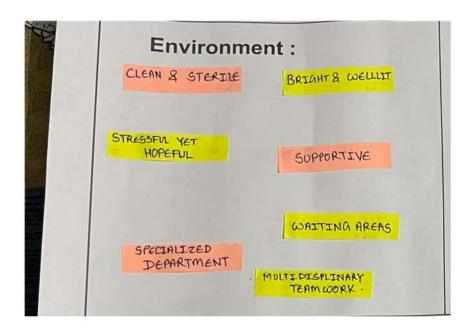


### A- ACTIVITES



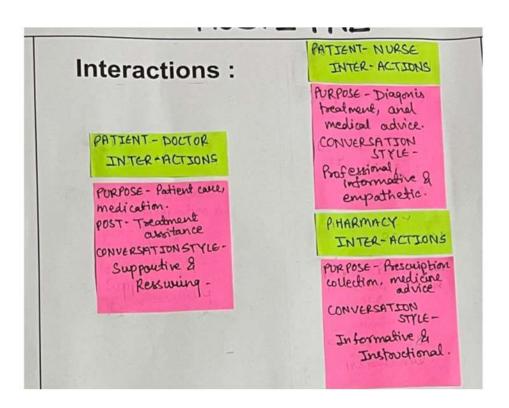
- Scenario 1 Waiting Area:
- Crowded, emotionally intense space. Families wait anxiously. Front desk staff manage patient intake.
  - Scenario 2 Emergency Ward:
- Fast-paced and urgent. Quick decisions, immediate care needed.
  - Scenario 3 Pharmacy:
- Final step in patient care. Patients collect medicines with guidance from pharmacists.

## E- ENVIRONMENT



- · Clean & Sterile: Ensures hygiene and safety for both patients and staff.
- Bright & Well-Lit: Promotes alertness and a sense of comfort.
- Stressful yet Hopeful: Emotional environment high tension due to emergencies but underlined with hope for recovery.
- Supportive: Staff and infrastructure are oriented toward patient wellbeing.
- Waiting Areas: Common, designated spaces for patients and families.
- Specialized Department: Different departments focus on specific medical fields (e.g., cardiology, orthopedics).
- Multidisciplinary Teamwork: Collaboration among professionals (doctors, nurses, technicians).

### I-INTERACTIONS



Patient-Doctor:

Purpose: Diagnose and plan treatment.

Style: Supportive, professional, reassuring.

Patient-Nurse:

• Purpose: Ongoing care, medication, and emotional support.

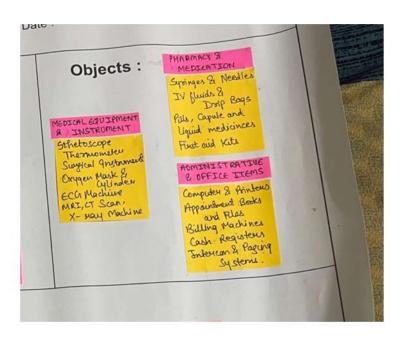
Style: Friendly, empathetic.

Pharmacist-Patient:

Purpose: Medication dispensing and information.

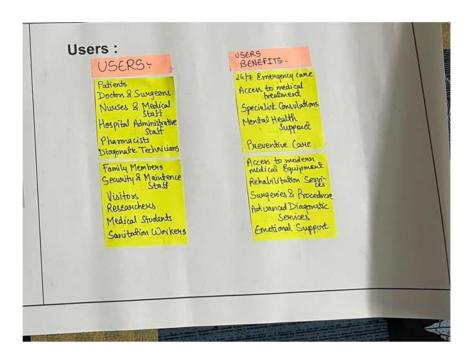
Style: Informative and instructional.

### O-OBJECTS



- Medical Equipment & Instruments:
- Includes stethoscopes, thermometers, ECG, X-ray machines critical for diagnostics and treatment.
- Pharmacy & Medication:
- Items like syringes, pill dispensers, IV bags, and tablets used in patient care.
- Administrative & Office Items:
- Computers, printers, ID cards, and billing machines used for hospital management.

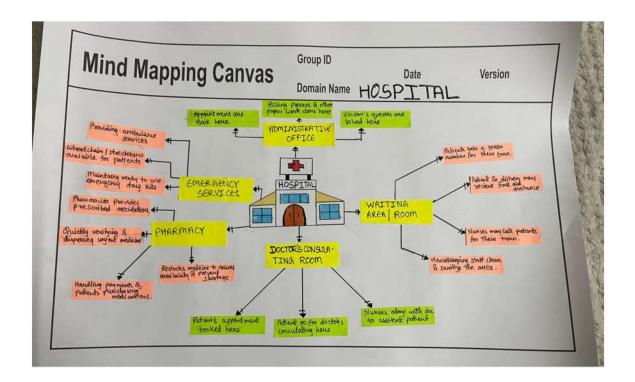
## U - USERS



- Primary Users:
- Patients, doctors, nurses, pharmacists, technicians, and administrative staff.
- Secondary Users:
- Family members, visitors, researchers, students, sanitation workers, security and maintenance staff.
  - User Benefits:
- 24×7 care, consultations, emotional support, advanced diagnostics, preventive care, and rehabilitation services.



### MIND MAPPING



 This mind map provides a structured overview of the functional units within a hospital and the key activities associated with each area. It represents the hospital as a centralized system, with interconnected departments working collaboratively to deliver healthcare services.

The primary departments illustrated are:

#### 1.WAITING ROOM

- The waiting area serves as the entry point for patients and visitors.
- Police & Security manage the crowd and ensure smooth entry.
- Receptionists issue call numbers for patients.
- Nurses may call patients for their turn.
- Housekeeping staff maintain cleanliness and sanitation.

#### 2 .DOCTOR'S CONSULATING ROOM

- This is the area where patients consult with doctors.
- Patients are called based on tokens or appointments.
- Doctors conduct medical evaluations and consultations.
- Nurses assist doctors during examinations or procedures.

#### 3. PHARMANCY

The pharmacy is the dispensing unit where prescribed medicines are provided to patients.

Patients register and provide prescriptions.

- Pharmacists verify prescriptions and dispense the required medication.
- Special medications (e.g., emergency kits) are issued as needed.
- Handling payments and updating availability is also managed here.

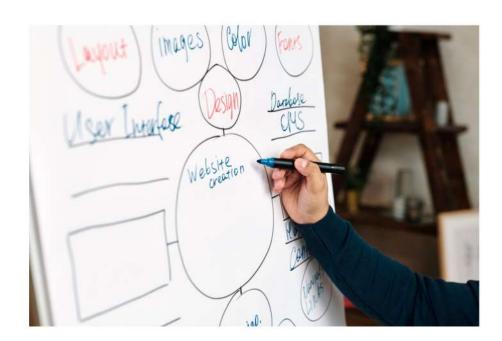
#### 4. EMERGENCY SERVICES

- This department handles urgent and life-threatening conditions.
- Immediate access to emergency tools and kits is ensured.
- Staff remain prepared to handle any emergency around the clock.
- Wheelchairs, stretchers, and basic support services are available.

#### 5. ADMINISTRATION OFFICE

The administrative unit supports the non-clinical operations of the hospital. It manages staff records, doctor lists, and general hospital documentation. Handles billing, ID cards, admission paperwork, and reports.

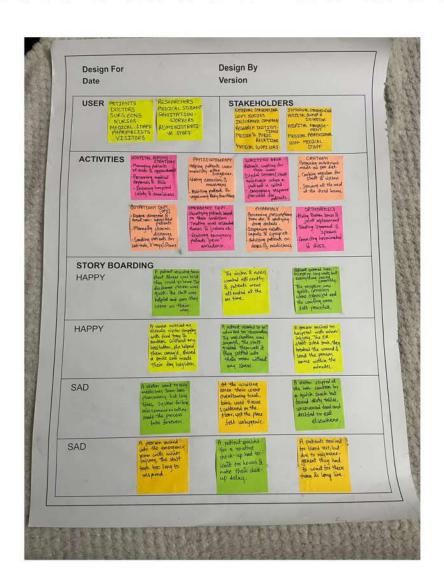
### PURPOSE OF MIND MAPPING



- The workflow between departments.
- The responsibilities of different staff members.
- The path of patient care, from arrival to discharge or follow-up.



### **EMPATHY CANVAS**



#### 1.USERS

**PATIENTS** 

**DOCTORS** 

**SURGEONS** 

NURSES

MEDICAL STAFF

**PHARMACISTS** 

**VISITORS** 

RESEARCHERS

MEDICAL STUDENT

SANITATION WORKERS

ADMINISTRATIVE STAFF

#### 2. STAKEHOLDERS

EXTERNAL STAKEHOLDER
GOVT. BODIES
INSURANCE COMPANY
RESEARCH INSTITUTE
MEDIA & PUBLIC RELATION
MEDICAL SUPPLIERS
INTERNAL STAKEHOLDER
HOSPITAL OWNER & TRUSTEE
HOSPITAL MANAGEMENT
HOSPITAL MAINTENANCE
MEDICAL PROFESSIONAL
NON-MEDICAL STAFF

#### 3. ACTIVITIES

HOSPITAL ADMIN

**PHYSIOTHERAPY** 

CANTEEN

OUTPATIENT DEPT.

**PHARMACY** 

**ORTHOPEDICS** 

#### 4. STORY BOARD

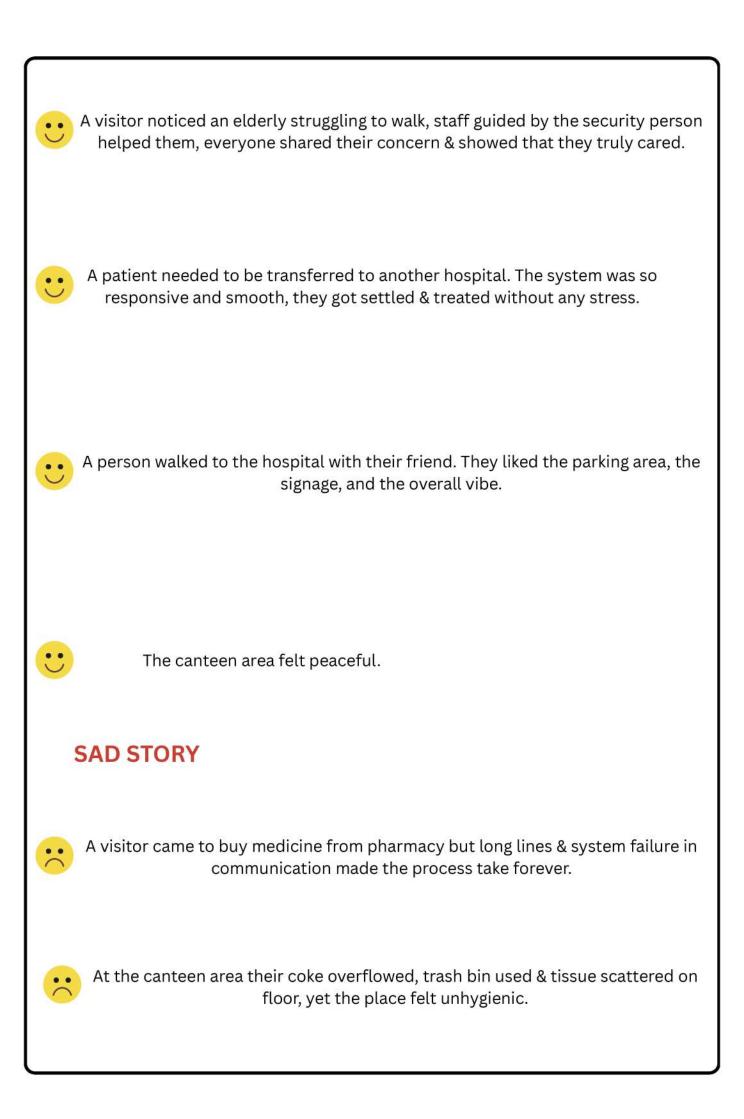
#### **HAPPY STORY**

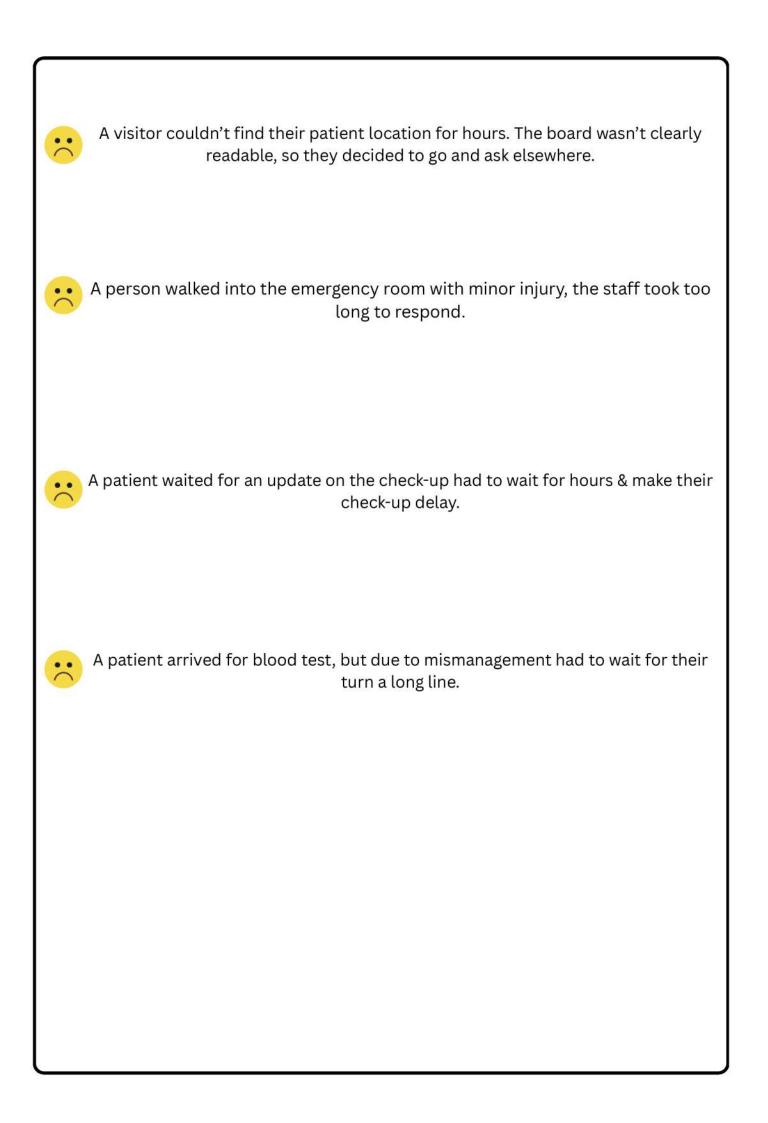


A patient entered with a serious condition, got immediate care & staff helped and sent them on treatment on day 1.



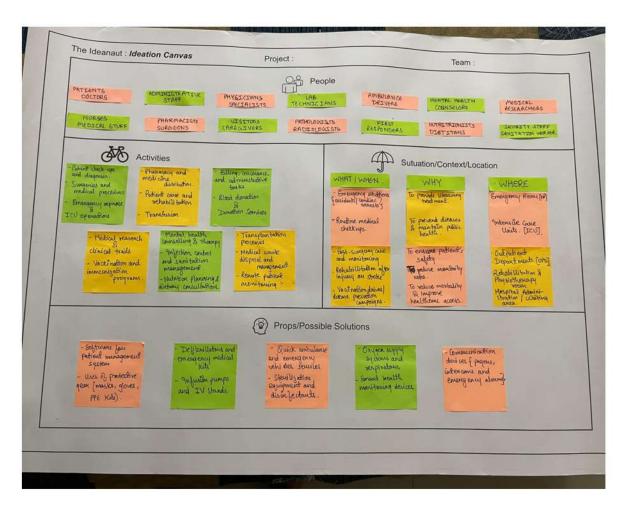
The doctor & nurses were very polite & gave confidence about the treatment.







### **IDEATION CANVAS**



#### 1.PEOPLE

- **Patients**
- **Doctors**
- Nurses
- Medical staff
- **Pharmacists**
- Surgeons
- Administrative staff
- Physicians
- Specialists
- Caregivers
- Ambulance drivers
- Mental health counselors
- Receptionists
- Assistant staff
- Research workers

#### 2. ACTIVITES

- These are the main activities performed:
- Medical record maintenance
- Treatment procedures
- Medication & therapy
- Patient admission, discharge and consultation
- ICU management
- Surgical procedures
- Doctor's services
- Transportation and coordination
- Lab testing and sample collection
- Waste disposal and hospital sanitization
- Billing & insurance verification

### 3. SITUATION/CONTEXT/LOCATION WHAT / WHEN

Emergency treatment needed immediately Sudden accidents Regular monthly health checkup

#### **WHY**

To avoid health issues & major disease To ensure patient is properly treated To save the patient's life (ICU)

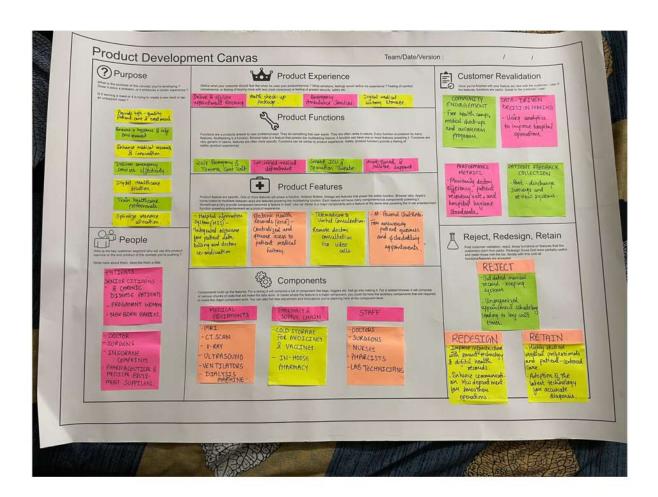
#### WHERE

Emergency room (ER)
Operation theatre
Lab testing room
ICU

#### 4. POSSIBLE SOLUTIONS

- Digitize and automate patient record systems
- Use of AI and ML to predict patient history and need
- Smart wearable device integration for monitoring
- Tracking and real-time updates for patient condition
- Digital display board for easier patient navigation
- Use smart card to record medical history and reduce manual error
- Emergency apps for coordination
- Communication boards for doctors, patients, staff

# PRODUCT DEVELOPMENT CANVAS



#### 1.PURPOSE

•

- This section outlines the goals the product is designed to achieve:
- Provide high-quality healthcare at a low cost.
- Ensure a hygienic and safe environment.
- Enhance overall medical services and improve infrastructure.
- Use digital healthcare systems efficiently.
- Train healthcare professionals.
- Optimize resource allocation.

#### 2.PEOPLE

- Patients:
- Senior citizens
- Chronic disease patients
- Pregnant women
- Newborn babies
- Stakeholders:
- Doctors
- Surgeons
- Insurance companies
- Pharmaceutical and medical equipment suppliers

#### 3. PRODUCT EXPERIENCE

- Describes how users will feel using the product or service:
- Online & offline appointment booking
- Health check-up packages
- Emergency medical services
- Digital medical history & treatment storage

#### 4. PRODUCT FUNCTIONS

- Functions the product should perform:
- 24×7 emergency and trauma care unit
- · Specialized medical departments
- Smart OPD (Outpatient Department)
- Monitoring and multiple support systems

#### 5.PRODUCT FEAUTRES

- Features that support product functions:
- Health Information System (HIS): Digital record-keeping and co-ordination
- Health records and reports (EMR): Patient medical history
- AI-powered chatbots for consultation and video calls
- Full awareness of patient queries and scheduling of physicians

#### 6. CUSTOMER REVALIDATION

- How the solution will be validated with actual users:
- Community engagement: Free health camps, check-ups, and awareness programs
- Data-driven decision-making: Use of analytics to improve hospital operations
- Performance metrics: Monitoring body efficiency, patient feedback, hygiene standards
- Patient feedback collection: Post-discharge review system

#### 7. COMPNENTS

- Core building blocks needed to implement the solution:
- Medical Equipment:
- MRI
- CT scan
- X-ray
- Ultrasound
- Ventilators
- Dialysis machines
- Pharmacy & Supply Chain:
- Cold storage for medicines and vaccines
- In-house pharmacy
- Staff:
- Doctors
- Surgeons
- Nurses
- Pharmacists
- Lab technicians

#### 8. REJECT/REDESIGN/RETAIN

- Neject:
- Outdated manual record-keeping systems
- Unorganized scheduling leading to long wait times
- 🗷 Redesign:
- Automate hospital records with advanced technology & digital health ID records
- Enhance communication between departments for smoother operations
- **V** Retain:
- Highly skilled and trained medical professionals with patient-focused care
- Adoption of new technology for accurate diagnosis



- The healthcare domain stands at the forefront of technological advancement, where data-driven solutions, efficient hospital management, and patient-centric care are reshaping the future of medical services. Through the integration of data analytics, AI, and digital tools, hospitals can enhance diagnosis accuracy, streamline operations, improve patient outcomes, and ensure resource optimization. This transformation not only supports medical professionals in delivering high-quality care but also empowers patients with better experiences and timely interventions. As the industry continues to evolve, embracing innovation while maintaining ethical standards and data privacy will be key to building a more resilient, accessible, and effective healthcare ecosystem.
- Moreover, the use of intelligent systems in hospitals—from automated scheduling and digital health records to predictive analytics for disease outbreaks—demonstrates the power of technology in saving lives and improving public health. With continuous advancements in telemedicine, wearable devices, and health informatics, hospitals can extend their reach beyond physical boundaries, ensuring timely care even in remote areas. The future of healthcare lies in this fusion of compassion, data, and innovation, creating systems that are not just efficient, but also truly responsive to human needs.

We would like to extend our heartfelt thanks to everyone who contributed to the successful completion of this team-based project. Our sincere gratitude goes to our team members for their dedication, cooperation, and collaborative spirit throughout the journey. Each member's unique contribution played a vital role in analyzing, designing, and presenting effective solutions within the hospital domain. We also appreciate the valuable guidance and support from our mentors and coordinators, whose insights helped us stay focused and aligned with our goals. This project has not only enhanced our technical and analytical skills but also strengthened our teamwork and problem-solving abilities in a real-world healthcare context.