RespiraSense

FYP-1 MID EVALUATION

OUR TEAM

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CONTENTS

INTRODUCTION

Project Name: RespiraSense

- AI-powered respiratory disease detection - chest x-rays
- Improve healthcare accessibility and diagnostic accuracy
- Target Diseases: Pneumonia, COVID, Tuberculosis

Key Features

- Real-time chest X-ray analysis
- Doctor recommendation system
- Chatbot to assist patient side users

Technology

- MERN Application
- Combined Machine Learning and Deep Learning Techniques

PROBLEM STATEMENT

Global Health Challenge

- **Respiratory diseases are leading causes of mortality worldwide**

Current Diagnostic Methods

- **Manually - slow and error prone**
- **Limited access to medical resources - under developed areas**

Need for solution

Fast, accurate, and accessible diagnostic tool to improve early detection

Our Approach

Automate chest x-ray analysis

PROBLEM ELABORATION

Challenges of Traditional Methods

- Slow, error-prone manual X-ray analysis

Impact on Patient Outcomes

- Delays in diagnosis, worsened patient outcomes

Data Management Issues

- Difficulty in securely storing/accessing medical data

Solution Overview

- AI solution for real-time, automated diagnosis

SCOPE

- AI disease detection, doctor recommendations, chatbot
- Built with MERN stack and Flask integration
- Focus on accuracy, UI responsiveness, functionality
- No mobile app, third-party integrations(for model) , or hosting

GOALS

Achieved

- Dataset obtained
- User-friendly web interface - Figma

Future

- AI model for lung disease detection
- Integrated chatbot, doctor recommendations

LITERATURE REVIEW

- 20 research articles reviewed
- Key methods – CNN and Deep Learning methods
- Results – High accuracy achievable with pre trained models
- Limitations – Dataset imbalance, limited disease coverage, early stage detection, bias
- Conclusion – AI integration is promising but requires diverse dataset

MOST RELEVANT

Title	Focus	Methodology	Findings	Relation
A Deep Learning Approach for COVID-19 and Pneumonia Classification using DenseNet201 [3]	Classifying COVID-19 and Pneumonia using DenseNet201 from chest X-rays to aid diagnosis.	DenseNet201 with transfer learning on 15,153 chest X-rays from Kaggle to classify as Normal, Pneumonia, or COVID-19.	DenseNet201 showed strong classification performance, compared against other models.	Both focus on using DenseNet201 for classifying COVID-19 and Pneumonia from X-rays
A Systematic Review of Healthcare Recommender Systems [2]	Review of healthcare recommender systems (HRS)	Analysis of 41 articles covering various HRS categories	HRS can improve disease prevention, cost reduction, and healthcare services	Provides insights for building a scalable, accurate recommendation system for RespiraSense's doctor recommendation module.
Chatbots and Their Applications in Medical Fields [1]	Review of the use of AI-powered chatbots in healthcare	Literature review across 5 databases	AI chatbots are increasingly used but can't replace professionals	Supports the integration of a chatbot in RespiraSense for effective patient communication.

METHODOLOGY

Disease Detection

- Classification of x-rays - Normal, Tuberculosis, COVID-19, Pneumonia
- Data Pre-processing
- TensorFlow framework

Chatbot

- Technique - OpenAI API

Recommendation System

- Machine Learning based matchmaking - popular hospitals
- Content based filtering

DESIGN(KEY REQUIREMENTS)

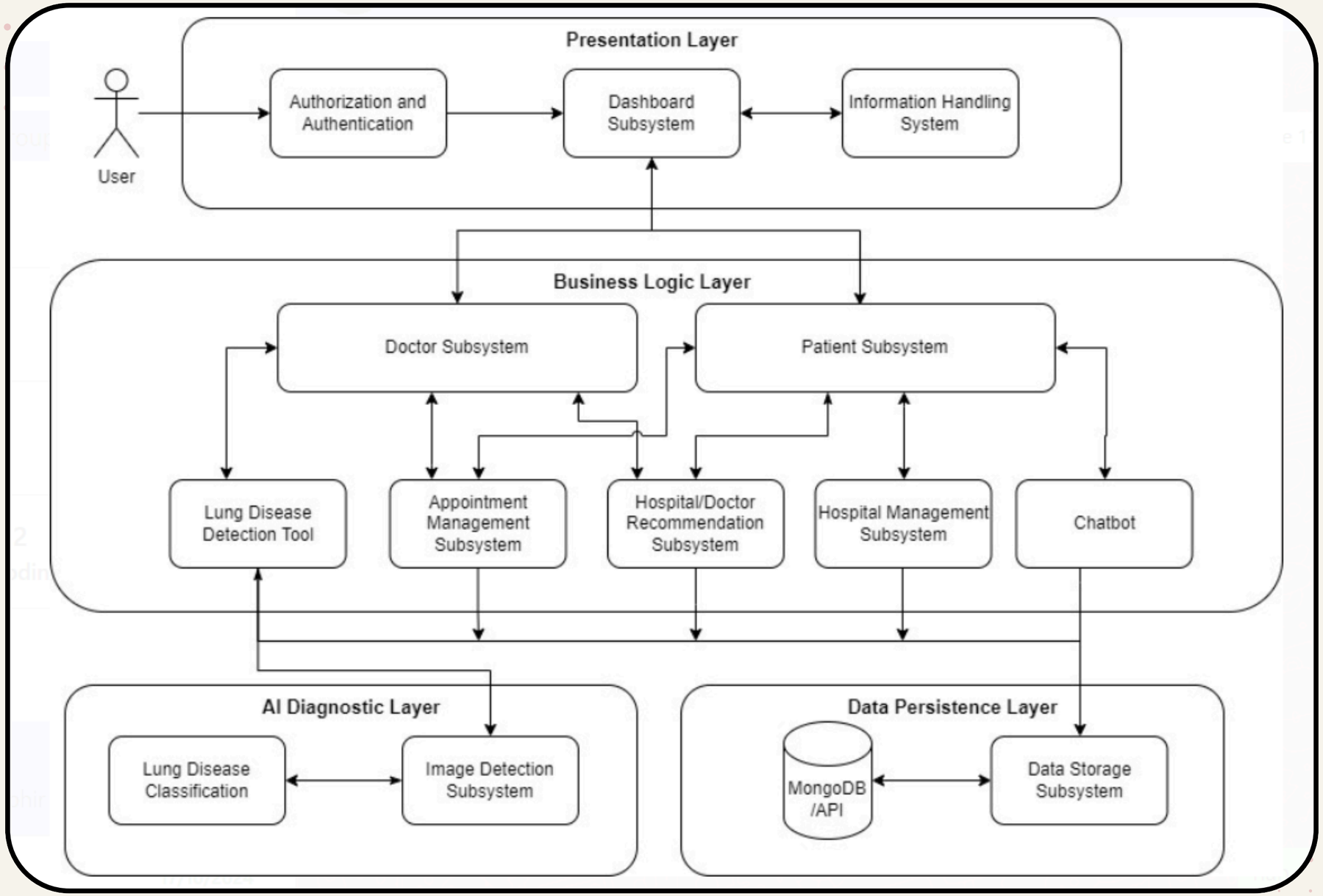
Requirements

- User Authentication
- Lung Disease Prediction
- Data Storage
- Security and Access control

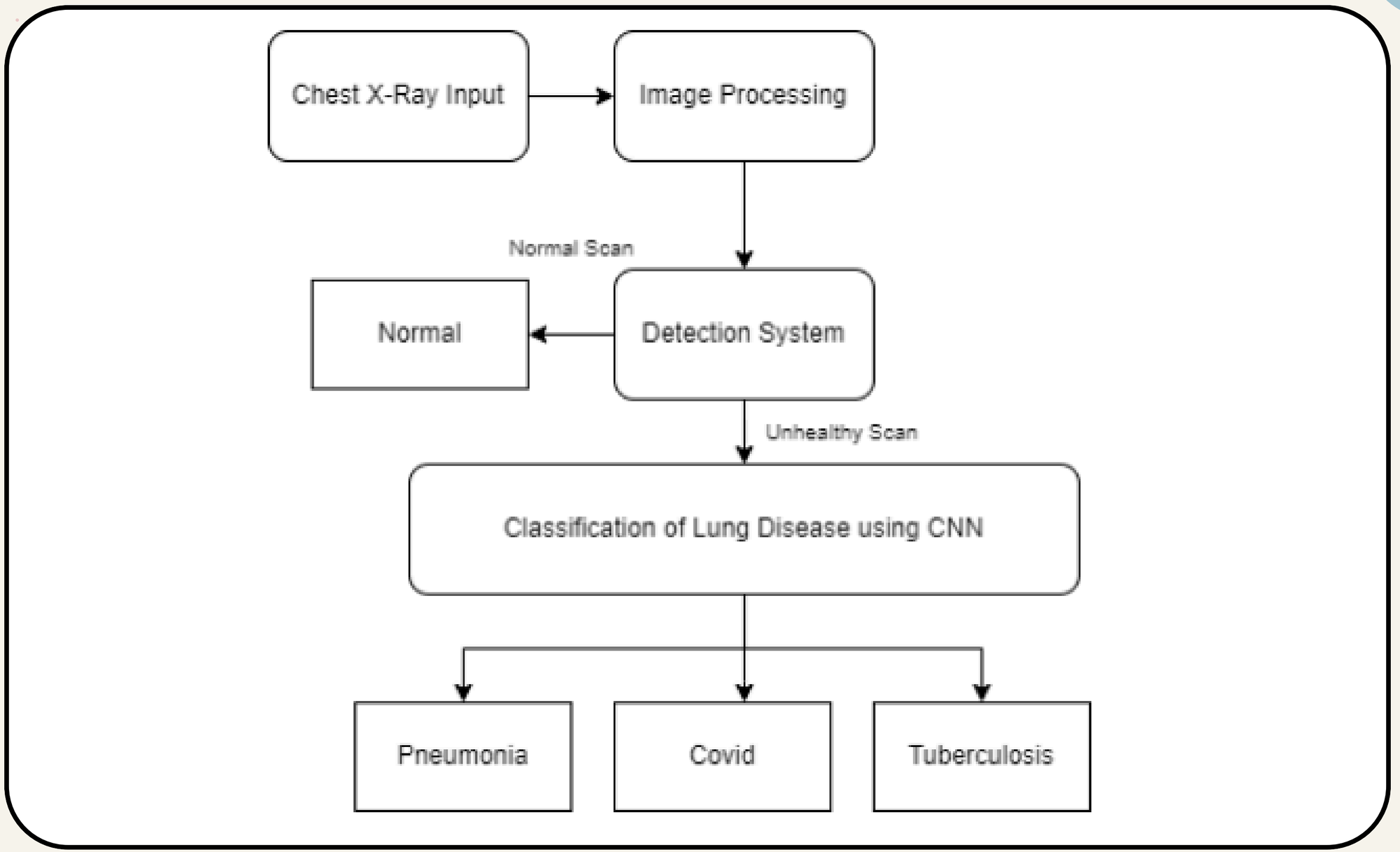
Constraints

- Only predicts Pneumonia, Tuberculosis and Covid-19
- Consistent internet connection

SYSTEM ARCHITECTURE



LUNG DISEASE DETECTION SUBSYSTEM



CONCLUSION

- Problem: Need for efficient, accessible respiratory disease diagnosis
- Objectives: AI disease detection, doctor recommendations, chatbot assistant
- Scope: Web app for disease detection, secure records, patient-doctor interaction.
- Methodology: Kaggle data, ML based disease detection and doctor matching, OpenAI chatbot.

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THANK YOU