DOCWISE AI-A SMART MEDICAL HISTORY ANALYZER & DOCTOR RECOMMENDATION SYSTEM

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CASE STUDY & BASE PAPER

Base Paper: AI-Driven Disease Prediction and Doctor Recommendation System.

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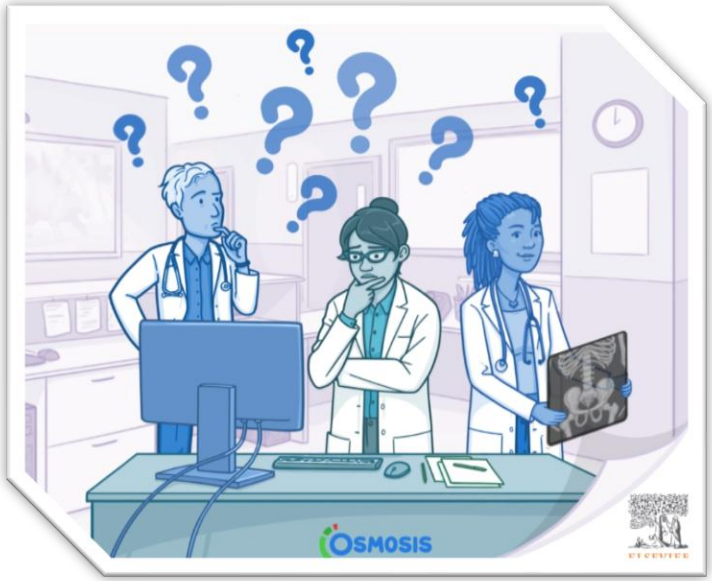
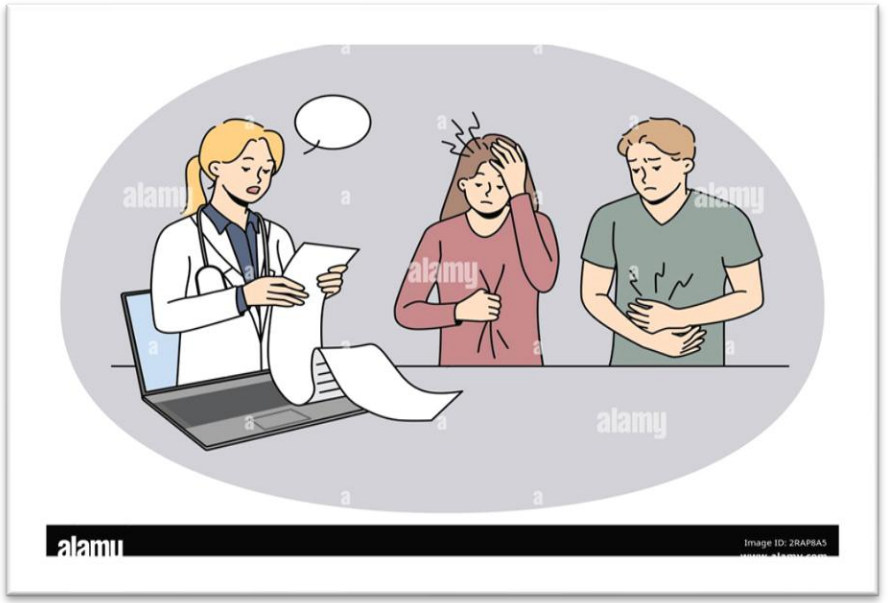
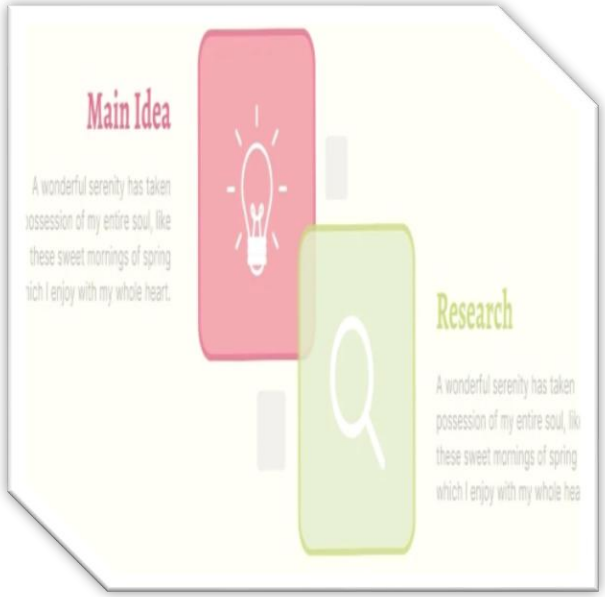
Key Learnings and Gaps Identified

We learned that AI can effectively match disease types with appropriate specialists to improve care access.
However, the gap lies in automated analysis of real medical reports and integration of verified doctor reviews, which our project aims to address.

ABSTRACT







Problem Statement:
Many patients face misdiagnosis or delayed treatment due to lack of access to their complete medical history.
Additionally, patients struggle to find trustworthy doctors due to unreliable or scattered recommendation sources.

Affected Users:
Patients seeking accurate diagnosis and reliable medical consultation face the highest risk.
Doctors and healthcare providers lack a streamlined tool to assess historical records efficiently during consultations.

Supporting Data:
Studies show that **medical errors affect over 12 million outpatients annually**, largely due to incomplete history.
Over **70% of patients** rely on online reviews, yet **only 30% trust them fully**, showing the need for verified doctor recommendation systems.

SDG GOALS:

SDG 3 :Good Health and Well-being

SDG 9 : Industry, Innovation, and Infrastructure

SDG 16 : Peace, Justice and Strong Institutions

INTRODUCTION

- In healthcare, incomplete patient history and difficulty in finding reliable doctors are major challenges.
- Lack of consolidated medical data leads to delays, repeated tests, and misdiagnosis.
- Patients often rely on scattered or unverified online reviews to choose doctors.
- AI and ML have been applied to disease prediction and recommendation systems, but most focus on single diseases or structured data only.
- DocWise AI addresses these gaps by:
- Reading and analyzing both scanned and digital medical reports.
- Summarizing patient history for doctors.
- Predicting diseases with risk levels.
- Recommending verified specialists based on expertise, location, and availability.

SOFTWARE SPECIFICATIONS

- **Operating System:** Windows11

- **Programming Language:** Python 3.9+

- **Libraries / Frameworks:** Scikit-learn, TensorFlow, PyTorch, Pandas, NumPy, NLTK, SpaCy,
Hugging Face Transformers, Matplotlib, Seaborn, Flask, Django, Streamlit, PyPDF2, pdfplumber, pytesseract

- **IDE / Tools:** VS Code, PyCharm, Jupyter Notebook, Git, GitHub

PROPOSED SYSETM

Description:

The proposed system is an AI-driven Doctor Recommendation platform that suggests the most suitable specialist for a patient based on symptoms, predicted disease, and personal medical history. Unlike generic search engines (like Google) that only give broad suggestions, this system uses intelligent algorithms and personalized mapping to connect the patient directly with the right doctor.

It integrates:
SMOTE – to balance the training dataset for better model performance.
Rule-Based Mapping – to match each disease with its correct specialist.
Content-Based Filtering – to recommend doctors based on expertise and patient needs.
Collaborative Filtering – to refine suggestions using feedback from similar patients.

MODULE

A module in a software project is a self-contained unit or component that performs a specific task in the application. Each module works like a building block and may interact with other modules to complete the overall functionality.

MODULES IN DOCWISE AI:

1. PDF Reporter Reader
2. Disease Symptom/Disease Matcher
3. Report Summarizer
4. Suggested Action Generator
5. Disease-to-Doctor Mapper
6. Doctor Profile Database
7. Matching & Filtering Engine
8. Recommendation Engine

1.PDF Report Reader:

- Extracts text, tables, and medical entities from medical PDF files, including scanned and digital formats.

FUNCTIONS:

- Reads both scanned and digital PDFs using OCR and text extraction.
- Identifies and separates medical sections like vitals, tests, observations.
- Converts structured/unstructured data into analyzable text.

2.**Disease Symptom/Disease Matcher:**

- Matches extracted symptoms/test results to possible diseases using a knowledge base and NLP models.

FUNCTIONS:

- Identifies symptoms, diagnosis terms, and test abnormalities.
- Maps to possible diseases using ontology (SNOMED/ICD).
- Uses semantic similarity and rule-based matching for accuracy.
- Sends suspected diseases to the prediction engine.

3.Report Summarizer:

- Converts extracted and analyzed content into a doctor-friendly summary of patient history and current findings.

FUNCTIONS:

- Creates a natural language summary (with AI/NLP).
- Highlights key concerns, trends, and abnormal findings.
- Mentions previously diagnosed conditions and medications.
- Structures it for easy readability in a PDF or web UI.

4.Suggested Action Generator:

- Provides AI-based recommendations for further tests, procedures, or specialist visits.

FUNCTIONS:

- Checks predicted diseases and suggests standard next steps (based on guidelines).
- Cross-checks with patient history to avoid repetition.
- Advises specialist type or diagnostic test to confirm.
- Flags critical conditions for urgent intervention.

5.Disease-to-Doctor Mapper:

- Maps predicted diseases to the appropriate type of medical specialist.

FUNCTIONS:

- Converts the output of disease prediction into relevant doctor categories (e.g., Cardiologist, Dermatologist).
- Stores predefined disease-specialist mappings in a dictionary or table.
- Allows updating or adding new disease-specialist pairs.
- Logs the disease-specialist mapping history for audit purposes.

6.Doctor Profile Database:

- Stores details of doctors including their name, specialization, location, availability, and ratings.

FUNCTIONS:

- Supplies doctor data for filtering and recommendation
- Allows admin or hospital staff to update doctor profiles.
- Supports search/filter based on location, consultation type (online/offline), etc.
- Can integrate with APIs to fetch real-time doctor availability.

7.Matching & Filtering Engine:

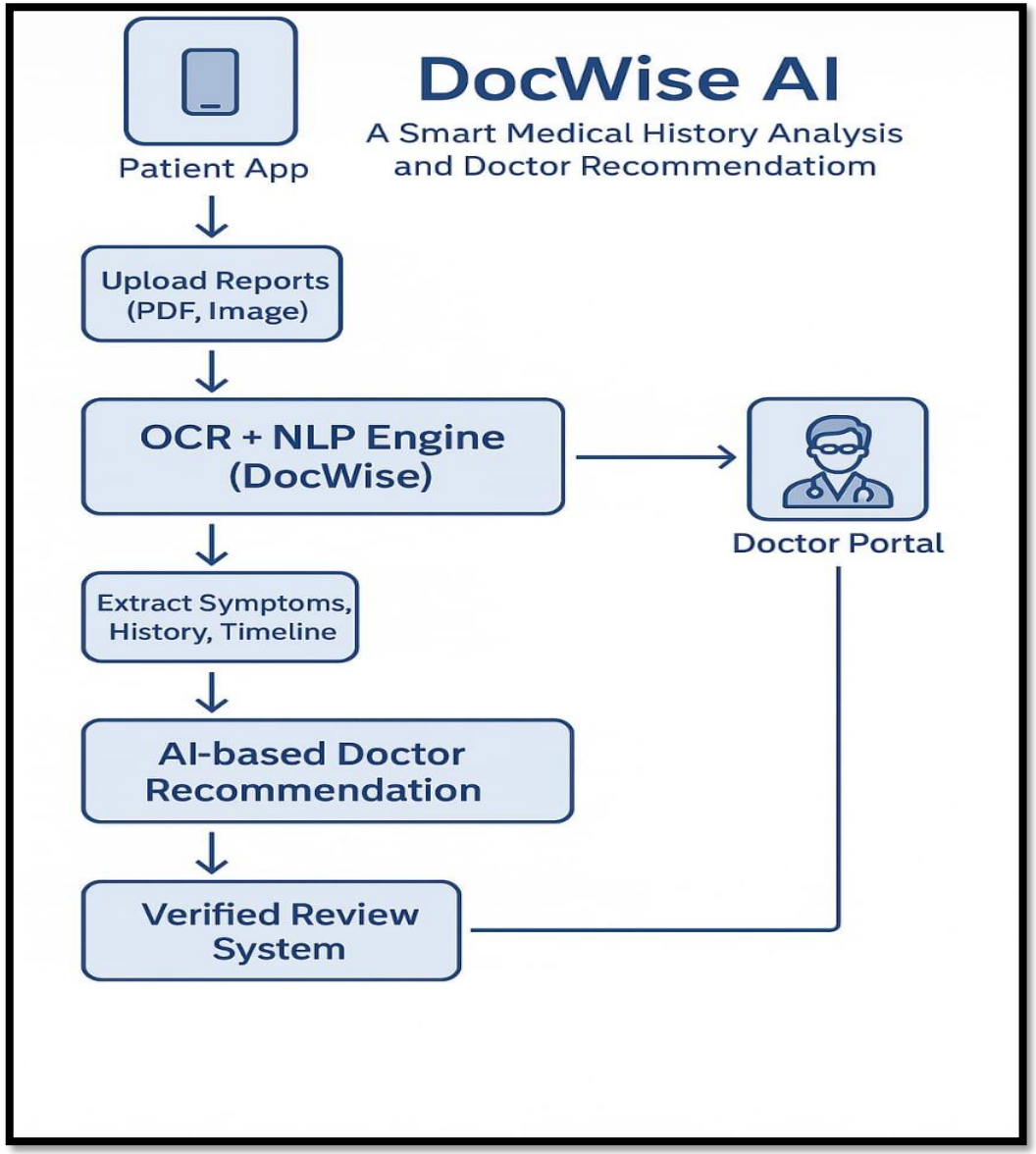
- Filters and selects doctors based on specialization, location, and other patient preferences

FUNCTIONS:

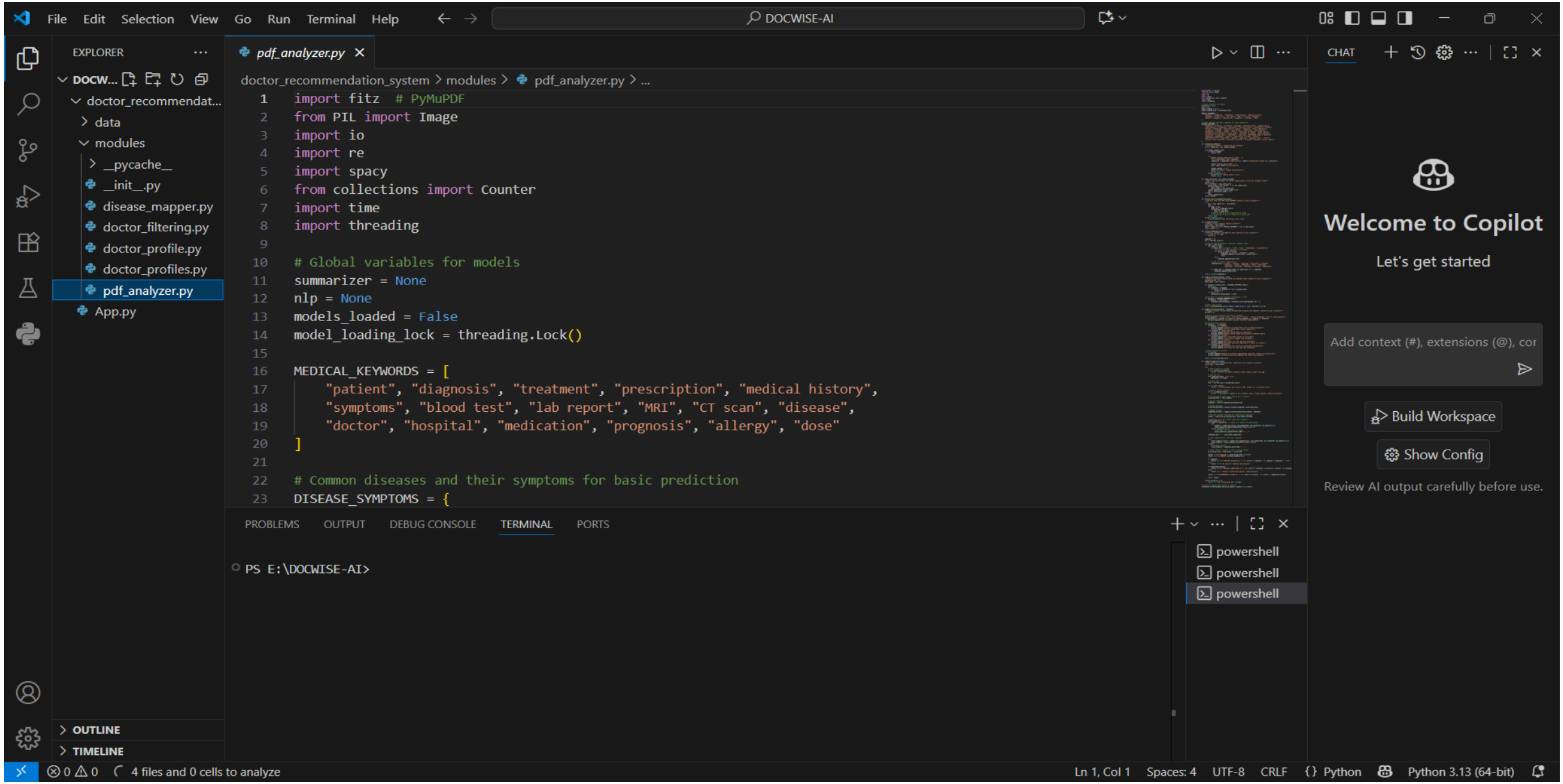
- Matches patient needs with available doctor profiles.
- Filters based on criteria like distance, consultation mode, language spoken, and patient gender preference.
- Supports ranking based on doctor experience or patient ratings.

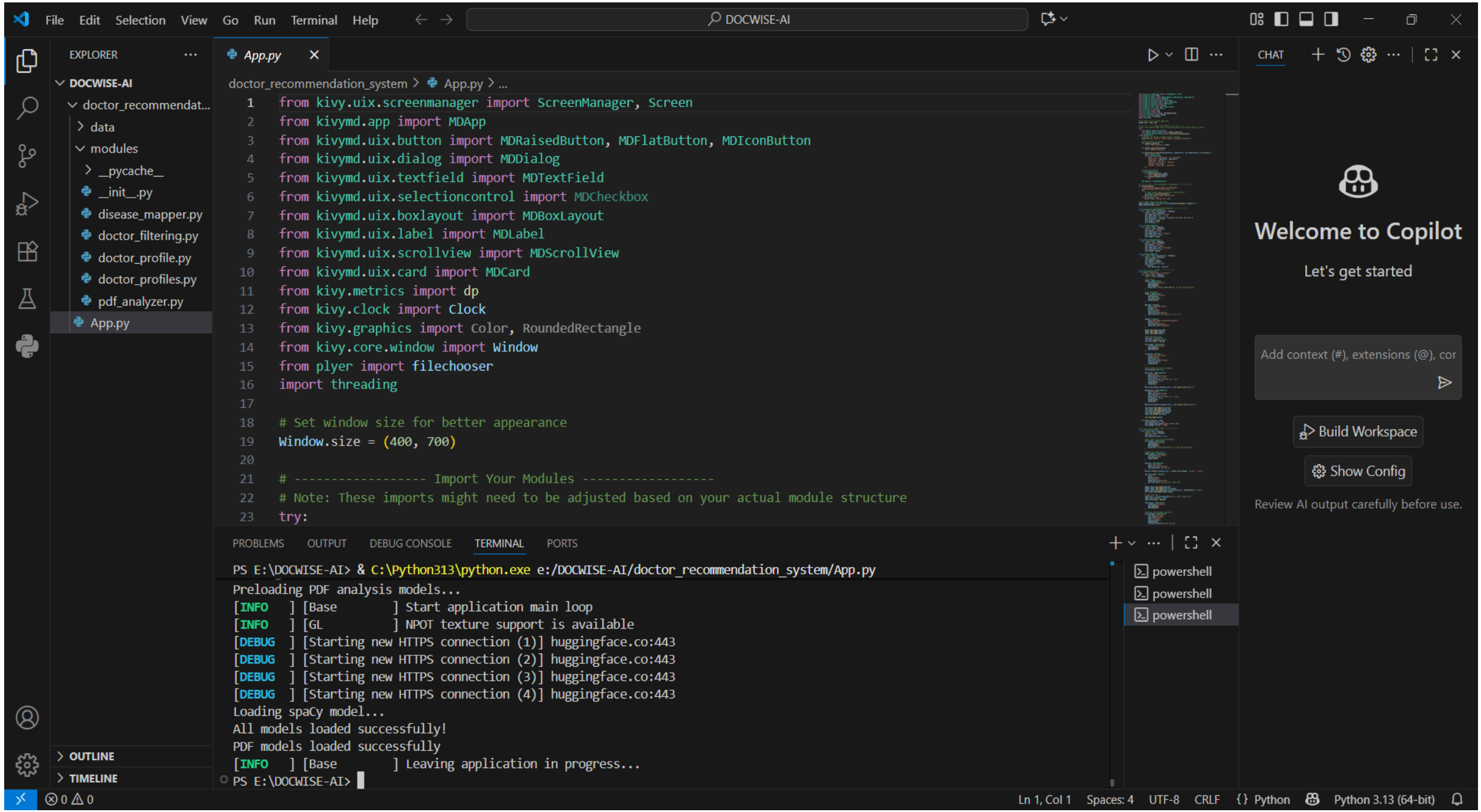
ARCHITECTURE

React Frontend → FastAPI/Flask Backend → NLP Model for Medical Report Analysis → Database + Email Service + Map APIThe architecture supports seamless user interaction, medical data processing, secure storage, doctor recommendation, and email notifications



IMPLEMENTATION

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modules
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__init__.py
disease_mapper.py
doctor_filtering.py
doctor_profile.py
doctor_profiles.py
pdf_analyzer.py
App.py
OUTLINE
TIMELINE
App.py
doctor_recommendation_system > App.py > ...
1 from kivy.uix.screenmanager import ScreenManager, Screen
2 from kivymd.app import MDApp
3 from kivymd.uix.button import MDRaisedButton, MDFlatButton, MDIconButton
4 from kivymd.uix.dialog import MDDialog
5 from kivymd.uix.textfield import MDTextField
6 from kivymd.uix.selectioncontrol import MDCheckbox
7 from kivymd.uix.boxlayout import MDBoxLayout
8 from kivymd.uix.label import MDLabel
9 from kivymd.uix.scrollview import MDScrollView
10 from kivymd.uix.card import MDCard
11 from kivy.metrics import dp
12 from kivy.clock import Clock
13 from kivy.graphics import Color, RoundedRectangle
14 from kivy.core.window import Window
15 from plyer import filechooser
16 import threading
17
18 # Set window size for better appearance
19 Window.size = (400, 700)
20
21 # ------------------ Import Your Modules ------------------
22 # Note: These imports might need to be adjusted based on your actual module structure
23 try:
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
PS E:\DOCWISE-AI> & C:\Python313\python.exe e:/DOCWISE-AI/doctor_recommendation_system/App.py
Preloading PDF analysis models...
[INFO] [Base] Start application main loop
[INFO] [GL] NPOT texture support is available
[DEBUG] [Starting new HTTPS connection (1)] huggingface.co:443
[DEBUG] [Starting new HTTPS connection (2)] huggingface.co:443
[DEBUG] [Starting new HTTPS connection (3)] huggingface.co:443
[DEBUG] [Starting new HTTPS connection (4)] huggingface.co:443
Loading spaCy model...
All models loaded successfully!
PDF models loaded successfully
[INFO] [Base] Leaving application in progress...
PS E:\DOCWISE-AI>
powershell
powershell
powershell
CHAT
Welcome to Copilot
Let's get started
Add context (#), extensions (@), cor
Build Workspace
Show Config
Review AI output carefully before use.
Ln 1, Col 1 Spaces: 4 UTF-8 CRLF {} Python Python 3.13 (64-bit)

CONCLUSION

- The proposed AI-Driven Doctor Recommendation System provides a personalized and accurate approach to connecting patients with the right medical specialists. By integrating techniques like Named Entity Recognition,Rule-Based Mapping, Content-Based Filtering, and Collaborative Filtering, the system ensures that recommendations are both medically relevant and accessible. Unlike generic search engines, it tailor results based on predicted disease, patient profile, location, and availability, making it more effective in improving healthcare accessibility and efficiency.

FUTURE SCOPE

*Integration with real-time hospital databases for live doctor availability.

*Addition of multilingual support to serve a diverse population.

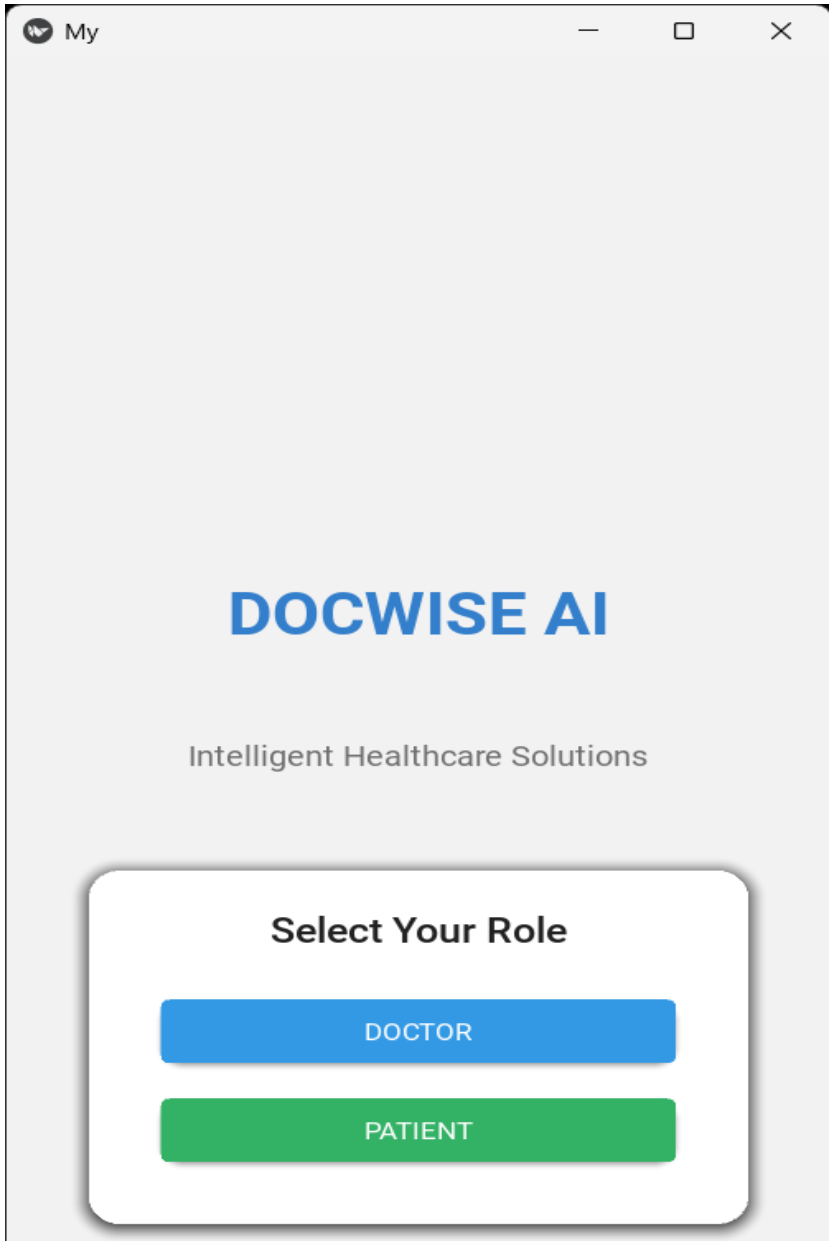
*Incorporation of telemedicine appointment booking directly from the system.

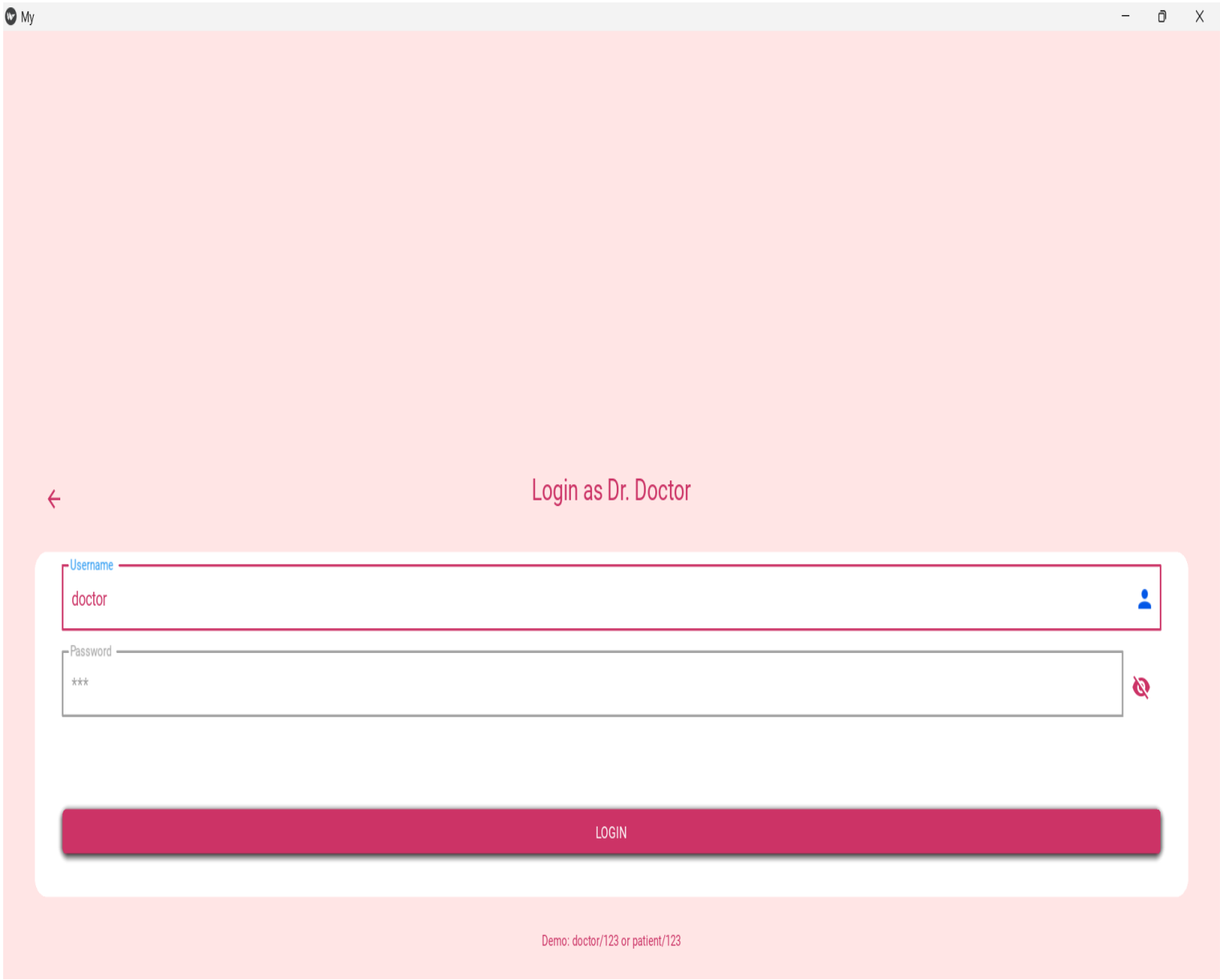
*Expansion to global healthcare networks for cross-border consultations.

*Implementation of AI-based treatment and medicine recommendations alongside doctor suggestions.

*Use of deep learning models for enhanced disease–specialist matching accuracy.

OUTPUT


My
DOCWISE AI
Intelligent Healthcare Solutions
Select Your Role
DOCTOR
PATIENT


My
Login as Dr. Doctor
Username
doctor
Password
***
LOGIN
Demo: doctor/123 or patient/123

My

DOCTOR DASHBOARD

Medical Report Analysis

Upload patient PDF reports for AI analysis and insights

UPLOAD PDF REPORT

Analysis Results

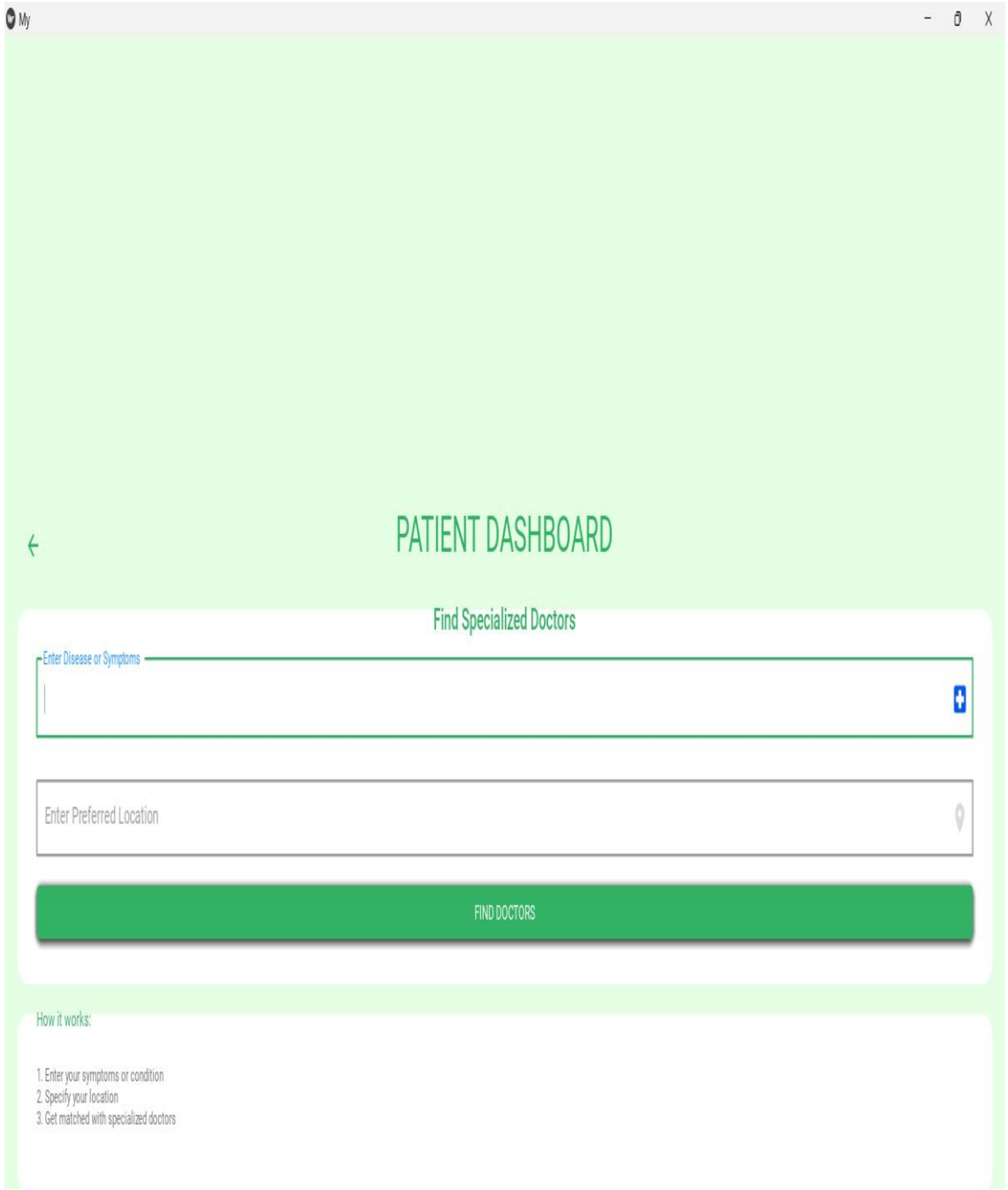
 Processed in 99.0s

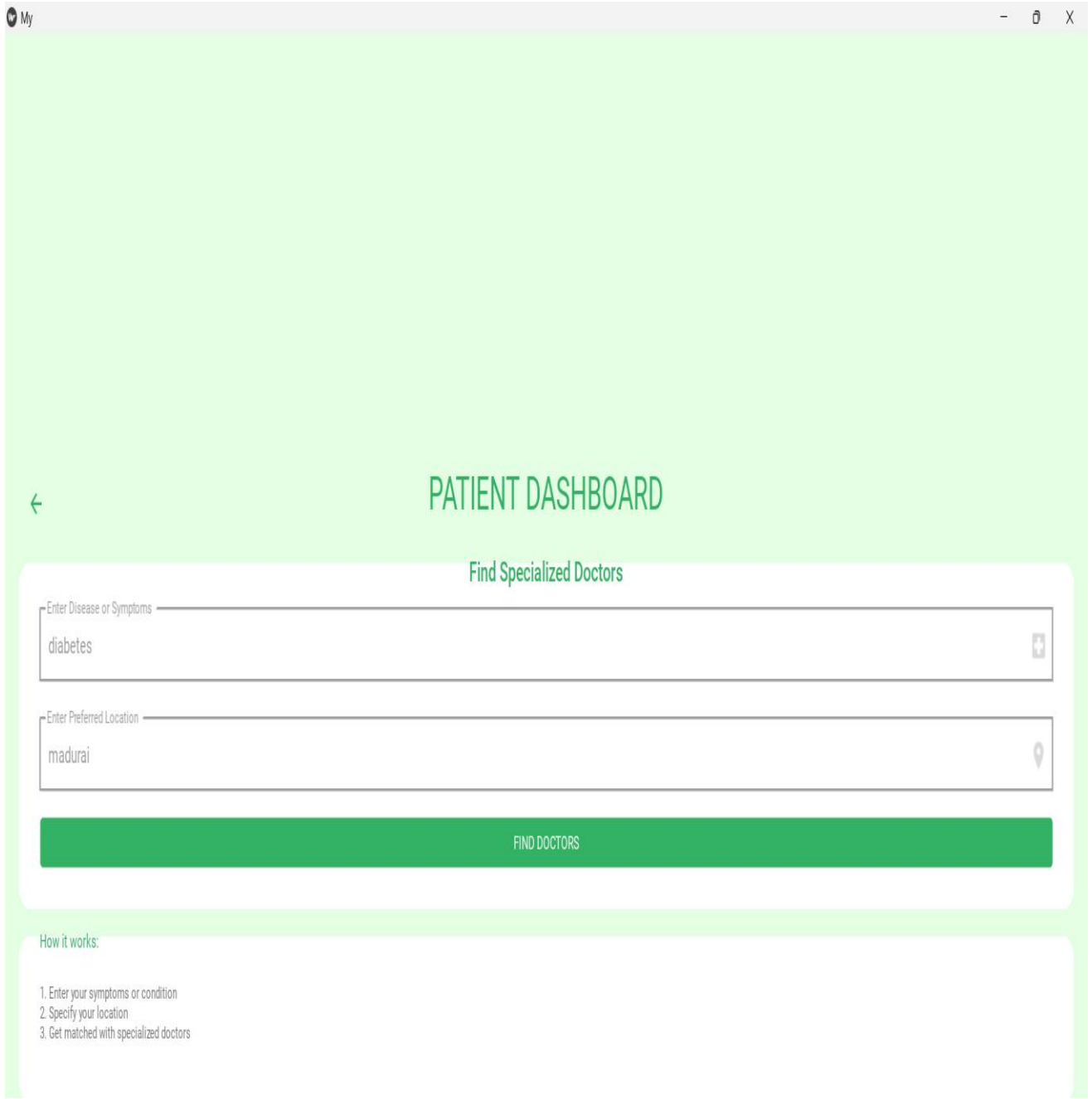
 SUMMARY:
Mr Tan Ah Kow is a 55 year old man, who is divorced, and unemployed. He has had hypertension and hyperlipidemia since 1990 and suffered several strokes in 2005. He developed heart problems (cardiomyopathy), cardiac failure and chronic renal disease and was treated in ABC Hospital. Mr Tan is at present incontinent, and is unable to bathe or use the toilet on his own.

 No specific symptoms detected

 POSSIBLE CONDITIONS:
• hypertension (confidence: 2)

 RECOMMENDED ACTIONS:
• Reduce sodium intake and maintain a healthy diet
• Monitor blood pressure regularly


My
PATIENT DASHBOARD
Find Specialized Doctors
Enter Disease or Symptoms
Enter Preferred Location
FIND DOCTORS
How it works:
1. Enter your symptoms or condition
2. Specify your location
3. Get matched with specialized doctors


My
PATIENT DASHBOARD
Find Specialized Doctors
Enter Disease or Symptoms
diabetes
Enter Preferred Location
madurai
FIND DOCTORS
How it works:
1. Enter your symptoms or condition
2. Specify your location
3. Get matched with specialized doctors

Recommended Doctors

Recommended Specialist: **Endocrinologist**

Dr. Pooja Mishra

Rating: 5.0

Specialist: endocrinologist

Experience: 28 years

Location: Madurai

Contact: 9213064059

Dr. Harish Rao

Rating: 4.0

Specialist: endocrinologist

Experience: 13 years

Location: Madurai

Contact: 7303695069

Dr. Suresh Reddy

Rating: 4.0

Specialist: endocrinologist

Experience: 11 years

Location: Madurai

REFERENCES

1)M. Natarajan et al., "AI-Driven Disease Prediction and Doctor Recommendation System," 2025.
2)S. K. Nayak et al., "An Intelligent Disease Prediction and Drug Recommendation Prototype by Using Multiple Approaches of Machine Learning Algorithms," 2023.
3)K. Alnowaiser, "Improving Healthcare Prediction of Diabetic Patients Using KNN Imputed Features and Tri-Ensemble Model," 2024.
4)A. Kumar et al., "Disease Prediction and Doctor Recommendation System using Machine Learning Approaches," 2021.
5)A. Das et al., "A collaborative empirical analysis on machine learning based disease prediction in health care system," 2024.

6)K. Arumugam et al., "Multiple disease prediction using machine learning algorithms," 2023.
7)M. M. Yaqoob et al., "Hybrid Classifier-Based Federated Learning in Health Service Providers for Cardiovascular Disease Prediction," 2023.
8)F. Al-Turjman et al., "Intelligence in the Internet of Medical Things era: A systematic review of current and future trends," 2020.
9)S. Dash et al., "Big data in healthcare: management, analysis and future prospects," 2019.
10)D. A. Watkins et al., "Rheumatic Heart Disease Worldwide: JACC Scientific Expert Panel," 2018.

11)S. Mohan et al., "Effective Heart Disease Prediction Using Hybrid Machine Learning Techniques," 2019.
12)J. P. Li et al., "Heart Disease Identification Method Using Machine Learning Classification in E-Healthcare," 2020.
13)R. Kaur et al., "Lifestyle and Dietary Management Associated with Chronic Diseases in Women Using Deep Learning," 2023.
14)R. Kaur et al., "Food Image-based diet recommendation framework to overcome PCOS problem in women using deep convolutional neural network," 2022.
15)R. Kaur et al., "Review on Transfer Learning for Convolutional Neural Network," 2021.

THANK YOU