# Phase 5: Project Demonstration & Documentation

## Title: AI-Healthcare Diagnostics and Treatment

## Abstract:

The AI-Healthcare Diagnostics and Treatment project aims to revolutionize healthcare accessibility by leveraging artificial intelligence, natural language processing, and IoT (Internet of Things) technologies. In its final phase, the system integrates advanced AI models to diagnose symptoms, real-time health data collection from IoT devices, and secure data management, while ensuring scalability and seamless integration with Enterprise Resource Planning (ERP) systems. This document provides a comprehensive report of the project's completion, covering the system demonstration, technical documentation, performance metrics, source code, and testing reports. The project is designed to handle large-scale operations with robust data security measures, providing accurate health recommendations in real-time. Screenshots, ERP diagrams, and codebase snapshots will be included for a full understanding of the system's architecture and functionality.

## INDEX TABLE

## 1.Project Demonstration (Revised for Diagnostics and Treatment Focus)

## Overview:

The AI-Powered Healthcare Assistant system will be demonstrated to stakeholders, showcasing its features, performance improvements, and functionality. This demonstration highlights the system's real-time responses, IoT data integration, security measures, and performance scalability.

## Demonstration Details:

- **System Walkthrough:** A live walkthrough of the platform, from user interaction to the output of health recommendations, showcasing the chatbot's responses to user health queries.
- **AI Diagnosis Accuracy:** The demonstration will show how the AI model provides accurate health suggestions based on real-time user inputs and IoT device data.
- **IoT Integration:** Real-time metrics like heart rate, oxygen level, and body temperature collected from IoT devices will be displayed and analyzed.
- **Performance Metrics:** Response time, system scalability, and load handling under multiple users will be highlighted to show improved system capacity.
- **Security & Privacy:** Encryption protocols and privacy measures will be explained and demonstrated as the system handles user health data.

## Outcome:

By the end of the demonstration, the system's ability to handle real-world scenarios, ensure data security, and deliver health insights through IoT integration will be showcased to the stakeholders.

## 2. Project Documentation

## Overview:

Comprehensive documentation for the AI-Powered Healthcare Assistant is provided to detail every aspect of the project. This includes system architecture, AI model details, code explanations, and usage guidelines for both users and administrators.

### Documentation Sections:

- **System Architecture:** Focused on AI diagnostics pipeline, IoT device APIs, and treatment engine.
- **Clinical Decision Support System (CDSS) Modules:** Explanation of diagnosis and therapy logic.
- **Usage Guides:**
    - **For Medical Staff:** How to use and interpret AI results.
    - **For Patients:** Monitoring and interacting with the system via app.
- **Testing Reports:** Emphasis on diagnostic accuracy (e.g., sensitivity/specificity), treatment validation, and risk analysis.

### Outcome:

All critical components of the system will be well-documented, providing a clear guide for future development, deployment, or system scaling.

## 3. Feedback and Clinical Validation

### Overview:

Feedback from the project demonstration will be collected from instructors, stakeholders, and a broader group of test users. This feedback will be used to make final refinements before project handover**.**

### Revised Steps:

- Collect feedback from physicians, medical students, and IT staff.
- Iterate AI models based on diagnostic errors or inappropriate treatment suggestions.
- Conduct usability and accuracy testing with medical professionals.

## Outcome:

Final adjustments will optimize the system for a broader rollout, ensuring that it is fully ready for real-world deployment.

## 4. Final Project Report Submission (Revised)

## Overview:

The final project report provides a comprehensive summary of all phases, key achievements, challenges faced, and outcomes of the AI-Powered Healthcare Assistant project. This report will include testing results, performance improvements, and future recommendations.

## Additional Sections:

- **Medical Validation:** Include metrics like diagnostic accuracy and treatment appropriateness.
- **Regulatory Considerations:** Discuss compliance with medical device regulations and standards (e.g., ISO 13485, FDA guidance).
- **Deployment Readiness:** Analysis of system readiness for use in healthcare institutions.

## Outcome:

A detailed project report will be submitted, outlining the entire journey from concept to completion.

## 5. Project Handover and Clinical Expansion

## Overview:

The projects intro for future development.

## Suggestions for Future Work:

- Support for chronic disease monitoring (e.g., diabetes, hypertension).
- Integration with electronic health records (EHR).
- Advanced diagnostics with radiology or pathology image processing.
- Multilingual medical NLP capabilities.

## Outcome:

The AI-Powered Healthcare Assistant will be officially handed over, along with recommendations for future enhancements and guidelines for system maintenance.

## Python code

```
from flask import Flask, request, jsonify, send_file

from flask_cors import CORS

import pandas as pd

import os

from datetime import datetime


app = Flask(_name_)

CORS(app)


EXCEL_FILE = 'patient_records.xlsx'

CSV_TEMP_FILE = 'patient_records.csv'


def ensure_excel_exists():

    if not os.path.exists(EXCEL_FILE):

        df = pd.DataFrame(columns=[

            'Type', 'Name', 'Age', 'Height', 'Weight', 'BMI',

            'BMI Category', 'Contact', 'Symptoms', 'Date'

        ])

        df.to_excel(EXCEL_FILE, index=False)
```

```
@app.route('/')
def home():
    return 'Welcome to the Patient Records API'

@app.route('/api/patients', methods=['GET'])
def get_patients():
    ensure_excel_exists()
    df = pd.read_excel(EXCEL_FILE)
    return jsonify(df.to_dict('records'))

@app.route('/api/patients', methods=['POST'])
def add_patient():
    ensure_excel_exists()
    data = request.json

    required_fields = ['Type', 'Name', 'Age', 'Height', 'Weight', 'BMI', 'BMI Category', 'Contact',
'Symptoms']
    missing = [field for field in required_fields if field not in data]
    if missing:
        return jsonify({"error": f"Missing fields: {', '.join(missing)}"}), 400

    # Add current date if not provided
    if 'Date' not in data or not data['Date']:
        data['Date'] = datetime.now().strftime('%Y-%m-%d %H:%M:%S')
```

```
    df = pd.read_excel(EXCEL_FILE)
    new_patient = pd.DataFrame([data])
    df = pd.concat([df, new_patient], ignore_index=True)
    df.to_excel(EXCEL_FILE, index=False)

    return jsonify({"message": "Patient added successfully", "data": data})

@app.route('/api/patients/excel', methods=['GET'])
def download_excel():
    ensure_excel_exists()
    return send_file(
        EXCEL_FILE,
        mimetype='application/vnd.openxmlformats-officedocument.spreadsheetml.sheet',
        as_attachment=True,
        download_name='patient_records.xlsx'
    )

@app.route('/api/patients/csv', methods=['GET'])
def download_csv():
    ensure_excel_exists()
    df = pd.read_excel(EXCEL_FILE)
    df.to_csv(CSV_TEMP_FILE, index=False)
    response = send_file(
```

```
        CSV_TEMP_FILE,
        mimetype='text/csv',
        as_attachment=True,
        download_name='patient_records.csv'
    )
    # Optional: delete temp CSV after sending
    # os.remove(CSV_TEMP_FILE)
    return response

@app.route('/my-page')
def my_page():
    return 'This is my page'

if _name_ == '_main_':
    app.run(debug=True, port=5000)
```

## HTML Code

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>AI Healthcare Diagnostic System</title>
    <link rel="stylesheet" href="styles.css">
```

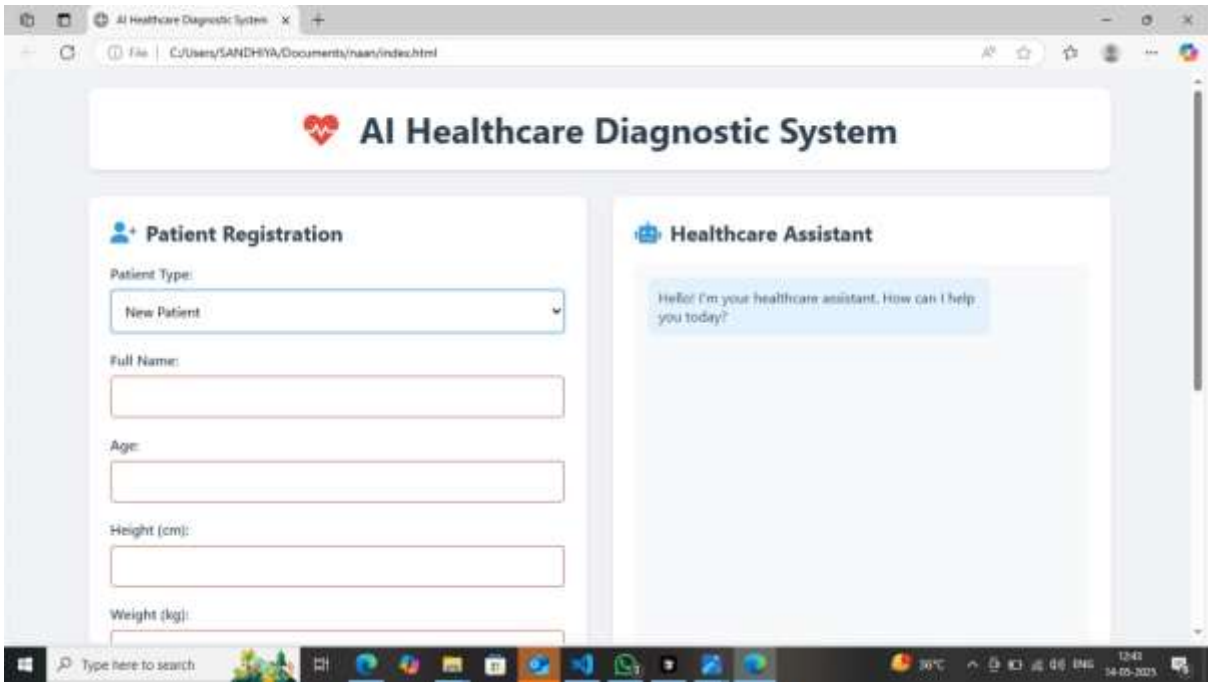
```
    <script src="https://unpkg.com/xlsx/dist/xlsx.full.min.js"></script>
    <link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/6.0.0/css/all.min.css">
</head>
<body>
    <div class="container">
        <header>
            <h1><i class="fas fa-heartbeat"></i> AI Healthcare Diagnostic System</h1>
        </header>

        <div class="main-content">
            <div class="patient-form">
                <h2><i class="fas fa-user-plus"></i> Patient Registration</h2>
                <form id="patientForm">
                    <div class="form-group">
                        <label for="patientType">Patient Type:</label>
                        <select id="patientType" required>
                            <option value="new">New Patient</option>
                            <option value="regular">Regular Patient</option>
                        </select>
                    </div>
                    <div class="form-group">
                        <label for="name">Full Name:</label>
                        <input type="text" id="name" required>
                    </div>
```

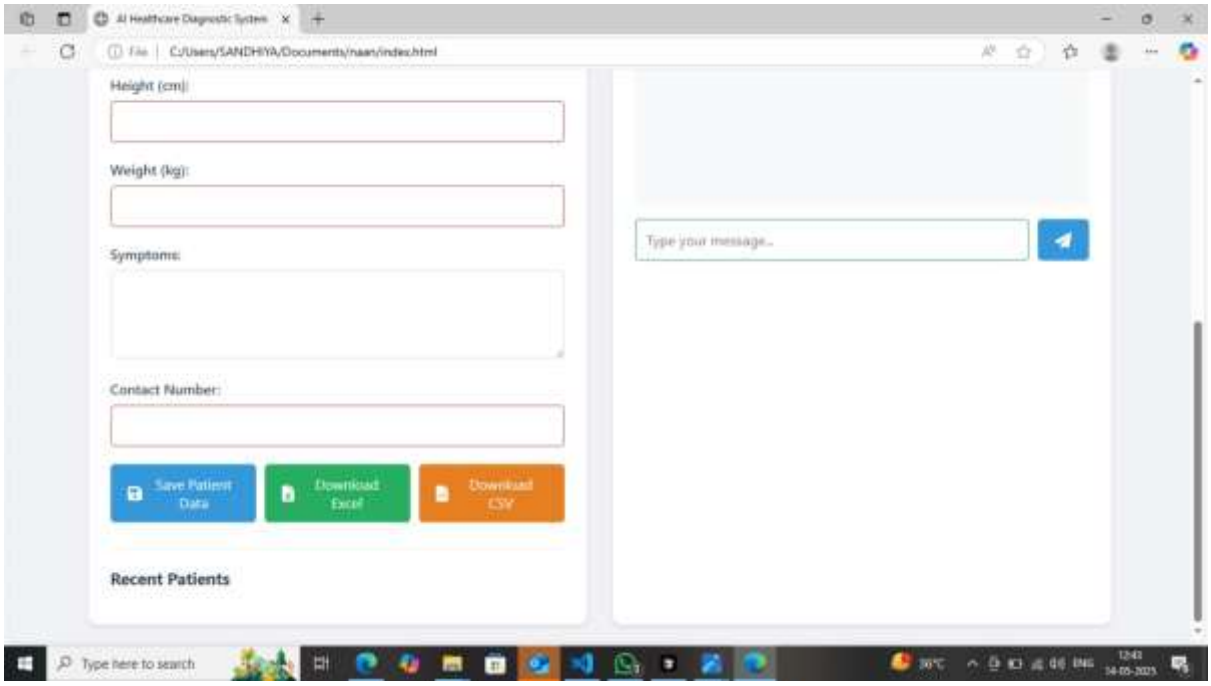
```
<div class="form-group">
    <label for="age">Age:</label>
    <input type="number" id="age" required>
</div>
<div class="form-group">
    <label for="height">Height (cm):</label>
    <input type="number" id="height" required min="50" max="250">
</div>
<div class="form-group">
    <label for="weight">Weight (kg):</label>
    <input type="number" id="weight" required min="1" max="300">
</div>
<div class="form-group">
    <label for="symptoms">Symptoms:</label>
    <textarea id="symptoms" required></textarea>
</div>
<div class="form-group">
    <label for="contact">Contact Number:</label>
    <input type="tel" id="contact" required>
</div>
<div class="button-group">
    <button type="submit"><i class="fas fa-save"></i> Save Patient Data</button>
    <button type="button" id="downloadExcel"><i class="fas fa-file-excel"></i> Download Excel</button>
```

```
                <button type="button" id="downloadCSV"><i class="fas fa-file-csv"></i> Download CSV</button>
            </div>
        </form>
        <div class="patient-list">
            <h3>Recent Patients</h3>
            <div id="recentPatients"></div>
        </div>
    </div>

    <div class="chatbot-container">
        <h2><i class="fas fa-robot"></i> Healthcare Assistant</h2>
        <div class="chat-box" id="chatBox">
            <div class="chat-messages" id="chatMessages">
                <div class="message bot">
                    Hello! I'm your healthcare assistant. How can I help you today?
                </div>
            </div>
            <div class="chat-input">
                <input type="text" id="userInput" placeholder="Type your message...">
                <button id="sendMessage"><i class="fas fa-paper-plane"></i></button>
            </div>
        </div>
    </div>
```

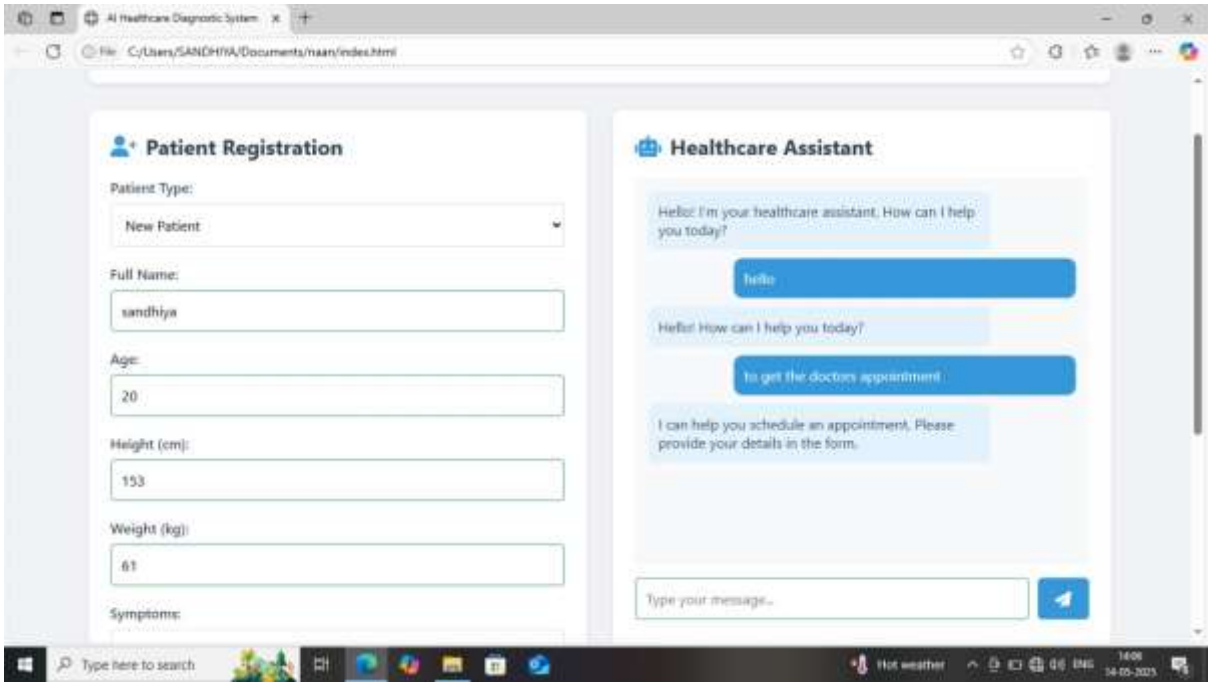
```
    </div>

    <script src="script.js"></script>

</body>

</html>
```

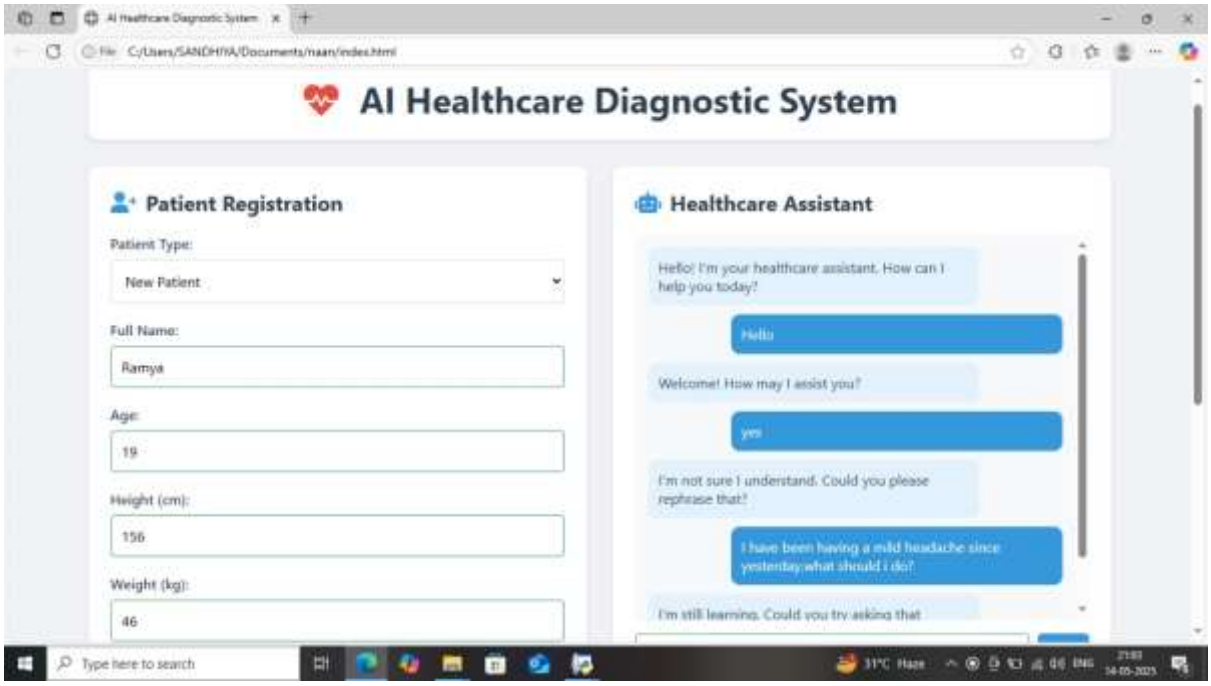
## Input

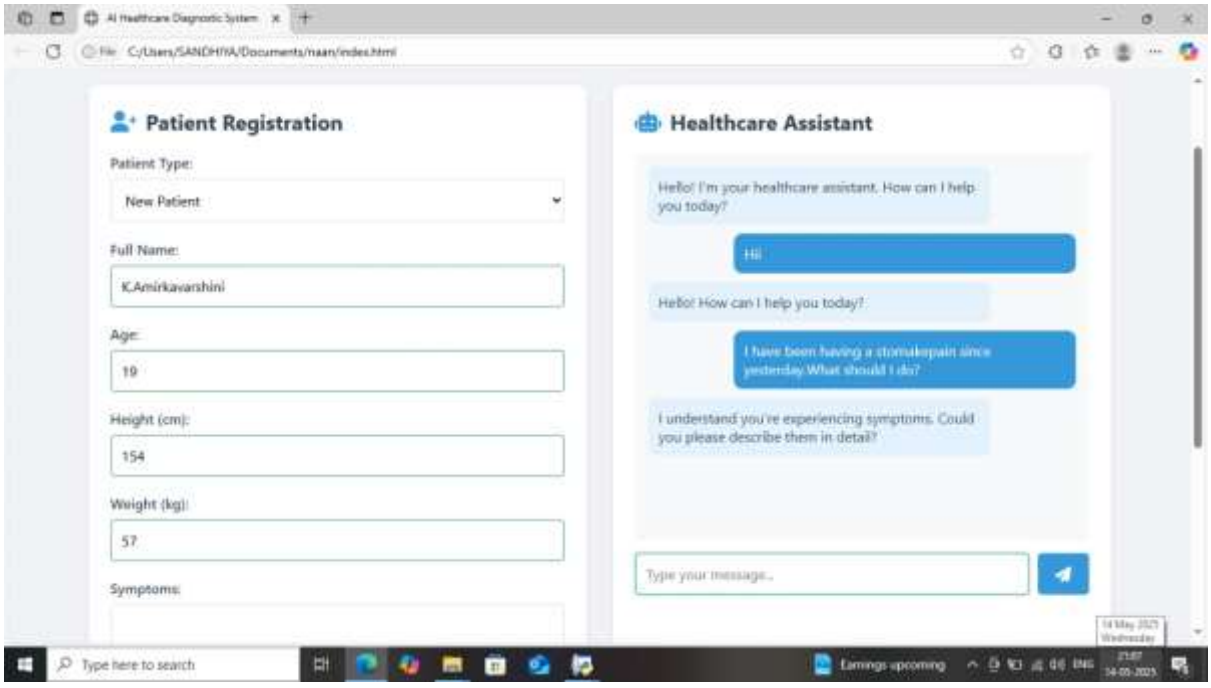


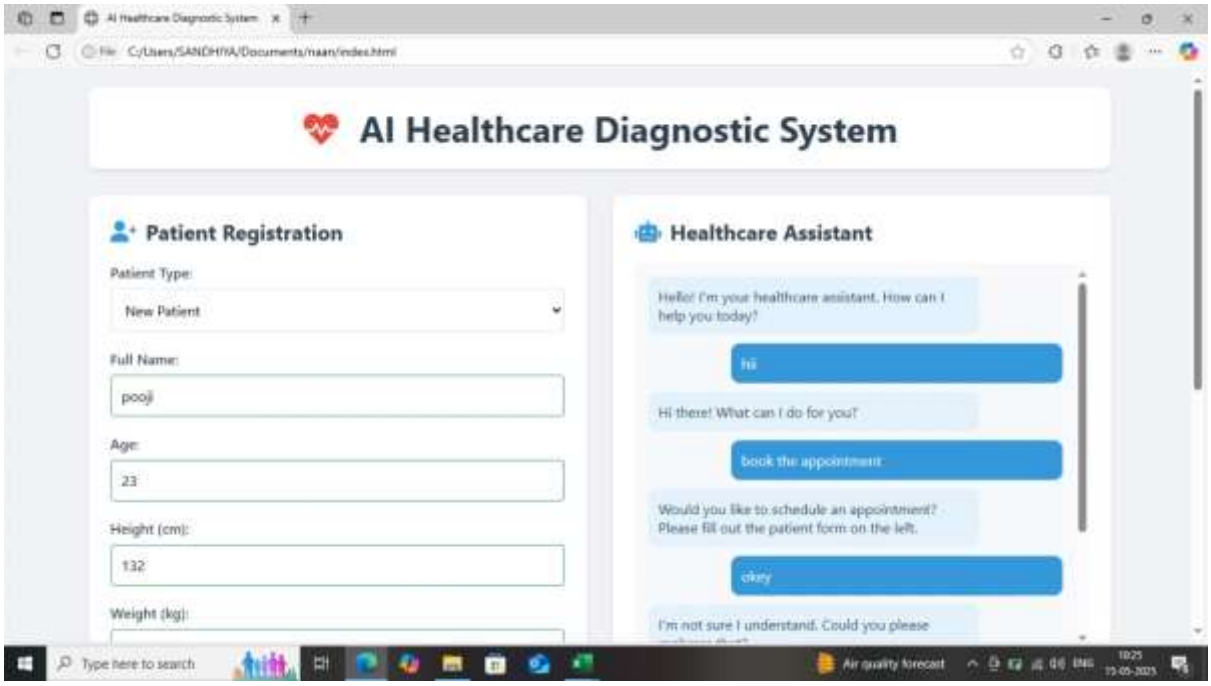

AI Healthcare Diagnostic System
C:/Users/SANDHIYA/Documents/naan/index.html
Height (cm):
Weight (kg):
Symptoms:
Contact Number:
Save Patient Data
Download Excel
Download CSV
Recent Patients
Type your message...
Type here to search

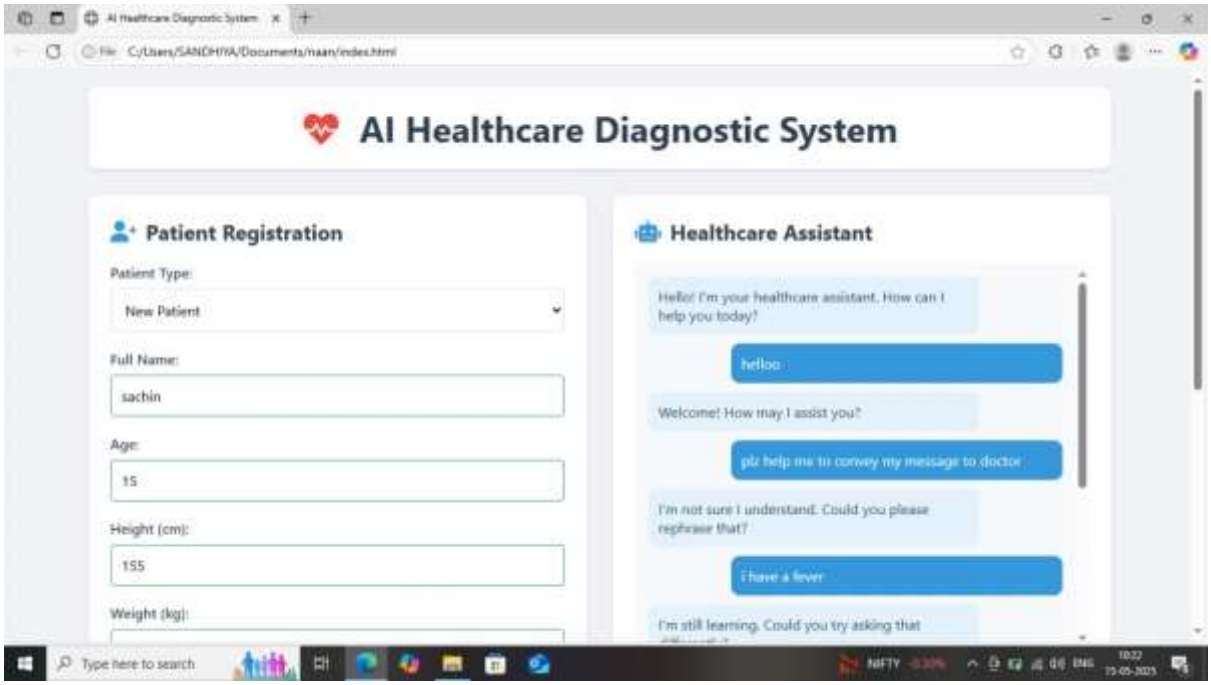
# Output

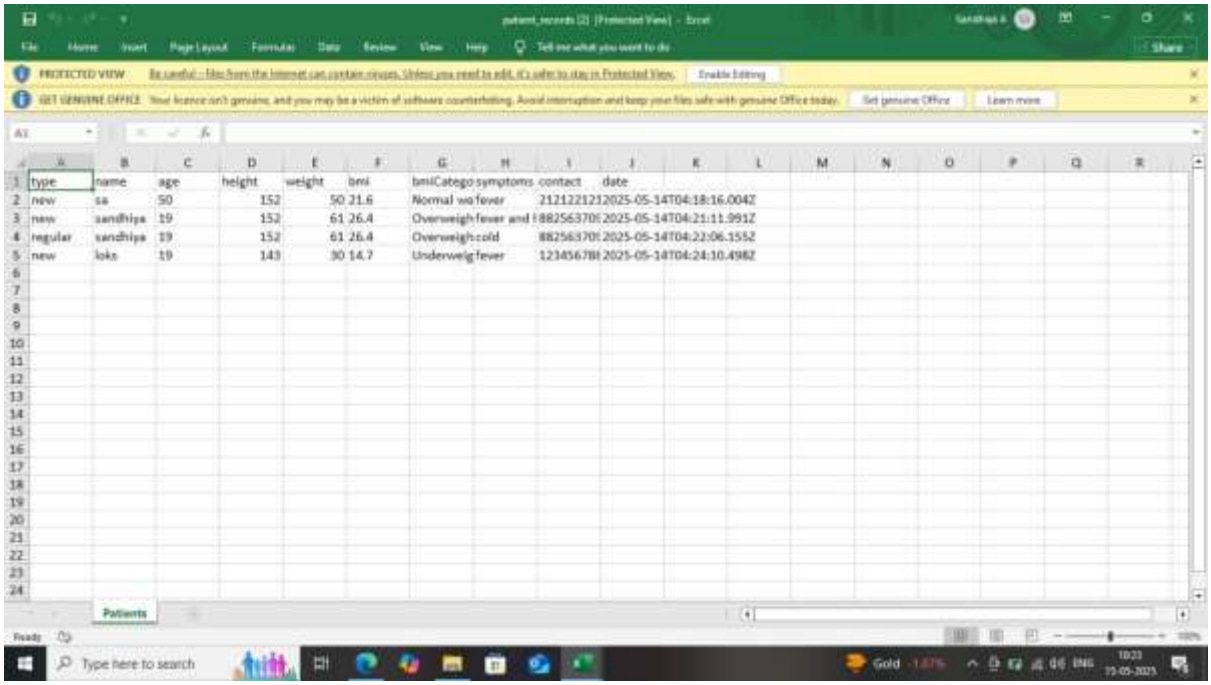

AI Healthcare Diagnostic System
C:/Users/SANDHIYA/Documents/naan/index.html
Patient Registration
Patient Type:
New Patient
Full Name:
sandhiya
Age:
20
Height (cm):
153
Weight (kg):
61
Symptoms:
Healthcare Assistant
Hello! I'm your healthcare assistant. How can I help you today?
hello
Hello! How can I help you today?
to get the doctors appointment
I can help you schedule an appointment. Please provide your details in the form.
Type your message...
Type here to search


AI Healthcare Diagnostic System
Patient Registration
Patient Type:
New Patient
Full Name:
Ramya
Age:
19
Height (cm):
156
Weight (kg):
46
Healthcare Assistant
Hello! I'm your healthcare assistant. How can I help you today?
Hello
Welcome! How may I assist you?
yes
I'm not sure I understand. Could you please rephrase that?
I have been having a mild headache since yesterday.what should i do?
I'm still learning. Could you try asking that
Type here to search

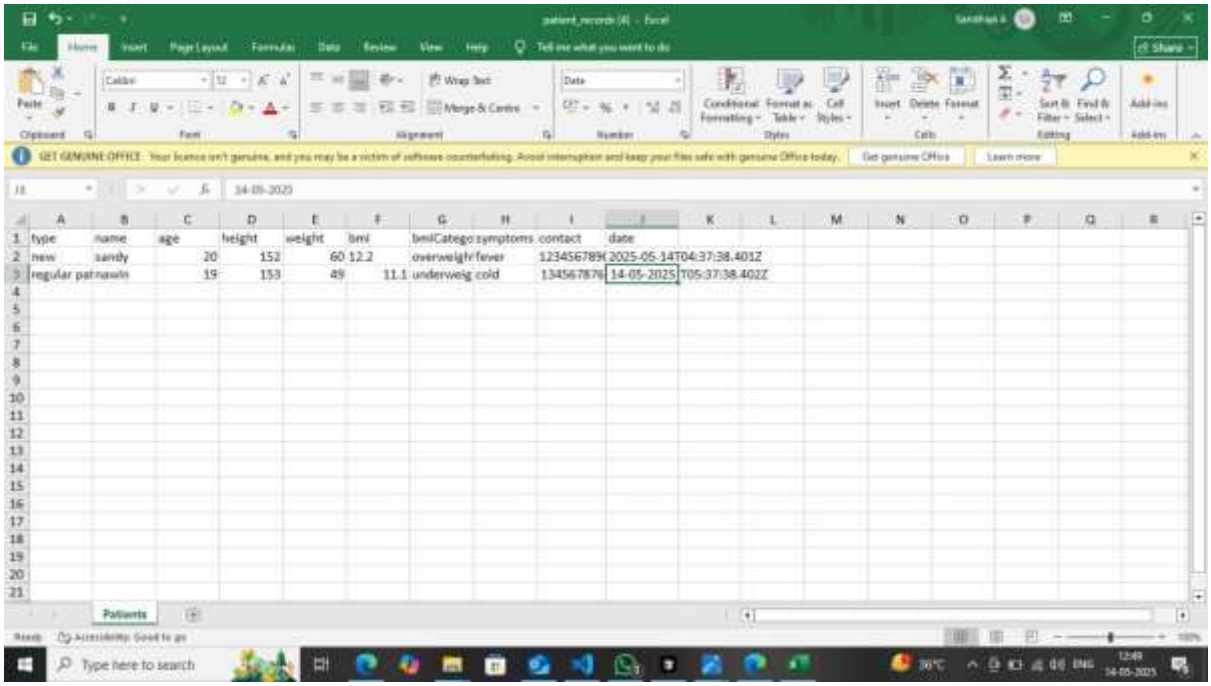

Patient Registration
Patient Type:
New Patient
Full Name:
K.Amirkavarshini
Age:
19
Height (cm):
154
Weight (kg):
57
Symptoms:
Healthcare Assistant
Hello! I'm your healthcare assistant. How can I help you today?
Hii
Hello! How can I help you today?
I have been having a stomakepain since yesterday.What should I do?
I understand you're experiencing symptoms. Could you please describe them in detail?
Type your message...
Type here to search


AI Healthcare Diagnostic System
Patient Registration
Patient Type:
New Patient
Full Name:
pooji
Age:
23
Height (cm):
132
Weight (kg):
Healthcare Assistant
Hello! I'm your healthcare assistant. How can I help you today?
hi
Hi there! What can I do for you?
book the appointment
Would you like to schedule an appointment? Please fill out the patient form on the left.
okey
I'm not sure I understand. Could you please


AI Healthcare Diagnostic System
Patient Registration
Patient Type:
New Patient
Full Name:
sachin
Age:
15
Height (cm):
155
Weight (kg):
Healthcare Assistant
Hello! I'm your healthcare assistant. How can I help you today?
helloo
Welcome! How may I assist you?
plz help me to convey my message to doctor
I'm not sure I understand. Could you please rephrase that?
i have a fever
I'm still learning. Could you try asking that



| type | name | age | height | weight | bmi | bmiCatego | symptoms | contact | date |
|---|---|---|---|---|---|---|---|---|---|
| new | sa | 50 | 152 | 50 | 21.6 | Normal we | fever | 2121221212 | 2025-05-14T04:18:16.004Z |
| new | sandhiya | 19 | 152 | 61 | 26.4 | Overweigh | fever and | 8825637051 | 2025-05-14T04:21:11.991Z |
| regular | sandhiya | 19 | 152 | 61 | 26.4 | Overweigh | cold | 8825637051 | 2025-05-14T04:22:06.155Z |
| new | loks | 19 | 143 | 30 | 14.7 | Underweig | fever | 1234567891 | 2025-05-14T04:24:10.498Z |



| type | name | age | height | weight | bmi | bmiCatego | symptoms | contact | date |
|---|---|---|---|---|---|---|---|---|---|
| new | sandy | 20 | 152 | 60 | 12.2 | overweigh | fever | 1234567891 | 2025-05-14T04:37:38.401Z |
| regular | pat navin | 19 | 153 | 49 | 11.1 | underweig | cold | 1345678761 | 14-05-2025T05:37:38.402Z |