Project Report

Project Title

AI Health Appointment Navigator Using Agentic AI (ReAct Pattern)

Date

December 2025

Project Type

Individual Project

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1. Overview

The **AI Health Appointment Navigator** is a smart healthcare assistance system designed to help users identify the appropriate medical specialist and nearby hospital based on their symptoms. Many patients face confusion while choosing the correct doctor, which often leads to delays in treatment. This project solves that problem by using an **agent-based AI approach** that reasons over user symptoms, interacts with external APIs, and queries a database to recommend suitable medical appointments.

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2. Problem Statement

Patients often do not know:

- Which medical specialist to consult for their symptoms
- Which hospital is nearby
- Whether a suitable doctor is available

This leads to wasted time, confusion, and inefficient healthcare access.

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3. Proposed Solution

The system accepts user inputs such as symptoms and city. An AI agent processes this information and:

1. Analyzes the symptoms
2. Determines the required medical specialty
3. Fetches nearby hospitals using a free map API
4. Checks doctor availability from a SQL database

5. Displays appointment recommendations

The solution is cost-effective, efficient, and scalable.

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4. ReAct Pattern (Agentic AI)

The project is based on the **ReAct (Reason–Act–Observe)** pattern:

- **Reason:** The agent interprets user symptoms and maps them to a medical specialty
- **Act:** The agent calls external APIs to find hospitals
- **Observe:** The agent queries the database to observe doctor availability

This cycle enables intelligent decision-making rather than static rule-based responses.

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5. System Architecture

User → Frontend (HTML) → FastAPI Backend → AI Agent → External API + SQL Database → Response

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6. Input and Output

Input:

- User Name
- Symptoms (e.g., fever, headache, chest pain, migraine)
- City

Output:

- Detected Medical Specialty
- Nearby Hospital Name
- Doctor Name
- Available Time Slot
- Appointment Status: Found

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7. Technical Stack

Backend:

- Python
- FastAPI

Frontend:

- HTML
- JavaScript

Database:

- SQLite (SQL Database)

API:

- OpenStreetMap (Nominatim API – Free)

AI Logic:

- Agent-based AI using ReAct Pattern

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8. Database Design

The database contains the following tables:

- **Doctors:** Stores doctor name, specialty, hospital, and availability
- **Appointments:** Stores patient name and appointment details

The database is queried dynamically by the AI agent.

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9. Key Features

- Supports multiple symptoms (fever, headache, migraine, chest pain, etc.)
- Uses free and open-source APIs (no payment required)
- Intelligent agent-based reasoning
- User-friendly web interface
- Safe error handling

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10. Advantages

- Saves time for patients
- Reduces confusion in doctor selection

- Demonstrates real-world use of Agentic AI
- Easy to extend and scale

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11. Limitations

- Does not perform real hospital booking
- Uses keyword-based symptom detection
- Limited to predefined specialties

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12. Future Enhancements

- Integration with real hospital booking systems
- Use of NLP models for symptom understanding
- Emergency detection for critical symptoms
- User authentication and appointment history

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13. Conclusion

The **AI Health Appointment Navigator** successfully demonstrates how Agentic AI using the ReAct pattern can solve real-world healthcare navigation problems. By combining AI reasoning, APIs, and databases, the system provides intelligent, efficient, and practical solutions for patients.

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14. Source Code

GitHub Repository: (To be added)

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15. Final Remark

This project highlights the practical implementation of AI agents in healthcare and showcases modern backend development practices.