MEDISLOT

An AI-Powered Doctor Appointment Booking Platform

Final Year Project Report

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1. Abstract

Healthcare appointment systems often suffer from inefficiencies such as long waiting times, poor slot management, and lack of intelligent assistance for patients. **MediSlot** is an AI-powered doctor appointment booking platform designed to simplify and optimize the process of finding doctors, understanding medical needs, and booking appointments efficiently.

The system integrates a modern web-based platform with an **AI Chat Assistant** capable of understanding patient problems (via text or voice), mapping them to relevant medical specializations, and recommending suitable doctors based on availability, hospital, and location. MediSlot provides role-based access for **Patients** and **Hospitals**, ensuring secure and organized appointment management.

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2. Problem Statement

Existing appointment booking systems: - Lack intelligent guidance for patients - Do not support voice-based interaction - Fail to map symptoms to correct medical specializations - Provide poor visibility of slot availability

This often leads to wrong doctor selection, overcrowding, and inefficient hospital workflows.

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3. Objectives

- To design an intelligent doctor appointment booking system
- To integrate AI for medical query handling and booking assistance
- To enable voice and text-based interaction
- To provide real-time slot availability
- To allow hospitals to manage doctors and appointments efficiently

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4. Scope of the Project

MediSlot is designed for: - Patients seeking medical consultation - Hospitals managing doctors and appointments - Educational and real-world deployment scenarios

The system can be extended for telemedicine, prescriptions, and emergency services.

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5. System Architecture

5.1 High-Level Architecture

- **Frontend**: React + TailwindCSS
- **Backend**: FastAPI (Python)
- **Database**: MongoDB
- **AI Engine**: Groq (LLAMA-3.3-70B)
- **Authentication**: JWT

5.2 Architecture Flow

1. User interacts via UI or AI Chat
2. Request sent to FastAPI backend
3. AI analyzes intent and specialization
4. Doctors fetched from MongoDB
5. Slot availability checked
6. Appointment booked securely

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6. Technology Stack

Frontend

- React.js
- Tailwind CSS
- Axios
- Web Speech API (Voice Input)

Backend

- FastAPI
- Python
- JWT Authentication
- REST APIs

Database

- MongoDB Atlas

AI Integration

- Groq API
- LLAMA-3.3-70B-Versatile model

7. Functional Modules

7.1 Patient Module

- User registration and login
- Search doctors by specialization, hospital, and location
- View real-time slot availability
- Book and cancel appointments
- AI Chat Assistant (Text + Voice)

7.2 Hospital Module

- Hospital registration and login
- Add, update, and delete doctors
- Set daily slot limits
- View appointments date-wise and doctor-wise

7.3 AI Chat Assistant Module

- Understand medical problems
- Map symptoms to specialization
- Recommend doctors dynamically
- Answer general medical queries
- Enable booking directly from chat

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8. AI Chat Logic

1. User describes problem (e.g., "I have fits")
2. AI analyzes input
3. AI maps problem → specialization (Neurology)
4. Backend fetches Neurology doctors
5. Doctors displayed in chat UI
6. User selects doctor and books slot

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9. Database Design

Collections

- Users
- Hospitals
- Doctors
- Appointments

Each collection is designed with proper indexing and relations using IDs.

10. Security Features

- JWT-based authentication
- Role-based access control
- Secure API endpoints
- Input validation with Pydantic

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11. Advantages

- Intelligent doctor recommendation
- Voice-enabled interaction
- Reduced booking errors
- Efficient hospital management
- User-friendly modern UI

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12. Limitations

- AI responses depend on model accuracy
- Requires internet connectivity
- Not a replacement for professional diagnosis

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13. Future Enhancements

- Telemedicine (video consultation)
- Prescription management
- Payment gateway integration
- Mobile application
- Multilingual AI support

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14. Conclusion

MediSlot successfully demonstrates how artificial intelligence can be integrated into healthcare systems to improve efficiency, accuracy, and user experience. The platform bridges the gap between patients and hospitals by providing intelligent guidance and seamless appointment management.

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15. References

1. FastAPI Documentation

2. MongoDB Documentation
3. Groq AI API Documentation
4. React.js Documentation

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End of Report