

# **Smart Assistance Appointment System for NIMHANS**

**PROJECT SYNOPSIS**

**OF MAJOR PROJECT**

**BACHELOR OF TECHNOLOGY**

**COMPUTER SCIENCE AND ENGINEERING**

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# 1. INTRODUCTION

The healthcare industry is constantly evolving, with a focus on enhancing patient experience and improving operational efficiency. One of the persistent challenges is the scheduling of outpatient department (OPD) appointments, which can often be cumbersome and time-consuming for both patients and administrative staff. To address this, we propose the development of a **Smart Assistance Appointment System** specifically designed for NIMHANS (National Institute of Mental Health & Neurosciences, Bangalore, Karnataka). This project aims to design and implement a voice assistant system that allows patients to easily interact with the hospital's appointment system through intuitive voice commands. Additionally, a smart, question-driven web portal will be developed for the categorization and booking of OPD appointments.

This system will improve the appointment scheduling process, reduce wait times, and enhance patient satisfaction by using Natural Language Processing (NLP) and speech recognition techniques. Traditional appointment scheduling methods can be time-consuming, prone to errors, and often inconvenient for patients, particularly those with limited digital literacy or accessibility needs, hence by using this system these problems can be eliminated. The voice assistant will manage various patient requests, including booking, rescheduling, and cancellations, ensuring real-time updates and maintaining data accuracy by integrating seamlessly with NIMHANS' existing management systems. The project will also cater to a diverse patient demographic, including those unfamiliar with traditional digital interfaces, by providing an intuitive, user-friendly voice-based interface. Through this initiative, we aim to demonstrate the transformative potential of AI-driven solutions in healthcare, showcasing how such technologies can optimize appointment management and improve overall service delivery. The goal is to create a scalable model that can enhance patient experience and operational efficiency at NIMHANS and potentially be adopted by other healthcare institutions.

## **2. RATIONALE**

The **Smart Assistance Appointment System for NIMHANS** is essential due to the increasing demand for efficient and patient-friendly healthcare services. As a leading mental health and neuroscience institution, NIMHANS handles a high volume of outpatient department (OPD) appointments daily, creating a significant administrative burden and potential for delays in patient care. Traditional appointment scheduling methods can be time-consuming, prone to errors, and often inconvenient for patients, particularly those with limited digital literacy or accessibility needs [2]. Implementing an automated voice assistant and smart web portal specifically designed for NIMHANS will address these challenges by streamlining the appointment process. The voice assistant will enable patients to book, reschedule, or cancel appointments using simple voice commands, making the system more accessible to a broader patient demographic. The smart web portal will further enhance efficiency by categorizing patients based on their specific needs, ensuring that appointments are scheduled appropriately and reducing wait times.

This system is not only a response to the operational needs of NIMHANS but also aligns with broader trends in healthcare towards digital transformation and patient-centered care. Thus, the project aims to improve the overall patient experience, reduce administrative workloads.

## **3. OBJECTIVES:**

Following objectives will be achieved for the accomplishment of the project:

- a) To design and implement voice assistant system for interacting with patients seeking doctor appointment.
- b) To develop a smart question driven web portal for categorization and appointment booking of OPD patients at NIMHANS.

## 4. LITERATURE REVIEW

Recent advancements in AI have led to the development of automated appointment booking systems that significantly enhance healthcare efficiency and patient experience. The "SMART DOCTORS ASSISTANT" (2023) is an AI-driven system designed to streamline appointment scheduling in hospitals, improving both patient accessibility and operational workflows [4]. Similarly, the study on an "AI-Based Medical Voice Assistant During Covid-19" focuses on the deployment of voice-activated technologies to manage appointments and provide medical information, demonstrating the effectiveness of AI during a crisis. Another system, "Medicare: A Doctor Appointment Application System," offers a comprehensive platform for booking and managing appointments, highlighting the potential for mobile integration in healthcare [5]. Lastly, the "Appointment Maker Using Computerized Voice" project showcases how voice recognition technology can be harnessed to create user-friendly appointment scheduling interfaces, further enhancing patient engagement and satisfaction [3].

Table1: Literature Review

Paper	Focus	Key Features
[4] SMART DOCTORS ASSISTANT (2023)	Advanced appointment booking system for hospitals	AI-driven automation, streamlined scheduling
[1] AI-Based Medical Voice Assistant During Covid-19 (2023)	Voice-activated assistant for managing appointments during Covid-19	AI and voice recognition for scheduling and medical information
[5] Medicare: A Doctor Appointment Application System	Mobile-based appointment booking platform	Comprehensive management, mobile integration

## **5. FEASIBILITY STUDY**

### **5.1 Technical Feasibility**

The proposed project is technically feasible, leveraging existing advancements in NLP and speech recognition technologies. The development of a voice assistant system for interacting with patients and a smart web portal for categorization and appointment booking can be achieved using readily available tools and frameworks. The availability of cloud computing resources also ensures that the system can handle high volumes of data and user interactions efficiently.

### **5.2 Operational Feasibility**

The project is highly feasible and meets the critical needs of NIMHANS. The current manual appointment scheduling system is cumbersome, leading to long wait times and administrative inefficiencies. By automating the process, the proposed system will significantly reduce the workload on administrative staff and streamline patient interactions. The voice assistant will make appointment scheduling accessible to patients who may not be comfortable with traditional digital interfaces, ensuring inclusivity and improved patient experience. The smart web portal will categorize patients based on their specific needs, ensuring appropriate and timely appointment scheduling, which is crucial for a specialized institution like NIMHANS.

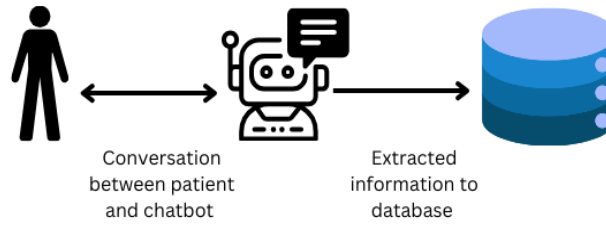
### **5.3 Economic Feasibility**

The investment in developing and implementing a voice-based chatbot can yield substantial returns. By automating appointment scheduling, hospitals can reduce labour costs associated with administrative tasks and improve resource allocation. Enhanced patient satisfaction and reduced wait times can lead to increased patient retention and higher revenue. Efficient scheduling can optimize the utilization of medical staff and facilities, further contributing to cost savings. Initial development costs can be offset by the long-term operational savings and potential for scalability across multiple departments or facilities.

## **6. METHODOLOGY/ PLANNING OF WORK:**

This project adopts an applied research approach, focusing on the practical development and implementation of an AI-driven appointment scheduling system for NIMHANS. The study will involve both qualitative and quantitative methods to assess the system's effectiveness and user satisfaction. Initially, a literature review was conducted to understand existing technologies and best practices in AI-driven healthcare solutions. Data collection will involve interviews and surveys to identify current challenges and user requirements. The project will then move to the design and development phase, where a prototype of the voice assistant and smart web portal will be created. Usability testing will be conducted to evaluate the system's performance in a controlled environment, followed by quantitative analysis of booking times, error rates, and user satisfaction. The final phase will involve integrating the system with NIMHANS' existing hospital management systems, deploying it for real-world use, and providing necessary training for staff. The project will conclude with an evaluation of the system's impact and a report on the outcomes. The steps to be followed are described below:

- a)** Identifying key requirements from stakeholders.
- b)** Creating the voice assistant and web portal.
- c)** Connecting the new system with existing hospital management tools.
- d)** Conducting usability testing and refining the system.
- e)** Implementing the system.
- f)** Monitoring performance, gather data, and report findings.



*Figure1: Workflow*

## 7. FACILITIES REQUIRED FOR THE PROPOSED WORK

**Software** needs include NLP libraries such as SpaCy and NLTK, machine learning frameworks like TensorFlow and PyTorch, and speech recognition. Additionally, tools for integration with existing hospital management systems and electronic health records (EHRs) are essential. On the **hardware** side, powerful servers or cloud-based computing resources will be necessary to handle data processing and real-time interactions.

Secure storage solutions and backup systems will be crucial to protect sensitive patient data and ensure system reliability. These facilities will support the efficient development, deployment, and maintenance of the appointment scheduling system, contributing to improved patient management and operational efficiency at NIMHANS.

## 8. EXPECTED OUTCOMES

- a) Voice-based interface for easy appointment management.
- b) Streamlined scheduling reduces administrative workload.
- c) Faster, user-friendly booking process.
- d) Accurate, up-to-date appointment information.
- e) Potential adoption by other healthcare institutions.



## 9. REFERENCES

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