**Medihub- A AI POWERED TELEMEDICINE PLATFORM**

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Abstract – Advanced web technologies with AI techniques created paths to bring forth modern healthcare solutions accessible while ensuring both efficiency and broad inclusion. These collaborative projects called AI Doctor Assistant and MediHub support the increasing healthcare requirements of people who lack healthcare resources in underserved communities and rural areas. These platforms target medical service availability improvement by automating systems and implementing intelligent solutions and by removing healthcare reliance on in-person consultations. The AI Doctor Assistant functions as an automation system that assists medical staff through its AI-based preliminary diagnosis mechanism that accepts patient-reported symptoms. The system adopts Support Vector Machine (SVM) and Naive Bayes among its machine learning algorithms together with Random Forest to generate disease predictions by obtaining major voting results. This tool serves regions with limited healthcare staff well by giving doctors fast trustworthy diagnostic feedback to aid early medical issue detection. As a different approach MediHub delivers its telemedicine system with complete platforms specifically designed for patient use. With its AI mental health bot for counseling and BMI tracking and hospital lookup functions this platform provides users easy access to appointment booking. Users with any location can access medical services through MediHub because its design focuses on accommodating accessibility. The combination of these two AI-based projects creates an end-to-end system that unites healthcare disruption and medical accessibility to enhance early diagnosis and deliver complete physical and mental health assistance to users.

Index Terms— Disease prediction, Artificial Intelligence in healthcare, Machine Learning, Support Vector Machine, Naive Bayes, Random Forest, Symptom classification, Medical diagnosis system.

# I INTRODUCTION

Over time Artificial Intelligence (AI) and web technologies continue advancing which brings fundamental changes to how healthcare services are distributed and obtained in the industry. These technological advances enabled the creation of intelligent health systems which help medical professionals and patients particularly in rural areas because they lack sufficient medical facilities. The essential healthcare challenges are addressed by two developed systems namely AI Doctor Assistant and MediHub – A Telemedicine Platform. AI Doctor Assistant operates as an AI-powered instrument that helps medical professionals conduct preliminary disease assessment from submitted patient symptoms. The system depends on Support Vector Machine (SVM) and Naive Bayes and Random Forest machine learning algorithms to achieve precise and uniform diagnostic results. A majority voting system within the model improves its reliability through early illness detection which lightens healthcare professional workloads. This system brings great value to areas lacking medical personnel and situations requiring rapid diagnosis. MediHub functions as a patient-first telemedicine system which provides smooth digital healthcare solutions to users. This AI-enabled platform maintains a chatbot to deliver emotional help to users and provides BMI tracking along with hospital search tools and scheduling features. Through its platform the system guarantees that users anywhere can get instant access to medical help and access mental health assistance. These two healthcare systems form a complete approach which delivers standardized care to patients. AI Doctor Assistant assists in medical diagnostics and healthcare choices yet MediHub enables patients to remotely supervise their health independently

# II. LITERATURE SURVEY

1. Paper Name**:** General Disease Prediction Using ML/DL  
   Authors: Springer  
   Year: 2023  
   Basic Concept**:** Utilizes logistic regression, CNN, and LSTM for disease prediction, highlighting the strength of deep learning in modeling complex health data.  
   Idea of Extraction: Inspired our use of interpretable ML models for reliable, symptom-based diagnosis.
2. Paper Name: A Review of Telemedicine Applications in the Pandemic Era  
   Authors: Smith et al., Journal of Medical Systems  
   Year: 2021  
   Basic Concept: Analyzes how telemedicine became a crucial tool during COVID-19, enabling virtual healthcare delivery and remote monitoring.  
   Idea of Extraction: Validated the need for AI-powered, user-accessible telehealth solutions like MediHub.
3. Paper Name: Telemedicine for Diabetes Care: Use and Evaluation in Real-World Settings  
   Authors: American Diabetes Association  
   Year: 2020  
   Basic Concept: Demonstrates effective chronic care via telemedicine, reducing hospital dependency and improving disease management.  
   Idea of Extraction: Influenced the incorporation of continuous care and health tracking in our platform.
4. Paper Name: A Cloud-Based Telemedicine Framework for Remote Healthcare  
   Authors: Patel & Mehta, Springer Health Informatics Journal  
   Year: 2018  
   Basic Concept: Proposes a scalable, secure cloud telemedicine framework with real-time communication between doctors and patients.  
   Idea of Extraction: Guided backend system design and cloud deployment strategy for MediHub.
5. Paper Name: Implementation Challenges in Telemedicine Systems  
   Authors: Kaur & Sharma, IEEE Access  
   Year: 2020  
   Basic Concept: Discusses barriers like privacy concerns, poor internet infrastructure, and the need for user training.  
   Idea of Extraction**:** Informed our focus on intuitive design, data privacy, and support for low-bandwidth areas.

III. PROBLEM STATEMENT

Limited access to timely healthcare in rural areas leads to misdiagnosis and delayed treatment. This project combines AI-based disease prediction and a telemedicine platform to offer instant, accurate health insights and remote medical support. It aims to bridge healthcare gaps through intelligent, accessible, and user-friendly digital solutions..

# IV. PROPOSED SYSTEM

The Telemedicine Platform proposed here is a user-centric, all-encompassing solution that connects patients to their doctors and administrators through cloud-based APIs, backend services, artificial intelligence integration, and secure databases. This optimizes remote consultations, appointment scheduling, and medical records—making healthcare services more accessible and efficient.

1. Interaction with User & Appointment Management

The system starts with the Patient Module, where users can register/login, book appointments, view appointment details, and check their appointment history. This interaction is propagated through a frontend interface, controlled by a secure backend using RESTful API services.

Doctors, on the other hand, use the Frontend Dashboard to manage appointments, patients, prescription, and reports.

Admin Module - This module takes care of the doctor registration approval and management of the appointment ecosystem that ensures the system is reliable and works smoothly.

1. Backend & AI Integration

Backend: Backend serves as a core service layer managing user inputs, storing appointment data, and firing AI-based assistance. An integrated AI Assistant runs on chat logs, symptom inputs, and consultation patterns to complement diagnosis and patient assistance. It is, in fact, generative AI modules like Gemini that take these decision-making and repetitive tasks to new levels of automation.

1. **Prediction & Medical Assistance**

The platform integrates disease prediction models using machine learning techniques such as **SVM, Naive Bayes, and Random Forest**. These models aid doctors during consultations by offering predictive suggestions based on patient symptoms, improving diagnostic speed and accuracy.

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| User uploaded image      Fig 1: Proposed Architecture Diagram |

1. Preprocessing

he Telemedicine Platform relies heavily on preprocessing to clean and structure patient data for AI driven decision support. This involves gathering information about the patient, including age, gender, symptoms, existing diagnoses, vitals, and test results, through secure online forms or networked health records.

This process includes identifying and addressing anomalies or missing data, providing an automatic approach for ensuring data integrity. Error entries are flagged using outlier detection methods, and consistent formats and units are enforced across datasets. It encodes all the collected data, i.e., categorical fields such as symptoms and conditions are converted into binary or numerical format using one-hot encoding and label encoding techniques.

The features are normalized using MinMaxScaler or standard scaling for all numerical columns for consistency. Next, this cleaned dataset is split into training and testing sets preserving the representation of common and rare medical cases..

1. Model Training

Model is made up of a mixture of stacked LSTM layers, The telemedicine platform uses various AI models, including SVM (Support Vector Machine), RandomForest, and Naive Bayes classifiers, to be trained to determine potential diagnoses based on symptom patterns along with patient history.

During training, each model is given the processed data as input and evaluated on their ability to correctly classify the disease categories. For example, if there are multiple models being built, cross-validation is performed to ensure models are not overfitted and that the model generalizes well on unseen patient data. Effectiveness is evaluated through performance metrics such as accuracy, confusion matrix.

The final prediction among all models is achieved using ensemble majority voting to get a risk-free diagnosis suggestion. The prediction could be presented back to the patient or the healthcare provider through the platform's interface, which can be created through Flask or Streamlit for smooth user interaction.

# V. IMPLEMENTATION DETAILS

Using Python in a Jupyter Notebook, the telemedicine platform leverages NumPy, Pandas, and scikit-learn libraries for preprocessing, training, and visualization. This patient data is collected from chatbot logs, appointment histories and prescriptions and is cleaned, encoded and normalized for machine learning. This system consists of Support Vector Machine (SVM), Naive Bayes and Random Forest classifiers trained on a high-dimensional binary dataset, showing the presence or absence of symptoms. These models are trained to recognize symptoms that match the patterns of known diseases and a majority voting system is implemented to improve the accuracy of predictions. Performance metrics, such as confusion matrices and accuracy scores, are visualized using tools like Matplotlib and sklearn.

The architecture diagram (fig.1) represents patients, doctors and admin interfaces as part of an overall platform. Patients register, book appointments and see their history, doctors connect through a dedicated frontend and APIs for prescriptions and appointments management and admins can register doctors and oversee appointments. A centralized backend using model and techniques integration with a database is used to store all patient records; an AI assistant, which is fed by the trained models, predicts the disease prediction in real time. Logs from the chatbot are used for symptom analysis through automation, while back-to-back with that, the Gemini AI module supports intelligent decision-making. A flask/streamlit based GUI can be created for user-friendly interaction and dynamic visualization of the diagnostic results.

# CONCLUSION

This telemedicine service transforms healthcare by providing remote consultations for patients with healthcare providers. By using advanced technologies such as video conferencing, secure messaging, and digitizing health records, it ensures high-quality care without worrying about location.

Patients can easily schedule appointments, talk with doctors, and review their medical files via an easy-to-use platform from any device. Healthcare providers are empowered with streamlined workflows that simplify administrative burdens and help deliver care more efficiently.

This AI-integrated platform aims to provide more accurate diagnostics and customized treatment suggestions, putting data-driven information into the hands of healthcare workers for better patient results. It’s also flexible with different healthcare systems and regulations, meaning it can be used around the world.

Aim Beyond not only enhances healthcare accessibility; the platform also cuts costs by reducing the frequency of appointments, and it decreases exposure risk, especially during public health emergencies. It links patients in rural or underserved regions with medical experts, helping address vital deficiencies in access to healthcare.

With time, the platform would continue to get smarter with features of enhanced remote monitoring and integration with newer digital health applications to optimize on such aspects of health care delivery and patient care. With its simplicity in form and enhanced level of prediction rate, it is a valuable resource in AI finance application.

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