

AI-Powered Healthcare Platform for Early Disease Detection

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Abstract— Machine Learning (ML) and Artificial Intelligence (AI) are transforming modern healthcare by providing faster and more accurate diagnostic support. An approach for automatic prediction of multiple diseases—specifically Diabetes, Heart Disease, and Parkinson’s Disease—using machine learning models integrated within an interactive healthcare application is proposed in this paper. The system utilizes ML algorithms such as the Random Forest Classifier and Support Vector Machine (SVM) for analyzing patient medical parameters and generating reliable prediction results. Disease-specific features are processed and classified through trained models to provide instant diagnostic insights.

Index Terms- Machine Learning, Artificial Intelligence, Random Forest Classifier, Support Vector Machine (SVM), Streamlit, Disease Prediction, Diabetes, Heart Disease, Parkinson’s Disease.

I INTRODUCTION

The *AI-Powered Smart Health Prediction System for Early Disease Detection* is an innovative and comprehensive healthcare platform designed to provide early detection of chronic diseases using machine learning technologies. In today's fast-paced world, timely health monitoring has become crucial, and this system aims to empower individuals by offering accurate predictions for conditions such as diabetes, heart disease, and Parkinson’s disease. By transforming traditional health assessments into intelligent digital processes. At the core of this solution are advanced machine learning models trained on real-world medical datasets, enabling users to receive personalized risk assessments based on their symptoms and health inputs. The platform presents results in a simple, user-friendly interface, ensuring that people with minimal technical knowledge can still understand and act upon the insights. Beyond

prediction models, the system integrates multiple healthcare-related services to create a unified ecosystem for patient support. Features such as doctor appointment booking, medicine reminders, ambulance booking services, and a health education portal enhance the platform’s practicality and real-world usefulness. These additional tools not only simplify daily health management but also ensure that users can easily access immediate assistance during emergencies or health concerns.

II PROPOSED SYSTEM

A. System Overview

The proposed system is a web-based AI healthcare platform that predicts diseases and provides multiple patient services in one place. The architecture consists of four main layers: The proposed system consists of four key layers. The Frontend Layer provides an interactive user interface developed using Streamlit, ensuring a simple and responsive user experience. The Backend Layer handles all core operations such as disease prediction logic, form submissions, and data storage using Python. The Machine Learning Layer incorporates pre-trained models for predicting diabetes, heart disease, and Parkinson’s disease, enabling accurate and fast diagnostic support. Finally, the API Integration Layer connects the system with external services, including the YouTube API for displaying disease awareness videos and embedded maps for locating nearby hospitals. The system ensures seamless communication between all layers, enabling real-time processing and smooth user interactions. This integrated architecture makes the platform scalable, allowing future expansion for additional diseases, patient monitoring features, and advanced healthcare services.

B. System Architecture

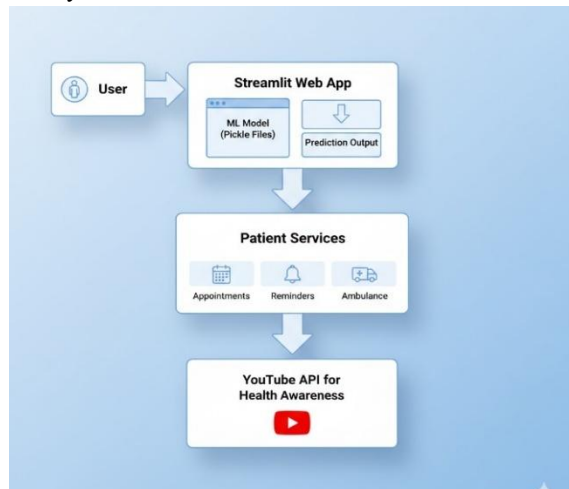


Fig: 1 The system architecture shown in the figure illustrates a Streamlit web app where users input data and receive disease predictions through ML models. These predictions link to patient services like appointments, reminders, and ambulance booking. Finally, the system integrates with the YouTube API to provide health-awareness videos for better understanding and guidance.

C. Modules of the System

The system consists of multiple integrated modules that enhance healthcare accessibility and prediction accuracy. The Disease Prediction Module uses pre-trained ML models to analyze user health data and detect diabetes, heart disease, and Parkinson's, presenting results with probability scores and visual graphs. The Doctor Appointment Module enables users to book hospital appointments, store patient details, and view schedules along with map locations. The Medicine Reminder Module allows users to set and manage reminders by storing medicine name, dosage, time, and frequency. The Ambulance Booking Module supports emergency needs by allocating the nearest available ambulance and maintaining booking history. Finally, the Disease Awareness Video Module uses the YouTube API (Application Programming Interface) to fetch educational videos, helping users better understand symptoms, prevention methods, and treatments.

D. Methodology

The proposed system follows a structured AI-driven methodology, as illustrated in Fig. 2. The workflow is divided into four key stages to ensure accurate disease

prediction and seamless healthcare service integration. In the Data Preprocessing phase, datasets are cleaned, normalized, and prepared using Pandas, while missing values are handled through mean imputation. Next, during the Model Training stage, machine learning models are developed in Python using the Scikit-learn framework, employing algorithms such as Logistic Regression and Random Forest. After training, these models are serialized into .sav files for efficient deployment. The third stage, Prediction and Visualization, involves loading the trained models within the Streamlit application using safe pickle operations. The system generates prediction outputs along with bar-chart visualizations that indicate risk probability levels for each disease. Finally, the API Integration module incorporates the YouTube API to dynamically fetch health-awareness videos, enhancing patient understanding of symptoms, prevention, and treatment options.

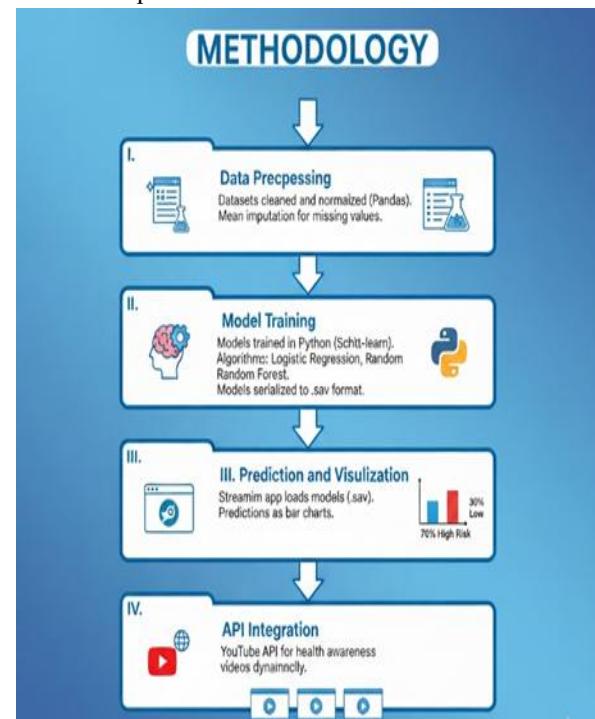


Fig 2: As shown in Fig the methodology flows sequentially from data preprocessing to model training, followed by prediction and visualization, and finally API integration. Each block represents a functional stage, with arrows indicating the logical progression of data through the AI pipeline.

III RESULTS

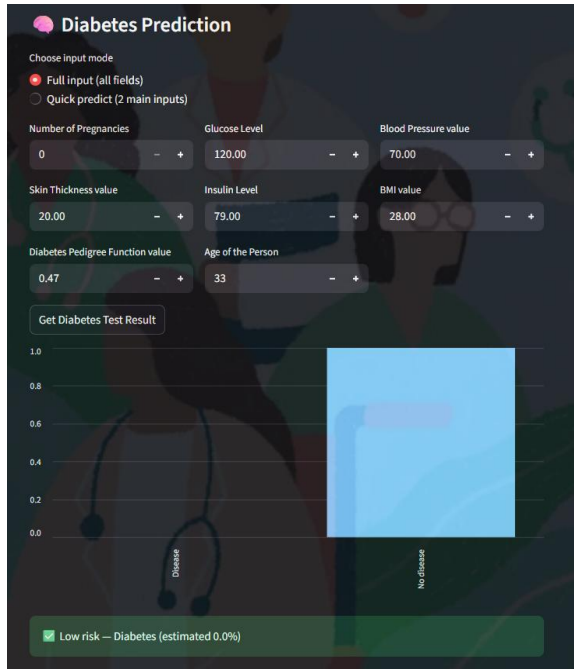


Fig 3: The figure shows the AI-powered platform predicting diabetes risk based on patient inputs, indicating a low-risk probability of 0.0%, visualized on a 0–1 scale for easy interpretation.



Fig 4: The heart disease risk based on patient inputs, indicating a low-risk probability of 45.5%, visualized on a 0–1 scale for clear interpretation.

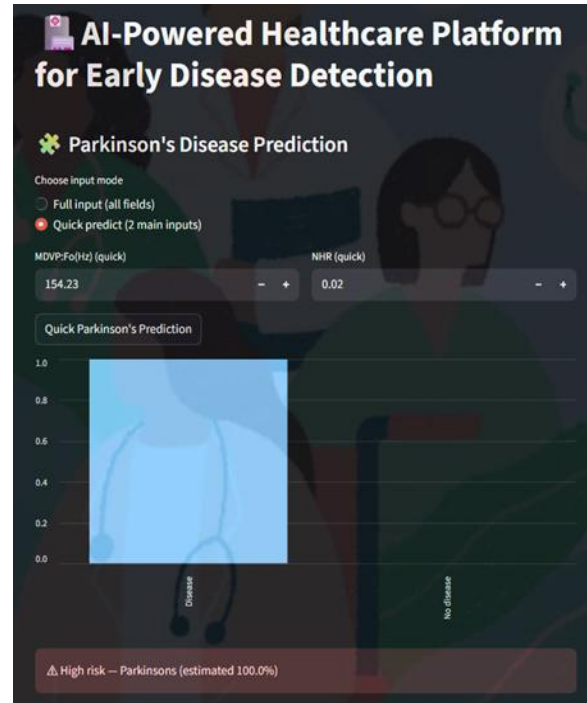


Fig 5: The figure shows the AI-powered healthcare platform predicting heart disease risk based on patient inputs, indicating a low-risk probability of 45.5%, visualized on a 0–1 scale for clear interpretation.

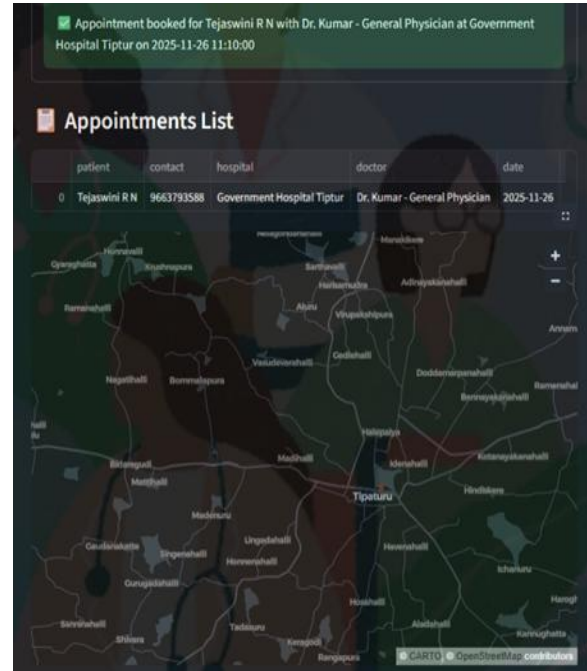


Fig 6: The figure shows the platform's appointment scheduling module, where the user selects a hospital, doctor, date, and time, resulting in a confirmed booking and an updated appointments list and location map displayed on the interface.

patient	contact	medicine	dosage	frequency	time	date
Teju	9663793588	Dolo	1	Once a day	11:12:00	2025-11-26

Fig 7: The figure displays where users enter medication details, dosage, frequency, and schedule, resulting in an automated reminder being set and listed under active reminders.

patient	contact	severity	hospital	ambulance_id	equipment	date
Tejaswini R N	9663793588	Critical	Tiptur	AMB003	Defibrillator	2025-11-26 11:13

Fig 8: The figure shows the emergency ambulance booking module, where the user enters patient details, severity level and required equipment.

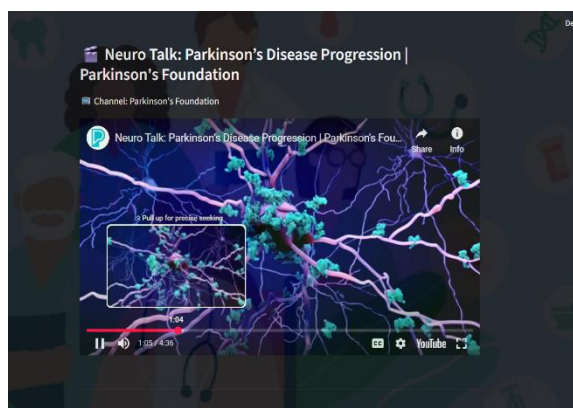


Fig 9: This interface allows users to search YouTube for medically verified disease-awareness videos, helping them understand conditions like Parkinson's disease through educational visual content.

Model	Algorithm		Accuracy
Diabetes Disease	Random Forest Algorithm		99%
Heart Disease	Random Forest Algorithm		98.54%
Parkinson's Disease	Support Vector Machine		87.17%

Table 1: Accuracy level for all three Diseases.

CONCLUSION

The AI-Powered Smart Health Prediction System presents a comprehensive and intelligent healthcare platform capable of delivering early and reliable predictions for diabetes, heart disease, and Parkinson's disease. By integrating machine learning models such as Logistic Regression, Random Forest, and SVM with a streamlined Streamlit-based interface, the system effectively transforms traditional diagnostic processes into fast, data-driven assessments. The modular architecture—with features including disease prediction, doctor appointment scheduling, medicine reminders, ambulance booking, and health-awareness video search—demonstrates the potential of AI to unify multiple healthcare services into a single accessible platform. Experimental results validate that the proposed models achieve strong classification performance, as reflected in the accuracy table (Table. 1), confirming the system's reliability for real-world use. The visual probability graphs and automated service modules further enhance user understanding and promote timely medical decision-making. Overall, the system significantly contributes to preventive healthcare by improving accessibility, enabling early

disease detection, and supporting users through emergency and routine medical activities. Future enhancements may include integrating deep learning models, expanding the dataset for higher precision, incorporating wearable-sensor data, and enabling multilingual support to reach wider populations.

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