HEALTH NEXUS

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Abstract— This feasibility study entitles us to identifying the type of health-related analytics that we can deliver through the application of both AI-based analytics in healthcare as well as other health areas of HMOs. AI is employed in this study for facilitating in diagnosis of different diseases through the analysis of the records of the patients. The implementation of AI in the healthcare sector is called health analytics. For instance, one can compare the records of patients and find characteristics that tie the two together. This is a case study for a pilot implementation of the City of Chicago´s hepatitis screening program. It differentiates the people who have been vaccinated from the people who need to be vaccinated but are not yet vaccinated. In this way, the environment in Chicago would be extremely clean according to our plan. This research would also allow the clinics to notify the respective patients on time for the success of the prevention, treatment, and other medical interventions.

Keywords - Healthcare Analytics, AI-Driven Insights, Role-Based Access, Real-Time Predictive Analytics, Web Application Development, Flask Framework, Machine Learning Models

INTRODUCTION

The project is a presentation of a computer at the top of the list of the latest technology. This provides the analyzing advantage of the medical data generated by the hospital as well as in other health-related units of HMOs. The AI-powered Electronic Health Record (EHR) software effectively captures diagnostic attendance and treatment patterns. The aim of this paper is to deploy a predictive model based on medical records (data-br/> fow) and AI, including computer-assisted radiology for the successful detection of damage to the lung due to pneumonia or other possible lung cancers. One of the main reasons why healthcare organizations use AI is to, among other things, treat and predict diseases. A machine learning model provides decision support to doctors by analyzing information about patient symptoms and medical history to make accurate diagnoses. Moreover, through clustering algorithms, hospitals can group patients and offer them individual treatments based on results.

The web application has been designed with human-centered characteristics where separate interfaces are made for clinicians and researchers. Clinicians can ask the system about the patient's symptoms, get disease predictions, and check the similarity scores to complement decision-making process. Researchers will have tools like getting the patient similarity matrices and analyzing clusters for the upcoming clinical trial. The platform is fully integrable and it leverages its components (...expansions like EHR and real-time data processing). The platform is secured by the EHR password encryption technology that allows security and authentication measures to take place practically. The dashboard will have a number of interactivestools that will allow the user to click on a visual representation of the data and extract the required information securely.

REVIEW EXISTING WORK

The project's work on this examining a well-organized strategy to the integration of machine learning as well as web technologies for the prediction of diseases. The system effectively merges a pre-trained machine learning model with an easy-to-use web interface, allowing users, such as both patients and researchers, to use specific functionalities. The utilization of training and testing data sets stands for the system's reliance on real-world data, and its modular design depicts transparency and maintenance convenience. Yet more, there are areas of the project that can be bettered. The model's accuracy and performance metrics require clearer documentation, which along with validation using various data types, can ensure reliability on demographic or clinically diverse samples. Base on the fact that the system

is functional locally, the ability to run on a cloud platform in a scalable way is still in question. User feedback mechanisms, strong error handling, and improved privacy measures are the main elements required for security and regulatory standards, especially for very delicate health data. The user interface, although it is functional, could be made more eye-catching and easier to navigate to ensure a seamless experience. The project may gain wider accessibility and a bigger effect while keeping trust and user satisfaction gained by addressing these aspects and integrating advanced validation methods, better documentation, real-world feedback, and cloud deployment.

METHODOLOGY

The method of this project is to systematically develop a disease prediction system using the Python and web development technologies. It is commenced by analyzing the requirements to define the objectives and set up the development environment with the necessary dependencies, including the Python libraries for machine learning and data processing. The provided data sets are processed with Python to handle the missing values, encodes the categorical variables, and prepares the data for training and validation. A machine learning model is developed or integrated, using the Python-based frameworks like scikit-learn or TensorFlow, evaluated for the performance, and fine-tuned for the accuracy. The backend is implemented in Python, probably using the frameworks like Flask or Django, to integrate the machine learning model with the web application. The frontend is developed by using the HTML, CSS, and JavaScript, the prototype ensures the user interface is user-friendly according to the different roles such as patients, and researchers. The system is tested end-to-end for functionality, robustness, and usability. Finally, it is deployed on a scalable platform, with security measures to protect sensitive data and comprehensive documentation is prepared to guide the usage, and maintenance. This gives the advantage to the Python programming language with machine learning, and web frameworks, and upcoming web technologies to create a reliable and an effective disease prediction solution.

RESULTS

This project is designed to help patients and the clinicians diagnosing it by using a machine learning algorithm & a user-friendly interface in order to provide accurate and useful outcomes. This allows the user to predict the diseases like clinicians, and the investigators to use the symptoms. It has a way of work that is much smoother thanks to the preloaded machine learning model that does the predictions, and an easily-navigated web interface-block presents the results, plus a user can get clear reports about it. The platform aims at customizing different user experiences - one for clients and the other for researchers by providing various features. The researchers can use graphics to spot the trends and the patients can get forecasts that are unique to them. A formidable back-end guarantees efficient data storage and retrieval granting the users smooth interactions. In general, the project was aimed as a tool for doctors and researchers to make clinical diagnosing and research blander while providing fun and reliable user experience.

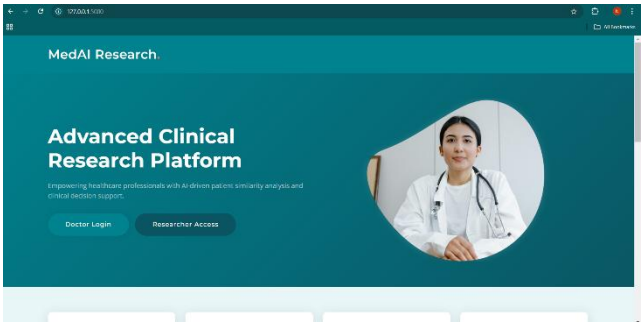

Fig 1 Main Home Page

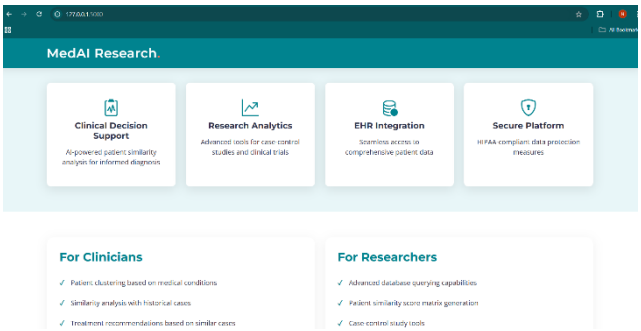

Fig 2 Main Home page

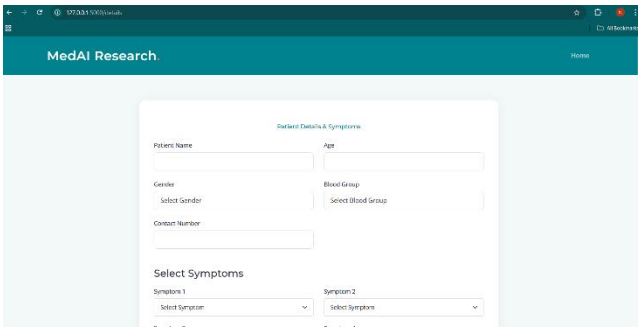

Fig 3 Doctor Query Page

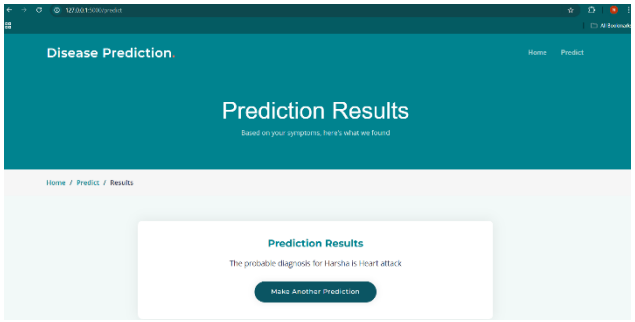

Fig 4 Disease Prediction Result

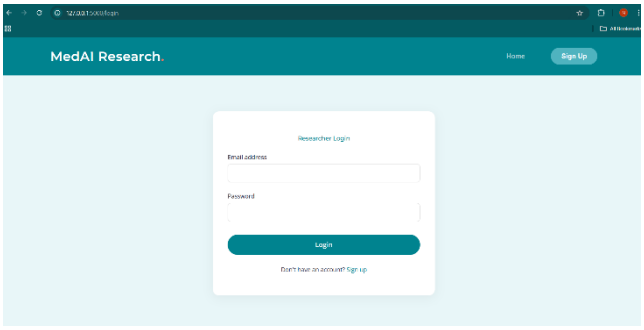

Fig 5 Researcher Login Page

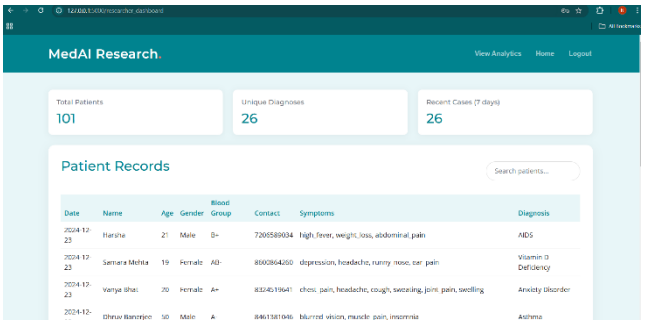

Fig 6 Researcher Dashboard

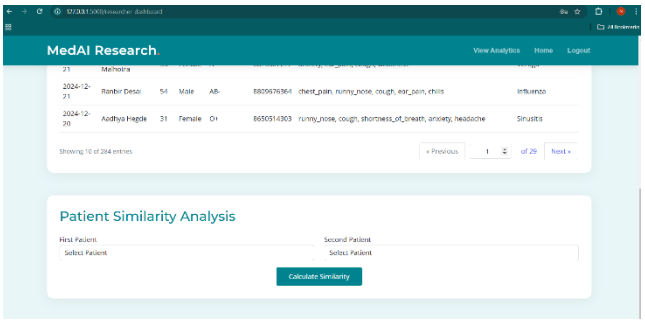

Fig 7 Patient similarity Analysis

Fig 8 Researcher Data Analytics

CONCLUSION

The project of making a web application for Clinicians and Researchers with a special focus on patient clustering based on medical conditions is the first step in the healthcare decision process and the clinical trial improvement. The integration of Machine Learning algorithms to cluster patients by the application makes sure that both doctors and researchers can effectively use the system for diagnosis, treatment recommendations, and clinical study insights. The user-friendly interfaces for both doctors and researchers are capable of easy querying of the database, with a unique feature of calculating similarity scores to guide decision-making.

Moreover, if the application is used in the proper way, it may bring considerable improvement in diagnostic accuracy, it may assist in patient treatment, and it may speed up clinical trials by the use of real-time, data-driven insights. Furthermore, the use of ReactJS for the user interface ensures a responsive and engaging experience for all users, while Google Cloud infrastructure offers reliable cloud service without backup support.

All in all, this project helps medical professionals to merge data science with clinical practices, which leads to better health outcomes and encourages innovative research in the medical field.

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