CureSageAI: Web based 2D Interactive Diagnosis and Healthcare Companion Driven by Artificial Intelligence

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Abstract - People today struggle with a wide range of illnesses as a result of their lifestyle decisions and the surrounds. Consequently, it's critical to detect the illness as soon as possible in order to preserve a strategic separation from any unfavourable defeats. Now that these issues have been taken into account, we have developed a solution and suggested CureSageAI, a web-based programme, online 2D interactive diagnosis and healthcare companion. This research paper explores the methodology, challenges, and outcomes of CureSageAI, shedding light on its significance in transforming healthcare practices. The findings contribute to the ongoing discourse on the integration of artificial intelligence in healthcare for improved diagnostics and treatment strategies.

Key Words: _Machine Learning, Drug-Recommendation, Interactive Diagnosis, Random Forest Classifier, Naïve Bayes Classifier, Disease Prediction._

1.INTRODUCTION

In the realm of modern healthcare, the escalating prevalence of diseases, intricately woven with lifestyle choices and environmental factors, underscores the imperative need for proactive disease prediction. Timely identification of ailments stands as a linchpin in effective treatment strategies, and herein lies the formidable challenge: the accurate diagnosis of diseases. Enter machine learning, a pivotal player in this healthcare paradigm shift, where predictive models serve as vanguards in forecasting diseases based on patient symptoms.

The catalyst for this transformative journey is CureSageAI, an innovative web-based 2D interactive diagnostic and healthcare companion. In a world where geographical and financial constraints impede timely diagnoses, particularly affecting those in rural areas with limited resources, CureSageAI emerges as a beacon of inclusivity.

The core functionality of CureSageAI revolves around harnessing the power of machine learning algorithms, specifically leveraging the prowess of Gaussian Naive Bayes and Random Forest Classifier methods. Especially, the interactive 2D model provides better interaction and user experience to the patient for diagnosis. This dynamic duo analyses a comprehensive dataset of patient symptoms, unravelling patterns and correlations that elude traditional diagnostic approaches. The output is not merely a prediction but a personalized healthcare roadmap, recommending suitable medications tailored to the patient's unique symptom profile.

The CureSageAI model represents a groundbreaking paradigm in healthcare by incorporating cutting-edge machine learning methodologies for disease prediction and personalized medication recommendations. As the healthcare landscape becomes increasingly intricate, our model addresses this challenge head-on. By meticulously analyzing patient information encompassing crucial factors such as gender, age, and symptoms, our model ensures a precise and accurate prediction of diseases. The implementation of sophisticated techniques, including Random Forest and Naive Bayes classifiers, goes beyond achieving high accuracy; it heralds a transformative potential in the realm of personalized medicine. The amalgamation of these technologies in CureSageAI signifies a significant step towards revolutionizing how healthcare is approached, emphasizing the role of artificial intelligence in ushering in a new era of precise diagnostics and tailored treatment strategies.

2. LITERATURE SURVEY

2.1 Medical Disease Using Machine Learning Algorithms.
May 2022 , Kunal Takke, Rameez Bhaijee, Avanish Singh. The use of Machine Learning to develop a disease prediction and doctor recommendation system. Different classification algorithms like Logistic Regression, Random Forest Classifier, KNN, and Naive Bayes are used to predict a person's disease based on their symptoms and then recommend which type of doctor to consult.

2.2 A Computational System for Disease Diagnosis and Prescription Generation.
April 2019 , Bakhrey, N., Bakhtiani, R., Soni, J., & Kalbande. Proposed a computational system for disease diagnosis and prescription generation using decision tree classification and affinity analysis. The system takes user-entered symptoms, uses association rules to identify relevant symptoms, predicts the disease, and generates a prescription based on user attributes and the identified disease.

2.3 Symptoms Based Disease Prediction Using Machine Learning.
Feb 2021, P. Hamsagayathri and S. Vigneshwaran. Proposed an automated disease prediction system to reduce the time needed for the initial disease prediction process, which depends on user input. It is designed in a way such that when the user is introduced to the chatbot system, they are given the choice of receiving an estimation or prediction of their disease

based on the data they have provided to the chatbot.

2.4 Disease Prediction and Doctor Recommendation System using Machine Learning Approaches.

Jul 2021, Kumar, Anand & U M, Prakash & Sharma, Ganesh. Suggests the use of Machine Learning to develop a disease prediction and doctor recommendation system. Different classification algorithms like Logistic Regression, Random Forest Classifier, KNN, and Naive Bayes are used to predict a person's disease based on their symptoms and then recommend which type of doctor to consult.

2.5 Disease Prediction and Doctor Recommendation System.

March 2018, Dhanashri Gujar, Rashmi Biyani, Tejaswini Bramhane, P Vaidya. The recommendation system suggests specialists based on user's chosen filters such as location, fees, experience, and feedback reviews.There is potential risk associated with relying solely on automated systems for making decisions regarding patient care without human input from healthcare professionals.

3. Aim and Objective

Aim

Our project aims to bridge the gap in healthcare accessibility, particularly for people in rural areas, by harnessing the power of machine learning and technology. Our primary objectives include the development of an accurate disease prediction system that uses symptom data for early diagnosis, providing personalized healthcare recommendations for nearby doctors and medications. Additionally, we strive to promote health education through an interactive 2D model, empowering users to learn about different body parts and related symptoms, ultimately fostering a proactive approach to health management.

Objectives

1. To create a disease prediction system that analyses user-provided symptoms to suggest potential diseases.
2. To develop a drug recommendation feature that provides information on medications related to the diagnosed disease.
3. To implement a doctor location service that helps users find healthcare providers specializing in the identified condition.
4. To integrate a clickable 2D interactive model for different body parts, enabling users to visualize disease effects and click on body parts to list related symptoms.
5. To enhance the overall user experience by offering a user-friendly interface for easy navigation.

4. MODULE DESCRIPTION

1. User Registration and Profile Creation:
If user is admin, he/she can login directly through credentials. If user is patient and is not registered , registration is required and one can login after that to perform diagnosis.

2. 2D Model Interaction and Symptom analysis:
User interacts with 2d model for concerned area and choses

symptoms listed and based on that applied algorithm predicts the disease

3. Disease Prediction:
Based on symptoms the model interacts with dataset available and maps symptoms with disease with enforced algorithms like random forest, nave Bayes, logistic regression and decision tree classifiers.

4. Drug Recommendation:
After the predicted disease is output ,it is supplied as input to the model and then the model interacts with drugs dataset and map disease with drugs, filtering based on age and gender. A candidate's qualifications and suitability for the position. It has an integrated resume builder for candidates.
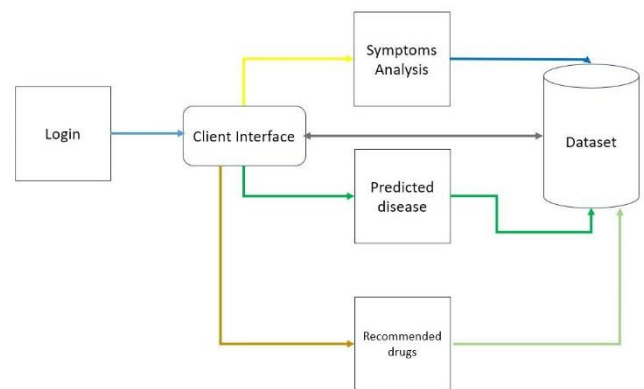

Fig 3.1 System Architecture

5. METHODOLOGY

In this section, the overall approach and tools used to perform disease prediction and drugs recommendation is discussed. This demonstrates the process of training multiple machine learning models for disease prediction, saving these models to files for later use, and making predictions based on symptoms using the trained models.
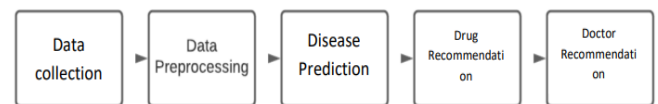

Fig 5.1 Implementation of the model

1. Data Collection:
Two datasets Training.csv and Drugs.csv is used for disease Prediction and drug recommendation respectively. Training.csv contains symptoms mapped with prognosis.Drugs.csv contains drugs mapped with disease gender and age of patients.

2. Data Loading and Preprocessing:
The code loads a CSV file named 'Training.csv' containing symptom data and prognosis. It selects specific columns ('symptoms') as the feature variables and the 'prognosis' column as the target variable. The dataset is split into training and testing sets.

3. Naive Bayes Model :
It trains a Naive Bayes classifier on the symptom data and the prognosis. It calculates and prints the accuracy of the Naive Bayes model on the test data. The Naive Bayes model is saved using joblib.dump() and later loaded.

4. Random Forest Model:
A Random Forest classifier is trained on the symptom data and prognosis. The accuracy of the Random Forest model on the test data is calculated and printed. The Random Forest model is saved using joblib.dump() and later loaded.

5. Logistic Regression Model:
A Logistic Regression model is trained on the symptom data and prognosis. The accuracy of the Logistic Regression model on the test data is calculated and printed. The Logistic Regression model is saved using joblib.dump() and later loaded.

6. Decision Tree Model :
An empty Decision Tree classifier is created and trained on the symptom data and prognosis. The accuracy of the Decision Tree model on the test data is calculated and printed. The Decision Tree model is saved using joblib.dump() and later loaded.

7. Predictions:
The code provides a mechanism to make predictions for a list of symptoms (test data). It constructs a binary list (list c), indicating the presence or absence of specific symptoms.The trained models (Naive Bayes, Random Forest, Logistic Regression, and Decision Tree) are used to predict the disease based on the provided symptoms.
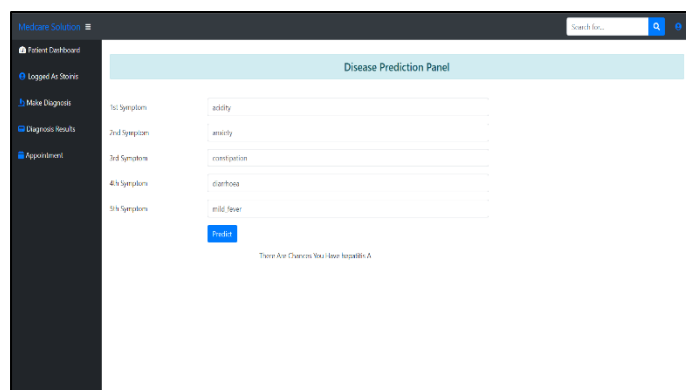
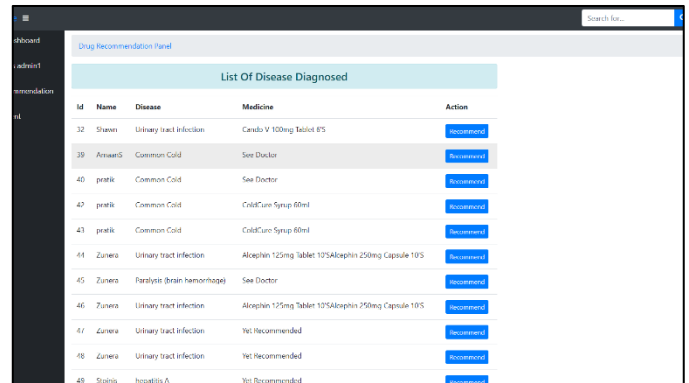## 6. GUI/WORKING MODULES

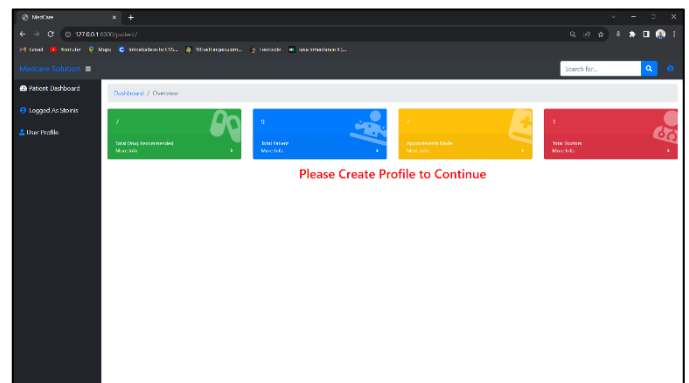Fig5.1 : Disease Prediction

Fig6.2 : Drug Recommendation

Fig6.3 : Patient Dashboard

7. CONCLUSIONS

The project harnesses the power of Python and the Django web framework to create a comprehensive healthcare solution. By leveraging machine learning algorithms such as Random Forest, Logistic Regression, and Decision Tree, the system excels in disease prediction based on user-provided symptoms Furthermore, the inclusion of drug recommendation and a feature to find nearby doctors enhances the project's utility for users, providing a holistic healthcare experience. This project showcases the seamless integration of technology and healthcare to improve disease diagnosis and treatment accessibility, ultimately contributing to better healthcare outcomes and patient satisfaction.

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