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SMART HEALTH CARE SYSTEM USING MACHINE LEARNING

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Abstract: Based on symptoms entered into the system, the condition Prediction system use predictive modelling to forecast the user's condition. The system generates the likelihood that a condition exists based on an analysis of the user's symptoms. Disease prediction is made possible by the Decision Tree Classifier's implementation. The probability of a disease is determined by the CNN Classifier. The system also evaluates the disease's severity and makes medication recommendations accordingly. The suggested technique also has the advantage of recommending suitable foods and workouts. The user's recent and past medical histories are taken into account for disease prediction.

Keywords: Machine Learning , CNN, Machine Learning in Healthcare , Smart Healthcare System

I. Introduction

It is essential to forecast diseases early on, yet it is difficult for clinicians to make reliable predictions based solely on symptoms. It is necessary to create a system that will make disease prediction for end users simpler, removing the need for them to seek a diagnosis from a doctor or physician. Furthermore, knowledge that is derived from the examination of lifestyle factors and activities is crucial for personalised healthcare and disease prevention services. The analysis and forecasting of aberrant health situations can be facilitated by intelligent data retrieval and classification methods. From unstructured medical health records, the Convolutional Neural Network (CNN) model is used to precisely detect disease-related knowledge. However, when using a fully connected network topology, the CNN model necessitates a significant amount of memory. Additionally, adding more layers may make the situation worse.

II. LITERATURE SURVEY

Jianliang Gao It is crucial to investigate the pathogenic traits of complicated diseases through the research of disease similarity. This investigation may provide trustworthy references for drawing conclusions about the relationships between novel and well-established diseases, aiding in the design of efficient therapeutic approaches. A single similarity metric, such as a semantic score or functional score from a single data source, was frequently used in previous methods for assessing disease similarities. As an alternative, several techniques combined numerous measures with different dimensions by using weighting coefficients.

Domenico Formica This special issue on "smart sensors for healthcare and medical applications" focuses on cutting-edge measuring methods, sensing technology, and healthcare and medical applications. We came up with this idea after seeing how important smart sensors may be for enhancing healthcare services for both acute and chronic disorders, as well as for preventing diseases and promoting active ageing. Before offering a general overview of the 24 articles chosen and published in this special issue, we briefly highlight the potential of smart sensors in the aforementioned applications in this editorial.

Dhiraj Dahiwade The accurate prediction of diseases is a challenging task, considering the various diseases people face due to environmental conditions and their living habits. Early-stage disease prediction is crucial in addressing this challenge. However, accurately predicting diseases solely based on symptoms proves difficult for doctors. Overcoming this obstacle requires leveraging data mining techniques to enhance disease prediction. The field of medical science experiences significant data growth each year, and effectively analysing this wealth of medical data contributes to early patient care. Data mining plays a vital role in uncovering hidden patterns and information within vast medical datasets. In the context of disease prediction, a study proposes utilizing the k-nearest neighbors (knn) and convolutional neural network (cnn) machine learning algorithms for precise disease prediction based on patient symptoms.

III. PROPOSED SYSTEM

This chapter is about system design. The consists of architecture and implementation flow. It includes diagrams like data flow diagram, use case activity, and class. These help in understanding the functioning of the system.

System Architecture

The hardest task is making an accurate diagnosis of a condition. Data mining is crucial in forecasting infections as a solution to this issue. Each year, there is significant data increase in the medical sciences. Accurate medical data analysis is now essential for providing early patient treatment as a result of a rise in the amount of data growth in the medical and healthcare fields. Based on symptoms, this technique is used to forecast diseases. The database, which is depicted in the picture below, contains signs of various diseases. These signs, along with the user's present symptoms and the patient's medical background, are given into the system as input. The CNN algorithm is used by a Python-based system to identify the patient's ailment. The system first predicted the sickness, then identifies three levels of severity for it: low, moderate, and severe.

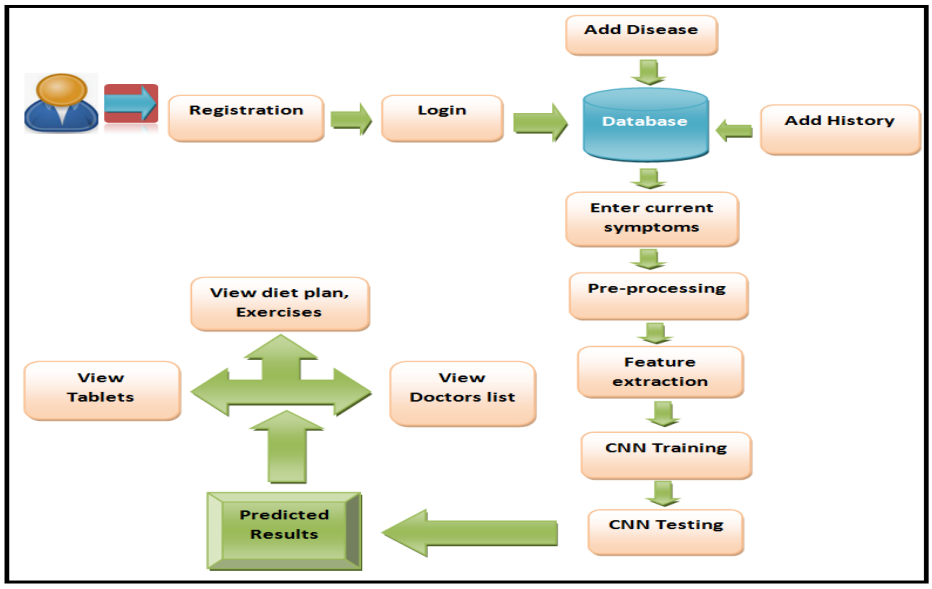


Fig 1.System Architecture

Pre-Processing:

Data preparation is the process of turning raw data into a format that is comprehensible. Since we can't operate with raw materials, it's also a crucial phase in mining. Before using machine learning or mining techniques, the quality of the should be evaluated. Cleaning, instance selection, normalisation, encoding, transformation, feature extraction and selection are a few examples of pre-processing. The final training set is the result.

There are seven significant steps in data pre-processing in Machine Learning:
Acquire the dataset.
Import all the crucial libraries.
Import the dataset.
Identifying and handling the missing values.
Encoding the categorical data.
Splitting the dataset.
Feature scaling.

IV. ALGORITHM

Convolutional Neural Network :

Neural networks are algorithms for pattern recognition that are roughly modelled after the human brain. Through tagging or clustering raw input, they understand sensory data using machine perception. All real-world data, such as pictures, sounds, text, or time series, are translated into numerical patterns called vectors.

These networks help classify and cluster data. They function as a layer over stored and maintained data, categorising labelled datasets and grouping unlabelled data based on similarity. Furthermore, features can be extracted from neural networks and

used in additional grouping, classification, and regression techniques. As a result, deep neural networks play a part in bigger machine learning applications that also use reinforcement learning, classification, and regression techniques.

Applications:

1.Identifying Diseases and Diagnosis

Identification and diagnosis of diseases and conditions that are typically thought of as difficult to diagnose is one of the main applications of ML in healthcare.

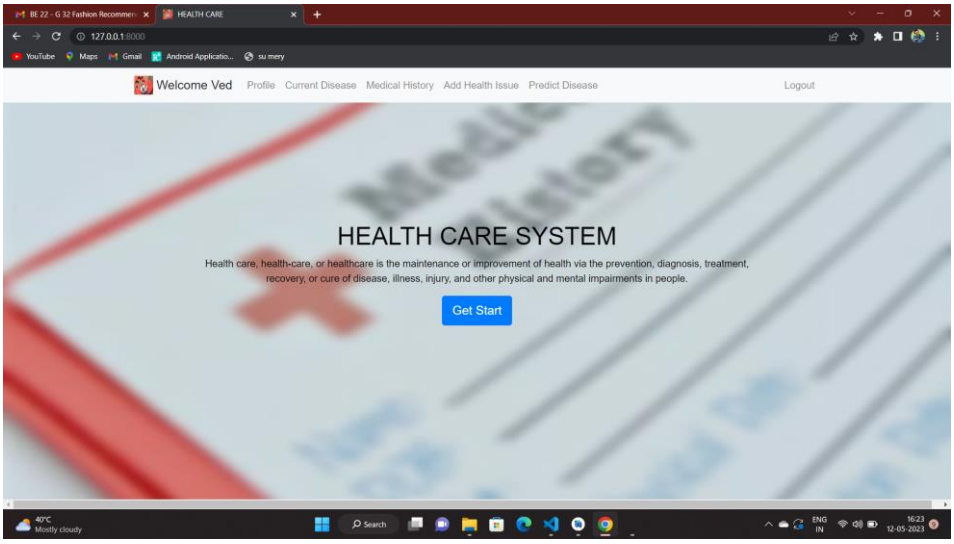
2. Drug Discovery and Manufacturing

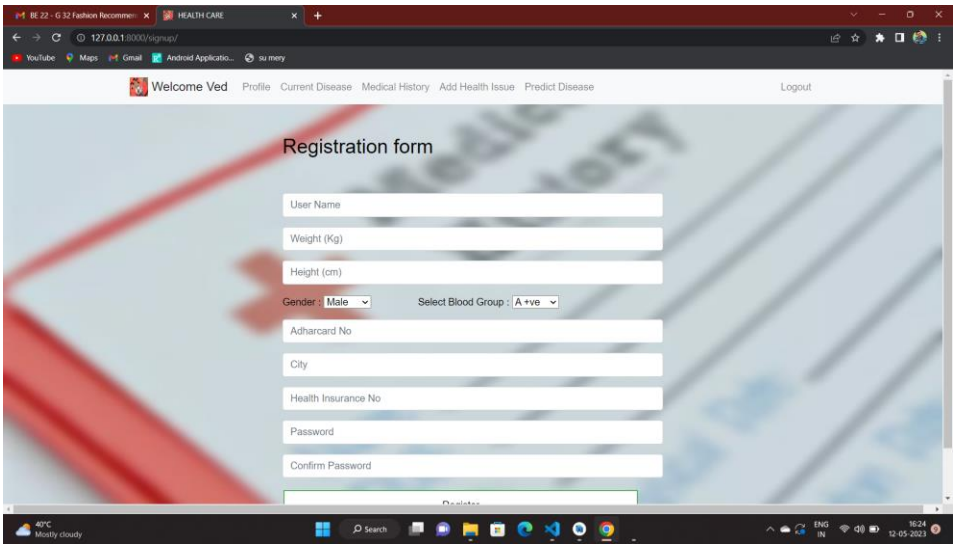
Early-stage drug discovery process holds a significant position among the primary clinical applications of machine learning.

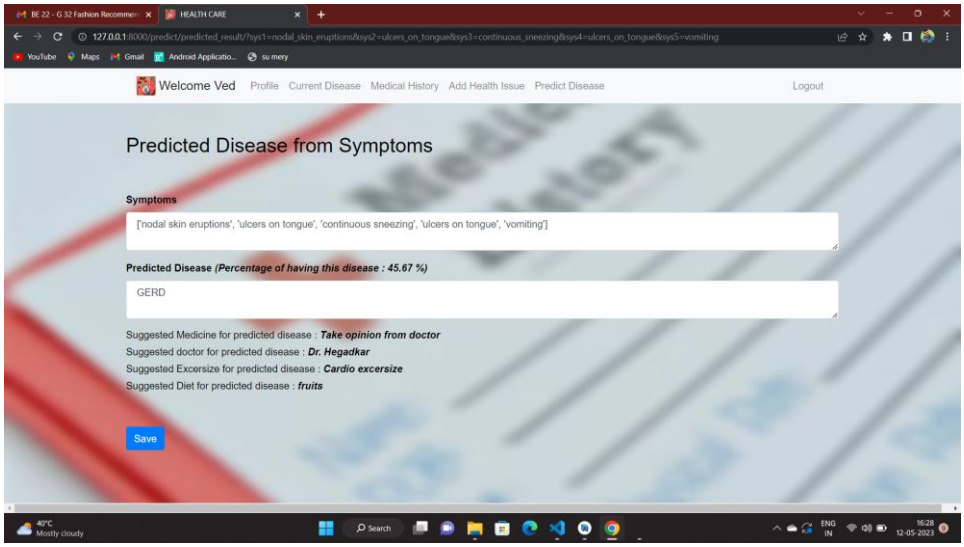
3. Personalized Medicine

Further research and improved disease assessment present an opportune area for exploring personalized treatments, which leverage predictive analytics to enhance effectiveness by aligning individual health.

Output:







V. CONCLUSION

To enhance disease prediction accuracy, we have introduced a comprehensive machine learning-based system. Our approach utilizes both KNN and CNN algorithms to classify patient data, addressing the significant growth of medical data and the necessity to process existing data for precise disease prediction based on symptoms. The system yields precise risk predictions for general diseases by analysing patients' records, offering valuable insights into the level of disease risk. Consequently, this system exhibits advantages such as reduced time consumption and minimal costs for disease and risk prediction. Comparatively, CNN outperforms KNN in terms of accuracy and efficiency.

VI. FUTURE SCOPE

1. **Integration of additional machine learning algorithms**: The project can explore the integration of more advanced machine learning algorithms, such as deep learning algorithms like recurrent neural networks (RNN) or transformers, to further enhance the accuracy and predictive capabilities of the system.

2. REAL-TIME MONITORING AND ANALYSIS: The system can be extended to enable real-time monitoring of health parameters and continuous analysis of data streams. This would allow for immediate detection of anomalies or critical health events, enabling timely interventions and proactive healthcare.

3.PERSONALIZED TREATMENT RECOMMENDATIONS: The system can be enhanced to provide personalized treatment recommendations based on individual patient data. By considering various factors such as medical history, genetic information, and lifestyle, the system can offer tailored treatment plans to optimize patient outcomes.

4. EXPANSION TO REMOTE AND TELEMEDICINE APPLICATIONS: The project can be extended to support remote healthcare and telemedicine applications. This would involve the integration of communication technologies and remote monitoring devices, enabling healthcare providers to remotely monitor patients, offer consultations, and provide timely interventions.

VII. REFERENCE

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