INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.488

Health Assistance (Disease Prediction and Medicine, Exercise and Diet Suggestion) Using CNN

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ABSTRACT: Disease Prediction system is based on predictive modeling predicts the disease of the user on the basis of the symptoms that user provides as an input to the system. The system analyzes the symptoms provided by the user as input and gives the probability of the disease as an output Disease Prediction is done by implementing the Decision tree Classifier. CNN Classifier calculates the probability of the disease. Along with disease prediction system also calculates severity of disease and as per severity of disease suggests medicine. Suggesting diet and appropriate exercise is another merit of proposed system. Prediction of disease involves current as well as medical history of user.

KEYWORDS: Disease Prediction, CNN, Exercise and DietSuggestion

I. INTRODUCTION

S The prediction of disease at earlier stage becomes important task. But the accurate prediction on the basis of symptoms becomes too difficult for doctor. There is a need to study and make a system which will make it easy for end users to predict the hronic diseases without visiting physician or doctor for diagnosis. Additionally, in terms of personalized healthcare and disease prevention services, these depend primarily on the strategy used to derive knowledge from the analysis of lifestyle factors and activities. Through the use of intelligent data retrieval and classification models, it is possible to study disease, or even predict any abnormal health conditions. To predict such abnormality, the Convolutional neural network (CNN) model is used, which can detect the knowledge related to disease prediction accurately from unstructured medical health records. However, CNN uses a large amount of memory if it uses a fully connected network structure. Moreover, the increase in the number of layers can lead to an increase in the complexity analysis of the model.

II. MOTIVATION

As an important application of medical informatization, healthcare big data analysis has been extensively researched in the fields of intelligent consultation, disease diagnosis, intelligent question-answering doctors, and medical assistant decision support, and has made many achievements. In order to improve the comprehensiveness and pertinence of the medical examination, this paper intends to use healthcare big data analysis combined with deep learning technology to provide patients with potential diseases which is usually neglected for lacking of professional knowledge, so that patients can do targeted medical examinations to prevent health condition from getting worse. Inspired by the existing recommendation methods, this paper proposes a novel deep-learning-based hybrid recommendation algorithm, which is called medical-history-based potential disease prediction algorithm.

III. PROBLEM STATEMENT

Now-a-days, people face various diseases due to the environmental condition and their living habits. So the prediction of disease at earlier stage becomes important task. But the accurate prediction on the basis of symptoms becomes too difficult for doctor. There is a need to study and make a system which will make it easy for end users to predict the chronic diseases without visiting physician or doctor for diagnosis. To detect the Various Diseases through the examining Symptoms of patient's using different techniques of Machine Learning Models.

IV.   LITERATURE SURVEY

Sr. no.	Paper Name	Author Name	Year	Outline	Advantages
1	A Medical-History-Based Potential Disease Prediction Algorithm	Wenxing et al	IEEE Access/2019	This paper proposed novel deep-learning-based hybrid recommendation algorithm, which predicts the patient's possible disease based on the patient's medical history and provides a reference to patients and doctors	1) It considers both, high-order relations as well as low order combination of disease among disease features, 2) Improved comprehensiveness compared to previous system.
2	Designing Disease Prediction Model Using Machine Learning Approach	Dahiwade, D., Patle, G., &Meshram, E.	IEEE Xplore/2019	Proposed general disease prediction, In which the living habits of person and checkup information consider for the accurate prediction. It also computes the risk associated with general disease	1) low time consumption 2) minimal cost possible 3) The accuracy of disease prediction is 84.5%
3	Explainable Learning for Disease Risk Prediction Based on Comorbidity Networks	Xu, Z., Zhang, J., Zhang, Q., & Yip, P. S. F.	IEEE/2019	Proposed a comorbidity network involved end-to-end trained disease risk prediction model. The prediction performances are demonstrated by using a real case study based on three years of medical histories from the Hong Kong Hospital Authority.	1) Comfortably incorporates the comorbidity network into a Bayesian framework 2) Exhibits superior prediction performance
4	Design And Implementing Heart Disease Prediction Using Naives Bayesian	Repaka, A. N., Ravikanti, S. D., & Franklin, R. G.	IEEE/2019	This paper focused on heart disease diagnosis by considering previous data and information. To achieve this SHDP (Smart Heart Disease Prediction) was built via Navies Bayesian in order to predict risk factors concerning heart disease.	1) Accuracy is 89.77% in spite of reducing the attributes. 2) The performance of AES is highly secured compared to previous encrypting algorithm (PHEC).
5	Similar Disease Prediction with Heterogeneous Disease Information Networks	Gao, J., Tian, L., Wang, J., Chen, Y., Song, B., & Hu, X.	IEEE/2020	Proposed a method to predict the similarity of diseases by node representation learning.	1) As the range of predictions expands, the proposed method is better than the disease prediction of only chemical-disease data source
6	Chatbot for Disease Prediction and Treatment Recommendation using	Mathew, R. B., Varghese, S., Joy, S. E., & Alex, S. S.	IEEE/2019	This paper explained a medical chatbot which can be used to replace the conventional method of disease diagnosis and treatment recommendation. Chatbot can act as a doctor.	1) This system help in reducing conduction of daily check-ups 2) It identifies the symptoms and gives proper diagnosis. 3) Chatbot doesn't

	Machine Learning				require the help of physician 4) Cheaper 5) The chat and users relation is completely personal which helps users to be more open with their health matters
7	Chronic Kidney Disease Prediction and Recommendation of Suitable Diet Plan by using Machine Learning	Maurya, A., Wable, R., Shinde, R., John, S., Jadhav, R., &Dakshayani, R.	IEEE/2019	The proposed system use machine learning algorithm and suggest suitable diet plan for CKD patient using classification algorithm on medical test records. This extracts the features which are responsible for CKD, then machine learning process can automate the classification of the chronic kidney disease in different stages according to its severity.	1) Detects and suggest diet which will be useful to the doctors as well as patients
8	Designing Disease Prediction Model Using Machine Learning Approach.	Dahiwade, D., Patle, G., &Meshram, E.	IEEE/2019	This system compares CNN and KNN for disease prediction Disease dataset from UCI machine learning website is extracted in the form of disease list and its symptoms. Pre-processing is performed on that dataset. After that feature extracted and selected. Then classification and prediction using KNN and CNN is performed.	1) The CNN takes less time than KNN for classifying large dataset. 2) CNN gives more accurate disease prediction than KNN.
9	Smart Health Monitoring System using IOT and Machine Learning Techniques	Pandey, H., &Prabha, S.	IEEE/2020	This paper deal with IoT which helps to record the real time (patient) data using pulse rate sensor and arduino and is recorded using thing speak. Machine learning algorithms were used to make prediction of heart disease.	1) The proposed system helps patient to predict heart disease in early stages. 2) It will be helpful for mass screening system in villages where hospital facilities are not available.
10	Random Forest Algorithm for the Prediction of Diabetes.	VijiyaKumar, K., Lavanya, B., Nirmala, I., & Caroline, S. S.	IEEE/2019	This paper proposed a system which performs early prediction of diabetes for a patient, with higher accuracy by using Random Forest algorithm.	1) The accuracy level is greater when compared to other algorithms. 2) The system is capable of predicting the diabetes disease effectively, efficiently and instantly.

V.   SYSTEM ARCHITECTURE

The correct prediction of disease is the most challenging task. To overcome this problem data mining plays an important role to predict the disease. Medical science has large amount of data growth per year. Due to increase amount of data growth in medical and healthcare field the accurate analysis on medical data which has been benefits from early patient care. This system is used to predict disease according to symptoms. As shown in figure below, database containing symptoms of different diseases is fed as input to system along with current symptoms of user and medical history of patient (when patient observed same type of symptoms before). Python based system used CNN algorithm to predict disease patient is suffering from. After predicting disease system classified disease into mild, moderate and severe conditions.
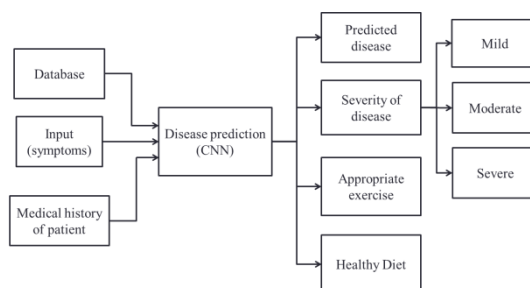

Fig.1 architecture of proposed system

If disease is mild then it suggest some medicine, in case of moderate along with medicines system suggest user to visit doctor if symptoms doesn't fade away and when its severe case system warn user to immediately visit doctor. System also suggests diet and exercise as per the disease.

VI.   CONCLUSION

We proposed general disease prediction system based on machine learning algorithm. We utilized KNN and CNN algorithms to classify patient data because today medical data growing very vastly and that needs to process existed data for predicting exact disease based on symptoms. We got accurate general disease risk prediction as output, by giving the input as patients record which help us to understand the level of disease risk prediction. Because of this system may leads in low time consumption and minimal cost possible for disease prediction and risk prediction. We can say CNN is better than KNN in terms of accuracy and time.

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