

Health Care Card System

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ABSTRACT

Article Info

Volume 8, Issue 3

Page Number : 111-119

Publication Issue :

May-June-2022

Article History

Accepted: 10 May 2022

Published: 22 May 2022

Disease Prediction using supervised machine learning algorithms has shown a potential growth in the past few years. The proposed system is based on a predictive model that predicts the disease of the user based on the symptoms provided. The system analyses these symptoms and gives the probability of the disease as an output. Along with disease prediction, the system also calculates the severity of the disease and suggests remedies like diet plans and exercises. Looking at the current growth of supervised algorithms in Health Risk Assessment (HRA) and the extensive research done, the system uses CNN algorithm to achieve its results.

Keywords : Supervised algorithms, Convolutional Neural Network (CNN), Artificial Neural Network (ANN), K-Nearest Neighbor (KNN), Navies Bayesian (NB), Random Forest (RF).

I. INTRODUCTION

Computer has made human life easier. Now-a-days computer are able to think with the help of AI. There are various machine learning algorithms used like Unsupervised, Semi Supervised, Supervised, Reinforcement techniques which can classify huge data. As a vital application of medical information, health care big data analysis has been extensively researched within the fields of intelligent consultation, disease diagnosis, intelligent question-answering doctors, and health care provider decision support, and has made many

achievements. So as to enhance the comprehensiveness and pertinence of the scrutiny, this paper intends to use health care big data analysis combined with deep learning technology to produce patients with potential diseases which is sometimes neglected due to the lack of professional knowledge, so patients can do targeted medical examinations to forestall health condition from getting worse. Inspired by the prevailing recommendation methods, this paper proposes a completely unique deep-learning-based hybrid recommendation algorithm, which is termed medical-history-based potential disease

prediction algorithm. The system analyzes the symptoms provided by the user as input and offers the probability of the disease as an output. Disease Prediction is completed by implementing the choice tree Classifier. CNN Classifier calculates the probability of the disease with disease prediction, system also calculates severity of disease and suggests remedies accordingly. This system also recommends proper diet and exercises. Now-a-days, people face various diseases thanks to the

status and their living habits. So predicting disease at an early stage is very important. There is a requirement to review and make a system which can make it easy for end users to predict the chronic diseases without visiting physician or a doctor for diagnosis. To detect the assorted Diseases through the examining Symptoms of patients using different techniques of Machine Learning Models this system is being introduced.

II. LITERATURE SURVEY

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. Table 1 shows literature survey about disease prediction systems proposed in different literatures.

Sr. No.	Paper Name, Author and 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 Comprehensive-ness 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.,	Proposed a comorbidity network involved end-to-end trained disease risk prediction model. The prediction performances are	1) Comfortably incorporates the comorbidity network into a Bayesian framework 2) Exhibits superior

	Zhang, Q., & Yip, P. S. F., IEEE/2019	demonstrated by using a real case study based on three years of medical histories from the Hong Kong Hospital Authority.	prediction performance
4	Design And Implementin g 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 Heterogeneo us 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 Recommend ation using Machine Learning, 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 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	This paper	1) The

	<p>Forest Algorithm for the Prediction of Diabetes, VijiyaKumar , K., Lavanya, B., Nirmala, I., & Caroline, S. S, IEEE/2019</p>	<p>proposed a system which performs early prediction of diabetes for a patient, with higher accuracy by using Random Forest algorithm.</p>	<p>accuracy level is greater when compared to other algorithms. 2) The system is capable of predicting the diabetes disease effectively, efficiently and instantly.</p>
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III. PROPOSED SYSTEM AND ARCHITECTURE

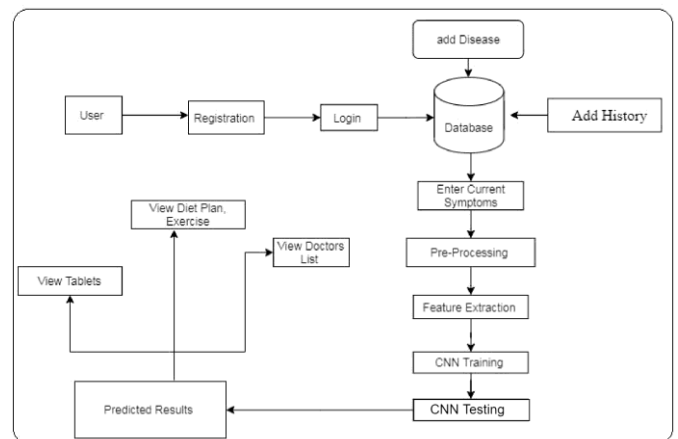
i. PROPOSED SYSTEM

Accurate prediction of diseases can be challenging. To overcome this problem classification algorithms are used to predict the disease. The system analyzes the symptoms provided by the user and considers it as an input and gives the probability of the disease as the output. The probability of the disease is calculated by implementing CNN Classifier. Once the disease has been predicted, the system suggests some remedies accordingly. Additionally, the system suggests a suitable diet plan and appropriate exercise(s).

suffering from based on the current symptoms. The final outcome of the system is to suggest remedies like diet plans, exercise after the disease has been predicted.

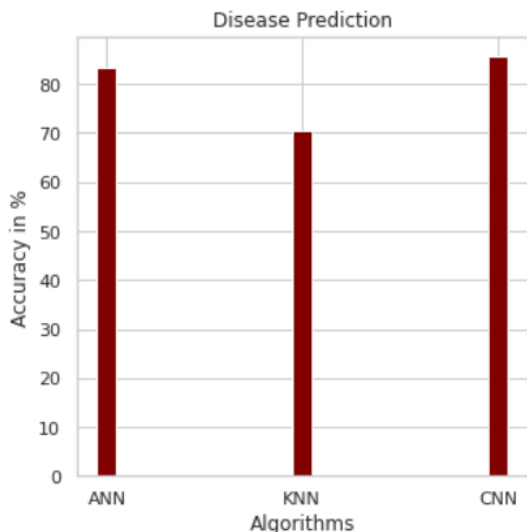
ii. ARCHITECTURE

This system is used to predict disease according to symptoms. As shown in figure below, database containing symptoms of different diseases is fed as an input to the system along with medical history of the users. When the user logs into the system, he/she can add a health issue, perform operations like view/edit current disease which can later be viewed in the current diseases section and also see his/her medical history which contains the list of diseases the person has suffered in the past. For prediction purposes, the system uses CNN to predict disease the user is



IV. COMPARITIVE ANALYSIS

To choose an appropriate algorithm to tackle a problem is a challenging situation. For the same purpose, we performed operations on a same dataset (heart.csv) using various algorithms like ANN, KNN and CNN. The primary purpose was to predict the heart diseases using the same dataset but different algorithms. The results of the same are as follows:



From the graph, it is clearly visible that CNN has the highest accuracy in case of disease prediction. Hence, we have chosen CNN for prediction purposes.

V. ALGORITHM DETAILS

i. CNN

Convolutional Neural Network Predictive Analytics is widely used in Health Risk Assessment, HRA is a predictive application that computes the likelihood of specific events. CNN uses a grid topology approach to process data, which is a set of spatial correlations between data points. The grid is one-dimensional in the case of time series textual data. The convolution algorithm is then used to identify some aspects of the input. It takes into account the variations of input and determines variable interactions that are sparse. Automatically detects the important features without any human supervision.

ii. KNN

It uses the closest training of the feature space using instance-based learning and takes in the class of the nearest neighbour. It is easy to implement, lowest complexity and carefully

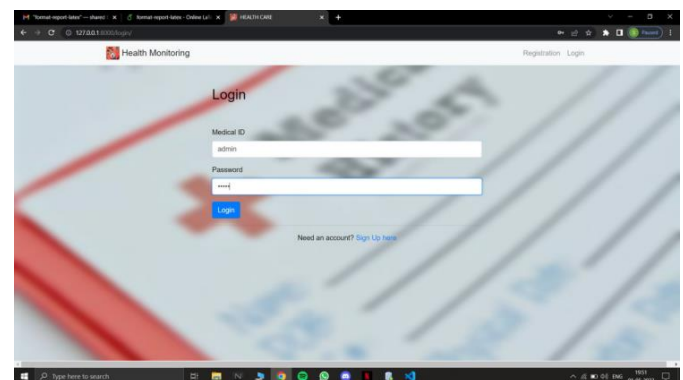
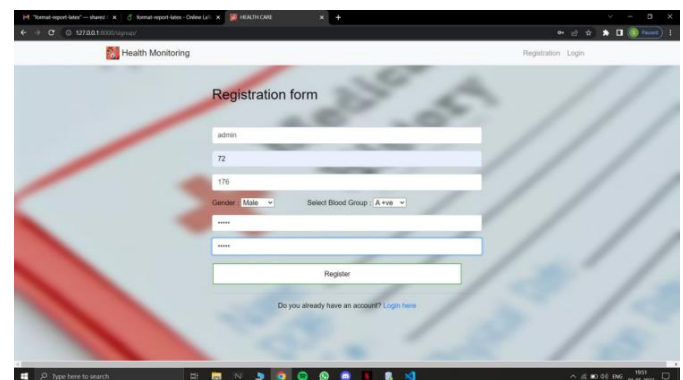
chosen features give good results but are sensitive to arbitrary attributes. Hence it has the lowest accuracy rate of 78%.

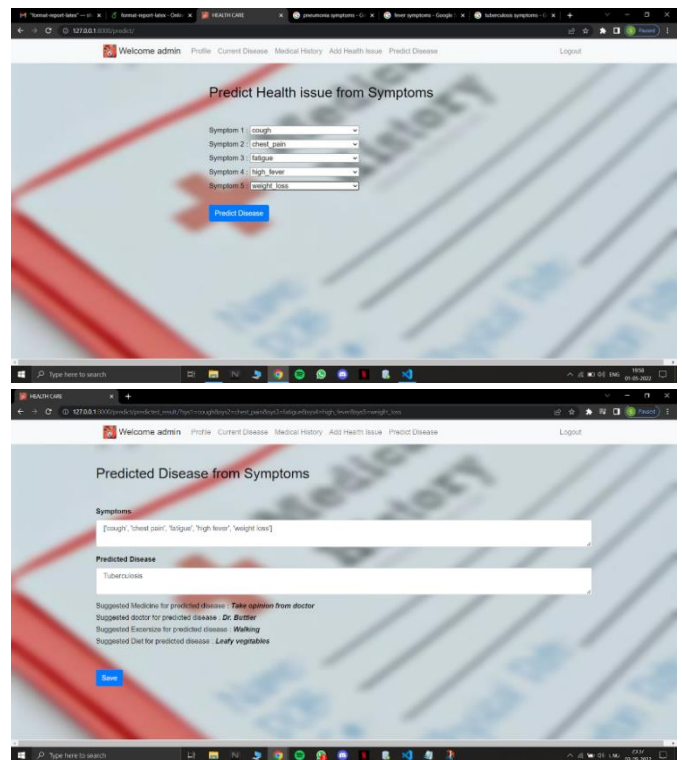
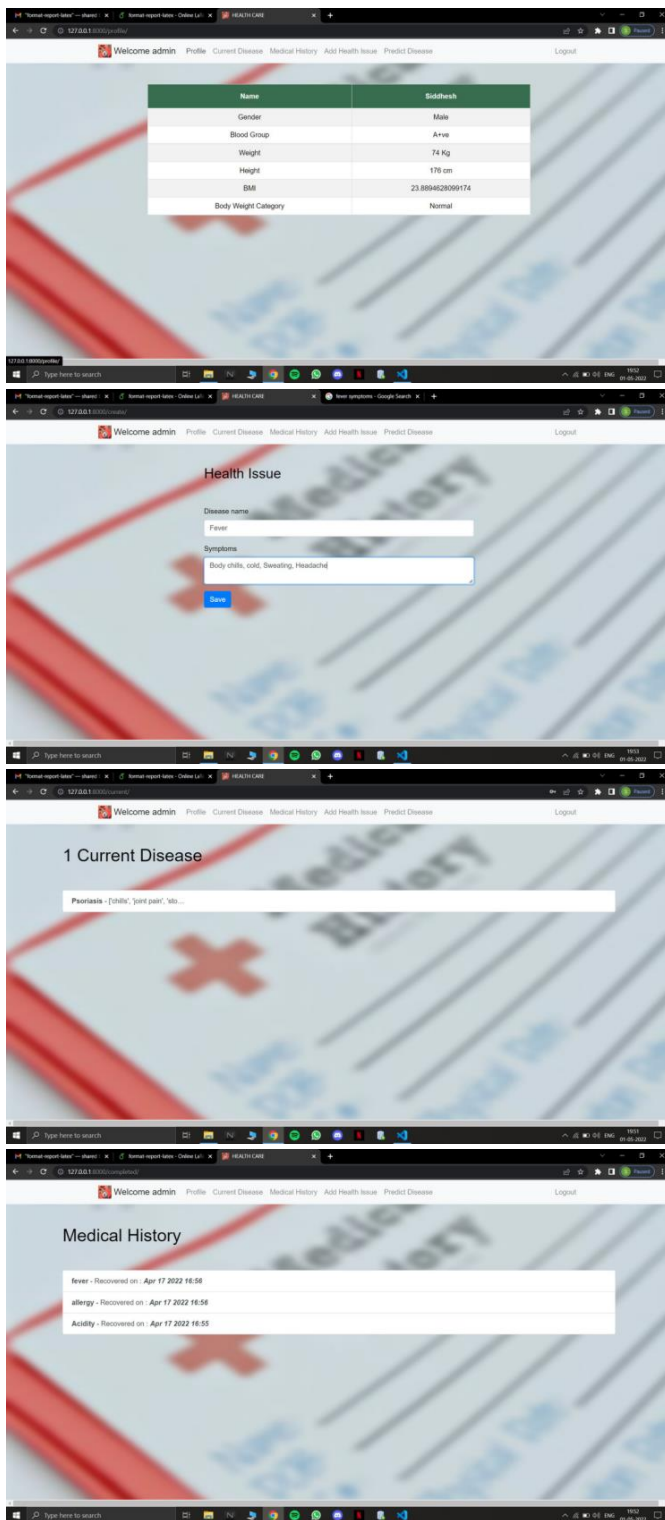
iii. ANN

Artificial Neural Network (ANN) is known as a Feed-Forward Neural network because inputs are processed only in the forward direction. This makes ANN one of the simplest variants of neural networks. ANN is considered to be less powerful than CNN due to its hardware dependence and unexplained behaviour of the network. Mainly used in facial recognition and computer vision.

VI. RESULTS

The system was correctly able to predict the disease of the person based on the current symptoms he is suffering from and the medical history.





VII. CONCLUSION

After the study on different supervised machine learning algorithms for disease prediction, selection of appropriate algorithm was made. Factors like time consumption, accuracy and cost optimization were considered while choosing CNN. It takes into account the previous data and self learns the data and results that were previously made to predict a result.

The system was able to predict the disease with an accuracy of 91.36%. This accuracy was achieved by the algorithm based on the current disease as well as the medical history of the patient. Subsequently, the remedies suggested by the system too were pretty accurate.

The role played by system can sometimes be beyond the scope and user may require consulting a doctor for taking health related tests. The future scope of the system of the can

be to set up an appointment with a doctor based on their schedule. It also includes to make a report and automatically forward it to a doctor when the disease is identified by the system.

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Cite this article as :

Pranjali Kulkarni, Siddhesh Bhosale, Atharva Gunjal, Aarya Soman, Pradnya Mehta , "Health Care Card System", *International Journal of Scientific Research in Computer Science, Engineering and Information Technology (IJSRCSEIT)*, ISSN : 2456-3307, Volume 8 Issue 3, pp. 111-119, May-June 2022.
Journal URL : <https://ijsrcseit.com/CSEIT22833>