International Journal of Scientific Research in Science, Engineering and Technology
Print ISSN: 2395-1990 | Online ISSN : 2394-4099 (www.ijsrset.com)
doi : https://doi.org/10.32628/IJSRSET2310338

Implementation of Smart Health Prediction Using ML

Prof. Shalu Saraswat, Shweta Gabhane, Alisha Pawar, Suhas Pingat, Shreyas Patil
Department of Information Technology Engineering, Pune District Education Association's College of Engineering, Pune-412307, Maharashtra, India

ARTICLEINFO

Article History:

Accepted: 10 April 2023
Published: 16 May 2023

Publication Issue
Volume 10, Issue 3
May-June-2023

Page Number
112-117

ABSTRACT

The "Smart Health Prediction Using Machine Learning" system uses predictive modelling to predict the disease of users or patients based on the symptoms that the user inputs into the system. User/patient, doctor, and admin are the three options for logging onto the application. The tool analyses the symptoms provided by the user or patient as input and returns the likelihood of the disease based on the algorithmic prediction. The Nave Bayes Classifier is employed to generate insightful health forecasts. The Nave Bayes Classifier determines the illness% probability by using all of its features that were trained during the training phase. For patients and users, an accurate interpretation of disease data helps with early disease prediction and provides them with a clear picture of the situation.

Keywords: Machine Learning, Naïve Bayes, Prediction Analysis, Symptoms.

I. INTRODUCTION

Machine learning is a generative method for producing predictive modelling from particular examples. It extends the idea that computer software can analyse data for patterns, learn from it, and draw conclusions with little assistance from humans. Machine learning is a programming technique that uses test data or previously obtained data to precisely optimise results.

Planning and research are the first two phases of the machine learning algorithm. To predict the rate of illness and health, the user's or patient's sign and symptom logs are used. Based on user/patient experience, machine learning technology offers a wide range of applications in the medical sector to tackle the issues of health disease prediction. We use machine learning to keep track of all ailments and symptoms. Predictive models may be quickly analysed with the help of machine learning technologies. Technology enables users/patients to determine independently whether to seek medical attention for certain symptoms, improving patient health care. Gaussian Nave Bayes classifier is used to examine the substantial amount of data that was obtained. The administrative, clinical, academic, and educational aspects of disease prediction from symptoms for each subfield of disease predictions were also demonstrated. There are several ways to acquire data.

There are several resources accessible to anticipate smart health. Studies, however, have concentrated on serious illness, and a level of risk has been established. For general disease, these methods aren't frequently used to forecast disease.

Utilising a strategy for Machine Learning Algorithms that is perfectly suited for diagnosing various ailments by analysing patient symptoms. Both time and resources are saved.

II. LITERATURE SURVEY

Numerous studies have been conducted on the topic of disease prediction utilising various machine learning approaches and algorithms that can be employed by medical organisations.

Naveenkumar and his colleague has proposed a system of health prediction using machine learning algorithms. In prediction of system he used different algorithms like Naive Bayes, K-Nearest Neighbor, and Decision Tree. This proposed system had an accuracy of 94%[1].Aditi Gavhane and her colleague suggested prediction for heart disease that utilizes Machine Learning. Multi-Layer Perceptron model is used in this system. This system predicts heart disease based on basic symptoms like age, sex, pulse rate, etc. The accuracy of this suggested system is 91% [2].Gupta A and his colleague proposed system for heart prediction which makes use of naive bayes algorithm.The accuracy of naive bayes algorithm is 97%.This system predicts heart diseases based on basic sysmtoms chest pain, pain of discomfort in jaw ,neck, shortness of breathing [3].D Dahiwade and his

colleague designed a model for prediction of the disease using approaches of machine learning and used techniques like KNN and CNN. This paper suggests disease prediction i.e. based on patient's symptoms. The accuracy of KNN is 95% and the accuracy of CNN is 98%[4].N. Shabaz Ali and his colleague designed a model for prediction of diseases using data mining technique. This paper is made on how the data mining techniques are used along with the machine learning to predict the diseases based on the user symptoms[5].Shubham Salunke and his colleague has designed system for identifying the diseases that patients are suffering from on the basis of naive bayes algorithm[6].H. Pandey and his colleague make use of IoT and machine learning for healthcare monitoring. The Internet of Things (IoT) has enabled the invention of smart health monitoring systems. These health monitoring systems can track a person's mental and physical wellness on the basis of stress level, anxiety level and hypertension of particular patient[7].Monika Gandhi and her colleague has proposed system for predicting heart diseases using data mining techniques. . In this paper, data mining methods namely, Naive Bayes, Neural network, Decision tree algorithm are analyzed on medical data sets using algorithms[8].S. Ananth and his colleague has proposed system for health prediction using IoT which has enabled invention in healthcare. The accuracy of the system is about 82%[9].S.S and his colleague proposed model for health and disease prognosis system. For prediction of diseases, different machine learning algorithms such as Random Forest, Naive Bayes, Logistic Regression, Support Vector Machine, K-Nearest Neighbours , Decision Tree and Gradient Boosting are compared to predict in an efficacious manner with better accuracy. The best accuracy model is saved for disease prediction. This system is especially used for early prediction of disease[10].Rudra A. and his colleague has proposed system for multiple disease prediction. This system has additional appearance of consulting drugs and medication of disease expected which is the biggest drawback of the model. The accuracy of the system is about 85%[11].M. Asia and his colleague tried to find a scalable solution that can predict different disease utilizing

Random Forest Algorithm. This system presents a comparison against Naïve-Bayes classifier but Random Forest gives more accurate results with accuracy 98%[12].Sneha R. and his colleague has designed system named disease prediction based of classification algorithm. The classification algorithms such as Decision Tree, Support Vector Machine(SVM), K Nearest Neighbour(KNN),Random Forest, Logistic Regression,

Naive Bayes are used for building this disease prediction model. The Naive Bayes provides highest

accuracy 97% and hence used for prediction of the diseases[13].Farooqui and his colleague has designed health prediction system using support vector machine and multilinear regression. The result generated by proposed system has accuracy up to 87%[14].N. Kosarkar and his colleague has proposed system for health prediction using different algorithms of machine learning like random forest, support vector machine and logistic regression. The accuracy of the proposed model is 82%[15].

III. PROJECT ANALYSIS

3.1. Existing Method:

The model predicts chronic diseases for a specific demographic and geographic area. The prediction of diseases only includes specific illnesses. In this method, convolutional neural networks and large data are used to forecast the likelihood of contracting a disease. The approach employs machine learning techniques like K-nearest neighbours and Decision Tree for S-type data. The method has an accuracy rate of up to 94.8% for various conditions. In earlier study, we dissected machine learning methods to predict chronic illness outbreaks in vulnerable populations to a disease. We are developing enhanced prediction models using actual hospital data from a few specific regions/areas. We present a novel multimodal patient/user input based structured and unstructured sickness risk prediction method for convolutional neural networks.

3.2. Proposed Method:

A person must consult a doctor or physician after receiving a diagnosis of a sickness, which is both timeconsuming and expensive. It might be exceedingly challenging for users to attend the hospital at times,

making it challenging to diagnose an illness on one's own. However, if the aforementioned operation were carried out using an electronic software programme, the patient would benefit greatly and both the user and the patient would save time and resources. The procedure would go off without a hitch. A web-based programme called "Smart Health Care Prediction" forecasts a user's disease based on the symptoms the user/patient experiences. The data set needed for the Smart Health Prediction Framework was gathered from several websites that deal with health. Based on the symptoms listed in the web application, the user would be able to anticipate the illness's onset. Create a web platform that can forecast disease episodes based on a variety of symptoms is the goal of this project. With the use of probabilistic estimates and conditions, users can select from a variety of symptoms and diagnose disease.

Efficiency comparison TABLE

Diseases	NB	LR	K*	DT
Breast Cancer Wise	96.25	93.45	96.48	97.18
Breast Cancer	75.36	69.48	74.36	77.83
Dermatomegaly	98.36	97.59	97.25	98.13
Echo Chambers	95.61	95.69	95.98	96.10
Liveries	57.12	69.48	71.29	72.39
Pimaricin Diabetes	73.89	75.98	76.27	77.19
Hematidrosis	72.39	85.65	79.45	81.34
Heart-statlog	83.69	85.69	74.56	81.59
Heart-b	85.74	84.58	78.85	81.29
Hepatitis	82.98	84.25	80.25	79.85
Lung Cancer	54.28	49.85	45.69	41.08
Lymph's	86.94	79.25	84.29	79.68
Osteoporosis	69.38	63.84	65.89	72.36
Tumor	51.84	43.65	39.71	43.58

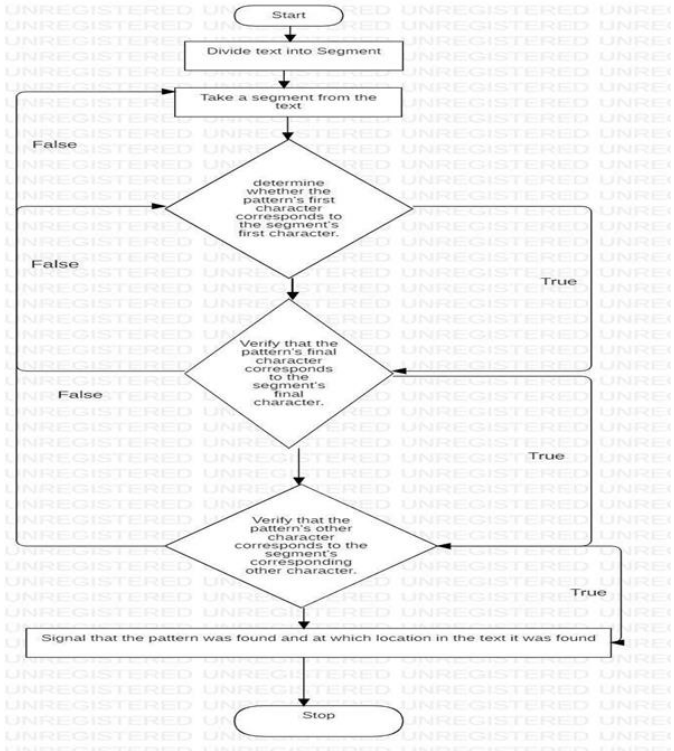
We analysed the accuracy of several approaches in the aforementioned table, and the results show that the Naive Bayes algorithm has higher accuracy and better timing in comparison. Because medical data are growing at an exponential rate and must be processed in order to predict exact disease from symptoms, we employed the naive bayes algorithm to identify patient data. We were able to obtain accurate general illness risk prediction as an output from having the input as a

user/patient record, which helped us comprehend the level of disease risk prediction. This technology made it possible to anticipate risk factors and diseases quickly, easily, and inexpensively.

IV. ALGORITHM AND ARCHITECTURE

4.1. Naïve Bayes Algorithm:

The Naive Bayes algorithm is a straightforward dynamic method for developing models for classifying issue instance occurrences in order to map them to objects. Class names are selected from a limited number of options. It is a group of algorithms built around a broad notion rather than a single method. This concept states that each Naive Bayes Classifier's function value is independent of the value of other feature. for instance, if the Fruit that is round, orange, and 10 to 15 cm in diameter could be referred to as an orange. Each characteristic is considered by the Naive Bayes algorithm in order to identify whether the fruit is an orange. There are n different probability models, but for some of them, the supervised learning performance of the Naive Bayes method is the best



4.2. Random Forest Algorithm:

The bagging method, a type of ensemble learning approach, is the foundation of random forest. Multiple decision trees are utilised in the random forest algorithm, which also combines the tree's output. This can both prevent the overfitting issue and increase accuracy. A forest is made up of a variety of different tree species, and the more species there are, the more robust the forest will be.

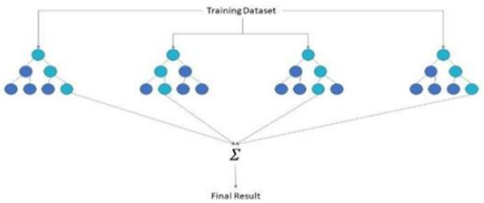


Diagram of Random Forest Classifier

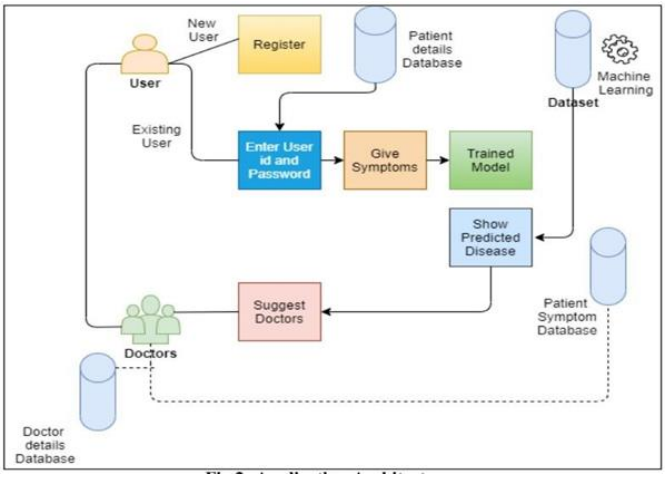
4.3. Support Vector Classifier- SVC:

- Support Vector Machine, or SVM, is one of the most used supervised learning algorithms, and it is used

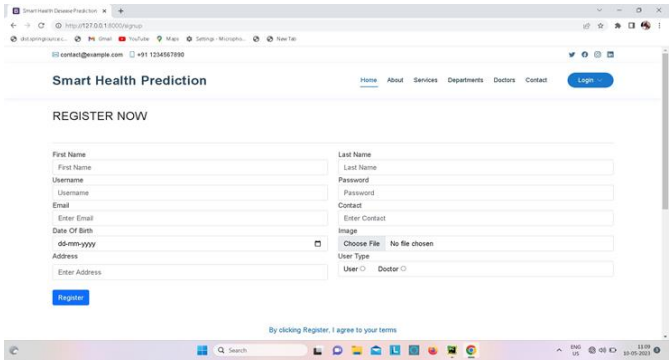
To address Classification and Regression problems. But it is primarily used in MachineLearning classification problems.

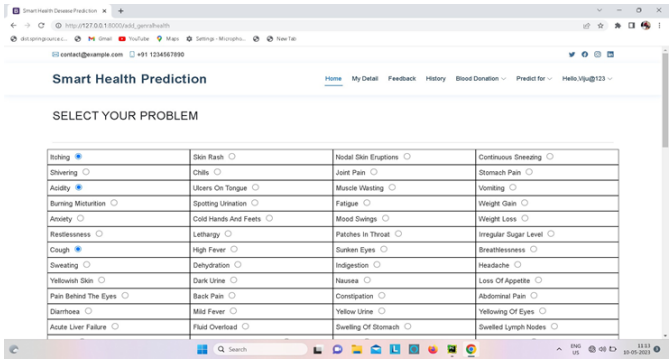
- In order to quickly categorise new data points in the future, the SVM algorithm aims to determine the optimum line or decision boundary that can divide n-dimensional space into classes. The name of this optimal decision boundary is a hyperplane.

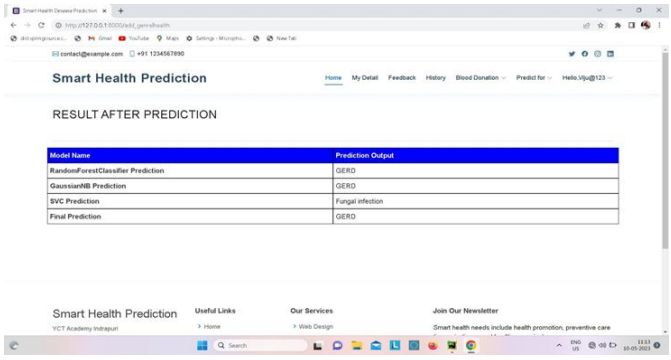
Architecture:



Output:







V. CONCLUSION

In this work, we examined convolutional neural network variations to avoid sophisticated pre-processing, expensive feature extraction, and a complex ensemble (classifier combination) method of a typical recognition system with the goal of increasing the performance of handwritten digit recognition. With the Adam optimizer, we were able to achieve a 99.89% recognition rate for the MNIST database. The uniqueness of the current study is that it carefully examines all the CNN architecture settings that provide the best recognition accuracy for an MNIST dataset. For the same dataset, ensemble CNN network topologies were used to increase recognition accuracy at the expense of higher computational costs and more difficult testing..

VI. REFERENCES

[1]. Naveenkumar S1 , Kirubhakaran R2 , Jeeva G3 , Shobana M4 , Sangeetha K5," Smart Health Prediction Using Machine Learning: A survey",3 march 2021.

[2]. Aditi Gavhane, Gouthami Kokkula, Isha Pandya and Kailas Devadkar, "Prediction of Heart Disease Using Machine Learning" IEEE Xplore ISBN: 978-1-5386-0965-1, pp. 1275-1278, 2018.

[3]. Gupta A., Kumar L., Jain R., Nagrath P. (2020) Heart Disease Prediction Using Classification (Naive Bayes). In: Singh P., Pawłowski W., Tanwar S., Kumar N., Rodrigues J., Obaidat M. (eds) Proceedings of First International Conference on Computing, Communications, and Cyber-Security (IC4S 2019). Lecture Notes in Networks and Systems, vol 121. Springer, Singapore.

[4]. D. Dahiwade, G. Patle and E. Meshram, "Designing Disease Prediction Model Using Machine Learning Approach," 2019 3rd International Conference on Computing Methodologies and Communication (ICCMC), Erode, India, 2019, pp. 1211-1215

[5]. N. Shabaz Ali, G. Divya,"Prediction of Diseases in Smart Health CareSystem using Machine Learning" 5 January 2020.

[6]. Shubham Salunke, ShubhamRajiwade, Deepak Yadav, S.K.Sabnis, "smarthealth prediction system using machinelearning",March 2020.

[7]. H.Pandey and S. Prabha, "Smart Health Monitoring System using IOT and Machine Learning Techniques," 2020 Sixth International Conference on Bio Signals, Images, and Instrumentation (ICBSII), Chennai, India, 2020, pp. 1-4.

[8]. Monika Gandhi and Shailendra Narayan Singh "Predictions in heart disease using techniques of data mining" 2015 International Conference on Futuristic Trends on Computational Analysis and Knowledge Management (ABLAZE) pp. 520-525 2015.

[9]. S. Ananth, P. Sathya, P. Madhan Mohan," Smart Health Monitoring System through IOT",In 2019 International Conference on Communication and Signal Processing (ICCSP),IEEE April 2019.

[10].S. S, V. S and A. R, "Health and Disease Prognosis System using Machine Learning," 2021 IEEE International Conference on Intelligent Systems, Smart and Green Technologies (ICISSGT), Visakhapatnam, India, 2021, pp. 192-196.

[11].Rudra A. Godse Smita S. Gunjal Karan A. Jagtap Neha Mahamuni and Suchita Wankhade "Multiple Disease Prediction Using Different Machine Learning Algorithms Comparatively" International Journal of Advanced Research in Computer and Communication Engineering vol. 8 no. 12 Dec 2019.

[12].R. Delshi Howsalya Devi P. Sreevalli Keerthana Prathyusha and M. Asia "Prediction of Diseases Using Random Forest Classification Algorithm" Zeichen Journal vol. 6 no. 5 2020.

[13].Sneha R. Monisha S. Jahnavi C. and S. Nandini "Disease Prediction Based On Symptoms Using Classification Algorithm" Journal of Xi'an University of Architecture & Technology vol. 12 no. 4 2020.

[14].Farooqui, Md. Ehtisham and Ahmad, Dr. Jameel, Disease Prediction System using Support Vector Machine and Multilinear Regression (August 13, 2020). International Journal of Innovative Research in Computer Science & Technology (IJIRCST) ISSN: 2347-5552, Volume, 8, Issue, 4, July, 2020.

[15].N. Kosarkar, P. Basuri, P. Karamore, P. Gawali, P. Badole and P. Jumle, "Disease Prediction using Machine Learning," 2022 10th International Conference on Emerging Trends in Engineering and Technology - Signal and Information Processing (ICETET-SIP-22), Nagpur, India, 2022, pp. 1-4, doi: 10.1109/ICETET-SIP-2254415.2022.9791739.

Cite this Article

Prof. Shalu Saraswat, Shweta Gabhane, Alisha Pawar, Suhas Pingat, Shreyas Patil, "Implementation of Smart Health Prediction Using ML", International Journal of Scientific Research in Science, Engineering and Technology (IJSRSET), Online ISSN : 2394-4099, Print ISSN : 2395-1990, Volume 10 Issue 3, pp. 112-117, May-June 2023. Available at doi : https://doi.org/10.32628/IJSRSET2310338

Journal URL : https://ijsrset.com/IJSRSET2310338