

APP TO PREDICT HEART DISEASE USING MACHINE LEARNING

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ABSTRACT

Heart-related diseases or cardiovascular diseases (CVD) are the main reason for huge number of deaths in the world over the past few decades and has proven to be the most life-threatening diseases not only in India but all over the world. So, there is a need for an approachable and feasible solution to this massive problem. Early diagnosis of these diseases can save many lives, hence using Machine learning is the most feasible way for early diagnosis of CVDs. The target of this project is to build an app integrated with ML which can predict the presence of Heart disease. According to current survey Doctors say that our unhealthy life style is the main reason behind the heart disease. We can't even know when people may have a fatal heart attack. We need warning to avoid the fatality of heart attack or heart failure. Every year Cardiological reports say most of the 60 or above aged people are undergoing heart disease and many of them die prematurely due to acute myocardial infraction. 655,000 Americans die from **heart disease** each year and more than 3 million in India.

Keywords: Heart Diseases, prediction, K-Nearest Neighbors Algorithm, Mobile application.

I. INTRODUCTION

Heart diseases have emerged as one of the most prominent causes of death all around the world. According to World Health Organization, heart related diseases are responsible for taking 17.7 million lives every year, 31% of all global deaths. World Health Organization, (WHO), suggest that India has lost up to \$237 billion, from 2005- 2015, due to heart-related or Cardio vascular diseases. Medical organizations, all around the world, collect data on various health-related issues. These data can be exploited using various machine learning techniques to gain useful insights. Machine-learning offers an opportunity to improve accuracy by exploiting complex interactions between risk factors. Medical organizations, all around the world, collect data on various health-related issues. These data can be exploited using various machine learning techniques to gain useful insights. But the data collected is very massive and, many times, this data can be very noisy.

II. LITERATURE SURVEY

[1] Krishnan, S., & Geetha, S. In this system, a heart disease data set is used. The main aim of this system is to predict the possibilities of occurring heart disease of the patients in terms of percentage. This is performed through data mining classification techniques. They used concept of Decision tree which 91% accurate and algorithm of Naïve Bayes was 87% accurate.

[2] Rajesh, N., Maneesha, T., Hafeez, S., & Krishna, H. In this paper, processing patient's dataset and a data of patients to whom we need to predict the chance of occurrence of a heart disease. They used Naïve Bayes Decision tree (ID3 Algorithm) to get accuracy output for their work.

[3] Marimuthu, M., Deivarani, S., & Gayathri, R. To achieve better accuracy and to make the system more efficient so that it can predict the chances of heart attack. They used KNN it worked with 83.60% accuracy, Naïve Bayes with 80.66% accuracy, Decision tree with 75.58% accuracy, and SVM with 65.56% accuracy.

[4] Dhar, S., Roy, K., Dey, T., Datta, P., & Biswas, A. In this paper, to develop a prediction system that be capable to envisage heart diseases based on measurements, are extracted from The ERIC laboratory consisting of 209 test cases. They used different algorithms for their work such as Naïve Bayes, Decision tree and Random Forest.

[5] Rajdhan, A., Agarwal, A., Sai, M., Ravi, D., & Ghuli, P. Processing a vast amount of data in the healthcare industry requires data science. Since predicting cardiac illness is a complex undertaking, it is necessary to automate the process in order to reduce risks and warn the patient well in advance. The heart disease dataset from the UCI machine learning repository is used in this study. The proposed work uses a variety of data mining approaches, including Naive Bayes, Decision Trees, Logistic Regression, and Random Forest, to forecast the probability of Heart Disease and identify patient risk levels. In order to compare various machine learning algorithms, this paper will analyze their performance. The trial results show that, when compared to other ML algorithms used, the Random Forest approach has the highest accuracy (90.16%).

[6] Ramalingam, V. V., Dandapath, A., & Raja, M. K. Machine learning algorithms have enormous potential for predicting heart-related or cardiovascular diseases. Each of the aforementioned algorithms has done incredibly well in some situations while failing miserably in others. When combined with PCA, alternating decision trees have demonstrated exceptional performance, however in some other situations, decision trees have demonstrated exceptionally poor performance, which may be caused by overfitting. Because Random Forest and Ensemble models use numerous algorithms (in the case of Random Forest, many Decision Trees) to address the issue of overfitting, they have demonstrated excellent performance. Naive Bayes classifier-based models had excellent performance and were computationally fast. SVM excelled in the majority of the cases. There is still more study to be done on how to manage high dimensional data and overfitting, even though systems based on machine learning algorithms and methodologies have proven very effective at predicting heart-related disorders. It is also possible to conduct extensive research on the ideal set of algorithms to employ for a specific kind of data.

III. EXISTING SYSTEM

In this system, the input details are obtained from the patient. Then from the user inputs, using ML techniques heart disease is analyzed. Now, the obtained results are compared with the results of existing models within the same domain and found to be improved. The data of heart disease patients collected from the UCI laboratory is used to discover patterns with NN, DT, Support Vector machines SVM, and Naive Bayes. The results are compared for performance and accuracy with these algorithms. The proposed hybrid method returns results of 87% for F-measure, competing with the other existing methods.

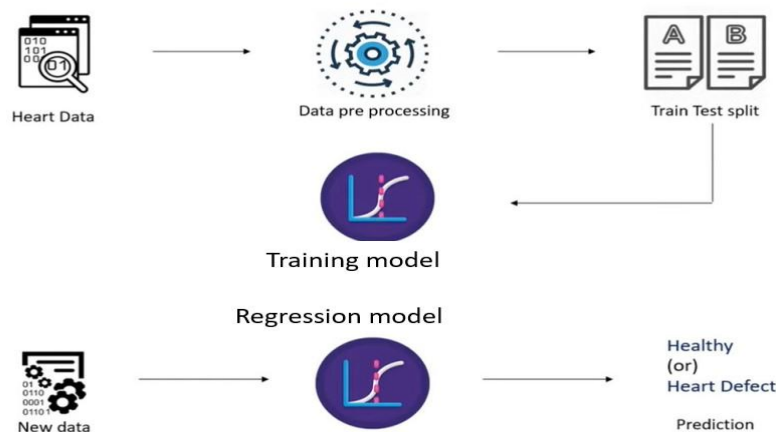


Figure 1: Workflow of existing system

IV. PROPOSED SYSTEM

The algorithms that are used in this paper are K nearest neighbors (KNN), which can be helpful for practitioners or medical analysts for accurately diagnose Heart Disease. The methodology is a process which includes steps that transform given data into recognized data patterns for the knowledge of the users. The proposed methodology includes steps, where first step is referred as the collection of the data than in second stage it extracts significant values than the 3rd is the preprocessing stage where we explore the data. Data preprocessing deals with the missing values, cleaning of data and normalization depending on algorithms used. After pre-processing of data, classifier is used to classify the pre-processed data the classifier used in the proposed model are KNN. Finally, the proposed model is undertaken, where we evaluated our model on the basis of accuracy and performance using various performance metrics.

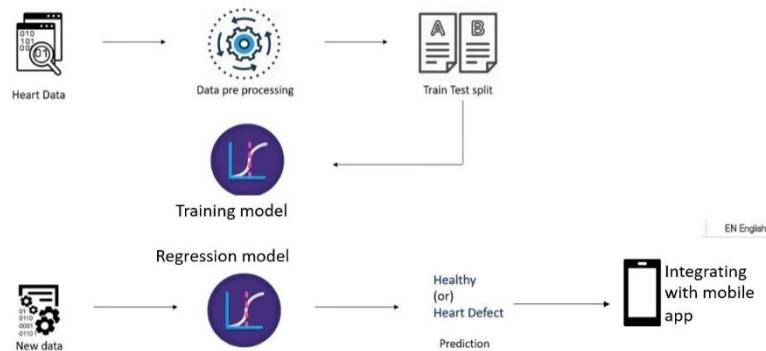


Figure 2: Workflow of proposed system

V. ALGORITHM USED

K-NEAREST NEIGHBORS (K-NN) ALGORITHM : K-NN is the most straightforward classification algorithm based on supervised learning techniques. However, the K-NN algorithm can also be used for regression but is mostly used for classification . A new data point is classified by using the K-NN algorithm depending on how similar the existing data is stored. It indicates that the K-NN algorithm can quickly classify new data when it appears in a suitable category. Here, the horizontal x-axis and vertical y-axis are independent and dependent variables of a function, respectively. Here is a simple example of the K-NN classification algorithm. The test sample (Yellow Square with what symbol) should be classified as either a green triangle or a red star in this algorithm. When $k=3$ is considered in a small dash circle, the yellow square would be a green triangle because the majority number in this region is green triangles, not red stars. Now, if we consider $k=7$, which is in a large dash circle, then the yellow square would be red stars because the number of red stars is four and the green triangles are 3. So, It can conclude that the majority vote in a specific region is important here.

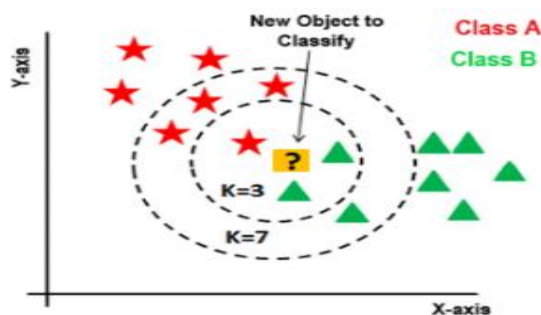
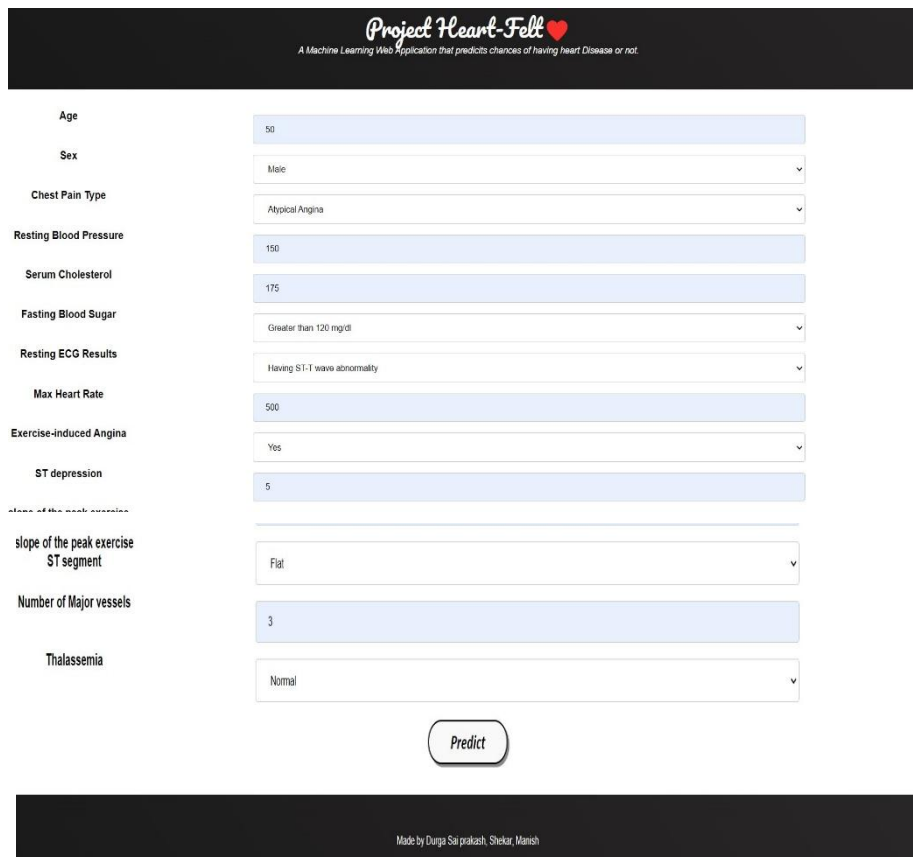


Figure 3:K-Nearest Neighbors

VI. IMPLEMENTATION

INPUT: After complete design of application give the input, such as user as to fill the all required field asked in the application to predict the output as user has heart disease or not.



Project Heart-Felt ❤️
A Machine Learning Web Application that predicts chances of having heart Disease or not.

Age: 50

Sex: Male

Chest Pain Type: Atypical Angina

Resting Blood Pressure: 150

Serum Cholesterol: 175

Fasting Blood Sugar: Greater than 120 mg/dl

Resting ECG Results: Having ST-T wave abnormality

Max Heart Rate: 500

Exercise-induced Angina: Yes

ST depression: 5

slope of the peak exercise ST segment: Flat

Number of Major vessels: 3

Thalassemia: Normal

Predict

Made by Durga Sai prakash, Shekar, Manish

Figure 4: Required details to Predict

OUTPUT: After filling the required details click the predict. Based on the given details it will give the information of the user that there is any chances of heart disease or not.



Project Heart-felt ❤️
A Machine Learning Web App

Prediction: You have chances of heart disease.

Made by Durga Sai prakash, Shekar, Manish

Figure 5: Output

VII. CONCLUSION

A heart disease detection model has been developed using three ML classification modelling techniques. This project predicts people with heart disease by extracting the patient medical history that leads to a fatal heart disease from a dataset that includes patients’ medical history such as chest pain, sugar level, blood pressure, etc. This Heart Disease detection system assists a patient based on his/her clinical information of them been diagnosed with a previous heart disease. The algorithm used in building the given model is KNN. Use of more training data ensures the higher chances of the model to accurately predict whether the given person has a heart disease or not. By using these, computer aided techniques and app we can predict the patient fast and better and the cost can be reduced very much. There are a number of medical databases that we can work on as

these Machine learning techniques are better and they can predict better than a human being which helps the patient as well as the doctors.

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VIII. REFERENCES

- [1] Krishnan, S., & Geetha, S. (2019, April). Prediction of Heart Disease Using Machine Learning Algorithms. In 2019 1st international conference on innovations in information and communication technology (ICIICT) (pp. 1-5). IEEE.
- [2] Rajesh, N., Maneesha, T., Hafeez, S., & Krishna, H. (2018). Prediction of heart disease using machine learning algorithms. International Journal of Engineering and Technology (UAE), 7(2.32 Special Issue 32), 363-366.
- [3] Marimuthu, M., Deivarani, S., & Gayathri, R. (2019). Analysis of heart disease prediction using various machine learning techniques. In Advances in Computerized Analysis in Clinical and Medical Imaging (pp. 157-168). Chapman and Hall/CRC.
- [4] Dhar, S., Roy, K., Dey, T., Datta, P., & Biswas, A. (2018, December). A hybrid machine learning approach for prediction of heart diseases. In 2018 4th International Conference on Computing Communication and Automation (ICCCA) (pp. 1-6). IEEE.
- [5] Rajdhan, A., Agarwal, A., Sai, M., Ravi, D., & Ghuli, P. (2020). Heart disease prediction using machine learning. International Journal of Research and Technology, 9(04), 659-662.
- [6] Ramalingam, V. V., Dandapath, A., & Raja, M. K. (2018). Heart disease prediction using machine learning techniques: a survey. International Journal of Engineering & Technology, 7(2.8), 684-687.