

# **Heart disease Prediction Using Machine Learning With Python**

Submitted in partial fulfillment of the requirements for the award of degree of

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## **DECLARATION**

We hereby declare that the project entitled “Heart Disease Prediction Using Machine Learning Algorithm”

Submitted to GALGOTIAS UNIVERSITY is our original work and is submitted in partial fulfillment of the requirements for the award of degree of BACHELOR OF ENGINEERING IN COMPUTER SCIENCE AND ENGINEERING .

This project is carried out under the guidance of Mr Damodharn Sir .I further declare that to the best of our knowledge, the report for BCA does not contain part of the work which has been submitted for the award of BCA degree either in this or any university without proper citation.

## **ACKNOWLEDGEMENT**

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### **Abstract**

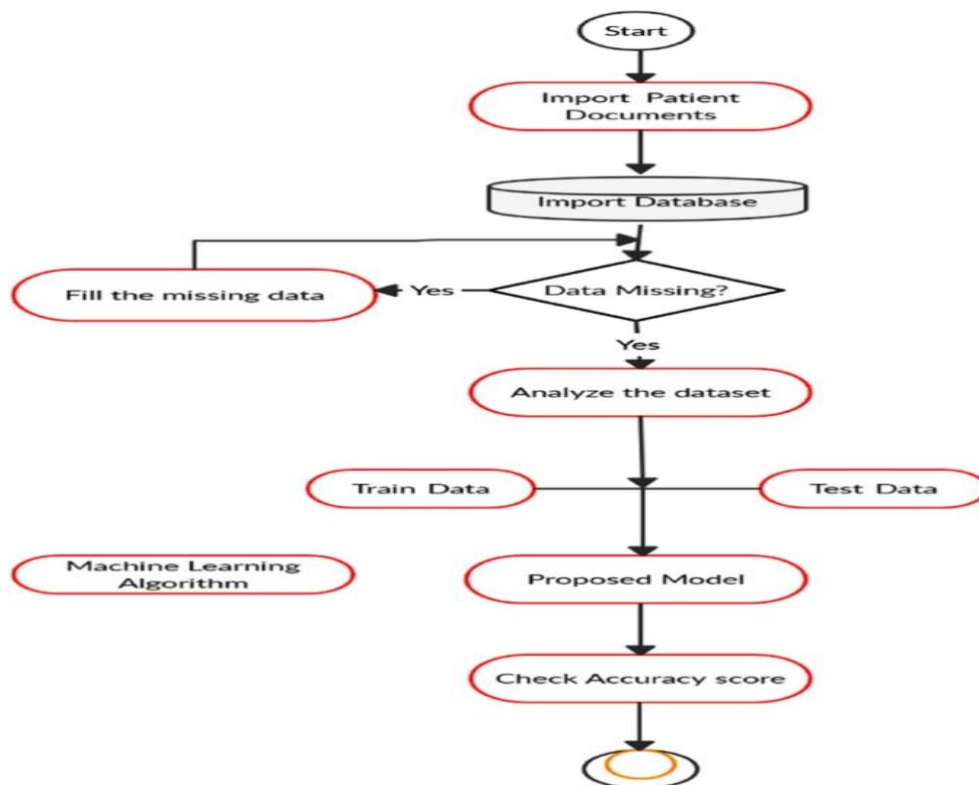
Heart Disease prediction is one of the maximum complex obligations in scientific subject In the current studies Approximately one man or woman dies in line with minute because of coronary heart sickness. Machine learning technology performs an essential function in processing big quantity of statistics withinside the subject of healthcare. As coronary heart sickness prediction is a complicated task, there may be a want to automate the prediction procedure to keep away from dangers related to it and alert the affected person nicely in advance Machine gaining knowledge of approach this is often applied for forecast. Some order calculations count on with applicable precision, even as others display a limited exactness. This paper explores a way named outfit characterization, that is applied for enhancing the exactness of frail calculations with the aid of using consolidating extraordinary classifiers. Investigations with this equipment have been accomplished using a coronary heart sickness dataset.The trial results verify that Logistic regression has achieved the highest accuracy of 85.2% compared to other ML algorithms implemented.

### **INTRODUCTION :**

Heart disease is the most commonly acquired heart disease in people under age 25, and mostly affects children and adolescents in low- and middle-income countries. Heart disease refers to any condition affecting the cardiovascular system. There are several different types of heart disease, and they affect the heart and blood vessels in different ways. These diseases are the leading cause of death globally. In all over the world, approximately 25% of hospital admissions and 13% of deaths are due to CVD. Every year, the disease claims 288,348 lives worldwide. It also accounts for about 2% of deaths from cardiovascular diseases—the number one cause of death globally.

Case fatality due to CVD in low-income countries, including India, appears to be much higher than in middle and high-income countries. In India, for example, the mean age at which people get the first myocardial infarction is 53 years, which is about 10 years earlier than their counterparts in developed countries. In 2016 India reported 63% of total deaths due to NCDs, of which 27% were attributed to CVDs. CVDs also account for 45% of deaths in the 40-69 year age group. Certain heart conditions, such as narrowed arteries in the heart (coronary artery disease) or high blood pressure, gradually leave the heart too weak or stiff to fill and pump blood properly.

A buildup of fatty plaques in your arteries, or atherosclerosis can damage your blood vessels and heart. Plaque buildup causes narrowed or blocked blood vessels that can lead to a heart attack, chest pain (angina) or stroke. Signs and symptoms can include: Chest pain, chest tightness, chest pressure and chest discomfort (angina) Shortness of breath. Pain, numbness, weakness or coldness in your legs or arms if the blood vessels in those parts of your body are narrowed.



Coronary artery disease symptoms may be different for men and women. For instance, men are more likely to have chest pain. Women are more likely to have other signs and symptoms along with chest discomfort, such as shortness of breath, nausea and extreme fatigue.

Signs and symptoms can include:

- Chest pain, chest tightness, chest pressure and chest discomfort (angina)
- Shortness of breath
- Pain, numbness, weakness or coldness in your legs or arms if the blood vessels in those parts of your body are narrowed
- Pain in the neck, jaw, throat, upper abdomen or back

Diagnosis of heart disease is very critical and hard process it take number of different tests are used to diagnose heart-related problems, including:

- electrocardiogram (ECG)
- exercise stress tests
- X-rays
- echocardiogram

- blood tests
- coronary angiography
- radionuclide tests
- MRI scans
- CT scans

Which cost a huge amount of time and money .For this reason some time it become very difficult for middle class people to afford .To over come this problem and to achieve better and faster results we could build automate system with help of machine learning algorithm that can predict wheather the person has heart disease or not. In past years, many researchers find out that machine learning algorithms perform very well in analyzing medical data sets.The data set that we are going to use has contain the following features

1. age
2. sex
3. chest pain type (4 values)
4. resting blood pressure
5. serum cholestorol in mg/dl
6. fasting blood sugar > 120 mg/dl
7. resting electrocardiographic results (values 0,1,2)
8. maximum heart rate achieved
9. exercise induced angina
10. oldpeak = ST depression induced by exercise relative to rest
11. the slope of the peak exercise ST segment
12. number of major vessels (0-3) colored by flourosopy
13. thal: 3 = normal; 6 = fixed defect; 7 = reversable defect

### PROPOSED SYSTEM

This proposed system has data which classifies if patients have heart disease or not according to some parameters. This proposed system can try to use this data to create a model that tries to predict (reading data and data Exploration)[9]if a patient has this disease or not. In this proposed system, using a logistic regression (classification) algorithm we use thesklearn library to calculate the score.Randomsearch is a technique where random combinations of the hyperparameters are used to find the best solution for the built model. Finally, analyzing the results with the help of Comparing Models and Confusion Matrix. From the data we are having, it is classified into different structured data based on the features of the patient heart. From the availability of the data, we have to create a model that predicts the patient's disease using a logistic regression algorithm. First, we have to import datasets read the datasets, the data should contain different variables like age, gender, sex, chest pain, slope, target. The data should be explored so that the information is verified. Create a temporary variable and also build a model for logistic regression[10]. Here, we use a sigmoid function

which helps in the graphical representation of the classified data. By using logistic regression, the accuracy is increased as compared to the previous work done in the existing system.

## Result

After Heart disease is a very critical issue in the present growing world. So, there is a need for an automated system to predict heart disease at earlier stages. So that it will be useful for the physician to diagnose the patients efficiently, and it will be useful to the people also because they can track their health issues by using this automated system .With the help Logistic Regression w achive good result

after working on the data set we used 1025 entries for prediction is weather person is suffering from Heart disease or Not with get 85% of accuracy during the implementation and for the training data and almost 80% with the test data. So we can develop a system with for diagnosis of heart disease in person in early stages.

### **CONCLUSION:**

Heart disease is a very critical issue in the present growing world. So, there is a need for an automated system to predict heart disease at earlier stages. So that it will be useful for the physician to diagnose the patients efficiently, and it will be useful to the people also because they can track their health issues by using this automated system. Some of the expert automated systems were summarized in this paper. Feature selection and prediction, these two are essential for every automated system. By choosing features efficiently, we can achieve better results in predicting heart disease. We have summarized some algorithms which are useful while selecting the features, like hybrid grid search algorithm and random search algorithm, etc. So, in the future, it is better to use search algorithms for selecting the features and then applying machine learning techniques for prediction will give us better results in the prediction of heart disease.

### **Reference**

- [1].L. Ali et al., “An Optimized Stacked Support Vector Machines Based Expert System for the Effective Prediction of Heart Failure,” *IEEE Access*, vol. 7, pp. 54007–54014, 2019, doi: 10.1109/ACCESS.2019.2909969.
- [2] A. Javeed, S. Zhou, L. Yongjian, I. Qasim, A. Noor, and R. Nour, “An Intelligent Learning System Based on Random Search Algorithm and Optimized Random Forest Model for Improved Heart Disease Detection,” *IEEE Access*, vol. 7, pp. 180235– 180243, 2019, doi: 10.1109/ACCESS.2019.2952107.
- [3] M. Gjoreski, A. Gradisek, B. Budna, M. Gams, and G. Poglajen, “Machine Learning and End-to-End Deep Learning for the Detection of Chronic Heart



Failure from Heart Sounds,” IEEE Access, vol. 8, pp. 20313–20324, 2020, doi: 10.1109/ACCESS.2020.2968900.

[4] M. R. Ahmed, S. M. Hasan Mahmud, M. A. Hossin, H. Jahan, and S. R. Haider Noori, “A cloud based four-tier architecture for early detection of heart disease with machine learning algorithms,” 2018 IEEE 4th Int. Conf. Comput. Commun. ICC 2018, pp. 1951–1955, 2018, doi: 10.1109/CompComm.2018.8781022.

[5] “types of heart disease.” [Online]. Available: [https://www.heartandstroke.ca/heart/what-is-heart-disease/types](https://www.heartandstroke.ca/heart/what-is-heart-disease/types-of-heart-disease) of-heart-disease.

[6] J. Schmidhuber, “Deep Learning in neural networks: An overview,” Neural Networks, vol. 61, pp. 85–117, 2015, doi: 10.1016/j.neunet.2014.09.003.

[7] N. H. Farhat, “Photonit neural networks and learning mathines the role of electron-trapping materials,” IEEE Expert. Syst. their Appl., vol. 7, no. 5, pp. 63–72, 1992, doi: 10.1109/64.163674.

[8] A. K. M Sazzadur Rahman, M. Mehedi Hasan, S. Asaduzzaman, M. Asaduzzaman, and S. Akhter Hossain, “An analysis of computational intelligence techniques for diabetes prediction Machine Learning View project An analysis of computational intelligence techniques for diabetes prediction,” Int. J. Eng. &Technology, vol. 7, no. 4, pp. 6229–6232, 2018, doi: 10.14419/ijet.v7i4.28245.