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PREDICTION OF HEART DISEASE USING MACHINE LEARNING TECHNIQUES

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Abstract: *A severe and common medical problem that many people experiencing now-a- days is heart disease. Early identification and evaluation of heart disease is essential for avoiding further complications. The diagnosis of cardiac disease using conventional techniques may not always be precise or effective, though. A software program that uses machine learning to reliably and effectively estimate the risk of heart disease is thus required. This software helps in the early detection of heart disease. The suggested system for predicting heart disease using machine learning algorithms includes the Heart Disease Prediction Module as a critical element. Based on a variety of characteristics, including age, gender, blood pressure, cholesterol level, and otherhealth metrics, this module is in charge of predicting heart disease for a specific patient.*

Keywords: Logistic Regression, Random Forest, Decision Tree, KNN.

INTRODUCTION

The largest issue in the medical field is predicting and diagnosing cardiac disease, which is dependent on the patient's physical examination, symptoms, and other physical manifestations. Body cholesterol levels, smoking, obesity , family history of illness, blood pressure, and work environment are all factors that affect heart disease. In order to accurately anticipate cardiac disease, machine learning algorithms are crucial. Modern technology makes it possible to manage unstructured data that is expanding fast by combining machine language with Big Data technologies. Heart disease is considered to be the most lethal form of human illness in the globe. We can now forecast cardiac disease using machine learning algorithms as a result of growing technological use and data collecting.

I. EXISTING SYSTEM

Currently, the basis for the diagnosis of heart disease includes electrocardiograms, echocardiograms, and angiograms. These simple examinations can be used to track your heart's electrical activity and rhythm throughout several cardiac cycls. An X-ray technique specifically used to examine blood vessels is known as an angiogram. An injection of a particular dye is used to make blood vessels visible on standard X-rays of the area being examined. The dye highlights the blood vessels because it movements via them.. The official medical term for this is catheter angiography Exists

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These methods are not always accurate, so there is a need for a more precise and effective method of predicting the risk of heart disease. The data analysis capabilities of the current system are limited.

II. PROPOSED SYSTEM

All around world, machine learning is applied in many different fields. here isn't anyt any exception withinside the healthcare sector. Machine learning may be crucial in determining whether locomotor disorders, heart illnesses, and other conditions are present or absent. If foreseen far in advance, such information can offer valuable insights to clinicians, who can then customize their diagnosis and course of care for each patient. In the suggested system, we use machine learning to train a model for the purpose of predicting cardiac disease. We will train a model to predict cardiac disease using several machine learning strategies. The accuracy produced by various algorithms will be compared in order to determine which algorithm produces the best accuracy.

III. TECHNOLOGIES USED

Python and Google Collaborative Notebook are the technologies we used for this project.

Google Collaborative: Collab is the abbreviation for Google Collaborative, a version of the free Jupyter notebook environment available online. You can do a lot of things with it,including create and run Python code, use Markdown to document your code, and view datasets. It works fully within the browser and requires very little setup. Data analysis, teaching, and machine learning all frequently use it.

Python: Python is a general-purpose programming language that can be utilized for a variety of activities, including automating processes and writing scripts as well as developing websites and software. Python has the ability to develop software that is ready for production, read and modify documents, interact with data storage systems, and build web applications on a server. Python is frequently combined with other programming languages, frameworks, and tools like Django and Flask to increase its effectiveness and utility.

IV. RESULTS

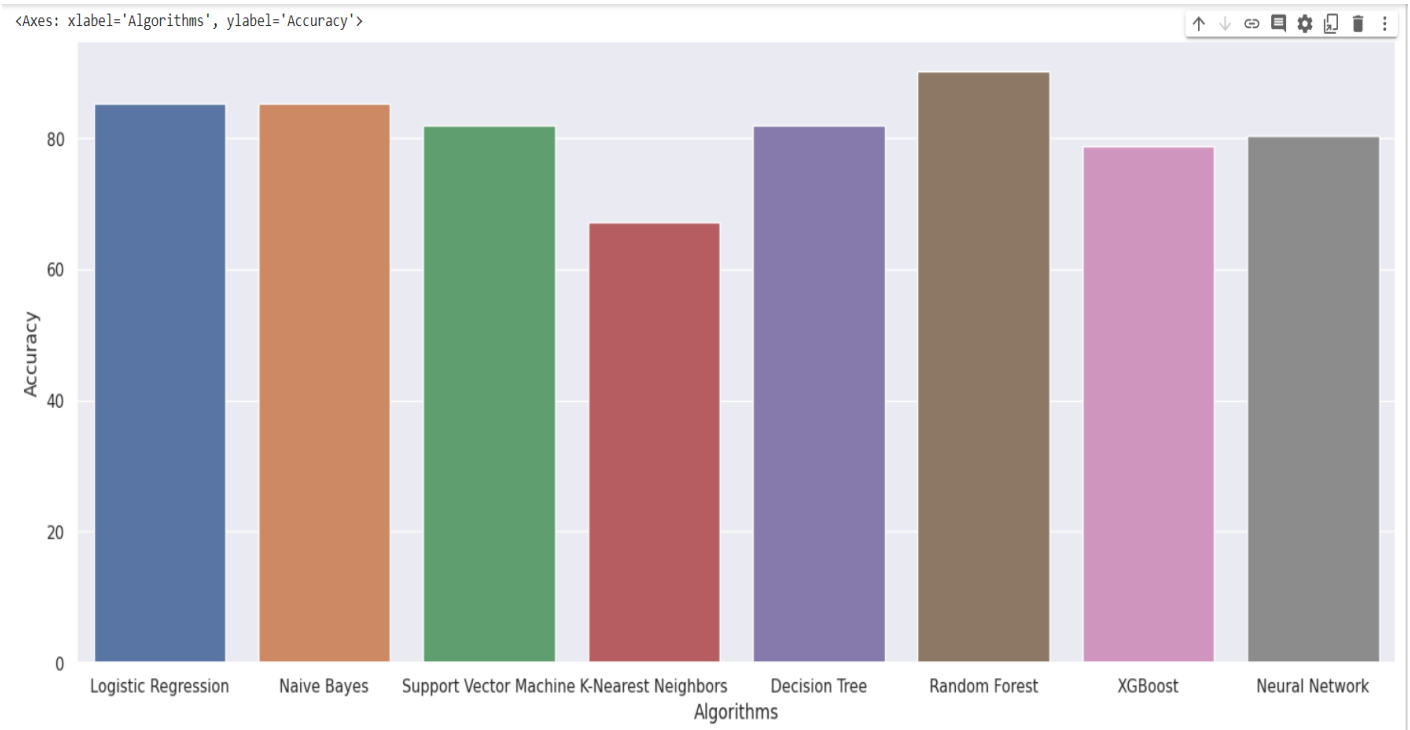

Fig: 1.1

The above bar graph is the accuracy differences between the various machinelearning algorithms.

```
scores = [score_lr,score_nb,score_svm,score_knn,score_dt,score_rf,score_xgb,score_nn]
algorithms = ["Logistic Regression","Naive Bayes","Support Vector Machine","K-Nearest Neighbors","Decision Tree","Random Forest","XGBoost","Neural Network"]

for i in range(len(algorithms)):
    print("The accuracy score achieved using "+algorithms[i]+" is: "+str(scores[i])+" %")
```

```
The accuracy score achieved using Logistic Regression is: 85.25 %
The accuracy score achieved using Naive Bayes is: 85.25 %
The accuracy score achieved using Support Vector Machine is: 81.97 %
The accuracy score achieved using K-Nearest Neighbors is: 67.21 %
The accuracy score achieved using Decision Tree is: 81.97 %
The accuracy score achieved using Random Forest is: 90.16 %
The accuracy score achieved using XGBoost is: 78.69 %
The accuracy score achieved using Neural Network is: 80.33 %
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Fig: 1.2

This project's output demonstrates that the Random Forest algorithm exhibits the highest accuracy when compared to other algorithms.

V. SCOPE OF FUTURE USE

The usage of sophisticated algorithms, such as other data mining and new technological algorithms, should be studied further in order to improve classification accuracy. Apply the suggested system to the area of interest after determining how well the predictions performed per algorithm. We can add more features as needed to increase the implementation accuracy of algorithms. It should be used exclusively by stakeholders to aid in better decision-making. In ourimplementation, we didn't alter any parameters. By altering the experiment's parameters in the future, it can be enhanced and adjusted. By utilizing more heart disease-related data in the future and a variety of data reduction approaches, more work can be accomplished. High quality oriented datasets can be used to produce better outcomes and predictions for heart disease.

VI. CONCLUSION

Our study focused primarily on the application of machine learning techniques in healthcare, particularly in the early diagnosis of heart disease. A dangerous disorder that might cause death is heart disease. Machine learning methods were applied using the KNN, Logistic Regression, Decision Tree, Support Vector Machine, Neural Network, XG-Boost, Naive Bayes, and Random Forest algorithms. Our standard for evaluating performance was accuracy.

For easier comprehension and comparison, the outcomes of every algorithm are presented in both data and bar graph form.

The experiment demonstrates that Naive Bayes and Logistic Regression both have accuracy of85%, while Random forest has the maximum accuracy of 90%. According to our findings, machine learning may be employed and implemented in the healthcare sector too.

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