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Feedback Mechanism in Heart Disease Classification

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Abstract:

Heart diseases are becoming more common every day, making it important and concerning to predict and diagnose these conditions accurately and efficiently. This research paper focuses on identifying patients who are more likely to have a heart disease based on various medical attributes and also examines which attributes are contributing to the heart disease. To address this issue, we developed a heart disease prediction system that uses machine learning algorithms, such as logistic regression, to predict and classify patients with heart disease. This system helps to relieve a significant amount of pressure on medical professionals by accurately identifying the likelihood of a patient having a heart disease. In addition, the heart disease prediction system improves medical care and reduces costs. Overall, this project provides valuable knowledge that can aid in the prediction of heart disease in patients and is implemented in .pynb format.

Introduction

Machine Learning is a method of extracting and manipulating useful information from data, whether previously known or unknown. It is a broad and diverse field that is constantly growing in scope and application. There are several types of machine learning, including supervised, unsupervised, and ensemble learning, which are used to predict and assess the accuracy of a given dataset. Cardiovascular diseases, which include a range of conditions that can affect the heart, are a common concern. According to the World Health Organization, 17.9 million deaths globally are caused by CVDs. These diseases are the leading cause of death in adults. Our project aims to predict which individuals are at risk of developing a heart disease based on their medical history. It can identify those with symptoms such as chest pain or high blood pressure and help diagnose the disease with fewer medical tests and more effective treatment. The main focus of the project is logistic regression, a supervised learning technique that uses discrete values. The accuracy of our project is 85%. The goal of the project is to determine whether a patient is likely to be diagnosed with a cardiovascular heart disease based on their medical attributes, such as gender, age, chest pain, and fasting sugar level. To do this, we used a dataset from the UCI repository containing the medical history and attributes of patients and applied logistic regression to classify those at risk of a heart disease.

METHODOLOGY

The system architecture provides an overview of how the system operates. The process begins by collecting data and selecting relevant attributes. The necessary data is then pre-processed into the necessary format and split into two parts: training and testing data. The algorithms are applied and the model is trained using the training data. The system's accuracy is evaluated by testing it using the testing data. This system is implemented using the following modules.

1. Collection of Dataset
2. Selection of attributes
3. Data Pre-Processing
4. Balancing of Data
5. Disease classification
6. Feedback

1. Collection of dataset: To build our heart disease prediction system, we first collect a dataset. We then split the dataset into training data and testing data, with 70% of the data used for training and 30% for testing. The dataset we use for this project is the Heart Disease UCI dataset, which includes 76 attributes, 14 of which are used in our system.

2. Selection of attributes: In order to improve the efficiency of the system, we carefully select relevant attributes, such as gender, chest pain type, fasting blood pressure, serum cholesterol, and exang, using a correlation matrix.

3. Data pre-processing: To ensure the accuracy of our model, we pre-process the data to clean it and transform it into a usable format. This includes importing the dataset, splitting it, and scaling attributes as needed.

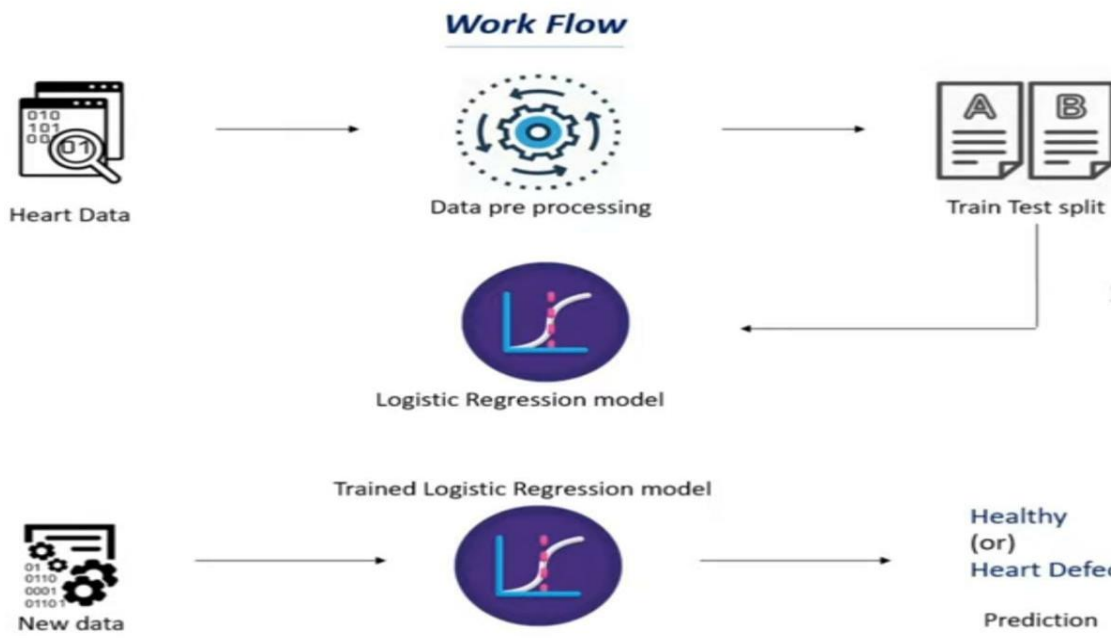
4. Classification: We use logistic regression, which gives the highest accuracy, to classify heart disease.

5. Feedback: Based on the prediction, the model provides feedback on the factors that may be contributing to heart disease.

Parameters Used For Classification

S no	Parameters	Parameter description	Values
1	age	Age in years	Continuous
2	sex	Male or female	1= male
			0= female
3	thestbps	Resting blood pressure	Continuous value in mmHg
4	cp	Chest pain type	1= typical type 1
			2= typical type angina
			3= non-angina pain
			4= asymptomatic
5	chol	Serum cholesterol	Continuous value
			in mm/dL
6	fbs	Fasting blood sugar	1≥120 mg/dL
			0≤120 mg/dL
7	restecg	Resting electrographic results	0= normal
			1= having ST-T wave abnormal
			2= left ventricular hypertrophy
8	thalach	Maximum heart rate achieved	Continuous value
9	old peak	ST depression induced by exercise relative to rest	Continuous value
10	exang	Exercise induced angina	0= no
			1= yes
11	ca	Number of major vessels colored by fluoroscopy	0–3 value
12	slope	Slope of the peak	1= unsloping

WORK FLOW DIAGRAM



CONCLUSION

The goal of this project is to investigate the use of machine learning techniques for classifying heart diseases. In the healthcare industry, the role of a classifier is crucial in determining appropriate treatment for patients. In this study, we compare and evaluate existing techniques in order to identify efficient and accurate systems. Our findings suggest that machine learning techniques can significantly improve the accuracy of predicting cardiovascular risk, allowing for early identification and prevention of heart diseases. Overall, there is significant potential for the use of machine learning algorithms in the prediction and prevention of cardiovascular diseases.

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