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HEART DISEASE PROGNOSIS: UNVEILING TOMORROW'S HEALTH WITH MACHINE LEARNING

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ABSTRACT

Heart attacks are a dangerous condition that have become more common in recent years. This could be because the number of elderly people worldwide is rising, which weakens the heart muscle. However, with prompt diagnosis and efficient treatment, these heart conditions can be successfully avoided. But due to the large-scale complexity that is achieved in the detection of cardiac disease is this requires a lot of time which the patient might not have. Therefore, by using a patient's qualities, this approach effectively predicts a patient's cardiac condition, improving the diagnostic process and helping the cardiac expert and the implementation of deep learning approaches. The methodology proposed in this research for the purpose of heart disease prediction implements Pearson Correlation along with Artificial Neural Networks and Decision Making for accurate heart disease prediction. The performance metrics of this approach have been thoroughly evaluated through experimental evaluation in this research to achieve highly satisfactory outcomes.

Keywords: Artificial Neural Network, Heart Disease, Blood Pressure, ECG, Clinical Diagnosis, Machine Learning, Patient Monitoring, Boosting, Feature Extraction, Magnetocardiography.

I. INTRODUCTION

The human body has one of the most complex and highly complicated mechanisms for the purpose of keeping the human alive. They have been significant researchers that have been performed to understand the various processes that take place in the body that are necessary for the survival of an individual. These researches were highly useful in achieving their desired goals of an analysis which are still being performed to this day. The human body performs a large selection of chemical-physical reactions inside the body that facilitated each and every system that effectively works in cohesion with the other systems inside the body to achieve survivability. These complex interactions have taken years of studies and experiments that have been conducted to analyze each and every inch of the human body for the purpose of providing valuable insight.

The paradigm of the medical sector focuses on this understanding of the internal processes of the body for the purpose of identification of diseases and other problems that can arise which can hinder the normal working of the body that in most cases leads to death. There have been multiple types of research that have been performed to identify a large variety of diseases b format is and inaccuracies in the human body. These have been highly useful to mitigate the bad effects of certain diseases and effectively cure a person by providing the required treatment. The medical approach has also significantly been enhanced over the years to effectively provide protection and treatment against a majority of the diseases. They have been effective medicines and chemicals along with diagnostic approaches that have been significant in achieving the kind of advancement in the medical sector that we see today.

One of the largest casualties that are being noticed due to a disease in recent years is cardiac diseases. Cardiac diseases are diseases that arise due to any inefficiency in the cardiac muscle the heart muscle. This can be highly problematic as the heart muscle is one of the most important muscles in the body that pumps oxygenated and nutrient-rich blood to different parts of the body nourishing the cells. It is the central organ of the circulatory system that is needed to maintain the levels of toxic chemicals in the body by eliminating them and providing fresh blood to the cells at the same time. Any problem in the cardiac system can lead to progressive disorders which can be fatal.

With the increase in the number of cardiac-related deaths, there is a problem that needs to be tackled to reduce these deaths and increase the effective treatment of these diseases to prevent these fatalities. But the problem in the detection of heart diseases is the lack of efficient diagnostic approaches as the complexity of the cardiac muscle and the circulatory system is quite high. This leads to a large amount of time required for the diagnosis which can be the difference between life and death for the patient. Therefore, this approach needs to be improved significantly to reduce the number of deaths related to heart diseases by effective diagnosis and

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timely treatment. Due to the increased complexity, the paradigm of machine learning approaches can be highly useful to achieve the desired goal of heart disease detection accurately

II. METHODOLOGY

Problem Statement

To enhance the process of prediction of heart failure conditions using Pearson Correlation model. This Will empowered by Artificial Neural Network and Decision Making. Too much money needed to test the heart disease. There are so many people in our country that are not able to pay the hospital bills that's why we select this topic.

Motivation

Early prediction of heart failure.

Proper deployment of machine learning algorithms.

Increasing accuracy in prediction.

III. MODELING AND ANALYSIS

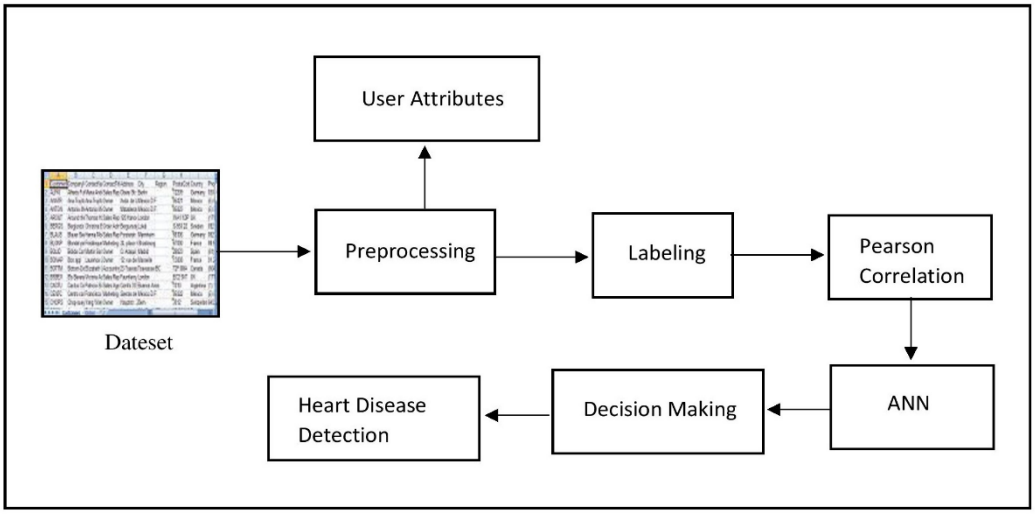

Figure 1: System Overview Design

Algorithm (1 Random Word Selection and Shuffling)

//Input : K-Means Cluster List KMC_L

// Input : User attribute list X[]

//Output:Correlation List CR_L

pearsonCorrelationEstimation(KMC_L)

1: Start

2: $CR_L = \emptyset$

3: **for** i=0 to Size of KMC_L

4: $S_G = KMC_{L[i]}$ [S_G= Single Cluster]

5: **for** j=0 to Size of S_G

6: ROW $= S_{G[j]}$

7: Y[]→ROW

8: P_C=pearsonCorrelation(X,Y)

9: ROW= ROW+P_C

10: $S_G = S_G$+ROW

11: **end for**

12: $CR_L = CR_L + S_G$

13: **end for**

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14: return CR_L

15: **Stop**

Module Description:

1) Module A: Preprocessing

- Get attribute of dataset
- Attribute Estimation
- Attribute Analysis
- Attribute Selection
- Attribute Vector

2) Module B: Pearson Correlation

- Correlation Vector
- Summation estimation
- Ratio Formation
- Correlation List

3) Module C: ANN

- Activation Function
- Hidden Layer Estimation
- Output Layer Estimation
- Heart
- disease prediction

IV. RESULTS AND DISCUSSION

One of the ideas that is most frequently applied globally is machine learning. It will be crucial in the medical field to help doctors diagnose patients more quickly. In this article, we will be dealing with the Heart disease dataset and will analyze, predict the result whether the patient has heart disease or normal, i.e. Heart disease prediction using Machine Learning. This prediction will make it faster and more efficient in healthcare sectors which will be and more efficient in healthcare sectors which will be a time-consuming process.

V. CONCLUSION

The methodology for effective and highly accurate detection of heart disease has been provided in this research. The entire system is trained through the effective realization of a data set containing the symptoms and other attributes of several patients suffering from heart diseases. Following successful method training, the user's or patient's characteristics are fed into the system as input. These attributes are effectively preprocessed to remove the redundant data and make the attributes lightweight for further processing. These attributes are effectively object of the labeled. This data is provided for the Pearson correlation module to extract the correlation list. As the correlation list is completed, the recurrent neural network receives it as an input for efficient processing. The recurrent neural network provides accurate heart disease detection in the form of probability scores that need to be classified by the next module. The Decision-Making approach effectively classified the probabilities course and cheese highly precise heart disease detection results.

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