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Survey on Heart Disease Prediction using Logistic Regression

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Abstract: *The health care industries collect huge amounts of data that contain some hidden information, which is useful for making effective decisions. For providing appropriate results and making effective decisions on data, some advanced machine learning techniques are used. Heart disease prediction is one of the most important and challenging task in the modern world.. A Logistic Regression classifier can be used to associate with the vector of random variables to a binomial random variable. In general LR is a special case of a generalized linear model. LR has been successfully used by most of the researchers in this field for the last twenty-five years. The paper provides a survey of available literature of some methodologies employed by different researchers to utilize LR for Heart Disease prediction. The predictive model built using LR approach can make a positive difference in business or organization. In medicinal area, this analytics can be used to predict the likelihood of disease for a given population, which means the preventive measures can be put in the place.*

Keywords: Heart disease, Machine Learning, Linear regression, Logistic regression.

I. INTRODUCTION

It is difficult to identify heart disease because of several contributory risk factors, various techniques in data mining have been employed to find out the severity of heart disease among humans. 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. In this project we are gathering the datasets of previous heart patients, symptoms, other parameters and predicting whether the new patient is having parameters satisfying conditions and checking whether the person is facing any heart disease. Heart disease is very minute to predict, so if the dataset and attributes can be complex the prediction will be more clear and accurate [1]. Machine learning is used widely in today's world because of increasing computation power and the availability of large datasets on open-source tools. Quality of transmission (QoT) can give some insights into the model. An attempt has been made to monitor the Quality of transmission to determine the physical condition of the model [2]. The first step is to use different data visualization methods to represent the text-based data into a visual format for identifying undetected trends. The third step is to use classification techniques to train the model and predict on the testing dataset. The fourth step is to propose a method for boosting the prediction rate for technique. In wireless networking, resource management is another problem where ML was applied to obtain optimal performance [3]. Heart Disease is the highly considerable human health problem and the statistics revealed that, this is the main reason behind more than 60% of the adult mortalities every year noticed by WHO [4]. Any mature obstacles in heart blood pumping process to the body organs can causes the high blood pressure, which further leads to flare-up the heart disease and may also to sudden death. Early prediction [5, 6] or sensing of this disease occurrence can help in preventing the people from its negative impacts.

II. LITERATURE SURVEY

In this paper, they calculate the accuracy of four different machine learning approaches and on the basis of calculation we conclude that which one is best among them. In this paper they have mentioned the introduction about the machine learning and heart diseases and described, the machine learning classification. They illustrated the related work of researchers. This is about the methodology used for this prediction system. Authors have briefly described the dataset and their analysis with the result of this project [1].

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In this paper, the authors have described the demonstration algorithms like Support Vector Machine, Hoeffding Decision Tree, Logistic Model Tree(LMT), Naïve Bayes, Random Forest. And they concluded that Random forest algorithm performs good predictions that can be understood easily
[2].

Five datasets are combined to develop a larger and more reliable dataset in this paper. Two selection techniques, Relief and LASSO, are utilized to extract the most relevant features based on rank values in medical references. This also helps to deal with over fitting and under fitting problems of machine learning [3].

In this paper, heart disease prediction system is developed using various algorithms of Machine learning techniques. The approach followed is, the NaN values are replaced by the mean of the column. Due to which accuracy for the prediction gets improved. [4].

In this paper, they have used decision trees in predicting the accuracy of events related to heart disease. They have also introduced Computer Aided Decision Support System (CADSS) in the field of medicine and research [5].

In this paper, they have used MLP perceptron; it provides the users with a prediction result that gives the state of a user leading to CAD. Due to the recent advancements in technology, the machine learning algorithms are evolved a lot and hence here they have used Multi Layered Perceptron (MLP) in the system because of its efficiency and accuracy [6].

In this paper, two supervised data mining algorithm was applied on the dataset to predict the possibilities of having heart disease of a patient, were analyzed with classification model . The classification technique is used for classifying the entire dataset into two categories namely yes and No [7].

In this system, the output consists of horizontal and vertical line splits based on the condition depends on the dependent variables. The accuracy level of this algorithm is quite higher than the other algorithms. The reason for the higher accuracy of this algorithm is this model analyses the dataset in the tree shape format [8].

III. CONCLUSION AND FUTURE WORK

The machine intelligence can serve as a genuine alternative diagnostic method for prediction, which will in turn keep the patients well aware of their illness state. Identifying the risk of heart disease with reasonably high accuracy could potentially have a profound effect on the long-term mortality rate of humans, regardless of social and cultural background. Early diagnosis is a key step in achieving that goal. Several studies have already attempted to predict heart disease with the help of machine learning. This study takes similar route, but with an improved and novel method and with a larger dataset for training the model. This research demonstrates that the Relief feature selection algorithm can provide a tightly correlated feature set which then can be used with several machine learning algorithms. We hereby conclude that using logistic regression we are getting 84% accuracy in predicting the heart disease.

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