Predicting Heart Disease and Type Classification

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Abstract

In today's contemporary world cardiovascular disease is the most mortal one. Medical prognosis plays imperative role and yet convoluted task that needs to be carried out productively and precisely. Nearly all the hospitals utilizes some hospital administration system to superintend medical help to patients. Tragically nearly all of the systems seldom employ the vast clinical reports where vital information is concealed. In this paper a system is introduced which predicts and diagnoses the disease using different features . Unambiguousness of the prediction degree is elevated when more number of attributes are used. This paper aims to perform predictive analysis using machine learning algorithms. The purpose here is to develop an economical treatment using data mining techniques for expediting data base decision support system.

Keywords:Artificial neural network, Predicting Heart Disease and Type Classifying (PHDTC).

1.INTRODUCTION

Heart disease is one of the utmost widespread ailment in the modernistic era. It is a manifestation of cardio vascular disease that can strike anyone irrespective of the gender. Coronary heart disease is an infestation in India and one of the major reason for the increasing death rate. It is roughly calculated that by the year 2012, India will carry 60% of the world's heart disease strain. Sixty years is the normal age of heart sufferers in India against 63-68 in advanced nations. The faultless interpretation of a heart disease is one of the predominant biomedical hindrances whose supervision is necessary. In medical

domain computers utilizes enormous healthcare information in distinctive forms such as pictures, texts, charts and numbers. Although most of the data are remains unused. Effectual tools to condense information from these databases for clinical discovery of diseases or other intentions are not much dominant. To overpower this issue a system that makes efficient use of this data and aids to speculate heart disease is required. This system is achievable and swifter and additional accuracy for determination of heart disease[3].

2.RELATED WORK

A. Artificial Neural Network:

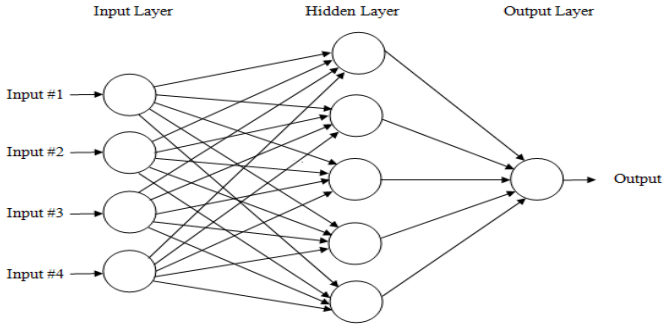
An artificial neural network (ANN) is the deception of human brain that is being applied to an numeralreal world problems. Considering neural networks as an implement one can extract the proficient data from data ware house. ANN are well trained so that it can to identify, reserve and restore the patterns to solve combinatorial cumulation problems. Ability to evaluate functions and to recognize patterns makes ANN a pervasive utility in data mining. The key advantage is that it is able to solve problems which are composite for standard technologies. ANNdeduce rules from the patterns extracted from the data. It provides necessary information on associations, classifications and clustering[5].

Three layers of ANN are as follows:

1) Input Layer: It mainly accepts the input values which is passed on to hidden layer. The input value that is the bias value is then multiplied by weight and added to sum before going into neuron.

2) Hidden Layer: At each neuron in the hidden layer, a weight (wji) is multiplied to the value from each input neuron. Then a combined value uj is produced by adding the resulting weighted values from each hidden layer neuron. This weighted sum (uj) is then given to the a transfer function ı, producing the outputs of value hj .The combined outputs obtained from the hidden layer neurons are then given to the neurons in output layer.

3) Output Layer: In this layer weight (wkj) is multiplied to the value that is obtained from each hidden layer neuron, and then a combined value vj is produced by adding the resulting weighted values .



B. Tensorflow:

“Tensorflow is a computational framework for building machine learning models. TensorFlow provides a variety of different toolkits that allow you to construct models at your preferred level of abstraction”. Lower-level APIs can be used build models by defining a series of mathematical operations. Similarly, higher-level APIs(like tf.estimator)is used to specify predefined architectures, such as linearregressors or neural networks[2].

C. Dataset:

The dataset consists of databases related to diagnosis of heart disease. Numeric values are assigned to attributes. The data was collected

from the Cleveland Clinic Foundation (cleveland.data).

age	sex	cp	trestbps	chol	fbs	restecg	thalach	exang	oldpeak	slope	ca	thal	target
47	1	2	130	253	0	1	179	0	0	2	0	2	1
35	1	1	122	192	0	1	174	0	0	2	0	2	1
58	1	1	125	220	0	1	144	0	0.4	1	4	3	1
56	1	1	130	221	0	0	163	0	0	2	0	3	1
56	1	1	120	240	0	1	169	0	0	0	0	2	1
55	0	1	132	342	0	1	166	0	1.2	2	0	2	1
41	1	1	120	157	0	1	182	0	0	2	0	2	1
38	1	2	138	175	0	1	173	0	0	2	4	2	1
38	1	2	138	175	0	1	173	0	0	2	4	2	1
67	1	0	160	286	0	0	108	1	1.5	1	3	2	0
67	1	0	120	229	0	0	129	1	2.6	1	2	3	0
62	0	0	140	268	0	0	160	0	3.6	0	2	2	0
63	1	0	130	254	0	0	147	0	1.4	1	1	3	0
53	1	0	140	203	1	0	155	1	3.1	0	0	3	0
56	1	2	130	256	1	0	142	1	0.6	1	1	1	0

Fig. 1: Dataset Structure

Following are the attributes with their descriptions:

Serial No.	Attribute	Description
A	Age	In Year
B	Sex	num 1: Male num 0: Female
C	Chest pain type	num 1: typical type 1 angina num 2: typical type angina num 3: non-angina pain num 4: asymptomatic
D	Trest Blood Pressure	mmHg
E	Cholestrol	In mg/dl
F	Fasting Blood Sugar	num1: > 120 mg/dl num 0:< 120 mg/d
G	RestECG	resting electrographic results num 0:normal num 1: 1 having ST-T wave abnormality num 2: showing probable/definite left ventricular hypertroph
H	Slope	the slope of the peak exercise ST segment num 1: unsloping num2: flat num 3: downsloping
I	Thalach	maximum heart rate achieved
J	Exang	exercise induced angina num 1: yes num 0: no
K	oldpeak	ST depression induced by exercise
L	Thal	num 3: normal num6: fixed defect num 7: reversible defect
M	Ca	number of major vessels colored by flouropsy (value 0 –3)
N	num	Diagnosis of heart disease (angiographic disease status) num0: < 50% diameter narrowing num1: > 50% diameter narrowing

D. Training Data:

Training Data is categorized data that is mainly used to instruct machine learning algorithms and enhance precision.

E. Test Data:

All models of machine learning are tested to check how strong is their predictions. That is the output data which is never seen before. It is just like challenging students with new problems in exams, the models also must be challenged to measure its performance. Here 80 percent of dataset is for training and 20 percent is for testing[8].

III. PROPOSED SYSTEM

Artificial intelligence is used in Predicting Heart Disease and Type Classifying (PHDTC) system. Based on decision condition, heart disease is predicted by The Artificial Neural Network i.e. ANN. The disadvantage of present system is that it provides less accuracy results. In order to enhance accuracy we make use of ANN. To normalize the data we make use of data mining classifier.Here we are classifying certain types of heart disease which are Coronary Artery Disease, Heart Arrhythmia, Myocardial Infraction and Hypertensive Heart Disease. Based on the variations in the values of the attribute we are able to predict few types of diseases.

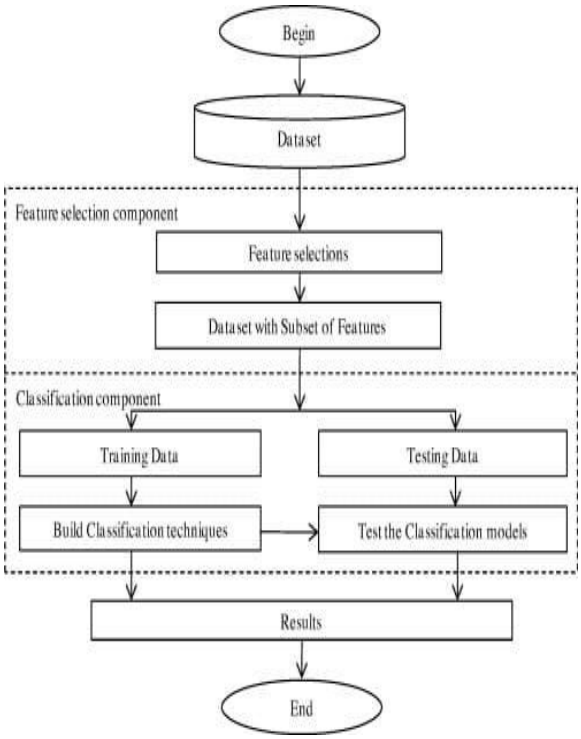


Fig. 2:System Architecture

IV. CONCLUSION

In this paper we are classifying certain types of heart diseases based on the dataset of patients who is having heart disease. The Machine learning algorithm, Artificial Neural Network is used for this purpose. As this paper suggests a new approach to classify heart disease accuracy is around 70 to 80 percent. In future approach more weightage must be given to accuracy.

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