CARDIOVASCULAR DISEASE PREDICTION USING ANN AND RANDOM FOREST ALGORITHMS

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Abstract

Heart-related diseases are on the rise, according to recent research by the World Health Organization. It kills 17.9 million people every year. As the population grows, early diagnosis and initiation of treatment becomes more difficult. But thanks to recent technological advancements, machine learning and deep learning techniques have accelerated the development of the health sector through several studies. With limited dataset and data features, a practical and composite data preprocessing, creative feature engineering methods examined in this project. Therefore, the purpose of this paper is to build a machine learning model for heart disease prediction based on relevant parameters. In this work, we used the Heart Disease Prediction benchmark dataset, which contains 14 different parameters related to heart disease. Machine learning algorithms such as Random Forest and ANN have been used for model development. We also try to find correlations between the different attributes available in the dataset with the help of standard machine learning methods, and then use them effectively to predict the chance of heart disease.

Keywords: *Machine Learning,Deep learning,Random Forest.*

I.INTRODUCTION

Machine learning is programming computers to optimize a performance criterion using example data or past experience. We have a model defined up to some parameters, and learning is the execution of a computer program to optimize the parameters of the model using the training data or past experience. The model may be predictive to make predictions in the future, or descriptive to gain knowledge from data.

The field of study known as machine learning is concerned with the question of how to construct computer programs that automatically improve with experience.

In this project we would like solve the problem of manually meeting the doctors. All the people who have diagnosed their may need not to go to the doctors. The main goal of this project is to find the accuracy of heart disease by taking the symptoms and give the review to the user. With the right treatment the disease can be treated after knowing the outcome. All the attributes we are taken can be taken from the primary basis tests and give accurate results more or less. The overall objective of the project is to take the input of symptoms from the tests and predict is there any heart disease is there or not. It shows us whether we should go and meet the doctor or not.

II.IMPLEMENTATION

Decision Tree

Decision tree learning is a method for approximating discrete-valued target functions, in which the learned function is represented by a decision tree

Random Forest

As the name suggests, "Random Forest is a classifier that contains a number of decision trees on various subsets of the given dataset and takes the average to improve the predictive accuracy of that dataset." Instead of relying on one decision tree, the random forest takes the prediction from each tree and based on the majority votes of predictions, and it predicts the final output.

ANN Algorithm?

Artificial neural networks are biologically inspired; that is, they are composed of elements that perform in a manner that is analogous to the most elementary functions of the biological neuron. The important characteristics of artificial neural networks are learning from experience, generalize from previous examples to new ones, and abstract essential characteristics from inputs containing irrelevant data.

Proposed System :-

Our project is to build a machine learning model for heart disease prediction based on relevant parameters. In this work, we used the Heart Disease Prediction benchmark dataset, which contains 14 different parameters related to heart disease. Machine learning algorithms such as Multi Linear Regression, Random Forest and ANN have been used for model development. We also try to find correlations between the different attributes available in the dataset with the help of standard machine learning methods, and then use them effectively to predict the chance of heart disease.
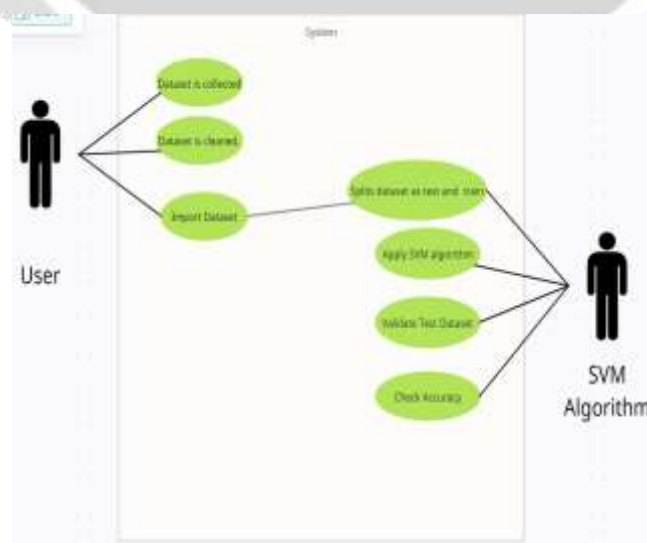

FIG-1:USECASE DIAGRAM

The above usecase diagram represents the enhanced application flow.Usecases diagram are one of the five diagrams in UML Diagrams.It shows a set of Usecases,Actors and their Relationship.It also contains notes and constraints.
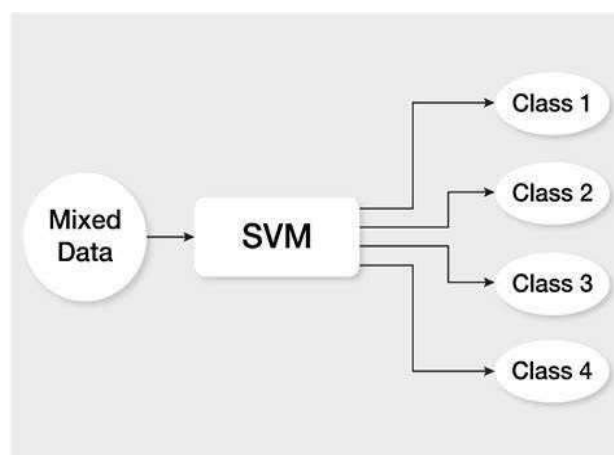

FIG-2:SEQUENCE DIAGRAM

A sequence diagram in a Unified Modeling Language (UML) is a kind of interaction diagram that shows how processes operate with one another and in what order. It is a construct of sequence diagram shows object interactions arranged in time 30 classes involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario. Sequence diagrams typically are associated with use case

III.RELATED WORK

Method of Implementation:-

Machine learning sickness prediction project aims to beat common early diseases as we have a tendency to all understand in competitive atmosphere of economic development the man has concerned such a lot that he/she isn't involved regarding health in step with analysis, four-hundredth of individuals ignore common diseases, that then result in dangerous diseases. The Project "Heart sickness Prediction victimisation Machine Learning" is enforced victimisation python fully .The shape is made victimisation markup language and CSS with Django integration. At the moment user must enter the main points within the kind to induce various correct output. This prediction is largely finished the assistance of three algorithms of machine learning and deep learning like ANN , Random Forest, Multi linear Regression. Once user enter all the symptoms then he/she desires to press the button of submit, for instance user entered the details and validate the input using forms and perform ML algorithms to generate the predicted output.

To create a machine learning model import libraries like pandas, scikit learn. Then import the dataset to train a model. Use Support vector machine to create the ML model. The imported dataset is used to test the ML model created.

#import packages import keras f

rom keras.models import Sequential from keras.layers import Dense

from keras.layers import LeakyReLU,PReLU,ELU f rom keras.layers import Dropout

SavingModel.Py

This python file saves the neural networks model. So that every time we can't train the model to predict the output. Model can be saved with pickle module with .pkl extension or simply we can save the model with .h5 extension. In this project we generated .h5 file for further use of model..h5(Hierarchical Data Format) is an

extension file contains the data multi-dimensional arrays of Scientific data. sample code classifier.save('./ann.h5')

ARCHITECTURE

Disease prognostication exploitation machine learning predicts the existence of the illness for the user oriented on numerous symptoms and also the data the user offers a like aldohexose level, plasma level and many additional such common details through the indications. the design of the system sickness forecasting exploitation machine learning incorporates varied datasets through that we'll compare the symptoms of the user and predicts it, then the datasets area unit reworked into the smaller sets and from there it gets classified supported the classification algorithms shortly the classified information then

processed into the machine learning technologies through that the information gets processed and goes in to the illness prediction model exploitation all the inputs from the user that is mentioned on top of. Then once user coming back data and overall processed data combines and compares within the prediction model of the system and eventually predicts the unhealthiness. ANN style diagram may be a graphical illustration of a bunch of study concepts, that areaunit a vicinity of ANN style, still as their principles, elements and parts. The diagram explains relating to the system coding system in perception of outlineof the system

IV. RESULTS

The code specifications followed generated the proper and the desired output and the results of it are as follows:

Figure 5.9: Form web page

V.CONCLUSION

The proposed project we have done is building the models and Front End(user Interface). We built the machine learning models of Multilinear Regression and Artificial Neural Network using Deep Learning . We observed that the accuracy of the multi linear regression model is 55% , accuracy of random forest model is 78% and by using ANN we got the accuracy of the 85%. We built the ANN with by setting hyper parameters with– activation function : relu, sigmoid number of layers :3 layers weight initilizers :he uniform,glorot distribution optimizer :adamax loss function : binary cross entropy we built user interface by using forms and table in html and we integrated the model and UI with Django (python module).By this we conclude that ANN is better than Random Forest and regression model for the given dataset. This modern approach helps to healthcare to prevent the disease with early intervention rather than go for treatment after diagnosis. Traditionally, physicians or doctors use a risk calculator to assess the possibility of disease development.

VI.REFERENCES

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