A Mini Project Synopsis on

HEART DISEASE DETECTION

I.T Engineering

Submitted By

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CERTIFICATE

This to certify that the Mini Project report on **Online Examination System** has been submitted by **RAGINI PANDEY (18104065), SAMIKSHA PAWAR (19104020) and SHREYASHA VINERKAR (19104032)** who are a Bonafide students of A. P. Shah Institute of Technology, Thane, Mumbai, as a partial fulfilment of the requirement for the degree in **Information Technology**, during the academic year **2021-2022** in the satisfactory manner as per the curriculum laid down by University of Mumbai.

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CHAPTER 1

Introduction

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 data mining techniques are used. In this study, a Heart Disease Prediction System (HDPS) is developed using Logistic Regression and Random Forest algorithms for predicting the presence of heart disease. The system uses 14 medical parameters such as age, sex, blood pressure, cholesterol, and obesity for prediction. The HDPS predicts the likelihood of patients getting heart disease. It enables significant knowledge. E.g., Relationships between medical factors related to heart disease and patterns, to be established. We have employed the multilayer perceptron neural network with backpropagation as the training algorithm. The obtained results have illustrated that the designed diagnostic system can effectively predict the risk level of heart diseases. The number of people suffering from heart disease is on the rise (health topics, 2010). The report from world health organization shows us a large number of people that die every year due to the heart disease all over the world. Heart disease is also stated as one of the greatest killers in Africa. Data mining has been used in a variety of applications such as marketing, customer relationship management, engineering, and medicine analysis, expert prediction, web mining and mobile computing. Of late, data mining has been applied successfully in healthcare fraud and detecting abuse cases. 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 data mining techniques are used to better the experience and conclusion that have been given.

Heart predictor system will use the data mining knowledge to give a user-oriented approach to new and hidden patterns in the data. The knowledge which is implemented can be used by the healthcare experts to get better quality of service and to reduce the extent of adverse medicine effect.

1.1 Purpose:

The importance and advantages of the application of Machine learning based heart disease detection and prediction system were discussed in several research findings. The application of artificial intelligence in disease detection system especially the cardiac disease system detection improves the performance of other existing widely used models.

This work aims in developing a Decision Support System in heart disease detection that uses the data mining technique having best accuracy and performance among Naïve Bayes, Support Vector Machine, Simple Logistic Regression, Random Forest etc. By using several cardiovascular system parameters such as age, blood pressure, ECG results, sex, and blood sugar, it is possible to measure the possibility of getting affected by heart disease.

In hospitals, there are provisions for continuous monitoring of critical care heart patients whereas after the release from the hospital patients normally go out of direct supervision. These patients need continuous monitoring of their health condition to reduce the risks of unwanted complications at least for a week or so. Hence, another objective of this work is to check at the comfort of our home.

This algorithm takes the medical parameters such as age, blood pressure, heartbeat, sex, ECG results, blood sugar etc. as input and shows the probability of getting affected by heart disease as output.

1.2 Objectives:

The objectives of Heart Disease Prediction are as follows:

- To achieve efficiency
- To ease the diagnosis process.
- To ensure a smooth process for diagnosing with the help of parameters used in dataset.
- The main objective is to develop a heart disease prediction system. The system can discover and extract hidden knowledge associated with diseases from a historical heart data set.
- Heart disease prediction system aims to exploit data mining techniques on medical data set to assist in the prediction of the heart diseases.
- It provides new approach to concealed patterns in the data.
- With the help of automated heart disease prediction system, it avoids the human biasness.
- To implement Logistic Regression that classifies the disease as per the input of the user.
- It might help reduce the medical costs if diagnosed earlier by the doctor.
- The purpose of the project is to build a machine learning which will reduce the manual work and depend on technology
- The data can be given by the user or doctor to find if the person in question is suffering from heart disease or not.
- To critically apply data interpretation strategies in python language for health problem detection.

1.3 Scope:

Heart Disease Prediction System is designed for medical institutes, like hospital and private institutes to conduct test for the Patients. This predictive system can also be used by the patients from Home if they have proper reports of the same.

The goal of our heart disease prediction project is **to determine if a patient should be diagnosed with heart disease or not**, which is a binary outcome, so: Positive result = 1, the patient will be diagnosed with heart disease. Negative result = 0, the patient will not be diagnosed with heart disease.

Our project aims at Business process automation, i.e., we have tried to computerize the diagnosis of heart disease for people.

- The integration of clinical decision support with computer-based patient records could reduce medical errors, enhance patient safety, decrease unwanted practice variation, and improve patient outcome.
- The potential to generate a knowledge-rich environment which can help to significantly improve the quality of clinical decisions.
- Data insight**:** As mentioned here we will be working with the heart disease detection dataset and we will be putting out interesting inferences from the data to derive some meaningful results.

CHAPTER 2

Problem Definition

- Problem Identified:

  - The major challenge in heart disease is its detection. There are instruments available which can predict heart disease but either they are expensive or are not efficient to calculate chance of heart disease in human.
  - However, it is not possible to monitor patients every day in all cases accurately and consultation of a patient for 24 hours by a doctor is not available since it requires more sapience, time and expertise.
  - Since we have a good amount of data in today's world, we can use various machine learning algorithms to analyze the data for hidden patterns. The hidden patterns can be used for health diagnosis in medicinal data.

- Solution Proposed:

  - With the right treatment, the symptoms of heart disease can be reduced and the functioning of the heart improved. The predicted results can be used to prevent and thus reduce cost for surgical treatment and other expensive.
  - The system is manageable and easy to use.
  - It provides quick, immediate and easy way to predict the results.
  - This is an advantage to patients as well as Doctors.

CHAPTER 3

PROPOSED SYSTEM

3.1 Features and Functionality

1.Prediction

- In this system we are implementing heart disease prediction using Logistic Regression Algorithm
- Input can be given through manual entry and CSV dataset file, after taking the input the algorithm applied on the input is Logistic expression.
- The proposed system will add some more parameters significant to heart attack with their weight, age and the priority levels are by consulting expertise doctors and the medical experts.
- Ease: It is a user-friendly application and time and location doesn’t matter.
- According to the values given in the dataset it can be figured out if the patient is healthy or unhealthy.
- The attributes that should be taken into consideration are included in the website and gives the user the relatable information.

CHAPTER 4

Project Outcomes

- Heart Disease Detection System is capable of successfully predicting the presence of Heart abnormality in a person.
- This system will help in minimizing the medical costs if it is detected earlier.
- The patient is more at risk if the 13 factors given in the dataset are surpassing the given values which are normal.
- This system not only proves beneficial to the doctors but also the patients, civilians who are keen to learn or use machine learning.
- The result can be obtained from anywhere as it is a system application.
- The potential to generate a knowledge-rich environment which can help to significantly improve the quality of clinical decisions.

CHAPTER 5

Software Required

The software used in this project, i.e. the technology stack is:

- Jupyter Notebook
- Google Collab
- Python 3.10.2
- Pandas
- Numpy
- Flask
- HTML
- CSS

CHAPTER 6

Project Design

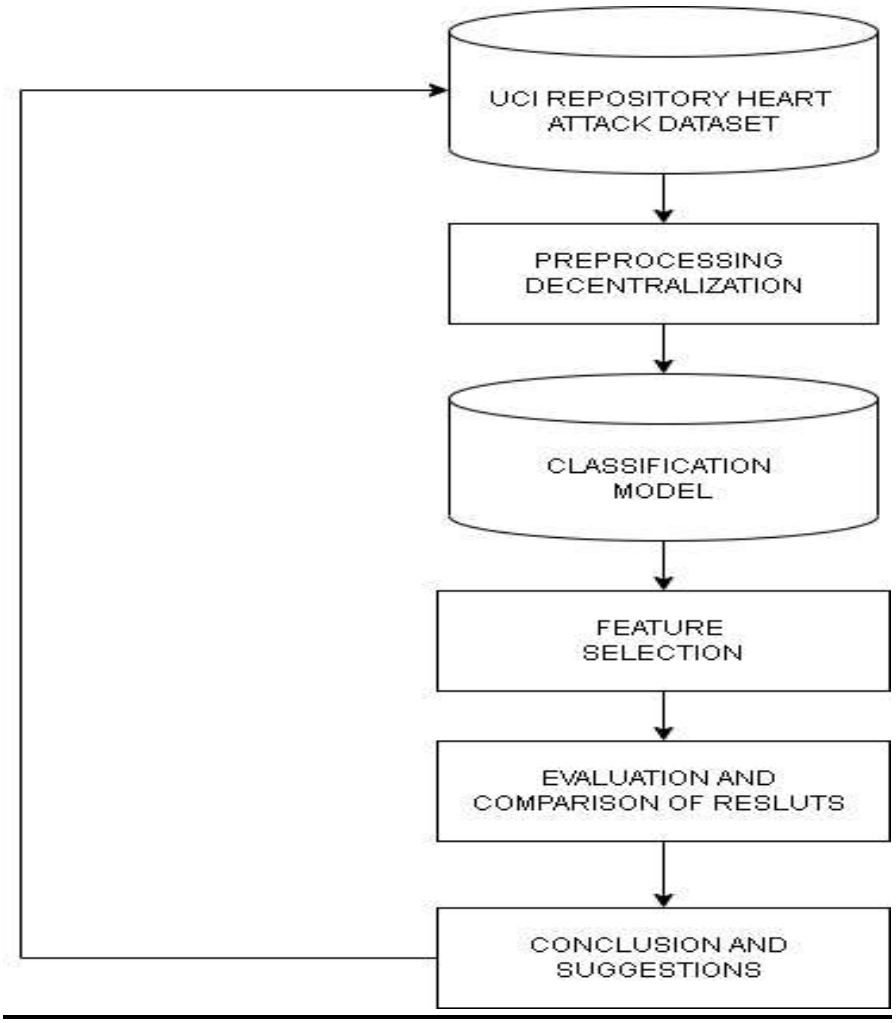

Figure 1.1

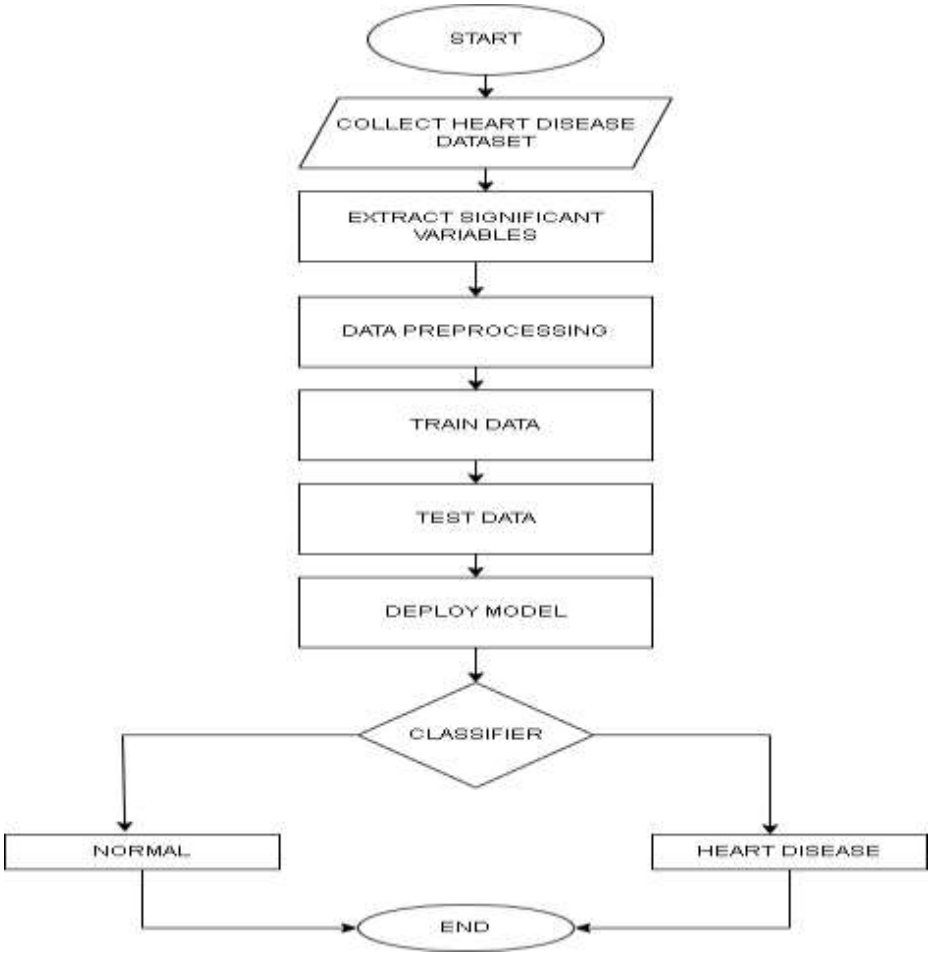
START
COLLECT HEART DISEASE DATASET
EXTRACT SIGNIFICANT VARIABLES
DATA PREPROCESSING
TRAIN DATA
TEST DATA
DEPLOY MODEL
CLASSIFIER
NORMAL
HEART DISEASE
END

Figure 1.2

- **Implementation**

Home Page

CHAPTER 7

Project Scheduling

Sr. No	Group Member	Time duration	Work to be done
1	Samiksha Pawar Ragini Pandey Shreyasha Vinerkar	1st week of January	Collected and imported the dataset
		2nd week of January	Designed and implemented html home page
2	Samiksha Pawar Ragini Pandey Shreyasha Vinerkar	3rd week of January	Trial and Error using various machine learning algorithms , research papers.
3	Samiksha Pawar Ragini Pandey Shreyasha Vinerkar	By the end of March month	Applied ML algorithm to the dataset and checked connectivity of dataset with UI.

CHAPTER 8

CONCLUSION:

The use of machine learning techniques can be applied to detection of heart-health status but different degrees of accuracy can be obtained. The study has shown the prediction accuracy of three machine learning models to predict the presence or absence of heart diseases.

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