



## HEART DISEASE IDENTIFICATION METHOD USING ML IN E-HEALTH CARE

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**Abstract:** Today In order to effectively treat people with a wide range of illnesses, medical services have evolved tremendously. today, it is more difficult than ever to diagnose patients accurately and administer therapy that works. Poor clinical judgment may result in patient death, which the hospital must cover because it will damage its reputation. Hospitals today employ hospital information systems. These systems routinely generate vast amounts of data, including text, figures, charts, and photographs. Sadly, the outcomes of these studies have only partially supported the patient's treatment. How can we transform data into knowledge that will help medical professionals choose wise treatments? The diagnosis of Heart diseases is a crucial job in medicine.

**Keywords:** Heart Disease , Illness

### Introduction.

People are exposed to a lot of data through the IT sector. Unless the information is converted into knowledge, it has no value. Analyses are needed in order to extract relevant information from this vast amount of data, there are different steps for a variety of tasks for this. Today In order to effectively treat people with a wide range of illnesses, medical services have evolved tremendously. The diagnosis of Heart diseases is a crucial job in medicine. Vital Body portion or organ is the Heart. The efficient functioning of the heart is essential to life. Vital Body portion or organ is the Heart. The efficient functioning of the heart is essential to life. Heart Only a pump, Heart circulates blood throughout the body. The term "Heart Ailment" implies diseases of the Heart and Arteries.



Fig 1. Heart Disease

**Characteristics of HD:** Aches or pains radiating from the arm, back, jaw, or throat. Feelings of satiety, Aching, Heartburn, or Suffocation, Perspiring, feeling queasy, Heaving, or Being unsteady, Extreme difficulty Agitation, or shortness of Breath.

### Various Types of HD

This refers to a number of ailments that can affect different regions of the Heart. Cardio is Latin for "Heart." Therefore, all cardiac illnesses are considered to be cardiovascular illnesses. There are numerous different cardiac problems.

- 1. Coronary Disease:** Coronary disease is the most prevalent form of coronary disease worldwide (CAD). It is a condition where plaque buildup restricts blood flow to the heart by obstructing coronary veins.
- 2. Angina Pectoris:** It is a term used in medicine to describe cardiac failure, which results in stomach pain. A warning symptom for a heart attack, it is sometimes referred to as angina. Intermittent and lasting a few seconds or minutes, the abdominal ache.
- 3. Heart congestion disappointment:** When the heart cannot adequately pump blood to the body's remaining tissues, there is a problem. A different name for it is heart disappointment.
- 4. Innate coronary illness:** The Emergence as a result flaw in the way the heart functions built .Especially children are born with a kind of this intrinsic illness.
- 5. Myocarditis :** A degeneration Tissues that is frequently infections with bacteria, parasites, and viruses that affect the Heart.

## I. RELATED WORK

- [1] Study of Heart failure Prediction Technique victimisation BAN; The technique are often extended to twelve lead ECG statics analysis for detection of various styles of internal organ abnormalities and provides the longer term direction of the work. The system utilizes the market wireless network for the statics transmission, that contributes to the value reduction.
- [2] Research On Applications Of Knowledge Mining Techniques In Medical Field; Siri Krishan Wasan and Harleen Kaur.
- [3] Prediction and Diagnosis of Heart Disease Patients who make use of data mining techniques , IEEE Explore April 25, 2019 ; This project's main objective is to provide knowledge on using data mining to treat or prevent heart disease. The primary strategy for collecting info has been using the Information of the pertinent patients.
- [4] Using Data Mining methods to analyse Health Care Data Haslina Mohd and Sharifah Mastura Syed Mohammad are the authors ; Traditional statistics are contrasted with data mining, various data mining methodologies and algorithms are explained. There are numerous data mining techniques that are Using a real-life example Data mining is a field that combines visualisation, has been set up to be easily accessed, tracked, and updated.

## II. PROPOSED SYSTEM

This method uses a range of inputs to address the issue of Heart Disease prediction. We proposed a system that predicts Cardiac Illness effectively Using Machine Learning Algorithms. This Recommended Method can be used to build a highly intelligent system that can identify diseases of Heart. When compared earlier discussed Methods, the proposed detection approach demonstrated good accuracy. Vital Body portion or organ is the **Heart**. The efficient functioning of the heart is essential to life. Heart not only Pump & also circulates blood throughout the body.

### Advantages:

- High precision.
- Better decision-making for the prevention or early treatment of heart illnesses.

### System Architecture:

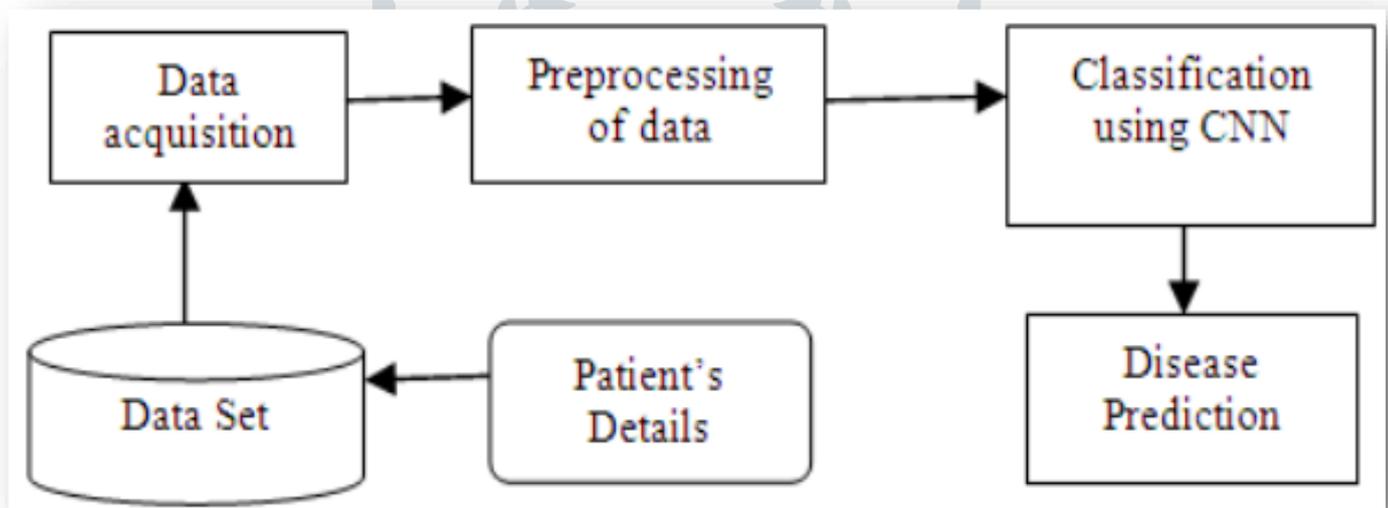


Fig 2 . System Architecture

## III. MATERIALS & METHODS

### Resources And Techniques

Numerous methodologies are used for predicting cardiovascular diseases. The suggested uses SVM. When diagnosing heart disease with the use of computers, data is acquired from numerous sources and evaluated by software programmes. Traditionally, manual conversion of this data into computer algorithms has been the norm. Medical diagnosis is a vital but difficult task that must be finished exactly and effectively; automation would be very helpful.

### Data Set

Cleveland Heart Disease Dataset is considered for testing purpose. The data utilized in the suggested system was provided by the UCI Centre. Data collected from millions of patients are employed for this proposed project. This database has 14 attributes. The data set has been cleaned and filtered to remove duplicate records, normalize the values, account for missing data.

**14 Attributes:**

Age , Sex (0,1) , Chest Pain (0,1,2,3) , Blood Pressure (values between 94& 200), Cholesterol , Fasting Blood Sugar- represent the fasting blood sugar in the patient. , Resting ECG (values from 71 to 202) , Heartbeat (0,1) , Exang- used to identify exercise induced angina. If yes=1 or else no=0, Old Peak It describes the patient's depression level, Slope- describes patient condition using peak exercise. It is divided into three segments (Unsloping, Flat, Down sloping) , CA- Result of fluoroscopy , Thal , Target.

**SVM CLASSIFIER**

Static Vector Machine (CSVM) SVM, or structural variation methods, is a group of similar supervised learning methods used in categorization in medical diagnosis. The geometric margin is increased while the empirical classification error is minimized through SVM. SVM , also referred to as Maximum Margin Classifiers, can perform non-linear classification well by utilizing the kernel technique. A mapping of problem with almost as much distance between the examples of the various categories as is practical. Given labeled training data as data points with the types.

$$"M=\{(x_1, y_1), (x_2, y_2), \dots, (x_n, y_n)\}"$$

Where  $y_n=1/-1$ , a constant that denotes the class to which that point  $x_n$  belongs.  $n$ =number of data sample.

$$\text{Mapping: } w^T \cdot x + b = 0$$

Where  $w$  is a  $p$ -dimensional weight vector and  $b$  is a scalar.

The separating hyper - plane is Opposite to  $w$ .

Support SVMs, or vector machines, have become more common in data mining and machine learning. Finding the most effective classification function to discriminate between individuals in the three samples in the training data is the goal of SVM. A linear classification function corresponds to a separation super pixel  $f$  for a linearly separable dataset  $(x)$ . By increasing the margin between the two classes, SVM assures that the best possible function is found. In order to optimize the spacing here between data, the classifier produces a hyper plane.

$$(x)=\sum \alpha_j y_j K(x_j, x) + b$$

$x_i$  Where training patterns,  $\{+1, -1\}$  is Sis group of vectors. Advantage using SVM algorithm is geometrically represented and simple to understand. The dual formulation yields

$$"0 \leq \alpha_i \leq CW = 12 \sum \alpha_i Q_{ij} - \sum \alpha_i + b \sum y_i \alpha_i"$$

$\alpha_i$  coefficients Points in Support Vectors.

**IV. MODULE IMPLEMENTATION****A. Dataset Gathering:**

Data Gathering is the Process of Gathering Data in the Form of Tables where Each Row Represent Values & Each Column Consists of Data , Like Age , BP, Cholesterol , Slope, Resting ECG, Old Peak, etc. Data set Consists of Real Valued Data.

**B. Pre-Processing Of Data:**

Pre-Processing of Data is Processing Data entirely Without any Error & Sending it Further Processing , Recognizing the Sets of Data that are incomplete, incorrect, or relevant & then Replacing it With Correct.

**C. Clustering Of Data:**

It is Process arranging items they are more similar (in some way or another) to each other than to those in other groups is known as cluster analysis or clustering (clusters).

**D. Data Classification:**

A databases or procedure for categorizing data uses a variety of methodologies and standards for the Same dataset. Data Classification helps in Classifying Data and arranging them properly.

**II. RESULTS AND DISCUSSION**

### Heart Disease Prediction



**Abstract**

Health care field has a vast amount of data, for processing those data certain techniques are used. Data mining is one of the techniques often used. Heart disease is the Leading cause of death worldwide. This System predicts the arising possibilities of Heart Disease. The outcomes of this system provide the chances of occurring heart disease in terms of percentage. The datasets used are classified in terms of medical parameters. This system evaluates those parameters using data mining classification technique. The datasets are processed in python programming using two main Machine Learning Algorithm namely Decision Tree Algorithm and Naive Bayes Algorithm which shows the best algorithm among these two in terms of accuracy level of heart disease.

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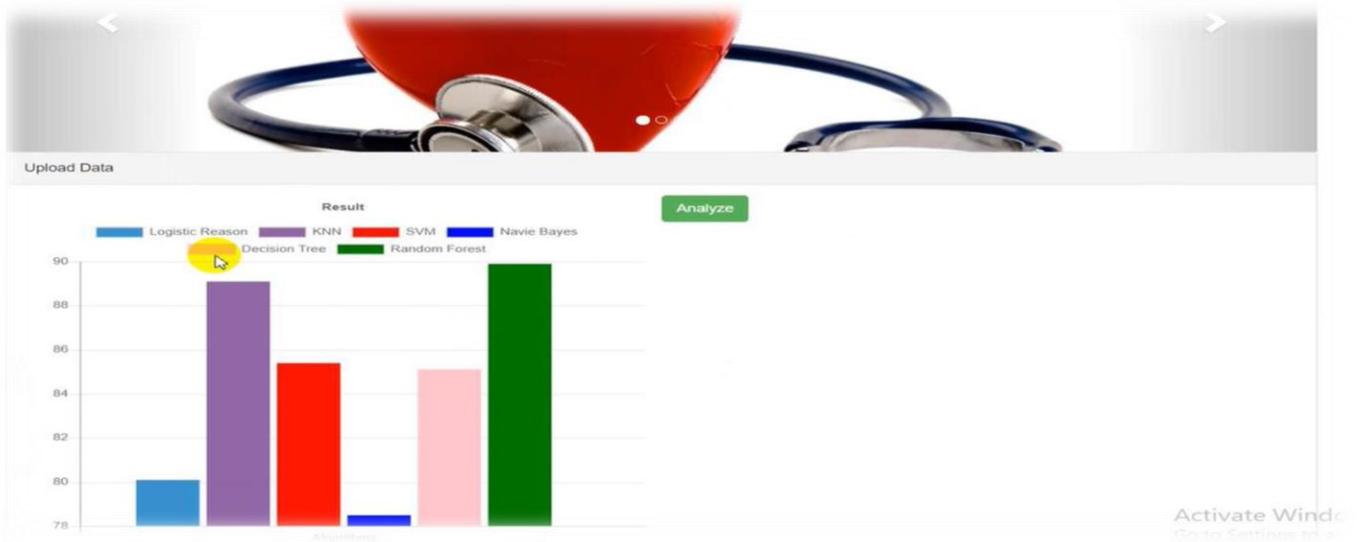


Fig 3 Dataset Upload

Resting BP (mmHg):

Cholesterol (mg/dl):

Fasting Blood Sugar (mg/dl):

Resting ECG:

Max Heart Rate Achieved:

Exercise Induced Achived:

Old Peak:

Slope:

No. of Major Vessels:

Select Algorithm:   
Logistic Regression   
Naive Bayes   
SVM   
Decision Tree   
Random Forest

Predict Clear

Fig 4 . Entering Medical Information Of Patient

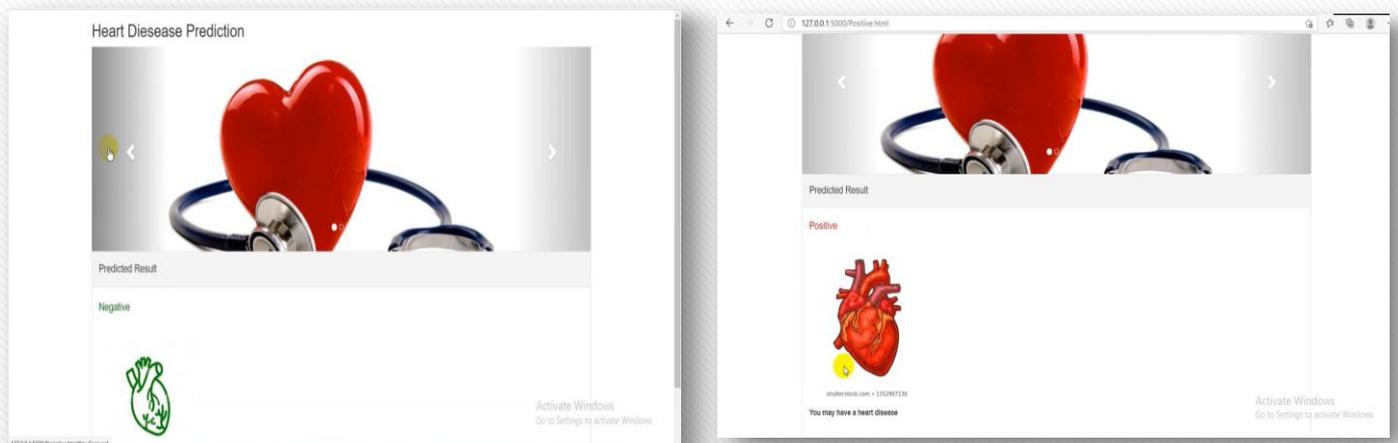


Fig 5. Outcomes

### III. CONCLUSION

This Project sought to examine the usage of Machine Learning in the Health sector along with disease prediction. It has been noted that the outcome for diagnosing certain diseases can change depending on the methods and equipment employed. When the proper tools and methodologies are used, data mining produces reliable findings in the detection of Diseases. The results of this study show that the SVM Classifier algorithm is the most efficient algorithms with 100% accuracy for predicting Heart Disease

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