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Heart Disease Prediction System Using SVM

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ABSTRACT: Cardiovascular are the diseases he most common cause of death worldwide over the last few decades in the developed as well as underdeveloped and developing countries. Early detection of cardiac diseases and continuous supervision of clinicians can reduce the mortality rate. However, accurate detection of heart -diseases in all cases and consultation of a patient for 24 hours by a doctor is not available since it requires more sapience, time and expertise. In this study, a tentative design of a cloud-based heart disease prediction system had been proposed to detect impending heart disease using (SVM)Machine learning techniques.

The heart is a kind of muscular organ which pumps blood into the body and is the central part of the body's cardiovascular system which also contains lungs. Cardiovascular system also comprises a network of blood vessels, for example, veins, arteries, and capillaries. These blood vessels deliver blood all over the body. Abnormalities in normal blood flow from the heart cause several types of heart diseases which are commonly known as cardiovascular diseases (CVD). Heart diseases are the main reasons for death worldwide.

KEYWORDS: Cardiovascular disease; Energy efficient algorithm; Support vector machine

I. INTRODUCTION

Machine learning technique means the use of sophisticated data analysis tools to determine previously unknown, valid patterns and relationships in large data set. These tools can include statistical models, mathematical algorithm and machine learning methods in early detection of chronic disease. Medical data mining has great potential for exploring the hidden patterns in the data sets of the medical domain. These patterns can be utilized for clinical diagnosis. However, the available raw medical data are widely distributed, heterogeneous in nature, and voluminous. These data need to be collected in an organized form. This collected data can be then integrated to form a hospital information system. Data mining technology provides a user-oriented approach to novel and hidden patterns in the data. Heart disease has considerably increased for the last two decades and become the leading cause of death for people in most of the countries in the world. World Health Organization (WHO) reported that 30% of death is due to heart disease. Nearly 17.3 million people died due to heart disease. More than 80% of passing away in world is because of coronary illness.

According to the survey of the World Health Organization (WHO), 17.5 million total global deaths occur because of heart attacks and strokes. More than 75% of deaths from cardiovascular diseases occur mostly in middle-income and low-income countries. Also, 80% of the deaths that occur due to CVDs are because of stroke and heart attack. Therefore, detection of cardiac abnormalities at the early stage and tools for the prediction of heart diseases can save a lot of life and help doctors to design an effective treatment plan which ultimately reduces the mortality rate due to cardiovascular diseases.

II. RELATED WORK

1. Data Mining based Fragmentation and Prediction of Medical Data

In 2014 Dubey A. et India is set to witness a spike in deaths due to heart diseases .

Heart disease is the leading cause of death in all over the world over past ten years. Researchers have developed many hybrid data mining techniques for diagnosing heart disease Here a pre-processing technique and analysis of the accuracy for prediction after pre-processing the noisy data explained. It is also observed that the accuracy has been

increased to 91% after pre-processing. Swarm Intelligence techniques hybridized with Rough Set Algorithm are to be taken as future work for exact reduction of relevant features for prediction

2. Therapeutic regulation of endothelial dysfunction in type 2 diabetes mellitus

In 2014 Masethe H.D. The heart disease accounts to be the leading cause of death worldwide. It is being found tough to predict the heart attack as it is a complex task that requires experience and knowledge to medical experts. The health sector today contains hidden information that can be important in making decisions. Here some mining algorithms like Naïve Bayes, REPTREE, J48, CART, and Bayes Net are used for the efficient prediction heart attacks. The research result found prediction accuracy of 99%.

3. An Efficient Data Mining and Ant Colony Optimization technique (DMACO) for Heart Disease Prediction

In 2013 Kumar S., Kuar G the Nowadays the use of computer technology in the fields of medicine area diagnosis, treatment of illnesses and patient pursuit has highly increased. The objective of this paper is to detect the heart diseases in the person by using Fuzzy Expert System. The designed system based on the Parvati Devi hospital, Ranjit Avenue and EMC hospital Amritsar and International lab data base. The system consists of 6 input fields and two output field. Input fields are chest pain type, cholesterol, maximum heart rate, blood pressure, blood sugar, old peak. By the obtained result field presence of heart disease in the patient and precautions accordingly has been detected. It is integer valued from 0 (no presence) to 1 (distinguish presence (values 0.1 to 1.0)). We can use the Mamdani inference method. The generated outcomes developed system are comparatively analysed. This observation found correct 92%.

4. A Pragmatic Approach of Pre-processing the Data Set for Heart Disease Prediction

In 2012, Muhammed et al. [5] present and discuss the experiment that was executed with naïve bayes technique in order to build predictive model as an artificial diagnose for heart disease based on data set which contains set of parameters that were measured for individuals previously. Then they compare the results with other techniques according to using the same data that were given from UCI repository data.

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III. PROPOSED SYSTEM

Cardiovascular disease is the leading global cause of death. A normal heart rate is 60-100 beats per minute. However, heart rate higher than 76 beats per minute when in resting may be linked to a higher risk of heart attack. Having an irregular heartbeat doesn't mean having a heart attack. But if it's a new symptom, or if you have chest pains or problems breathing, may be the preliminary symptom for heart attack. we can predict the disease depending on the parameters mentioned.

IV. SUPPORT VECTOR MACHINE

A Support Vector Machine (SVM) is a supervised machine learning algorithm that can be employed for both classification and regression purposes. SVMs are more commonly used in classification. SVM is used for text classification tasks such as category assignment, detecting spam and sentiment analysis and mainly used for result prediction. It is also commonly used for image recognition challenges, performing particularly well in aspect-based recognition and colour-based classification. SVM also plays a vital role in many areas of handwritten digit recognition, such as postal automation services.

V. SIMULATION RESULTS

A support vector machine is a machine learning model that is able to generalise between two different classes if the set of labelled data is provided in the training set to the algorithm. The main function of the SVM is to check for that hyperplane that is able to distinguish between the two classes.

There can be many hyperplanes that can do this task but the objective is to find that hyperplane that has the highest margin that means maximum distances between the two classes, so that in future if a new data point comes that is to be classified then it can be classified easily.

The input heart parameter and age entered through mobile which is sent to cloud and fetched by the python script and SVM machine learning algorithm is performed and result is predicted the predicted result is sent to cloud and displayed in the mobile.

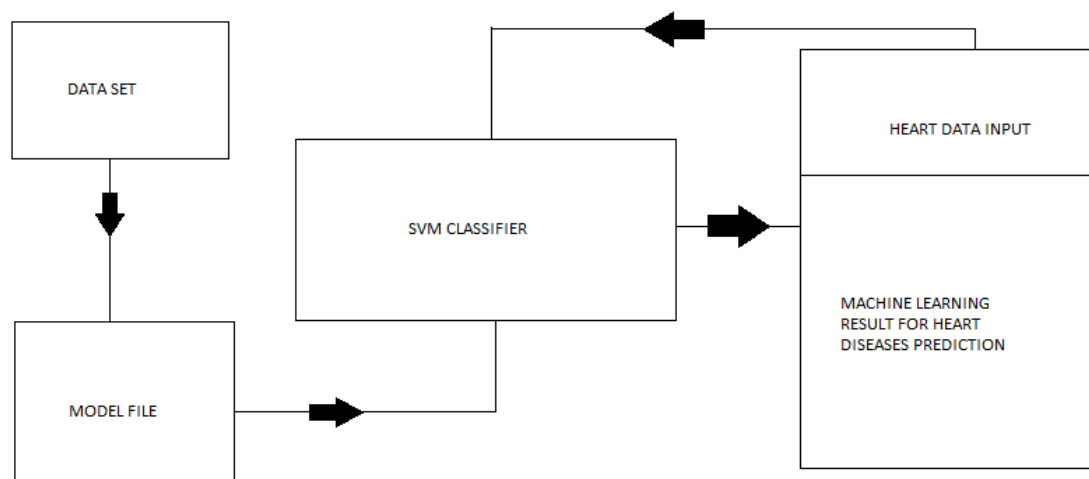


Figure: 1. Flow chart of the process

VI. CONCLUSION AND FUTURE WORK

There are large number of systems had been already in use for medical disease symptoms detections using Non-Machine learning concepts. The use of ML techniques in Heart Disease Detection increases the chance of making a correct and early detection, which could prove to be vital in combating the disease. We proposed an efficient concept for detection of Heart Diseases based on SVM. There are many possible improvements that could be explored to improve the scalability and accuracy of this prediction system. As we have developed a generalized system, in future we can use this system for the analysis of different data sets. The performance of the health's diagnosis can be improved significantly by handling numerous class labels in the prediction process, and it can be another positive direction of research. In DM warehouse, generally, the dimensionality of the heart database is high, so identification and selection of significant attributes for better diagnosis of heart disease are very challenging tasks for future research.

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