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Correlation of ECG Values to the Behavior of Heart Attack Sufferers

Chaithra B¹, K R Sumana², Dr. H. D. Phaneendra³

¹PG Student, ²Assistant Professor, ³Professor, The National Institute of Engineering, Mysuru, India

Abstract: Heart attack is among one of the deadliest of cardiovascular diseases. It happens as circulation or blood flow to heart muscle is interrupted, causing the heart muscle to damage or die. The essential reason for most heart assaults could be a blockage which causes blood stream to one of the coronary courses, imperative channels through which blood voyages to the heart muscle, to become reduced or obstructed. When blood stream is discouraged or decreased, the heart muscle is quickly denied of ruddy blood cells which carry the fundamental oxygen basic for supporting life and awareness in the human body. It takes as few as six to eight minutes without oxygen to cause the heart muscle to capture, driving to the individual's passing. And the cause of most heart attacks is plaque, a hard substance which builds up over time in the coronary arteries. Plaque, a substance made up of numerous cells and cholesterol (fat), draws platelets, etc., which increase over time, causing a blockage large enough to diminish or block blood flow to heart muscle. Cardiac disease medications are regularly being subjected to the securing and investigation of tremendous amount of advanced cardiac information. The objective of the project is to make the analysis on the digital ECG dataset is made on the various medical terminologies that correlates towards Heart Attack. To implement a Deep Learning Model that correlates what digital ECG values maps to the abnormal patterns which leads to Heart Attack. To analysis further on gender, age group and lifestyle of a Heart Attack Patients.

Keywords: Heart Attack Prediction, ECG data, KNN, SVM, CNN.

I. INTRODUCTION

The foremost troublesome thing in therapeutic science is foreseeing heart illness. The heart is the foremost critical organ within the human body. It is important to predict the degree and level of cardiac illness to provide appropriate treatment to patients. The phrase "heart disease" refers to a variety of illnesses that cause the heart to operate improperly. Heart disease refers to several diseases that cause abnormal heart function, including blood vessels, arteries, and other blood vessels.

The patient receives adequate therapy after an accurate diagnosis of heart illness. This necessitates an exhaustive evaluation of the patient's cardiovascular system that considers signs and symptoms such chest pain, tightness, pressure, breathing problems, numbness, and more. Cardiovascular diagnosis requires making decisions based on a patient's medical history and the results of clinical tests Medical practitioners face a tough challenge in making decisions since they must be made properly and quickly and even a little error in judgment can put a patient's life in jeopardy. Age is the non-modifiable hazard element which is furthermore a reason for coronary heart infection. Smoking is the purpose for forty of the lack of existence of coronary heart illnesses. Because it limits the oxygen diploma in the interior of blood then it damages and tightens the blood vessels.

An intelligent automated system that aids medical practitioners in forming judgments based on the patient's present symptoms and medical history is necessary for proper and accurate diagnosis.

Medical practitioners can use automated technologies to help them to provide that effective therapy. Data mining techniques combine statistical methodology and machine learning algorithms it also helps in predicting disease based on the outcome of the analysis. This automated technique has the advantage of being able to anticipate sickness in less time and at a cheaper cost. The a few wellbeing conditions of way of life are like Nourishment Propensities, Physical Action and family history can increment hazard for a heart condition. These are referred to as hazard variables.

II. LITERATURE SURVEY

The heart illness for Patient utilizing Classification Methods. The detailed information almost Coronary Heart illnesses such as its Facts, Common Sorts, and Hazard Components has been explained in this paper. The Information Mining device utilized is WEKA (Waikato Environment for Knowledge Analysis), a great Information Mining Apparatus for Bioinformatics Areas.

The all three accessible Interface in WEKA is utilized here. Gullible Bayes, Manufactured Neural Networks and Choice Tree (J48) are Primary Data Mining Strategies and through this strategies heart disease is anticipated in this Framework. Through this paper the data about Data Mining and heart infections has been accumulated. The detailed data approximately heart infections, symptoms of heart assault and heart infection sorts are displayed in this paper, the three fundamental information mining techniques namely Choice Tree, Neural Systems and Naive Bayes Classifier are utilized. The most assignment of data Prediction is done utilizing these three strategies.

Various considers have been done that have centered on the determination of heart infection. They have connected different data mining methods for conclusion & accomplished different probabilities for diverse methods. This framework assesses those parameters utilizing the data mining classification strategy. The datasets are evaluated in python utilizing two primary Machine Learning Algorithms: The choice Tree Calculation and the Naive Bayes Calculation which appears the most excellent calculation between these two in terms of the precision level of heart disease. Aditi Gavhane et al. anticipated heart assault for early diagnosis to diminish the number of passings. For this problem Machine Learning plays a major part in this paper. This prediction takes individuals from the threat zone of their life. In this paper, we utilize the KNN calculation and Random Forest calculation to foresee the heart assault in progress.

One of the bases on which the contrast are the choice of parameters on which the strategies have been utilized. Numerous creators have indicated distinctive parameters and databases for testing the exactnesses. In specific, analysts have been examining the application of the Choice Tree procedure within the conclusion of heart malady with significant victory. Sitair-Taut et al. utilized the Weka device to explore applying Gullible Bayes and J48 Choice Trees for the location of coronary heart malady. Tu et al. utilized the sacking calculation within the Weka apparatus and compared it with J4.8 Choice Tree within the determination of heart infection. In the choice making handle of heart illness is viably analyzed by Arbitrary woodland calculation. In based on the likelihood of choice bolster, the heart illness is anticipated. As a result the creator concluded that choice tree performs well and now and then the exactness is comparable in Bayesian classification.

Heart is one of the basic and vitals of human body and expectation approximately heart infections is additionally important concern for the citizenry so as that the accuracy for calculation is one of parameter for analysis of execution of calculations. Precision of the calculations in machine learning depends upon the dataset that utilized for preparing and testing reason .

III. PROPOSED WORK

The proposed system we are presenting a web application with the name of heart attack prediction using machine learning. In our application we are collecting numerical data from users and using KNN, SVM and CNN algorithm we compare the numerical data with the trained dataset that predict the positive or negative heart attack up to four stages. It is not as much time-consuming and lengthy process as the existing system. It mainly focuses on the numerical data given by the users and the trained dataset. So using the result from the comparison the patient can decide whether they need treatment or remedies from the heart specialist.

IV. METHODOLOGY

The heart attack prediction using a machine learning project user has to register first to use this application, once the user register he/she can log in to this application and user can upload heart-related information asked by the system. after the user fills in all details then the system will process the data and predict the result using KNN, SVM and CNN algorithm. Once the user register, he can log in at any time and he can view predicted answer and medication. Admin is the controller of this application, admin can manage registered doctor, admin can view and delete doctors based on credential and admin can manage data set he can update data set and he can delete old data set based on credential. Following are the modules of the system.

A. User Module

During registration, the user can input their information from the control, and the database will save it for later use. Name, email, phone number, and other contact details are gathered and entered into a database so they can be used later. In order to store the data into the server, which will be utilized by the user to enter into the program, the user must submit information such as Name, Username, Password, Email, Phone, etc. Textboxes for fields like login, email, phone number, and password will be present during this procedure; these fields are entered into the database by clicking the submit button, which launches an activity related to those fields.

Users can submit their credentials during the login process, which allows them to access the database and access the application's data. Before redirecting to an explicit page, the application checks are correct. If validates successfully, then there will be a Popup stating user to enter valid credentials by the application. The user will upload the dataset based on his / her issues and get the result in return.

B. Admin Module

The registered users in this module will be under the admin's control. The administrator has the authority to review or remove any enrolled students as necessary. The uploaded datasets from the registered students in this module will be under the admin's watchful eye. Documents may be viewed or deleted by the admin. A prediction or forecast is a statement about the content based on the processing training data with test data. The values are extracted and then using it based on the clusters by uniform verification of the data.

C. System Architecture

The admin uploads the dataset, the users will register with their details after that he can login by giving username and password. The admin can view and approve or delete documents. Once admin approves the doctor's login details, user can login by using username and password. Then the details of the patient is being uploaded and processed by comparison methods. Later result is predicted and it also gives the precaution to be taken further.

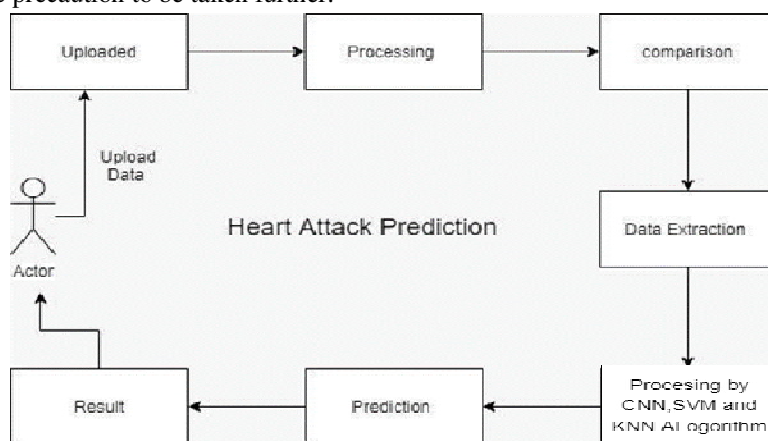


Fig. 1 Architecture Diagram

V. RESULT ANALYSIS

In the below figure Fig 2 shows the stage of the heart attack and Status is either negative or positive.

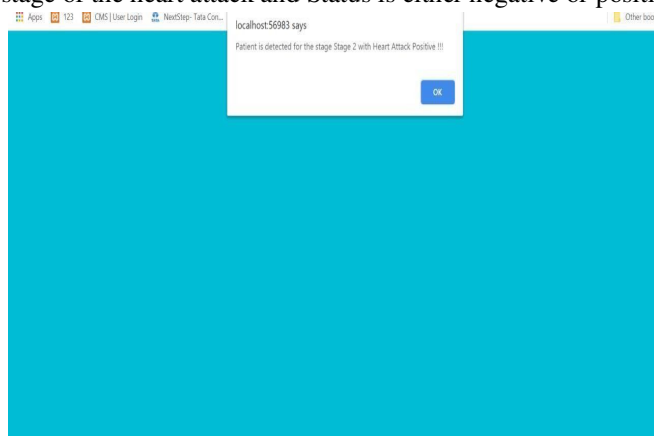


Fig. 2 Prediction of stages

In the below Figure Fig.2 shows the heart attack prediction of different stages. In normal stage the status is negative and for stage1,stage 2, stage 3 the status is positive.

Heart Attack Predictor - Report		Heart Attack Predictor - Report	
Patient - ID : 83982	Processed Date: 19-07-2022	Patient - ID : 83981	Processed Date: 19-07-2022
Patient : chbh	Doctor : test	Patient : abc	Doctor : test
Date : 19-07-2022		Date : 19-07-2022	
Gender : Female		Gender : Male	
Symptoms : pain		Symptoms : 0	
Status : Negative	Stage : Normal	Status : Positive	Stage : Stage 1
Authorized Signatory		Authorized Signatory	

Heart Attack Predictor - Report		Heart Attack Predictor - Report	
Patient - ID : 83983	Processed Date: 19-07-2022	Patient - ID : 83980	Processed Date: 19-07-2022
Patient : abc	Doctor : test	Patient : abc	Doctor : test
Date : 19-07-2022		Date : 19-07-2022	
Gender : Male		Gender : Female	
Symptoms : 0		Symptoms : 0	
Status : Positive	Stage : Stage 2	Status : Positive	Stage : Stage 3
Authorized Signatory		Authorized Signatory	

Fig. 3 Normal Stage, Stage 1, Stage 2, Stage 3 Heart Attack Prediction

In the figure Fig. 4 shows the Status, Symptoms Matched and Precaution to be taken for different stages of heart attack prediction.

Status : Normal Symptoms Matched weight loss	Heart Attack Status : Positive, Stage : Stage 1 Symptoms Matched red spots on skin shortness of breath
Precautions Avoid Smoking	Precautions Avoid tobacco
Heart Attack Status : Positive, Stage : Stage 2 Symptoms Matched unintentional weight loss weakness	Heart Attack Status : Positive, Stage : Stage 3 Symptoms Matched pain in bones or joints Fatigue
Precautions Avoid tobacco Avoid Smoking	Precautions Avoid Smoking

Fig. 4 Precautions of Normal Stage, Stage 1, Stage 2, Stage 3 Heart Attack Prediction

VI. CONCLUSIONS

The technique for locating raw heart attack data will aid in both the early identification of irregularities in coronary heart diseases and the long-term preservation of human life. Machine learning techniques were employed in this artwork to process the raw data and produce a fresh and unique prediction regarding the site of a heart attack. Heart disease prognosis is difficult and important to the scientific endeavor. However, if infectivity is detected early and preventative measures are put in place as soon as it is practicable, the death rate can be greatly reduced. In order to direct research to the Genuine Global dataset rather than only theories, it is definitely vital for this study to be broadened.

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