

19CSP14 - PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY AND ENTREPRENEURSHIP
VISUALIZING AND PREDICTING HEART DISEASES WITH AN INTERACTIVE DASHBOARD

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Problem Statement:

Visualizing and predicting heart diseases with an interactive dashboard

Abstract:

Heart disease refers to several types of abnormalities in heart conditions. The leading cause of death in the developed world is heart disease. It is infeasible for a common man to frequently undergo costly tests for ECG and so on. Hence, there needs a replacement to be done which must be handy and reliable. Thus, we propose an interactive dashboard in which user can view his medical report analysis and the predicted final result.

Introduction:

Heart disease is perceived as the deadliest disease in the human life across the world. Some of the symptoms of heart disease include physical body weakness, improper breathing, swollen feet, etc. Heart disease can be predicted based on various factors such as age, gender, pulse rate, cholesterol, blood pressure etc. The techniques are essential to identify the complicated heart diseases which results in high risk in turn affect the human life.

Dataset:

HeartDiseasePrediction dataset contains 13 attributes with 271 records. It describes about the details such as age, sex, chestpain type, cholesterol, FBS over 120, EKG Results, Max HR, exercise angina, ST depression, slope of ST, number of vessels fluoro, thallium. The final field, heart disease refers to the presence of heart disease in the patient. It is label valued as presence and absence.

Literature Survey:

- (1) R.Indrakumari, et al.(2020) worked with K-means unsupervised algorithm on heart disease prediction by exploiting features of publicly available dataset for heart disease. This analysis identifies the necessary hidden patterns for predicting heart diseases. This algorithm lessens the sum of squares distance from the centroid within the cluster. The algorithm divides the data into k clusters with a centroid. K-means iteratively finds the centre that reduces the distance among individual points in a cluster and the cluster centre.

- (2) Dimman Hassan, et al. (2022) proposes a new approach utilizing a pre-trained Deep Neural Network (DNN) for feature extraction, Principal Component Analysis (PCA) for dimensionality reduction, and Logistic Regression (LR) for prediction. The efficiency of prediction models is measured against various threshold values. Its value ranges between 0 and 1, with 0 indicating the poorest prediction, 1 indicating the ideal prediction, and 0.5 indicating the model prediction is no better than a random guess.
- (3) K.Aruljothi, et.al(2021) proposed a system which predicts the chances of getting heart disease in advance using KNN and Decision tree algorithm for guessing the risk level of heart disease. Decision Tree algorithm can be used on the dataset, to predict the chances of getting heart diseases of a patient in and K-Nearest Neighbour algorithm can be used on the same dataset, to predict the chances of getting heart disease of patient in advance.
- (4) Renji P.Churian, et.al(2020) proposed a new heart disease prediction model with the inclusion of specific processes like Feature Extraction, Record, Attribute Minimization, and Classification. The presented work majorly deals with accurate prediction and therefore, it was planned to optimize the weights of NN. For optimization, this work deploys the PM-LU model, which involves the hybrid concept of LA and PSO.
- (5) Md Mamun Ali, et.al (2021) worked with machine learning classifiers for highest accuracy of such diagnostic purposes. This study found that using a heart disease dataset three classification based on k-nearest neighbour (KNN), decision tree (DT) and random forests (RF) algorithms the RF method achieved 100% accuracy along with 100% sensitivity and predictivity.

References:

- (1) Md Mamun Ali, Bikash Kumar Paul, Kawsar Ahmed, Francis M. Bui, Julian M. W. Quinn , Mohammad Ali Moni, "Heart disease prediction using supervised machine learning algorithms: Performance analysis and comparison", ELSEVIER – Computers in Biology and Medicines, Vol.136, (2021).
- (2) Renji P. Churian, Noby Thomas, Sunder Venkitachalam, "Weight optimized neural network for heart disease prediction using hybrid lion plus particle swarm algorithm", ELSEVIER – Journal of Biomedical Informatics, Vol.110, (2020).
- (3) K. Arul Jothi, S. Subburam, V. Umadevi, K. Hemavathy, "Heart disease prediction system using machine learning", ELSEVIER – Materials Today: Proceedings, (2021).
- (4) Diman Hassan, Haval I. Hussein, Masoud M. Hassan, "Heart disease prediction based on pre-trained deep neural networks combined with principal component analysis", ELSEVIER – Biomedical Signal Processing and Control, (2022).
- (5) R. Indrakumari , T. Poongodi , Soumya Ranjan Jena, "Heart Disease Prediction using Exploratory Data Analysis", ELSEVIER – Smart Sustainable Intelligent Computing, (2020).