LITERATURE SURVEY

Visualizing and Predicting Heart Diseases with an Interactive DashBoard

Team members:

Sabarishkumar T

Srinath S P

Mariyon J

Shivakumar V

Team Mentor:

Mrs. RAM PRASATH S

Paper1:

Title: Analytical study of heart disease diagnosis using classification techniques

Author: C. Sowmiya and P. Sumitra published in the year 2017.

Description:

Heart disease is the number one problem for world. Heart disease more than people deaths occur during the first heart attack. But not only for heart attack have some problems attacked for breast cancer, lung cancer, ventricle. Valve, etc... It is essential to have a frame work that can effectually recognize the prevalence of heart disease in thousands of samples instaneously. In this paper the potential of nine (9) classification techniques was evaluated of prediction of heart disease. Namely decision tree, naive Bayesian neural network, SVM.ANN, KNN. The proposed algorithm of Apriori algorithm and SVM (support vector machine) in heart disease prediction. Using medical profiles such as a age, sex, blood pressure, chest pain type, fasting blood sugar. It can predict like of patients getting heart disease Based on this, medical society takes part interest in detecting and preventing the heart disease. From the analysis it has proved that classification based techniques contribute high effectiveness and obtain high accuracy compare than the previous methods.

Paper2:

Title: Human heart disease prediction system using data mining techniques

Author: J. Thomas and R. T. Princy Published in 2016.

Description:

Nowadays, health diseases are increasing day by day due to life style, hereditary. Especially, heart disease has become more common these days, i.e. life of people is at risk. Each individual has different values for Blood pressure, cholesterol and pulse rate. But according to medically proven results the normal values of Blood pressure is 120/90, cholesterol is and pulse rate is 72. This paper gives the survey about different classification techniques used for predicting the risk level of each person based on age, gender, Blood pressure, cholesterol, pulse rate. The patient risk level is classified using datamining classification techniques such as Naïve Bayes, KNN, Decision Tree Algorithm, Neural Network. etc., Accuracy of the risk level is high when using more number ofattributes.

Paper3:

Title: Machine Learning Based Heart Disease Prediction System

Author: M. S. Raja, M. Anurag, C. P. Reddy and N. R. Sirisala published in 2021

Description:

Heart attack disease is one of the leading causes of the death worldwide. In today's common modern life, deaths due to the heart disease had become one of major issues, that roughly one person lost his or her life per minute due to heart illness. Predicting the occurrence of disease at early stages is a major challenge nowadays. Machine learning when implemented in health care is capable of early and accurate detection of disease. In this work, the arising situations of Heart Disease illness are calculated. Datasets used have attributes of medical parameters. The datasets are being processed in

python using ML Algorithm i.e., Random Forest Algorithm. This technique uses the past old patient records for getting prediction of new one at early stages preventing the loss of lives. In this work, reliable heart disease prediction system is implemented using strong Machine Learning algorithm which is the Random Forest algorithm. Which read patient record data set in the form of CSV file. After accessing dataset, the operation is performed and effective heart attack level is produced. Advantages of proposed system are High performance and accuracy rate and it is very flexible and high rates of success are achieved.

Paper4:

Title: Prediction of Heart Disease using Random Forest

Author: N. M. Lutimath, N. Sharma and B. K. Byregowda published in 2021.

Description:

Random Forests are of the vital models in machine learning. They are comprehensive and effective classification paradigms in machine learning. The random forest recognizes the most important attributes of a given problem. The heart disorder is a cardiovascular disease, with a set of conditions affecting the heart. During heart disease there will be heart beat problems with congenital heart disorders and coronary artery defects. Coronary heart defect is a heart disease, which decreases the flow of blood to the heart. When the flow of blood decreases heart attack occurs. It is necessary to analyse the prediction of heart attack based on the symptoms. Available data set instances of the patients with heart defects symptoms is taken and analysed in this paper. Python language is utilized to prediction of the accuracy.

Paper 5:

Title: Efficient Medical Diagnosis of Human Heart Diseases Using Machine Learning Techniques With and Without GridSearchCV

Author: G. N. Ahmad, H. Fatima, S. Ullah, A. Salah Saidi and Imdadullah published in 2022.

Description:

Predicting cardiac disease is considered one of the most challenging tasks in the medical field. It takes a lot of time and effort to figure out what's causing this, especially for doctors and other medical experts. In this paper, various Machine Learning algorithms such as LR, KNN, SVM, and GBC, together with the GridSearchCV, predict cardiac disease. The system uses a 5-fold cross-validation technique for verification. A comparative study is given for these four methodologies. The Datasets for both Cleveland, Hungary, Switzerland, and Long Beach V and UCI Kaggle are used to analyze the models' performance. It is found in the analysis that the Extreme Gradient Boosting Classifier with GridSearchCV gives the highest and nearly comparable testing and training accuracies as 100% and 99.03% for both the datasets (Hungary, Switzerland &; Long Beach V and UCI Kaggle). Moreover, it is found in the analysis that XGBoost Classifier without GridSearchCV gives the highest and nearly comparable testing and training accuracies as 98.05% and 100% for both the datasets (Hungary, Switzerland & Long Beach V and UCI Kaggle). Furthermore, the analytical results of the proposed technique are compared with previous heart disease prediction studies. It is evident that amongst the proposed approach, the Extreme Gradient Boosting Classifier with GridSearchCV is producing the best

hyperparameter for testing accuracy. The primary aim of this paper is to develop a unique model-creation technique for solving real-world problems.

Paper 6:

Title: Heart Disease Identification Method Using Machine Learning Classification in E-Healthcare

Author: J. P. Li, A. U. Haq, S. U. Din, J. Khan, A. Khan and A. Saboor Published in 2020.

Description:

Heart disease is one of the complex diseases and globally many people suffered from this disease. On time and efficient identification of heart disease plays a key role in healthcare, particularly in the field of cardiology. In this article, we proposed an efficient and accurate system to diagnosis heart disease and the system is based on machine learning techniques. The system is developed based on classification algorithms includes Support vector machine, Logistic regression, Artificial neural network, K-nearest neighbour, Naive bays, and Decision tree while standard features selection algorithms have been used such as Relief, Minimal redundancy maximal relevance, least absolute shrinkage selection operator and Local learning for removing irrelevant and redundant features. We also proposed novel fast conditional mutual information feature selection algorithm to solve feature selection problem. The features selection algorithms are used for features selection to increase the classification accuracy and reduce the execution time of classification system. Furthermore, the leave one subject out cross-validation method has been used for learning the best practices of model assessment and for hyper parameter tuning. The performance measuring metrics are used for assessment of the performances of the classifiers. The performances of the classifiers have been checked on the selected features as selected by features selection algorithms. The experimental results show that the proposed feature selection algorithm (FCMIM) is feasible with classifier support vector machine for designing a high-level intelligent system to identify heart disease. The suggested diagnosis system (FCMIM-SVM) achieved good accuracy as compared to previously proposed methods. Additionally, the proposed system can easily be implemented in healthcare for the identification of heart disease.

Paper 7:

Title: HDPS: Heart disease prediction system

Author: A. H. Chen, S. Y. Huang, P. S. Hong, C. H. Cheng and E. J. Lin published in the year 2011

Description:

The diagnosis of heart disease in most cases depends on a complex combination of clinical and pathological data. Because of this complexity, there exists a significant amount of interest among clinical professionals and researchers regarding the efficient and accurate prediction of heart disease. In this paper, develop a heart disease predict system that can assist medical professionals in predicting heart disease status based on the clinical data of patients. These approaches include three steps. Firstly, select 13 important clinical features, i.e., age, sex, chest pain type, trestbps, cholesterol, fasting blood sugar, resting ecg, max heart rate, exercise induced angina, old peak, slope, number of vessels colored, and thal. Secondly, develop an artificial neural network algorithm for classifying heart disease based on these clinical features. The accuracy of prediction is near 80%. Finally, develop a user-friendly heart disease predict system (HDPS). The HDPS system will be consisted of multiple features, including input clinical data section, ROC curve display section, and prediction performance display section (execute time, accuracy, sensitivity, specificity, and predict result). Our approaches are effective in

predicting the heart disease of a patient. The HDPS system developed in this study is a novel approach that can be used in the classification of heart disease.

Paper 8:

Title: HEART SOUNDS CLASSIFICATION WITH DEEP FEATURES AND SUPPORT VECTOR MACHINES

Author: F. Demir, A. Şengür and M. Çavaş, published in the year 2018.

Description:

In this study, the heart which is one of the most important organ affecting life-sustaining function is examined whether it works properly in a certain rhythm or not. In this regard, an effective algorithm both analyzing and categorizing Phono-cardiogram signals (PCG) which is significant at diagnosis of diseases is presented. First of all in this context, as colored spectrogram images of heart sounds are established to be able to analyze PCG signals, the characteristic extraction maps of Convolutional Neural Networks (CNN) are used to educate the data of images obtained. CNN-VGG16 model educated previously is used when these maps are established and and it is categorized with Support Vector Machine (SVM) which is an effective classifier at machine education. The performance of all rating labels is evaluated separately for experimental study with two different data. While max performance improves about %8 in one data set (DATASETA), max performance is obtained at other dataset (DATASETB) for normal rating label.

Paper 9:

Title: Continuous Estimation of Left Ventricular Hemodynamic Parameters Based on Heart Sound and PPG Signals Using Deep Neural Network

Author: T. Feng, H. Tang, M. Wang, C. Zhang, H. Wang and F. Cong published in the year 2020

Description:

Continuous estimation of left ventricular hemodynamic parameters is helpful to early diagnosis of cardiovascular diseases. Current non-invasive methods are somewhat inconvenient to monitor these parameters. Here, a deep neural network is built to noninvasively estimate left ventricular systolic pressure (LVSP), left ventricular diastolic pressure (LVDP), maximum rate of left ventricular pressure rise (+ dp/dt(max)) and minimum rate of left ventricular pressure drop (- dp/dt(min)) based on heart sound and PPG signals. The model consists of residual network and bidirectional recurrent neural network. Performance is evaluated on 2 beagle dogs' experiment data with large ranges induced by epinephrine. Mean absolute errors and standard deviations between the estimated and the measured LVSP, LVDP, + dp/dt(max) and - dp/dt(min) are 7.23±8.33 mmHg, 2.12±3.0 mmHg, 298±406 mmHg/s, and 172±386 mmHg/s, respectively. The average correlation coefficients for LVSP, LVDP, + dp/dt(max) and - dp/dt(min) are 0.94, 0.86, 0.95 and 0.92. The results show that accurate intraventricular hemodynamic parameters can be achieved by non-invasive heart sound and PPG signals with deep neural networks. This technique suggests an easy way for real-time monitoring of intraventricular hemodynamics.

Paper 10:

Title: ECG Heartbeat Classification Using CNN

Author: M. Chourasia, A. Thakur, S. Gupta and A. Singh published in the year 2020.

Description:

Electrocardiogram(ECG) is a valuable clinical signal, which is widely used to identify the cardiovascular diseases. However, it remains a cumbersome process to manually evaluate the ECG signals because of smaller variations in its physiological features in normal and abnormal cases that too when there are a huge number of cardiac patients to examine. In such a scenario, automatic classification of ECG signals can provide an ease to the doctors to make a correct diagnosis of a particular disease. This work proposes a classification model to classify the ECG in five different classes based on their morphological features. Instead of using manually designed features as most of the existing ECG classification works do, we have extracted data-driven non-linear features using convolutional neural network. The 1D-CNN model architecture is based on three convolutional, max pooling and dense layers which automatically extracts distinguishable nonlinear features from the ECG signals and automatically classify them into five different classes: Non-ectopic beats (Normal Beat), Supraventricular ectopic beats, Ventricular ectopic beats, Fusion Beats and Unknown Beats. The proposed algorithm was assessed using open-source database of MIT-BIH, which is based on 47 subjects. After 5-fold cross-validation, the presented algorithm achieves an accuracy of 97.36% and f1 score of 99.83%. It is a simple yet fast performing model that is implementable on e-healthcare-based devices for remote heart diagnosis of patients

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