Literature survey

Statistical Machine learning approaches to Liver disease prediction

1.C. Geetha,AR. Arunachalam," Evaluation based Approaches for Liver Disease Prediction using Machine Learning Algorithms",2021.

The life of humans living without liver tumors is one of the fundamental care of human livelihood. Therefore, for better care, detection of liver disease at a primitive phase is necessary. For medical experts, predicting the illness in the early stages due to subtle signs is a very difficult task. Many, when it is too late, the signs become evident. The current work aims to augment the perceive nature of liver disease by means of machine learning methods to solve this epidemic. The key purpose of the present work focused on algorithms for classification of healthy people from liver datasets. Centered on their success variables, this research also aims to compare the classification algorithms and to provide prediction accuracy results.

2.Md. Fazle Rabbi,S. M. Mahedy Hasan,et al," Prediction of Liver Disorders using Machine Learning Algorithms: A Comparative Study",2020.

Liver, a crucial interior organ of the human body whose principal tasks are to eliminate generated waste produced by our organism, digest food, and preserve vitamins and energy materials. The liver disorder can cause various fatal diseases, including liver cancer. Early diagnosis, and treating the patients are compulsory to reduce the risk of those lethal diseases. As the diagnosis of liver disease is expensive and sophisticated, numerous researches have been performed using Machine Learning (ML) methods for classifying liver disorder cases. In this paper, we have compared four different ML algorithms such as Logistic Regression (LR), Decision Tree (DT), Random Forest (RF), and Extra Trees (ET) for classifying Indian Liver Patient Dataset (ILPD). Pearson Correlation Coefficient based feature selection (PCC-FS) is applied to eliminate irrelevant features from the dataset. Also, a boosting algorithm (AdaBoost) is utilized to enhance the predictive performance of those algorithms. The comparative analysis is evaluated in terms of accuracy, ROC, F-1 score, precision, and recall. After comparing experimental results, we have found that boosting on ET provides the highest accuracy of 92.19%.

3. A. Sivasangari,Baddigam Jaya Krishna Reddy,et al," Diagnosis of Liver Disease using Machine Learning Models",2020.

Liver disease is one of the key causes of high numbers of deaths in the country and is considered a life-threatening disease, not just anywhere, but worldwide. Liver disease can also impact peoples early in their life. More than 2.4 per cent of annual Indian deaths are due to liver disorders. It is also difficult to detect liver disease due to mild symptoms in the early stages. If it is too late the signs always come to light. Thus liver-related disease poses more problems for people living and is more important nowadays to recognize the causes, and identification phase. So, for early detection of liver disease, an automated program is needed to build with more accuracy and reliability. Specific machine learning models are developed for this purpose to predict the disease. In this paper, the methods of Support Vector Machines (SVM), Decision Tree (DT) and Random Forest (RF) is proposed to predict liver disease with better precision, accuracy and reliability.

4. G. Shobana,K. Umamaheswari," Prediction of Liver Disease using Gradient Boost Machine Learning Techniques with Feature Scaling",2021.

Lifestyle diseases have become common these days and a sedentary way of life has paved the way for a range of syndromes and unknown diseases. Identification or diagnosis of the disease at an early stage is most crucial. This greatly helps in the prevention of the disease at an early stage with minimal medications. Traditional methods involve physical examination and lab results. Identification of the Liver disease at an early stage is very difficult as the symptoms of the diseases are visible only at a later stage of the disease. The Application of Machine learning models would help in the early diagnosis of the disease and hence facilitates in identifying crucial factors that lead to liver damage. In this paper, we propose a method of feature reduction using Recursive Feature Elimination and applying the Machine learning boosting algorithms to enhance the prediction accuracy. Basic machine learning models were applied to the dataset, where Logistic regression and Multi-Layer Perceptron had higher prediction accuracies with reduced features. Boosting algorithms like CatBoost, LGBM Classifier, XGBoost and Gradient Boost were applied to the dataset. The impact of feature reduction was investigated on the Gradient boosting machine learning algorithms.

5. Chokka Anuradha,D Swapna,et al," Diagnosing for Liver Disease Prediction in Patients Using Combined Machine Learning Models",2022.

In the human body one of the most important organs is liver. If the regular functionality of the liver is disturbed then this condition is called disease affected liver. Therefore, an early stage of disease detection is more important which helps in disease prevention at starting stage with small medications. But, it is too difficult to identify Liver disease at early stages because symptoms are very less at the starting stage. Lab results with physical examination are involved in the Traditional methods. This paper aims to represent a Diagnosing for Liver disease prediction in Patients using Combined Machine Learning Models. Optimized three machine learning algorithms are used in accurate diagnosis of liver disease by the doctors and these are Artificial Neural Networks (ANN), Decision Trees, K-Nearest Neighbors (KNN). With the help of these algorithms, given data is classified and results are produced. The future data is predicted with the help of past and present data in these machine learning algorithms. The accuracy results are produced by comparing three classification algorithms.

6. Neda Afreen,Ranjeeta Patel,et al," A Novel Machine Learning Approach Using Boosting Algorithm for Liver Disease Classification",2021.

Machine learning has been highly recommended in medical sector for diagnosis of several diseases and for effective decision making due to its performance. With recent years, there is rise in number of liver patients with different kinds of complication and it is important to identify it at initial stage to reduce the risk incurred by it. In this research, we implemented gradient boosting based machine learning classifier to achieve the results. CatBoost and LightGBM model are employed for prediction and classification of liver disease with feature selection approach. Preprocessing is performed on the original dataset to remove deviated values using isolation forest and to get relevant features for better results. Model performance is calculated in respect of precision, accuracy, recall and f1-score. CatBoost resulted in highest accuracy of 86.8% and LightGBM achieves 82.6% accuracy with feature selection on Indian Liver Patient Dataset.

7. Kanza Hamid,Amina Asif,et al," Machine Learning with Abstention for Automated Liver Disease Diagnosis",2019.

This paper presents a novel approach for detection of liver abnormalities in an automated manner using ultrasound images. For this purpose, we have implemented a machine learning model that can, not only generate labels (normal and abnormal) for a given ultrasound image but, it can also

detect when its prediction is likely to be incorrect. The proposed model abstains from generating the label of a test example if it is not confident about its prediction. Such behavior is commonly practiced by medical doctors who, when given insufficient information or a difficult case, can choose to carry out further clinical or diagnostic tests before generating a diagnosis. However, existing machine learning models are designed in a way to always generate a label for a given example even when the confidence of their prediction is low. We have proposed a novel stochastic gradient descent based solver for the learning with abstention paradigm and use it to make a practical, state of the art method for liver disease classification. The proposed method has been benchmarked on a data set of approximately 100 patients from MINAR, Multan, Pakistan and our results show that the performance of the proposed scheme is at par with medical experts.

8. T. M. Kamruzzaman,Md. Salman Mahbub,et al," A Structured Method For Predicting Liver Disease Using Machine Learning Techniques & Improvements In Correctness",2021.

It's been told from the beginning that the liver is one of the most important organs of our body function. Once upon a time, it couldn't see that a large number of people are suffering from liver diseases. But in recent years, the number of patients with liver diseases is increasing day by day. For this reason, affected people must go to a medical center for checking. In this paper, a model for the liver-affected people is implemented by which they do not need to go outside for checking the possibility of liver disease problems. To implement this model, datasets were collected based on some basic attributes which are related to liver diseases so that the possibility of liver problem can be detected. The data carries both liver-affected people and non-affected people. Those data were used to train our model so that the model can identify the affected people and non-affected people easily. Several machine learning algorithms were applied to generate results. The evaluation was done by following two approaches. Firstly, the complete result was generated using all of the attributes from both of the datasets where KNN provides the highest accuracy for both of the datasets which are 73% and 75.19% respectively. But after gone through an important attribute selection process, SVM gave the highest and increased accuracy which is about 82.68% and 81.15% respectively.

9. K. Prakash,S. Saradha," A Deep Learning Approach for Classification and Prediction of Cirrhosis Liver: Non Alcoholic Fatty Liver Disease (NAFLD)",2022.

The early stage liver diseases prediction is an important health related research and using this kind of research easily can predict the diseases and take the remedies. The liver diseases are classified into different types such as liver cancer, liver tumor, fatty liver, hepatitis, cirrhosis etc. The early prediction of cirrhosis and earlier stages of liver failure reduce the risk. In this work proposed a new deep learning approach for prediction and classification of cirrhosis liver based on the non alcoholic fatty liver disease. The proposed work consists of different features, deep neural network and Spearman's rank correlation. The 52 features such as gray level co-occurrence matrix (GLCM) texture features, gradient co-occurrence matrix (GLGCM) texture features are used for classification and prediction. The deep neural network (DNN) used to feature prediction and classification. Based on the different features the various types of the classifications are performed. The Spearman's rank correlation used to predict the rank correlation using different layers of the DNN network. The experiment of the proposed work is performed using MRI images and datasets. The predicted dataset is evaluated using sensitivity, specificity, accuracy and precision. The predicted results are compared with existing dominated methods and it shows better results in terms of comparison parameters.

10. Vyshali J Gogi,Vijayalakshmi M.N.," Prognosis of Liver Disease: Using Machine Learning Algorithms",2018.

The process of identifying patterns in huge datasets comprising methods such as machine learning, statistics, and database system can beconsidered data mining. It is a multidisciplinary field in computer science and it excerpts knowledge from the massive data set and converts into comprehensible format. The Medical environment is rich in information but weak in knowledge. Medical systems contain wealth of data which require a dominant analysis tool for determining concealed association and drift in data. The health care condition that comprehends to liver disorder is termed as Liver disease. Liver disorder leads to abrupt health status that precisely governs the working of liver and intern affecting other organs in the body. Data mining classification techniques like Decision Tree, Linear Discriminant, SVM Fine Gaussian and Logistic Regression algorithms are applied. Laboratory parameters of the patients are used as the dataset. Data contains features that can establish a rigorous model using Classification technique. MATLAB2016 is used in this paperfor implementing classification algorithm on the dataset. Linear Discriminant algorithm showed the highest prediction accuracy 95.8% and ROC is 0.93.