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Liver Failure Prediction Using Machine Learning Technique

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ABSTRACT: Liver failure can be a life-threatening emergency that requires immediate medical attention. Predicting a liver failure in its early phases is very important. This initiative seeks to resolve this problem by improving liver failure diagnosis using machine learning approaches. The primary goal of this study is to find liver patients using classification algorithms. In the modern period, one can gather data and visualize many hidden outcomes, such as dealing with missing data in a medical study. Decision-making can be aided by statistical machine-learning methods based on particular issues. Data-driven algorithms for machine learning (ML) can be used to verify current techniques and provide academics to reach possibly novel conclusions. Data visualizations were used to highlight important discoveries, like missing numbers. Principal component analysis (PCA) and multiple imputations by chained equations (MICEs) were used to create missing data points. The goal of this research was to use ML algorithms to extract meaningful predictors of liver failure from the medical analysis of several humans using Random forest algorithm.

KEYWORDS: Random Forest Algorithm, Data Visualization, Principal component analysis (PCA), Multiple imputations, Data-driven algorithm.

I. INTRODUCTION

Medical data gathering is expanding, giving doctors a new chance to enhance patient diagnosis. In order to enhance decision-making support, practitioners have expanded their use of computer technologies in recent years. In the health care industry, machine learning is becoming an important solution to aid the liver failure patients. When a job is complex and challenging to program, such as analyzing genomic data or turning medical records into knowledge, machine learning is used as an analytical tool. In recent studies, machine learning methods were used to identify various cardiac issues and predict future outcomes. The large dimensionality of the dataset is one of the main issues with machine learning. The weighting features reduce redundant data and processing time to improve algorithm efficiency because the analysis of many features uses a lot of memory and results in over fitting. Different illnesses of health management and genome expression can be distinguished by a limited number of characteristics.

II. RELATED WORK

In our paper we propose a cascaded system that combines both 2D and 3D convolutional neural networks to effectively. Our 2D network operates on a slice by slice basis to segment the liver and larger tumors [1]. Liver and lesion segmentation data are provided by the Liver Tumor Segmentation challenge (LiTS), with an increase in dice score of up to 2 points [2]. We have empirically tested the efficacy of our technique by utilizing the well-known Lung Image Consortium Database (LIDC) [9]. Due to rapid advancement in Artificial intelligence (AI), like various machine learning algorithms SVM, K-mean clustering, KNN, Random forest, Logistic regression, etc., This will improve the life span of a patient suffering from Chronic Liver Disease (CLD) in early stages [10]. From this we detected the liver implications from the user [3]. This paper helps us to classify the techniques from the machine learning algorithm [7]. To assist doctors, this work uses the existing large-scale annotation medical image data to delve deep into liver lesion

detection from multiple directions[4]. Accurate lesion detection in computer tomography (CT) slices benefits pathologic organ analysis in the medical diagnosis process. More recently, it has been tackled as an object detection problem using the Convolutional Neural Networks (CNNs)[6].

III. METHODOLOGY

Logistic Regression and Support vector machine algorithm can be used to predict liver failure in its early phase. But ,It's accuracy is less when compared with random forest algorithm. So, Random Forest algorithm can be used to get better results.

Random forest algorithm:

Random Forest is an ensemble strategy that can handle both regression and classification tasks. The fundamental concept behind this method is to combine multiple decision trees to arrive at the final result rather than relying solely on one decision tree. Multiple decision trees serve as the fundamental learning models in Random Forest. We randomly choose rows and features from the dataset to generate sample datasets for each model. This part is referred to as Bootstrap. Produce a specific query or collection of data, then request the required information from the source. List any glaring inconsistencies and any information that might be missing in order to get the desired data. Establish a machine learning algorithm. Choose the fundamental strategy you want to implement. train the machine learning model with the input. Provide test results that illuminate the idea. Now compare the success measures between the test data and the model's predicted data. If it doesn't meet your expectations, you can try using an alternative data modeling technique, dating your data, or updating your model to reflect this. At this stage, you analyze the data you've gathered and provide it as needed.

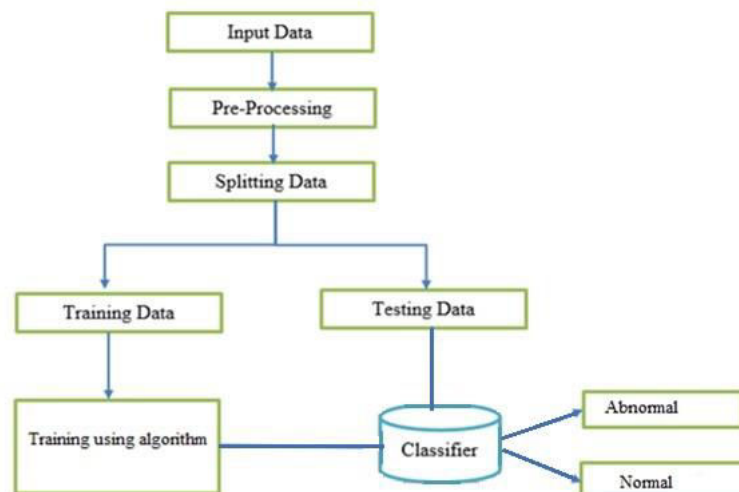


Fig 1. Architectural Diagram



IV. EXPERIMENTAL RESULTS

Liver Failure Prediction

Predict Your Disease

Age *
62

Gender *
1

Total Bilirubin *
10.9

Alkaline Phosphatase *
699

Alamine Aminotransferase *
64

Fig 2. Takes input from the user.

Liver Failure Prediction

Alamine Aminotransferase *
64

Aspartate Aminotransferase *
100

Total Proteins *
7.5

Albumin *
3.2

Albumin and Globulin Ratio *
0.74

Predict

Fig3.Takes input from the user.

Fig2, Fig 3shows the input that the Random forestalgorithms takes to perform the prediction. The main page takes the inputs Age, Gender, Total bilirubin, Alkaline Phosphotase, Alamine Aminotransferase, Aspartate Aminotransferase, Total proteins, Albumin, Albumin and Globulin ratio



Liver Failure Prediction

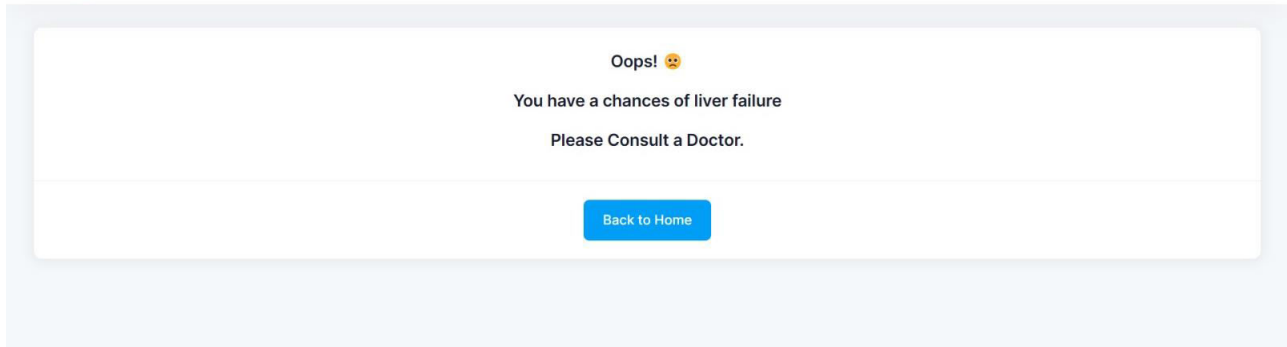


Fig4.Indicates the chances of liver failure.



Liver Failure Prediction

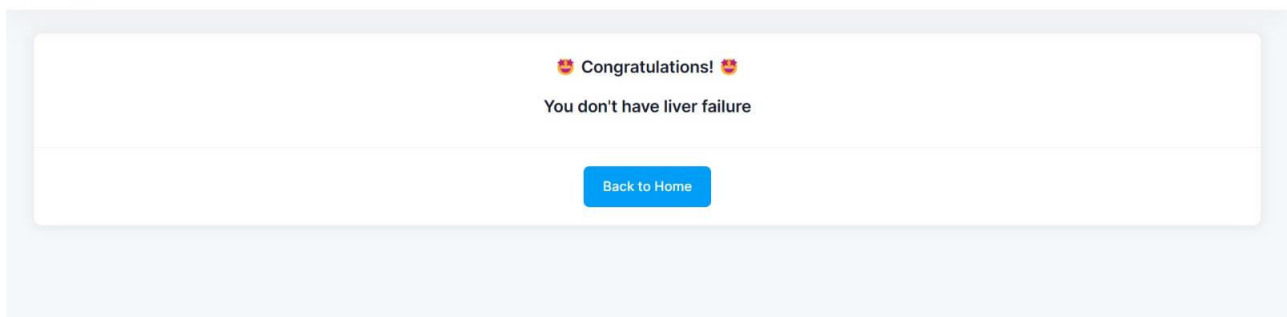


Fig5.Indicates user does not have chances of liver failure.

V. CONCLUSION

Clinicians who are skilled at recognising noteworthy observations and categorising them as normal or abnormal utilising background knowledge and other context clues can detect liver failure disease. ML algorithms may be taught to recognise the danger of liver disease to help medical professionals. By using the association of each variable with the risk of liver disease to train the model, ML methods were able to identify which blood donors were healthy and which had liver disease with high accuracy. Multinomial classification may be used to categorise the many types of liver disease rather than binary classification. Hence, the effectiveness of each model may be compared. The ML techniques mentioned can help the health industry identify groups more effectively and improve illness management.

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