

Revolutionising Liver Care

Predicting Liver Cirrhosis Using Advanced Machine Learning

Abstract

This project focuses on predicting liver cirrhosis using advanced machine learning techniques. Early detection can significantly improve patient outcomes and reduce complications. This work aims to develop a predictive model to assist clinicians in identifying patients at risk.

Introduction

Liver cirrhosis is a late stage of scarring (fibrosis) of the liver caused by many forms of liver diseases and conditions. This project uses machine learning to aid in the early detection of liver cirrhosis by analyzing patient data.

Literature Review

Numerous studies have applied machine learning to healthcare problems. Previous works on liver disease prediction have used logistic regression, decision trees, and support vector machines with varying levels of success.

System Architecture

The system consists of four main modules: data collection, preprocessing, model training, and prediction. It includes a front-end interface for user interaction and a back-end model for predictions.

Dataset Description

The dataset consists of medical records with features such as age, gender, bilirubin levels, albumin, and other biomarkers relevant to liver health.

Methodology

Data was cleaned and normalized. Feature selection techniques were applied. Several classification

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algorithms were tested, including Random Forest and Support Vector Machines. The model was evaluated using accuracy, precision, recall, and F1-score.

Results & Analysis

The Random Forest model provided the best accuracy with 87%, precision of 85%, and recall of 88%. This suggests that the model can be effective in real-world scenarios.

Conclusion

Machine learning provides an effective tool for predicting liver cirrhosis. With further refinement and validation, the model could be integrated into clinical workflows to support diagnostic decisions.

Future Work

Future improvements include integrating real-time data streams, deploying the model as a web application, and collaborating with healthcare institutions for real patient validation.

References

1. UCI Liver Disorders Dataset
2. Scikit-learn Documentation
3. WHO Liver Disease Reports
4. Recent ML research articles in healthcare