ISSN: 2321-2152

IJMECE

International Journal of modern electronics and communication engineering

E-Mail
editor.ijmece@gmail.com
editor@ijmece.com

www.ijmece.com

ISSN2321-2152
www.ijmece .com
Vol 12, Issue 2, 2024

Comparative Analysis of Liver Diseases By Using Machine Learning Techniques

[1]Dr.CHIRAPARAPU SRINIVAS RAO, [2] KOVVURI LAKSHIMI APARNA

[1]Associate Professor, S.V.K.P & Dr K.S. Raju Arts & Science College(A), Penugonda, W.G. District, Andhra Pradesh, chiraparapu@gmail.com

[2]PG, Scholar, S.V.K.P & Dr K.S. Raju Arts & Science College(A), Penugonda, W.G. District, Andhra Pradesh, lakshmiaparna433@gmail.com

ABSTRACT

In a human body function of the liver is important. Many persons are suffering from liver disease, but they don't know it. The identification of liver diseases in the early stage helps a patient get better treatment. If it is not diagnosed earlier, it may lead to various health issues. To solve these issues, physicians need to examine whether the patient has been affected by liver disease or not, based on the multiple parameters. In this paper, we classify the patients who have liver disease or not by using different machine learning algorithms by comparing the performance factors and predicting the better result. The liver dataset is retrieved from the Kaggle dataset

1.INTRODUCTION

Patients with liver problems that are difficult to detect in the early stage will help to continue their function normally even if they are partially damaged. There are chances for a patient surviving a liver disease to be better if they are diagnosed early.

[1] The liver is an important organ that performs many functions energy storage, linked to metabolism, and waste cleansing. It also aids in the

ISSN2321-2152
www.ijmece .com
Vol 12, Issue 2, 2024

digestion of food, the change of food into energy, and the storing of energy until needed. It also helps in the removal of potentially dangerous compounds from our bloodstream. The disease may be a general term that refers to any condition affecting the liver [2]

A. Functions of Liver*:*

These are some of the functions of the Liver:

- It produces a component in the immune system that can combat illness.
- Producing the proteins that aid in blood coagulation.
- Red blood cells that are old or damaged are broken down.
- Excess blood sugar is stored as glycogen

The liver and its activities can be harmed by a variety of disorders. Some people respond well to treatment, while others do not. Fig. 1 shows the condition of No

rmal and affected liver with diseases. Some of the common conditions that affect the liver are discussed below:

1) Autoimmune hepatitis

The immune system of the body attacks itself and destroys healthy liver tissue in this disease. Cirrhosis and other liver damage can result from autoimmune hepatitis.

2) Cirrhosis

In this healthy liver, tissues are affected and changed as scar tissue due to chronic hepatitis, Long-term excessive alcohol consumption, and rare hereditary disorders such as Wilson's disease are all examples that might cause this problem.

3) Hemochromatosis

An overabundance of iron builds up in the body as a result of this disorder. The liver might be harmed by too much iron.

4) Hepatitis A

viral infection which causes swelling in the liver is known as Viral hepatitis. There are some types of hepatitis, like

A, B, C, D, and E. Each has its own set of causes and consequences.

Hepatitis A is most common in underdeveloped nations with poor sanitation and access to clean drinking water. Hepatitis A is usually treatable without causing liver damage or long-term consequences

5) Hepatitis B

It can be an infection either short-term or long-term. It can also be contracted by sharing the needles with others or inadvertently injecting oneself with a contaminated needle. These serious complications, which include a cause of liver failure and cancer, can occur as a result of illness. There is a vaccine available to prevent the sickness.

6) Hepatitis C

Hepatitis C is a viral infection that can be either acute or persistent. It's disseminated most usually through coming into touch with hepatitis C virus-infected blood, such as by using dirty needles to inject drugs or apply tattoos. Due to this liver failure, and liver cancer are all possible.

7) Non-alcoholic fatty liver disease and NASH The excess fat that builds up in the liver will damage the liver, which causes swelling. Fatty liver disease may cause scarring or fibrosis due to non-alcoholic steatohepatitis. Type 2 diabetes-related diseases may cause due to this problem.

B. Symptoms of liver conditions

There are so many types of liver disorders, which show symptoms like flu- and cause more serious damage in the liver which includes jaundice and dark-colored urine.

The following are some of the signs and symptoms of liver disease:

fatigue

- a decrease in appetite
- vomiting
- Pain in joint
- stomach ache or discomfort
- Bleeds in the nose

- aberrant blood vessels on the surface of the skin (spider angiomas)

Symptoms that are more severe include:

 The skin and eyes turn a yellowish color (jaundice)

 bloating in the stomach (ascites)

 Leg swollenness (edema)

 Gynecomastia is a term used to describe a condition in which a man develops (when males start to develop breast tissue)

 Enlarged liver (hepatomegaly)

 bloating in the stomach (ascites)

 Leg swollenness (edema)

 Gynecomastia is a term used to describe a condition in which a man develops (when males start to develop breast tissue)

 Enlarged liver (hepatomegaly)

2.LITERATURE SURVEY

A literature survey on the comparative analysis of liver diseases using machine learning techniques would involve reviewing existing research papers, articles, and studies in the field. Here's a step-by-step guide on how you might conduct such a survey:

1. Define your Scope: Determine the specific aspects of liver diseases and machine learning techniques you want to focus on. Are you interested in comparing different machine learning algorithms for liver disease diagnosis? Or perhaps you want to explore the use of machine learning in predicting disease progression or treatment outcomes?

2. Search Relevant Databases: Utilize academic databases like PubMed, IEEE Xplore, Google Scholar, and ScienceDirect to search for relevant literature. Use keywords such as "liver disease," "machine learning,"

"comparative analysis," and related terms to find relevant papers.

3. Screen and Select Papers: Read through the abstracts and titles of the search results to identify papers that are directly relevant to your research question. Exclude papers that are not related or do not meet your inclusion criteria.

4. Read and Summarize Papers: Read the selected papers in detail and summarize the key findings, methodologies, datasets used, and the comparative analysis performed. Take note of any limitations or challenges mentioned by the authors.

5. Identify Trends and Patterns: Analyze the collected papers to identify common trends, patterns, and gaps in the existing literature. Look for recurringthemes in the methodologies, algorithms used, and the performance metrics evaluated.

6. Compare Methodologies and Results: Compare the different machine learning techniques employed in the selected papers and their respective performances in diagnosing liver diseases. Pay attention to factors such as accuracy, sensitivity, specificity, and computational efficiency.

7. Evaluate Limitations and Challenges: Critically evaluate the limitations and challenges associated with the use of machine learning techniques for liver disease analysis. Consider issues such as data availability, imbalanced datasets, interpretability of models, and generalization to diverse populations.

8. Draw Conclusions and Future Directions: Based on your analysis, draw conclusions regarding the effectiveness of different machine learning techniques for liver disease analysis. Discuss potential areas for

future research and improvement in methodology

3.EXIXTING SYSTEM

Nazmun Nahar, et al. [3] implemented by using various decision trees techniques like LMT, J48, Hoeffding Tree, Decision Stump, and Random tree. for calculating expected time predication of disease affected to liver finally, the Decision Stump gives the highest accuracy results among other techniques.

A Saranya, et al. [4] explained the applications in data mining techniques and also used Medical Data Mining (MDM) to diagnose liver diseases. This technique includes prediction in the early stage, the existence and also complexity of the disease which helps partial assistance to the physicians.

S. Dhamodharan [5] considers three major liver diseases like cirrhosis, hepatitis, and liver cancer. The fundamental purpose of this forecast is to find the type of disease by using classifications techniques such as cirrhosis, hepatitis, liver cancer, and "no disorders." Then compare the accuracy of the FT and Naive Bayes tree algorithms and shows that the Naive Bayes algorithm accuracy is significantly higher than that of the other methods.

Kemal Akyol, Yasemin Gultepe [6] by using the dataset which has shown a balanced result by using sampling technique for getting accuracy. the Stability Selection technique is used for selection based on attributes. For improving the performance, a blend of Stability Selection and Random Forest methods is used.

ShambelKefelegn, Pooja Kamat [7] for getting better results

different data mining classification techniques are compared with the earlier liver prediction methods. The accuracy is measured with the help of confusion matrices for getting the better performance of the accuracy FadlMutaher Ba-Alwi, et al. [8] using various machine learning algorithms compared the Hepatitis prognostic data among them. In that Naive Bayes, technique gave good accuracy and also takes less time to build a model.

K. Thirunavukkarasu, et al. [9] Used different classification techniques for predicting liver diseases. They compare the results of accuracy score and confusion matrix with Logistic Regression, SVM, and K-Nearest Neighbour. Bendi Venkata, et al. [10] used different classifications algorithms, they checked the accuracy, precision, sensitivity, and specificity on liver datasets.

Tapas Ranjan Baitharua et al. [11] has proposed an Intelligent medical decision support system to help physicians diagnose liver disorders through a learning pattern technique. In this, several classification techniques are used to compare the effectiveness, correction rate, and also accuracy for the data is analysed with different scenarios.

A diagnostic support system [12] was developed with the support of a number of models with help of neural, which is helped to the physicians for diagnosis on the liver in the medical field. M. Banu Priya P, et al. [13] Using a root mean error value, root mean square value, the accuracy is calculated, and better accuracy is produced with the support of the PSO features selection technique.

Dietterich, Thomas G [14] states that the ensemble learning technique produces a better performance than the other single classifier techniques with the Bayesian averaging, error-correcting output coding, boosting, and bagging. In this paper, the author analyses existing ensemble approaches with some novel experiments to determine why Adaboost does not overfit quickly.

Disadvantages:

- An existing methodology doesn't implement an effective Machine Learning Classifiers.
- The system not implemented Decision Trees which leads complexity in testing and training datasets.

4.PROPOSED SYSTEMS

To analysis about liver disease, the data is retrieved from the Indian Liver Patient from the Kaggle. Here the patient has been characterized based on diseases as either 1 or 2. The values used in the dataset are given in Table I. The gender attribute is transformed to an integer value during the data pre-processing stage (0 and 1). The overall procedure of the proposed system is depicted in this system. The workflow of the proposed system is as follows a collection of data sets, Handling Categorical values, Splitting the data for Training, and Testing. Perform feature selection and apply the machine learning techniques and compare the predicted result and find better accuracy.

Advantages:

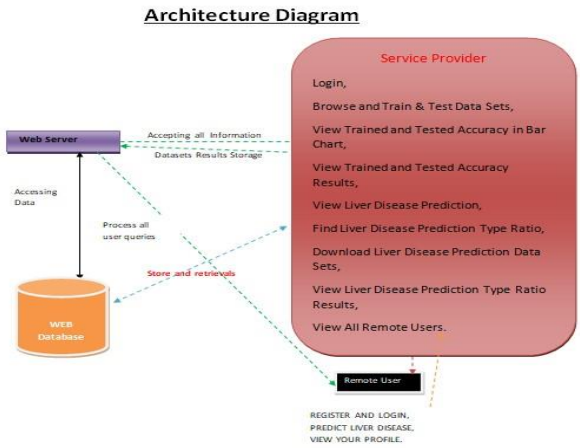
- It is a supervised Machine learning technique applied for both classification and regression kinds of problems, but it is used for classification

ISSN2321-2152
www.ijmece .com
Vol 12, Issue 2, 2024

types of problems. This model is applied to predict the categorical dependent variable with support of independent variables the output should be 0 or 1.

- This Classifier technique is effective when only a small amount of training data is required to derive approximation parameters. With highly scalable model creation, it can tackle a wide range of challenging real-world problems.
- This is a pattern recognition system that involves the training datasets for finding the k closest relatives in new conditions. When using k-NN for classification, we must calculate the location data within the nearest neighbor's category.

5.ARCHITECTURE



6.MODULES

Service Provider

In this module, the Service Provider has to login by using valid user name and password. After login successful he can do some operations such as

Browse and Train & Test Data Sets, View Trained and Tested Accuracy in Bar Chart, View Trained and Tested Accuracy Results, View Liver Disease Prediction, Find Liver Disease Prediction Type Ratio, Download Liver Disease Prediction Data Sets, View Liver Disease

ISSN2321-2152
www.ijmece .com
Vol 12, Issue 2, 2024

Prediction Type Ratio Results, View All Remote Users.

View and Authorize Users

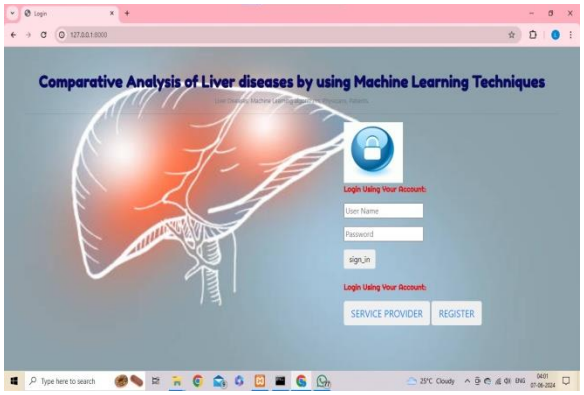
In this module, the admin can view the list of users who all registered. In this, the admin can view the user's details such as, user name, email, address and admin authorizes the users.

Remote User

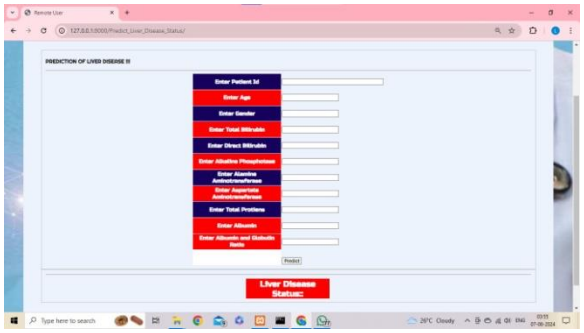
In this module, there are n numbers of users are present. User should register before doing any operations. Once user registers, their details will be stored to the database. After registration successful, he has to login by using authorized user name and password. Once Login is successful user will do some operations like REGISTER AND LOGIN, PREDICT LIVER DISEASE, VIEW YOUR PROFILE..

7.OUTPUT SCREENS

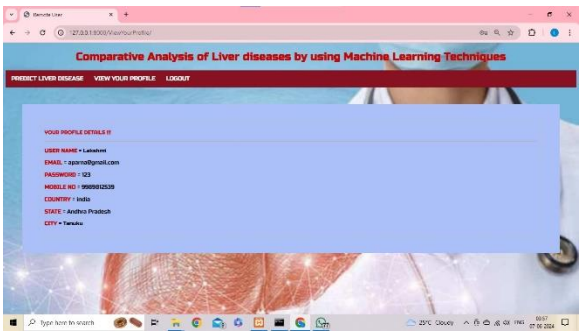
User Login:



Output Screen:



User details:



7.CONCLUSION

In the above system, we have studied some classification algorithms like SVM, Random Forest, KNN, LR, Naive Bayes, Kernel SVM, Decision tree to predict the patent has a Live disease or not. The early prediction gives the physicians to take the necessary steps to save the life of the patient. In this, the Kernel SVM approach produces better accuracy results than the other techniques. But we need to predict more accurate results. To get better results we need to use some advanced techniques for predicting the diseases

9. REFERENCE

Liver Disease Using Machine Learning Techniques", International Research Journal of Engineering and Technology (IRJET), Volume: 05, Issue: 04,2018, pp 4011-4014.

[2] Pragati Bhagat et al.," System for diagnosis of Liver Disease Using Machine Learning Technique", International Research Journal of Creative Research Thoughts", ISSN: 2320-2882, pp25-30.

[3] Nazmun Nahar and Ferdous Ara, "Liver Disease Prediction Using Different Decision Tree Techniques", International Journal of Data Mining & Knowledge Management Process Vol.8 No.2(March 2018).

[4] A Saranya, G.Seenuvasan, "A Comparative Study Of Diagnosing Liver Disorder Disease Using Classification Algorithm", International Journal Of Computer Science and Mobile Computing, Vol. 6 Issue 8mpage no 49-54(August 2017).

[5] S. Dhamodharan, Liver Disease Prediction Using Bayesian Classification, National Conference on Advanced Computing, Application & Technologies, 2014.

[6] Kemal Akyol, Yasemin Gultepe," A Study on Liver Disease Diagnosis based On Assessing the Importance Of Attributes", I.J. Intelligent systems, and Applications, Vol. 11, Page No 1-9(2017).

[7] ShambelKefelegn, Pooja Kamat, "Prediction and Analysis of Liver Disorder Diseases by using Data Mining Technique: a survey", International Journal of pure and applied mathematics, volume 118, No 9,765-770, 2018.

[8] Fadl Mutaher Ba-Alwi et al....," Comparative Study for Analysis the Prognostic in Hepatitis Data: Data Mining Approach", International Journal of Scientific & Engineering Research, Vol 4mIssue 8 ISSN 2229-5518(2013).

[9] Bendi Venkata Ramana, et al. …, "A Critical Study of Selected Classification Algorithms for Liver Disease Diagnosis", International Journal of Database Management Systems, Vol 3, (May 2011).

[10] K. Thirunavukkarasu et al....," Prediction of Liver Disease using Classification Algorithms", International Conference on Computing Communication and Automation (ICCCA), https://doi.org/10.1109/CCAA.2018.87776552018.

[11] Tapas Ranjan Baitharua, Subhendu Kumar Panib, "Analysis of Data Mining Techniques For Healthcare Decision Support System Using Liver Disorder Dataset", International Conference on Computational Modeling and Security, 2016.

[12] BUPA Liver Disorder Dataset. UCI repository machine learning databases

[13] M. Banu Priya P, et al.," Performance Analysis of Liver Disease Prediction using Machine learning Algorithms", International Research Journal of Engineering

and Technology, Vol. 05 Issue:01(Jan. 2018).

[14] Dietterich, Thomas G. "Ensemble methods in machine learning." International workshop on multiple classifier systems. Springer, Berlin, Heidelberg, 2000

[15] Velliangiri, S., Karthikeyan, P., Joseph, I. T., & Kumar, S. A. (2019, December). Investigation of Deep Learning Schemes in Medical Application. In 2019 International Conference on Computational Intelligence and Knowledge Economy (ICCIKE) (pp. 87-92). IEEE.

[16] Joseph, S. I. T., Sasikala, J., Juliet, D. S., &Velliangiri, S. (2021). Hybrid spatio-frequency domain global thresholding filter (HSFGTF) model for SAR image enhancement. Pattern Recognition Letters, 146, 8-14.