REVIEW PAPER ON LIVER CANCER

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ABSTRACT:

Currently there is one of the prevalent diseases of 21st century is liver disorders annually killing so many people round the worlds. A range of therapies have been provided by researcher to evaluate results. Early diagnosis is of considerable amount of significance in treating the disease. Diagnosis is of the physician skills conducting based on their knowledges and experience yet an error might occurrence is here. Using various Artificial Intelligence methods for liver disorders diagnosis has recently become wide spreading data. These intelligent helps systems help physicians as diagnosis assistants. Now, various Artificial Neural Network system, Expert Systems, Fuzzy Neural Network, Classification, This paper provides a review of different Artificial System and expert system method in diagnosis and detections of liver disease disorders acuteness is the key for results[1]. Different types of machine learning, Supervised, Unsupervised and Semi- Supervised, Reinforcement Learning for diagnosis of liver disease such as SVM, KNN, K-Mean clustering, neural network, Decision tree etc and give difference accuracy, precision, sensitivity[2]. This paper is to provide details about the liver issues, their causes and effects.

KEYWORDS:

Liver Disease, Artificial Intelligence, risk, cause, diagnosis and treatment.

INTRODUCTION:

The use of intelligence systems in medical diagnosis is increasing gradually. There is no doubt that evaluation of data taken from patient and decisions of experts are the most important factors in diagnosis. But, expert systems and different artificial intelligence techniques for classification also help experts in a great deal. Classification systems, helping possible errors that can be done because of fatigued or inexperienced expert to be minimized, provide medical data to be examined in shorter time and more detailed. Problems with liver patients are not easily discovered in an early stage as it will be functioning normally even when it is partially damaged. An early diagnosis of liver problems will increase patient's survival rate[1].

As per the World health organization's latest survey report published in 2017, death due to liver disease is 2.95% of total death and Indian ranks 63rd position in the world .The liver is the largest internal organ in our human body. The liver has two lobes, left lobe and right lobe. The liver weight is approximately 3 pounds, it's a reddish-brown color. The gallbladder is located under the liver. The main important role of the liver is to remove the toxic and harmful substances from the blood before distribution to different parts of our body. Liver disease is also considered one of the most dangerous and deadliest diseases faces in the globe. The reason behind the causes of liver disease are as follows, liver fibrosis, fatty liver, liver cirrhosis, hepatitis infection excessive alcohol drink, drug and toxic and genetic abnormalities. If liver is 100% fail there is not option to recover but only one solution that is liver transplantation. Early detection of liver disease can helpful in treatment, of the disease to fast recover. The stages of liver disease are shown in the below figure.

Figure. Liver disease stages

It is very difficult to identify in early stages of liver disease even liver tissue has damaged moderately, in these case many medical expert system difficult to identify the disease. This leads to fail in treatment and medication. In order to avoid this early prediction is crucial to give proper treatment and save life of patient.[2]

Symptoms:
The earliest warning signs, when they do appear, could include the followings –
- Persistent fatigue, tiredness, listlessness.
- A frequent feeling of weakness Occasional nausea
- Reduced appetite, often causing unintentional weight loss.
- Lowered sex drive
- As cirrhosis progresses further, these symptoms would begin to occur
- Jaundice, which cause a yellow tint in the skin and whites of the eyes.
- Fever, often including shivering.
- Vomiting
- Changes in bowel movements, including diarrhea and dark, tarry stools
- Skin will begin to feel itchy as toxins build up in the blood streams
- Abdominal discomforts possibly severe pain
- A swollen of bloated stomach
- A tendency to bleed or bruise easily
- Tiny red lines appear on the skin waist level (blood capillaries)
- Legs, ankles and feet become swollen as excess fluids build – up (also called edema)
- Maintaining normal weight become more difficult [7]

Note: Cirrhosis occurs through the loss of liver cells and irreversible scarring damage of the liver, often caused
- by excessive alcohol use or viral infections like hepatitis.[7]

Survival rate:
- The survival rate for cirrhosis is difficult to determine because some patients pass away within days of being
- diagnosed, while others survive many years. Surviving with cirrhosis depends on many different factors, which
- include the followings cause of cirrhosis [7].

Causes:

- ☐ Age and general health of the patient
- ☐ Presence of complications
- ☐ Stage (the extent of liver damage) [7]

Risk factors:

- Personal habits (Alcohol use, injection drug use)
- Medications (herbal and over the counter)
- Sexual activity
- Exposure to jaundice or other high risk   persons
- Recent surgery
- Remote or recent blood products transfusion
- Occupation[7]

LITERATURE SURVEY:

1.Miss. Hemalata Vaidya1, Miss. S. K. Chaudhari::proposed model selection affects the decision support systems accurately. In their model selection, how to affects the accuracy of decision support system hydrides by single model and ensembles. They proposed single model is not more accurate than ensembles. Ahmed M. Hash metal., proposed to predict Liver Cirrhosis or fibrosis single stage classification model and multistage classification model. In their model based on Decision Tree, Neural Network, Nearest Neighbourhood clustering and Logistic regression.[1]

2. **Golmei Shaheamlung** : Authors used two different input dataset and evaluate that the AP datasets has better than UCLA dataset for all the different selected algorithms. Based on performance on their classification KNN, Backward propagation and SVM are giving better results. The AP data set is better than UCLA for the entire selected algorithm. And found out Naïve Bayes, C4.5, KNN, Backward propagation and SVM has 95.07, 96.27, 96.93, 97.47, & 97.07% accuracy respectively [2].

3.Prof. Samiksha H. Zaveri :use different decision tree techniques such as Random tree, LMT, Random Forest, J48, Hoeffding Tree, and Decision Stump to investigate the predicted time of disease affecting the liver. The age, gender, total bilirubin, albumin, direct bilirubin, proteins, and globulin ratio of liver disease are all included in the dataset used for this study. According to their research, among the various methods, Decision Stump provides the best accuracy. [3]

4.Harsha Pakhale: proposed "Classification of Liver Disease Diagnosis: A Comparative Study" . They used two liver patient dataset. Both datasets are taken from UCI Repository. The first dataset is AP dataset and the Second dataset is BUPA dataset. They worked with different classification algorithms such as Logistic, Bayesian Logistic Regression, Logistic Model Trees (LMT), Multilayer Perceptron, K-star, RIPPER, Neural Net, Rule Induction, Support Vector Machine (SVM) and CART. Accuracy, Precision and Recall parameters are used to evaluate the performance of the proposed method.[4]

5.Roger Williams: The presence of steatosis in the liver is increasingly recognized as an additional risk factor for the development of additional injury. Excess body weight in
subjects with heavy alcohol consumption markedly increases the severity of steatosis and is a risk factor for the development of acute alcoholic hepatitis and cirrhosis.24,25 Similarly, in hemochromatosis, the odds of having liver fibrosis increase by 3.9% when steatosis is present.[5]

6.Elliot B. Tapper: Of 5,647 studies screened, 11 studies met our inclusion criteria. For a description of the included studies, see Table 1. Of these 11 studies, four were from the United States,(6-9) two from Denmark,(10,11) and one each from China, Taiwan, Japan, Spain, and
Italy.(12-16) Overall, these studies enrolled 2,299 (range 11-544) patients. The stage of liver disease was available for 1,550 (67%), of whom 586 (38%) were Child A and 964 (62%) were Child B-C. Granular details of cirrhosis etiology were available for 1,268 (55%) patients, of whom 643 (51%) had viral hepatitis and 360 (28%) had alcoholic liver disease.

7.Shashikala Vishwakarma: Cirrhosis is characterized by fibrosis and nodule formation of the chronic liver disease. It usually progresses world – wide. There are many cells play a major role in the development of cirrhosis including hepatocytes, sinusoidal lining cells such as hepatic stellate cell (HSCs), sinusoidal endothelial cells (SECS) and kupffer cells (KCS). Cirrhosis was the 2th leading cause of death in the United state in 2011. The main cause of cirrhosis is hepatitis B and C viruses, overuse of alcohol. Cirrhosis prevalence was estimated at 0.15% or 400,000 in the USA, where it accounted for more than 25,000 deaths and 373,000 hospital discharges.

SUMMARY OF LITERATURE SURVEY:

The predict Liver Cirrhosis or fibrosis single stage classification model and multistage classification model. In their model based on Decision Tree, Neural Network, Nearest Neighbourhood clustering and Logistic regression.[1]. Based on performance on their classification KNN, Backward propagation and SVM are giving better results. The AP data set is better than UCLA for the entire selected algorithm. And found out Naïve Bayes, C4.5, KNN, Backward propagation and SVM has 95.07, 96.27, 96.93, 97.47, & 97.07% accuracy respectively [2].Both datasets are taken from UCI Repository. The first dataset is AP dataset and the Second dataset is BUPA dataset. They worked with different classification algorithms such as Logistic, Bayesian Logistic Regression, Logistic Model Trees (LMT), Multilayer Perceptron, K-star, RIPPER, Neural Net, Rule Induction, Support Vector Machine (SVM) and CART. Accuracy, Precision and Recall parameters are used to evaluate the performance of the proposed method.[4]. we summarised that different author used different algorithms on liver effects.

RESULTS OF EXISTING WORKS :

Chronic liver diseases represent a major health burden worldwide, with liver cirrhosis being the ninth leading cause of death in Western countries. Chronic viral hepatitis B and C, alcoholic liver disease, non-alcoholic fatty liver disease and hepatocellular carcinoma are the major entities and many problems remain unresolved.

Treatment options for common liver diseases such as cirrhosis, fatty liver and chronic hepatitis are often limited in efficacy, carry the risk of adverse effects and are often too costly, especially for the developing world.

Causative factors for liver toxicity mainly are alcohol, viral and induced by drugs. Alcoholic liver damage is differentiated by three main histological stages, i.e., steatosis, acute alcoholic hepatitis and cirrhosis.

The main roles of the liver include removing toxins, processing food nutrients and regulating body metabolism. Important causes of liver disorders are fatty liver, hepatitis virus infections and alcohol. Cirrhosis (liver scarring), the end result of many liver disorders, can lead to liver failure.

CONCLUSION:

This paper gives us the basic idea of past published paper of detection and diagnosis of liver disease based on different machine learning algorithm. With this survey and study it has clearly find and observed that some machine learning algorithm such as Decision tree, J48 and ANN provide better accuracy on detection and prediction of liver disease. And different algorithm has different performance based on different scenario but most importantly the dataset and feature selection is also very important to get better prediction results. And also the paper presents a survey on different types of machine learning techniques used by different authors and every machine learning techniques has some good and bad outcomes depend on the datasets and features selection etc. With this survey we found out that the accuracy and performance can be improve by using different combination or hybrid machine learning algorithm and in future we can also work on more parameter which help to get better performance than the existing technique.

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