NEURO FUZZY BASED LIVER DISEASE CLASSIFICATION

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ABSTRACT

Currently there is one of the prevalent diseases of 21st century is liver disorders annually killing so many people's 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 knowledge's 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. Fuzzy Logic, and Swarm Intelligence are widely used.

Keyword: *-Expert System; Fuzzy Logic; Liver Disorders; kmeans clustering etc….*

1. 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. Liver disease can be diagnosed by analyzing the levels of enzymes in the blood. Furthermore, nowadays mobile devices are widely used for supervision humans' body conditions. In addition, automatic classification algorithms are demanded. According to their implements for liver diseases (almost definitely mobile capable or web capable), that decline the patient queue at the liver experts such as endocrinologists. Liver disorders are also an important disease in medicine. Levels of enzymes combined to blood are analyzed in Liver Disorders diagnosis. It can be a lot of possible errors in this diagnosis due to the number of enzymes to be many as well as the effects of different taken alcohol rates to be very from one patient to the other.

This paper is structured as follows. Section two briefly Data set of liver disorders, Section three reviews the various methods of liver disorders finally, Section four is a conclusion. The used data source in this study is UCI machine learning repository.The Liver Disorders data is named as BUPA Liver Disorders. BUPA Liver Disorders database make ready by BUPA Medical data Company includes 345 specimens consisting of six fields and two classes. Each sample is taken from an single man. Two hundred of these samples are of one class with remaining 145 are possessed by to the other. First Five attributes of the collected data samples are the outcomes of blood test while the last attribute includes daily alcohol consuming. The attributes are as follows:

1. mcv: mean corpuscular volume,
2. alkphos: alkaline phosphotase,
3. sgpt: alamine aminotransferase,

4. sgot: aspartate aminotransferase,
5. gammagt: gamma-glutamyl transpeptidase,
6. Drinks:the number of half-pint equivalents of alcoholic beverages drunk per day.

2. EARLIER WORK

Artificial neural networks are useful in the diagnosis of liver disorders and good results have been achieved. These results can be a good help for physicians until recognize more accuracy and better. Of course all these methods have some error and this is natural. The amount error is acceptable[17] According to the opinion of physicians. Because even physicians diagnosed have the small error. In follow the variety of artificial intelligence methods to be studied in diagnosis of the liver disorders.

2.1 Neural network

One of the human wish is designing Intelligence systems that have learning ability. To some extent this wish is come true. Simulation of brain structure and human learning Led to the invented artificial neural network (ANN). ANN has many applications in medical systems. Especially in the diagnosis and determine disease severity or predict disease .

2.2 ASAMC for neural network training

A general-purpose stochastic optimization algorithm is the so-called annealing stochastic estimation Monte Carlo (ASAMC) algorithm for neural network training. ASAMC capable be regarded as a space annealing version of the stochastic approximation Monte Carlo (SAMC) algorithm. Under mild conditions, they show that ASAMC can converge.

3. LITERATURE SURVEY

Paul Mangiameli et al., [2] 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. Hashem et al., [18] 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 Neighborhood clustering and Logistic Regression.

Ziol.M et al.,[3] proposed to evaluated liver fibrosis with chronic hepatitis C for patients using liver stiffness measurement (LSM).Z. Jiang.Z.,[4] proposed for discovering the corresponding degree of fibrosis by support vector machine (SVM).

Kemal Polat et al.,[22] proposed resource allocation mechanism of AIRS was changed with a new one decided by Fuzzy-Logic. This approach called as Fuzzy- AIRS was used as a classifier in the diagnosis of Liver Disorders. In this Classification accuracies were evaluated by comparing them with reported classifier's accuracy, time and number of resources.

Piscaglia et al.,[6] proposed to predict Liver cirrhosis and other liver-related diseases used by Artificial neural network. Dong-Hoi Kim et al.,[19] proposed machine learning technique and decision tree(C4.5).In this method is used for to predict the susceptibility to two liver diseases such as chronic hepatitis and cirrhosis from single nucleotide polymorphism(SNP) data . They also used to identify a set of SNPs relevant to those diseases.

Anh Pham,[8] developed optimizing the classification accuracy when analyzing some medical datasets. This proposed work done by new meta-heuristic approach, called the Homogeneity-Based Algorithm (or HBA).This approach used to predict error rates and associated penalty costs. These costs may be dramatically different in medical applications as the implications of having a false-positive and a false-negative case may be tremendously different.

Rong-Ho Lin [9] proposed to predict accuracy of liver disease using case-based reasoning (CBR) and classification and regression tree (CART) approach. He also integrates CART and CBR for the diagnosis of liver diseases. In this model included two major steps. (1) CART To diagnose whether a patient suffers from liver disease using CART. (2)To predict which types of Liver disease affected for patients using CBR.He also [18], proposed to determine whether patients suffer from liver disease or not using case-based reasoning, artificial neural networks and analytic hierarchy methods . They also predict which types of liver disease suffered human body.

Chun-Ling Chuang et al.,[15] proposed to diagnosis early Liver disease and predict classification accuracy by integrated case- based reasoning into classification and regression tree, back-propagation neural network (BPN), discriminatory analysis and logistic regression of classification methods in data mining techniques. In their methods used a ten-fold cross-validation to select a best.

4. PROPOSED SYSTEM

The proposed system is build expert system which employ Fuzzy C-Means[3] for the diagnosis of LDs is developed in an environment characterized by Microsoft Window XP professional Operating System, Microsoft Access Database Management system, Visual Basic Application Language and Microsoft Excel. Neuroph and Crystal reports were used for neural network analysis and graphical representation. An approach for analyzing clusters to identify meaningful pattern for determining whether a patient suffers from LD or not is presented. The system provides a guide for diagnosis of LDs within the decision making framework. The process for the medical diagnosis of LD starts when an individual consults a physician (doctor) and presents a set of complaints (symptoms). The physician then requests further information that will further aid in the proper diagnosis of the disease.

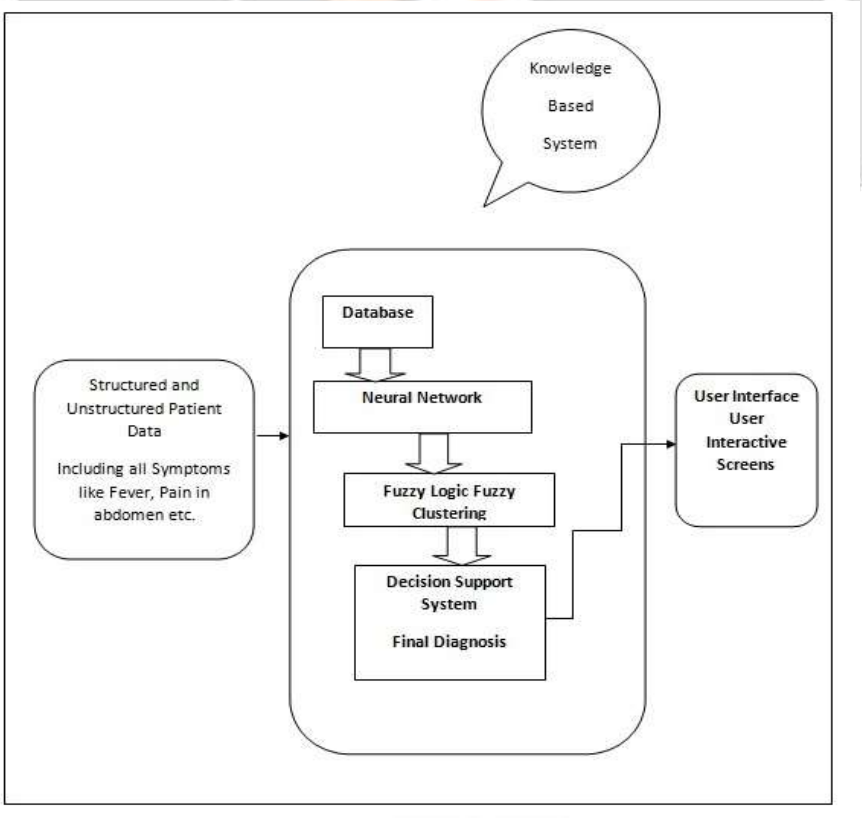

Fig -1: Overall Architecture of Proposed System

Data collected include patient's previous state of health, living condition and other medical conditions[7]. When diagnosing LD, the physician looks at the patient's symptoms[8] and conducts a physical examination. In addition, the physician may request a liver biopsy, liver function tests, an ultrasound, CT scan, and/or a magnetic resonance imaging (MRI)[16] scan From the symptoms presented by the patient, the physician narrows down the possibilities of the illness that corresponds to the apparent symptoms and make a list of the conditions that could account for what is wrong with the patient. These are usually ranked in possibility order (Low, Moderate and High). When the list has been narrowed down to a single condition, it is called differential diagnosis and provides the basis for a hypothesis [21] of what is ailing the patient. The examining physician accounts for possibilities of having LD through an interview, physical examination, LFT tests or liver biopsy. LFT test is used for identifying the presence of certain liver enzymes in the blood. A thorough diagnostic evaluation may include a complete history of; when the symptoms started, how long the symptoms have lasted, how severe it has been and having occurred before, was it treated and what treatment was received.

5. EXPERIMENTAL RESULT AND DISCUSSION

Figure 5.1: Admin Login of the System

Here is the login panel of the Fuzzy Cluster Means System for the Diagnosis of Liver In this the admin user will have to enter Login details and get access to current system.

Figure 5.2: Admin Home of System

After Login to system get authenticated successfully got access to admin home containing Left menu which contain the available options to different modules

Figure 5.3: Upload Dataset (Admin side)

The system have to pass the dataset of the patients data so that its used for making the frequency tables.

Figure 5.4: Dataset (Admin side)

Here we got display the dataset passed to the system

Figure 5.5: No of Clusters (Admin side)

The System is making clusters of the required dataset so here we give the number of clusters to formed

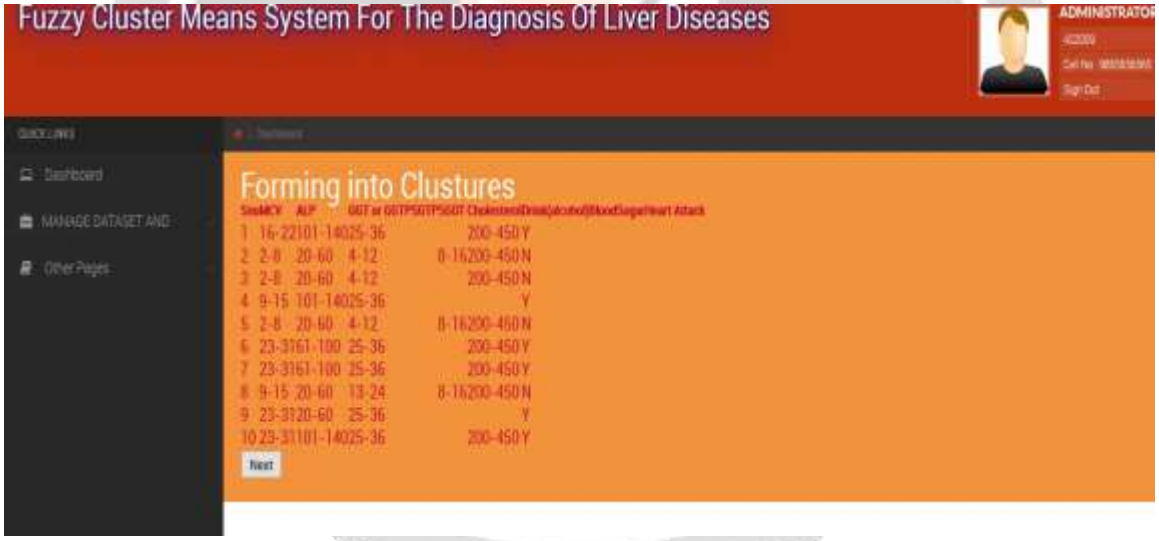

Figure 5.6: Forming Clusters (Admin side)

Here we get the display of the cluster which are formed with the help of cluster formation algorithm and these are used for the prediction system

Figure 5.7: Frequency table completed(Admin side)

Finally the frequency table got completed

Figure 5.8: User Login of System

Here User is login to the system with given username and password

Figure 5.9: User Home of System

This is the user home of the system it contains the option of operations in the left bar to perform further operations.

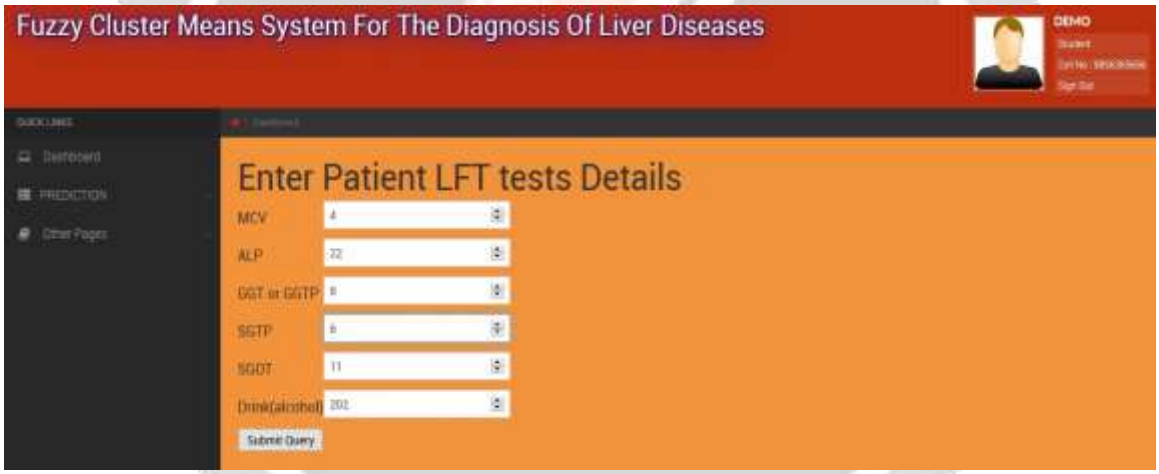

Figure 5.10: LFT Test Data (User Side)

Here user enter the LFT test data in which all values of the MCV, ALP, GGT, SGTP ,SGOT and Drink levels are given this test are given form test Laboratory.

Figure 5.11: Forming Clusters (User Side)

The algorithm checks the values given from user and select the appropriate cluster for the user values

Figure 5.12: Result State-negative(User Side)

If the user enter values not falls under any of the cluster required for the user it show negate result

Figure 5.13: LFT Test Data -positive (User Side)

Here user enter the LFT test data in which all values of the MCV, ALP, GGT, SGTP ,SGOT and Drink levels are given this test are given form test Laboratory.

Figure 5.14: Forming Clusters -positive (User Side)

The algorithm checks the values given from user and select the appropriate cluster for the user values

Figure 5.15: Result State-Positive (User Side)

Here the user got result as per his test data

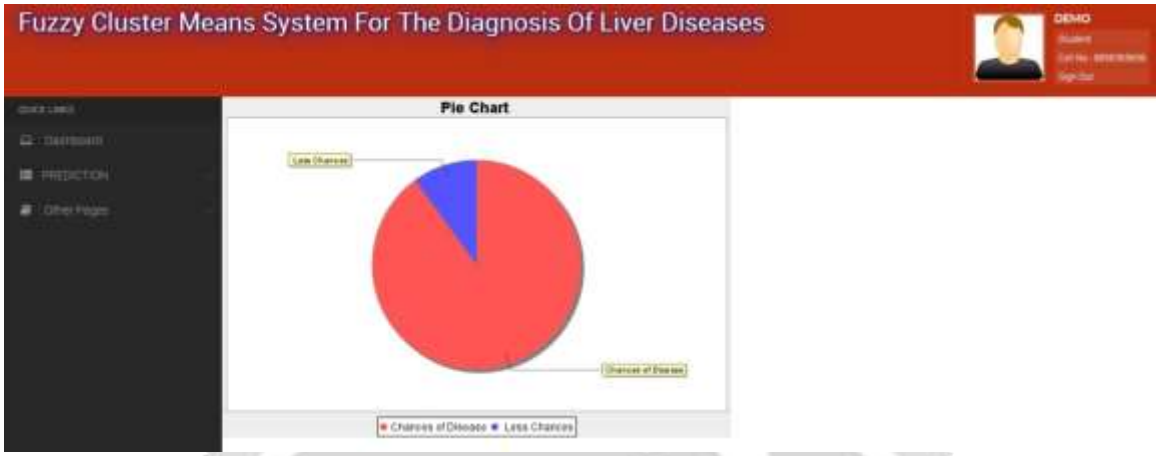

Figure 5.16: Pie chart-Positive (User Side)

The Pie Chart is generated from the positive and negative result.

Above figures shows the complete flow of the implemented system involving user side as well as admin side also with dataset use of forming frequency tables. and user will get predicted result.

6. CONCLUSIONS

In this paper the problem of summarizing the different algorithm of data mining is used in the field of medical prediction are discussed. The main focus is on using different algorithm and combination of several targets attributes for different types of disease prediction using data mining. A foremost class of problems in medical science absorbs the diagnosis of disease, based upon an assortment of tests carried out upon the patient. When several tests are involved, the ultimate diagnosis may be difficult to obtain, yet for a medical expert. This has given rise, over the past few decades, to automated problem-solving tools, intended to assist the physician in making sense out of the welter of data. In healthcare, data mining is becoming increasingly more essential.
The selection of data mining approaches depends on the nature of the dataset if the dataset consist of the labeled features then the classification techniques can be suggested for best prediction. If the dataset is with unlabelled features then the clustering techniques are best suited for pattern recognition. If the optimization of the results needs to be improvised means then bio inspirational based techniques are best suited. Keeping in consideration with these existing problems this paper aims to survey the existing approaches in the field of medical sciences and the importance of data mining techniques used by various authors. The study reveals the importance of life threading disease should be diagnosed.

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