

COMPARISON OF NEURAL NETWORK BASED DSS FOR ANALYSIS AND CLASSIFICATION OF MILD AND SEVERE HEPATITIS: DIFFERENTIAL LEARNING APPROACH

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Abstract

The purpose of this research work is to design the neural network (NN) based decision support system (DSS) and investigate the ability of DSS to discriminate the two subtypes, mild and severe form, of chronic active hepatitis, on the basis of laboratory clinical data base. The optimal parameters are identified for the suggested neural networks (NN) like Multi Layer Perceptron (MLP), Radial Basis Function (RBF) and Principal Component Analysis (PCA). The three optimal NN based DSS are chosen, which are tested exhaustively on the available data set of 155 patients for classification of two forms of hepatitis such as mild or severe. The differential learning method is used for data partitioning, and rigorous experimentation is carried out on different data sets in order to compare the performance of three designed optimal DSS. The classification results of neural networks are compared with the classification results of Discriminant Analysis. The results show that the all the three designed neural network based DSS (Decision Support System) clearly outperforms the statistical method with respect to classification accuracy. PCA NN based DSS could correctly predict the two categories of hepatitis as high as 100% and 92% for severe and mild respectively. Moreover, the area under the ROC curve for PCA NN based classifier is observed as 0.9533 as against other NN models and Discriminant Analysis.

Key Words : *Decision Support System, Differential Learning, Multi-layer Perceptron Neural Network, Radial Basis Function, PCA, Discriminant Analysis, Hepatitis diagnosis.*