NN MATLAB SIMULATION FOR 'UNDERSTANDING HOW TO SOLVE PATTERN

RECOGNITION PROBLEMS USING BACKPROPAGATION

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Experiment 1

Overview

The experiment is about training neural networks with a cancer dataset available in the MATLAB repository. This network is built using the nntools library of MATLAB, which is a multi-layer perceptron with one hidden layer. The nntools is a flexible platform to build and train neural networks with less coding. The nntools app enables to experiment with different parameters and after satisfactory parameters are obtained the script for the neural network can be obtained using the script generation function in the tool and later can be optimized in the MATLAB workspace. The dataset is randomly split into 50/50 ratios for training and testing the neural network. The model experiments against different epochs-hidden layer combinations.

Procedure

The experiment is done for a combination of 3 different hidden layers with neurons count of 2, 8 and 32 and with different epochs values as 1, 2, 4, 8, 16, 32 and 64. Thus a total of 21 combinations of results can be obtained. The early stopping is set to 0 so that the model can run for the specified amount of epochs. Each of these combinations is run 30 times with different values of train-test split ratios. After running 30 times for each of these combinations the mean and standard deviation of the classification error is computed which is then used to evaluate the performance of the model. This procedure is repeated for all the other combinations as well and finally, 21 values of the mean and standard deviation of the classification error are obtained. Finally, the mean values are plotted against the number of epochs for visualization and analysis.