MACHINE INTELLIGENCE AND EXPERT SYSTEMS

COMPUTER-BASED ASSIGNMENT (Neural Network)

1. Train a neural network for classification of Sea snail data (refer ‘Snail.csv’) to predict the gender of the sea snail. It has three classes ‘Male(M)’ , ‘Female(F)’ & ‘Both(I)’ . The dataset contains eight features for each sample: Length, Diameter, Height, Whole-weight, Shucked-weight, Viscera weight, Shell-weight, rings.

* Design a neural network with the following parameters:
* No. of hidden layers: 1 (with maximum upto 8 nodes)
* Sigmoid activation function for both hidden layer and output layer

Sigmoid function is given as,

* Learning rate: 0.01
* Cost function: , where ok is calculated output and tk is the target output.

Implement neural network with functions for forward propagation, error calculation, back propagation and weight update upto 500 iterations.

**(Do not use in-built functions or toolboxes for forward propagation, gradient calculation and back propagation)**

After training, classify the following samples:

[100 50 20 55.5 42 23 35 11]

[110 74 25 153.6 47.4 15.5 11 10]

[106 73 16 70.3 47.4 29.9 33 19]

[94 81 20 132.9 33.5 34.2 38 10]

(Note: Do not forget to normalize the data)

* Cost vs epoch for the training data using the Neural Network classifier built.
* Plot to visualise the input values before and after normalisation of training data.
* Predicted output values and the gender associated for the test data.
* Calculate the accuracy for the test and training data for different values of epoch.