SLIIT
Discover Your Future

BSc in Information Technology
Specialising in Data Science

Semester 2

Lab Exercise 1

IT 3071 - Machine Learning and Optimization Methods 2022

Lab 2- Back-propagation Algorithm

Objectives:

The objectives of this laboratory session are summarized as follows:

- Clear understanding of the Back-propagation Algorithm
- Implementation of Back-propagation Algorithm in a neural network • Visualization of the training error

Pre-Lab:

Write down the main steps of the Back-propagation Algorithm. Clearly denote any notations that you use. **(10%)**

Tasks:

Download the 'backprop.txt' data-set and import it to OCTAVE.

1. Study the data-set 'backprop.txt' and design a neural network with one hidden layer to classify the data-set. **(5%)**
2. Pre-process the data (remove unwanted rows or columns) initialize the required parameter values. Split the data-set into testing data (30%) and training data (70%). **(5%)**
3. Train the neural network with back-propagation algorithm for following two learning methods.
   I. Online learning
   II. Batch learning (batch size= sample size)

   For the training, use the training data. Set total number of epochs = 1000, learning rate = 0.01 and use sigmoid activation function) **(60%)**
4. Plot the mean squared loss with the no of epochs for the both methods. **(10%)**
5. Get the accuracy of the two models from the test data. You can take 0.5 as the threshold value for classification. That is, if the model output for a given sample is greater than 0.5, classify it as 1. Otherwise classify as 0. **(10%)**

Submit a report (results and answers to the questions) and the OCTAVE codes to submission link in the course web. Create a one zip fie which include both files (report and code) and name the zip file according to the following format, Name_IT Number. Example- S.S.Abc_It1234.