Indian Institute of Information Technology Sri City

Course Name: Machine Learning

Assignment –3

1. Implement Softmax regression for classifying OCR hand-written Digits. You have to use cross-entropy loss function.

   About dataset: Optical Character Recognition (OCR) hand-written data set which has 6670 training examples and 3333 testing examples. Each training and test example (pattern) is of 192 dimensions given in a row. In the same row the last value (i.e., 193rdvalue) is the class label. Class labels are 0, 1, 2, …, 9.

2. Implement Feed-forward Neural Network (with one hidden layer) for classification of the same data. The FFNN should have 250 neurons in the hidden layer. You should use sigmoid as the activation function and sum of squared error as the objective (loss) function.

   You can choose the stopping criteria as per your understanding but you have to clearly mention it in your report.

3. Compare the two classifiers w.r.t. their performance, stopping criterion and other parameters.

   The data set, viz, training1.csv and test1.csv are given

   Submit your source code (should be in python) and a report (ideally two to three pages) in PDF format giving your understanding/observations and results. This is a technical report in support of your submission (so please take care in preparing this report). Precise and concise answers will attract more marks. Unnecessary scribbling or copied versions will be penalized. Give a title for your report and divide the report into sections (possibly add a small abstract).

Note: Students are not allowed to use built-in functions that are supported by some packages such as scikit-learn or any other. However, students can use the packages such as NumPy for matrix or any other operations.

For any queries, you can contact Course TA. Thank you.

Deadline: 16th Nov 2020 (Monday) 5pm.

This is an individual assignment. So each individual student has to work separately and submit separately.