CEE 494/501

Homework #4 –Neural Networks

Note:

1. Submission of homework must be electronic. Problems require you to write computer program. Please submit a Jupyter notebook that contains the output.

2. If you have any questions regarding homework problems, post them on the Canvas discussion board (under Homework 4 Q & A), instead of sending emails to the instructor/TA. This will help to avoid repeated questions, and also help the entire class to stay on the same page whenever any clarification/correction is made.

Problem 1. (5 points) Build a neural network with given concrete dataset.

Use the Concrete Quality dataset given in Concrete_Quality_Binary.xlsx. Note: The file is of 'xlsx' format. It has 639 labeled samples with 9 features – Index, Cement, Blast Furnace Slag, Fly Ash, Water, Superplasticizer, Coarse Aggregate, Fine Aggregate, Age. The last column represents the quality of cement (Good/Bad). Scale the data using standard scaler and implement a Neural Network with 2-3 layers for binary classification. Use accuracy as the metric.

Download the template notebook from canvas.

Problem 2. (4 points) Try building a neural network with Annealing data.

Download dataset from https://archive.ics.uci.edu/dataset/3/annealing

Submission:

1. Submit 2 notebooks for one problem each.

2. For each problem, report the confusion matrix and classification report for neural network.

3. Code with output (Python file)