**CENG463 – Introduction to ML**

**Homework 2**

**Due Date: 30.Dec.2018, 23:55**

You are going to implement an ANN with sigmoid units with the gradient descend algorithm in Python.

The input.csv file has 200 training input. Each sample has 64 features. Each sample is in either category 0 or category 1. Feature values are integers between 0 and 255. You can normalize the features.

**Step1.** Read input.csv

**Step2.** Randomly pick 80% of the data for training, 20% for testing. then normalize

**Step3.** Yourinput layer (64 values) are connected to two sigmoid units (hidden layer). The output is also a single sigmoid unit as shown below. Assign random weights for each connection including bias. If your student id is even, your initial random weights are between -0.5 and 0.5. Otherwise, use the interval -0.7 and 0.7

**Step 4.** Apply gradient descend algorithm to learn this categorization. If your gender is female, your learning rate is 0.5. Otherwise, use 0.6 as learning rate.

**Step 5.** Stop the gradient descend algorithm after 500 epochs.

**Step 6.** Test ANN on the test set you split before. Report your results.

**Notes:**

- You are not allowed to use any ANN library for training. You must implement the gradient descend algorithmically.

- You can use libraries for reading the csv file, normalizing the features, or calculating the confusion matrix.

- Submit your code, and a text file containing precision, recall and f-1 score of the test.

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| --- |
| f1 |
| f2 |
| f3 |
| … |
| f64 |