CS 489/689
INTRODUCTION TO MACHINE LEARNING

FALL 2020
Assignment #5

Due Date/Time: **11/24/2020 @ 11:59PM**
Total Points: **100**

CS 489 students may complete this assignment individually or in teams of two; CS 689 students are to complete it individually.

Description:

- For this assignment, you will implement ***multi-layer perceptron (MLP) classifier*** in Python, Julia, or MATLAB to solve a ***binary classification problem***. You may use any and all built-in methods.
- Train and test your model with the dataset you used for Assignment 3.
- Use 80% of the dataset for training and 20% for testing your model.
- Experiment with ***three (3)*** different combinations of model parameters (e.g., number of hidden layers, number of neurons at each hidden layer, activation function, learning rate, etc.).
- Summarize your approach and results in a report that includes at least the following:
    - The dataset you used, its source and characteristics.
    - The data preprocessing steps you took (if any).
    - A table showing how many iterations it took for training to converge with the three different combinations of model parameters you experimented with.
    - A table showing relevant evaluation metrics for the training dataset with the three different combinations of model parameters you experimented with.
    - A table showing relevant evaluation metrics for the test dataset with the three different combinations of model parameters you experimented with.
    - Comparison of performance metrics for MLP classifier and Logistic Regression from Assignment 3.
    - Any additional details you would like to include.
- Submit your report along with your dataset and source code. Feel free to include your code in the report, but you also need to submit your source code files (.py, .jl, or .m) and your dataset separately, so that your results can be replicated for scoring.

Submission Instructions:

Compress all the files and name the submission file **<YourLastName>_Assignment5**:

- If you are completing the assignment individually, your last name is Smith, and you are submitting a .zip file, the file should be named Smith_Assignment5.zip.
- If you are completing the assignment as a team of two, your last names are Rogers and Smith, and you are submitting a .zip file, the file should be named Rogers_Smith_Assignment5.zip. Only one of the team members needs to submit the assignment.

I will set Canvas to allow unlimited number of submissions and will only grade the last submission. So, please do not wait until the last minute to submit as you can always submit an updated version.