**Assignment 3**

**Machine Learning**

MET CS767

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**Problem 1(100 points)**

Adding Leaky ReLU activation and regularization to Assignment 2 – problem 1:

Using single layer Perceptron neural network which is connected to “Leaky ReLU” activation function with (a=0.05) to predict salary of baseball players using the data set “Assignment\_3\_Hitters.csv”. Use batch gradient descent to adjust the weights and predict salary with L2 regularization and Lasso with lambda = 0.01 and 10.

1. Input data is Assignment\_3\_Hitters.csv data, which is available in Blackboard.
2. Write a code and build a single layer Perceptron with Leaky ReLU activation function as follows.

W0

Wn

W1

X1

Y

X3

X2

W2

W3

.

.

.

Xn

1. Use all the features to predict Salary.
2. Assume anything that is needed to solve the problem. Make sure to state your assumptions.

Questions:

* 1. (30 points) Choose a learning rate. Show details of your work and all the steps that you take to choose a suitable learning rate.
  2. (20 points) Plot total cost (MSE - Mean Square Error + regularization cost) as a function of iterations for both regularizations.
  3. (50 points) Create a table of the weights and show the final weights of the solution
     1. Without regularization
     2. With L2 regularization and two different lambdas
     3. With Lasso regularization and two different lambdas