CS 596 Machine Learning

**Homework Assignment 2**

**(10 Credits)**

Due: 11:59pm, Feb 25, 2018

This homework assignment aims to implement an iterative algorithm for predicting unit prices of meal items. Sample codes are provided and you are required to complete missing lines, evaluate your codes and report your observations. Details instructions are as follows.

**Overview.**  In this exercise, you are allowed to order a meal of fish, chip and ketchup at a cafeteria, with different portions each. The cashier will provide the total price of the meal you ordered. After ordering several meals, you should be able to figure out the unit price of each portion of fish, chip or ketchup using an iterative method.

**Sample codes.** The file “main\_part.m” is used to simulate the interactions between a customer and a cashier. It starts with a random guess of the unit prices. At each iteration, with ground-truth unit prices, we first randomly generate a three-element array, representing the portions of fish, chip and ketchup in a meal. Then, the meal is priced based on the ground-truth unit prices. Last, we need to update the unit prices using the method we taught in the class. Once done, the starter codes will compare the optimal prediction with the ground-truth, and calculate the average error as a quantitative result.

You will need to fill in the missed code lines to complete the iterative prediction. Replace the PLACEHOLDER lines with your code.

This script includes two PLACEHOLDERS.

For the first PLACEHOLDER, you need to set the three parameters, i.e., initial predictions, learning rate, and stop conditions.

For the second PLACEHOLDER, you need to calculate the current error, i.e. the difference between the estimated price and true price. You also need to adjust the estimation of unit prices based on the current error.

Upon completing the script, please try to run through the script with different values for the three parameters (i.e., initial predictions, learning rate, stop conditions) in PLACEHOLDER\_1. Please observe how these changes affect the quantitative results of your script, i.e. prediction errors. Please explore at least 3 configurations of these parameters and report your best results.

Write-up

In the report you will describe your algorithm and any decisions you made to write your algorithm a particular way. Then you will show and discuss the results of your codes following the above instructions. In the case of this project, show the convergence curves and quantitative results for each case of your implementations. Also, discuss anything extra you did. Feel free to add any other information you feel is relevant.

How to submit

* Submit your source codes and report using the SDSU Blackboard. The codes should be self-contained, and run without any error. Otherwise, severe penalty will be applied.
* Two re-submissions are allowed.
* ***No hard copy required.***