ECE 595 Homework 2 Due: 4 PM, Sep. 22

Using the data file AutoData\_HW1.xlsx, perform a multivariate linear regression with four of the features: No. of cylinders, displacement, horsepower and weight. The target is the MPG (miles per gallon). Because of the varying sizes of features, they need to be normalized individually before running your gradient descent algorithm for multivariate linear regression. Your code should perform the computation of the cost function and updating the hypothesis parameters in a vectorized form. Do NOT use *for* or *while* loops! You may stop the algorithm with a fixed number of iterations.

Cost function J, for example, can be vectorized as follows. Watch the sizes of the variables.

*ht = X\*theta; % Hypothesis: m x 1*

*J = (1/(2\*m))\*(ht - y)' \* (ht -y); % ht: m x 1; y: m x 1*

Parameter updating can similarly be carried out in vectorized form.

You need to turn in the following.

1. Scatter plot of *y* vs. *x*, where *x* is still the weight (as in the first project)
2. Linear hypothesis plot on the scatter plot of *y* vs. *x*
3. Plot of J vs. Iteration index
4. Minimum J and the hypothesis parameters for the iterative and the closed form cases
5. Predicted output for *x = 3100*
6. Your code