**CS584 – Machine Learning**

**Homework #1 Writing**

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1. To solve this linear regression in closed form, we need to calculate the weight by the formula we that is used in the lecture .

To do that we add an intercept (column of ones) to construct 2 by 4 matrix X and perform our calculations.

­ so, now we transpose the matrix to get .

Now we will calculate the multiplication:

Now we have 2x2 matrix which we need to inverse. By the formula:

the invers of the matrix will be

Now we need to calculate the second half of the formula.

As we have both parts now, we can multiply them together to get the weight:

So, the liner model will have parameters giving us .

1. To calculate MSE and MAE we use following formulas respectively:

Let’s get started with calculation:

For

For

For

For

Now, as we have all the values, we can calculate MSE and MAE.

1. In order to estimate bias, we calculate the mean of differences of actual values from predicted values. . As we can see Average difference in this case is 0.

To calculate variance, we need to calculate mean of all predicted values . Now we can calculate variance by this formula: