ECE586 MP2 Least-Squares Solutions Report

Libo Zhang (NetID – lz200)

**Exercise 1**

Table

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**Exercise 2**

Chart

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**Exercise 3**

With the help of Least Squares function, I find the Mean Squared Error is 0.0810, so the gradient descent MSE at most 20% larger should be 0.0810 \* 1.2 = 0.0971.

With the help of Least Squares Gradient Descent function (step size = 0.0002), I find that:

When T (number of iterations) is equal to 80000, the gradient descent MSE is 0.0953 < 0.0971.

When T = 500000, the gradient descent MSE is 0.0815, which is very close to the Least Squares MSE, 0.0810.

Chart, line chart

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**Exercise 4**

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For the test set, compute the histogram of the function output separately for each class and then plot the two histograms together.

Chart, histogram

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**Exercise 5**

A picture containing calendar

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**Exercise 6**

Report both the overall classification error rate and confusion matrices for both the training and test sets.

Calendar

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The following pages are Appendices, in which I showed the results of running all test cases in lsq\_code\_test.py. My running results matched the desired output indicated in the test code.

As for the training and testing errors are a bit different from those in the desired output, after consulting with the professor, this is because splitting training and testing samples is random. Sometimes I get a larger error such as 5.X% or 6.X%. Sometimes I get a smaller error such as 3.X% or 4.X%.

**Appendices**

A picture containing calendar

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