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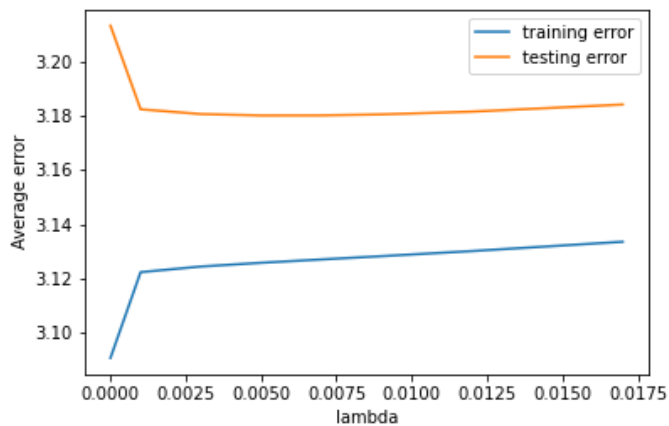**ECE 1396 – Homework 4 report**

1) B) The size of the feature matrix is shown below

```
PART 1

Size of the feature matrix is:  (1001, 501)
```
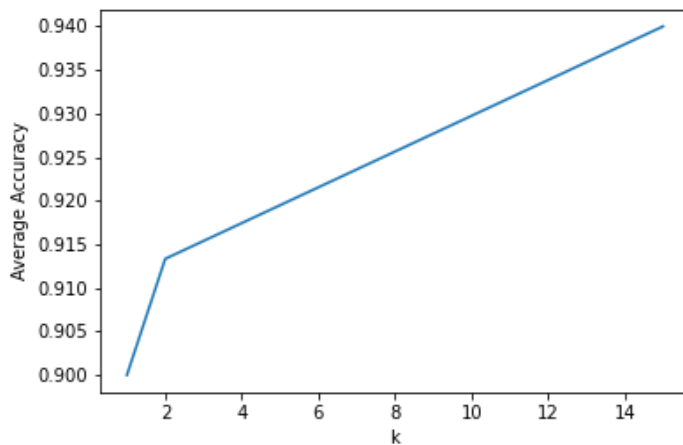
So it has 1001 rows (training samples) and 501 columns (features)

C) Here is a screenshot of the obtained figure ("ps4-1-a.png")

The value of lambda for this problem should be 0.001 as this is where the gap between the training and testing error is minimal without getting more unnecessary data (as after that the gap doesn't change).

2) Here is the screenshot of Average Accuracy vs k ("ps4-2-a.png")

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The value of k we should use is 15 since k=1 is too small (leads to unstable decision boundaries) and k=2 is even. This value is not necessarily robust for any other problem because it depends on the data we have (training set). If the number of training samples increases, k will increase.

3) The following shows the training accuracy and the testing accuracy

```
PART 3

Testing accuracy:   84.0 %
Training accuracy:   93.60000000000001 %
```

The training accuracy is higher as expected because the model is fit on the training data (it is already familiar with it).