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ECE 1395
Homework 8

```
One-vs-All SVM:
Classification error on training set: [0.01, 0.07, 0.06, 0.05, 0.06]
Classification error on testing set: 0.05
```

This had the lowest error. SVM's tend to perform well on high dimension data sets. It was very slow to train compared to others though.

```
KNN:
Classification error on training set: [0.07, 0.12, 0.11, 0.1, 0.1]
Classification error on testing set: 0.12
```

This had one of the higher errors since K probably wasn't ideal at 5. It may have done better by using weighted Knn instead.

```
Logistic Regression:
Classification error on training set: [0.01, 0.08, 0.09, 0.08, 0.09]
Classification error on testing set: 0.1
```

This had one of the lower errors. This could be because the data is somewhat linearly seperable.

```
Decision Tree:
Classification error on training set: [0.0, 0.27, 0.27, 0.27, 0.29]
Classification error on testing set: 0.32
```

This had the highest error out of all classifiers. This could be because the model is overfitting, and pruning is needed.

```
Random Forest:
Classification error on training set: [0.9, 0.08, 0.1, 0.1, 0.07]
Classification error on testing set: 0.08
```

This had one of the lower errors because it averages the predictions of many randomly trained trees.

```
Combined:
Classification error on testing: 0.06
```

Overall, results were good, as using the majority vote of all model achieves an accuracy of 94%. Bagging does help by reducing variance, especially for models like decision tree. Generally, it seemed to help here since data seemed a little noisy.