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ECE 1395
Homework 8

Results:

```
 *** SVM ***
SVM Error on X1: 0.016000000000000014
SVM Error on X2: 0.016000000000000014
SVM Error on X3: 0.016000000000000014
SVM Error on X4: 0.016000000000000014
SVM Error on X5: 0.016000000000000014
SVM Error on X_test: 0.05600000000000005
 *** KNN ***
KNN Error on X1: 0.06000000000000005
KNN Error on X2: 0.06000000000000005
KNN Error on X3: 0.06000000000000005
KNN Error on X4: 0.06000000000000005
KNN Error on X5: 0.06000000000000005
KNN Error on X_test: 0.08599999999999997
 *** Logistic Regression ***
LR Error on X1: 0.006000000000000005
LR Error on X2: 0.006000000000000005
LR Error on X3: 0.006000000000000005
LR Error on X4: 0.006000000000000005
LR Error on X5: 0.006000000000000005
LR Error on X_test: 0.10799999999999998
 *** Decision Tree ***
DT Error on X1: 0.0
DT Error on X2: 0.0
DT Error on X3: 0.0
DT Error on X4: 0.0
DT Error on X5: 0.0
DT Error on X_test: 0.30200000000000005
 *** Random Forest ***
RF Error on X1: 0.0
RF Error on X2: 0.0
RF Error on X3: 0.0
RF Error on X4: 0.0
RF Error on X5: 0.0
RF Error on X_test: 0.10999999999999999
 *** Majority Voting ***
MV Error on X_test: 0.040000000000000036
```

Discussion:

All of the classifiers performed well. Each one performed worse on the testing data than on the training data, indicating that they each suffered from overfitting. This was especially evident with the decision tree and random forest classifiers, which had no error on training data but the highest testing error of all of the classifiers. The majority voting classifier had the lowest testing error of all of the other simple classifiers, indicating that the bagging process we followed did

help for this particular dataset. This does not necessarily indicate that bagging will help for every dataset.