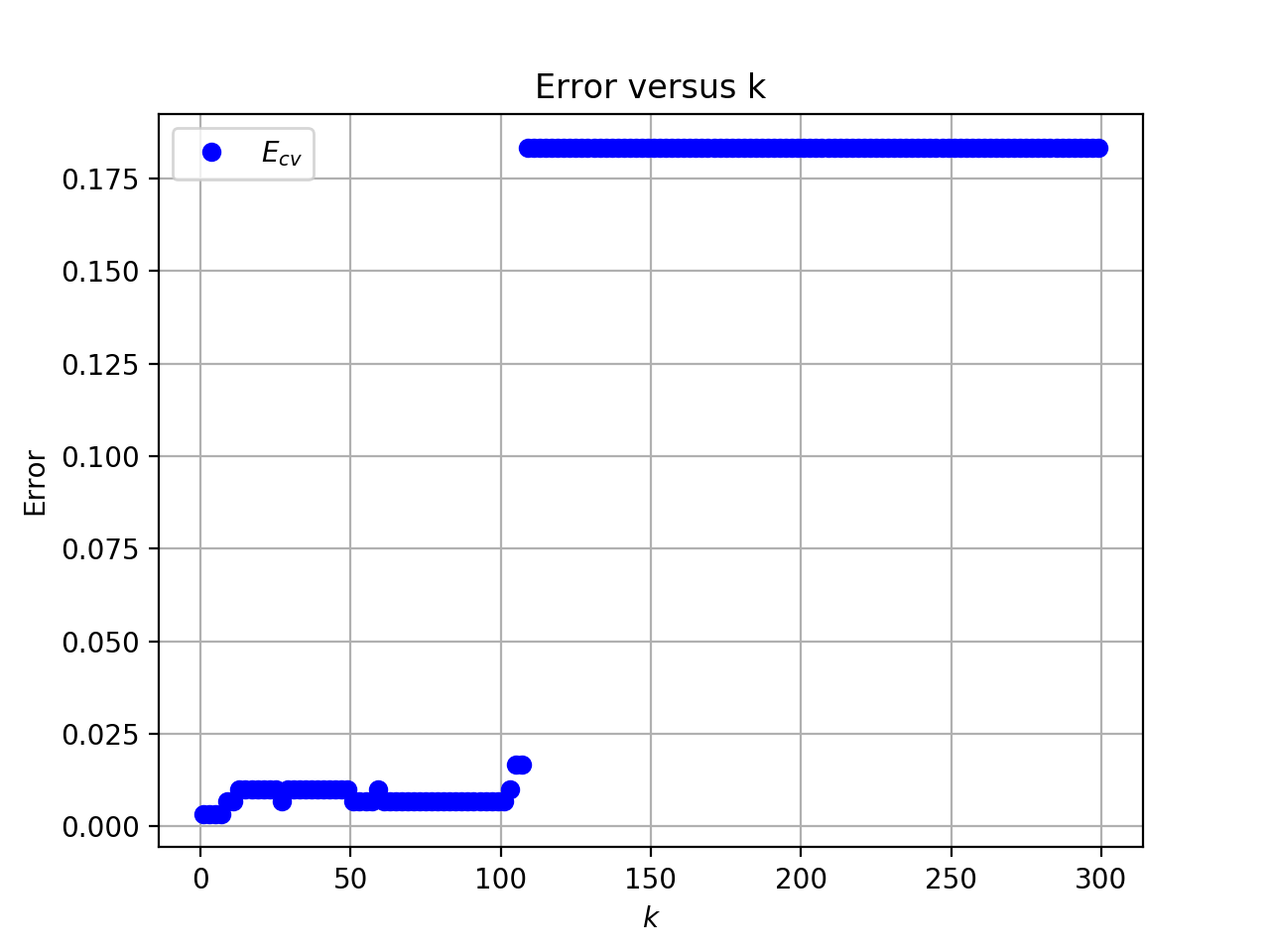
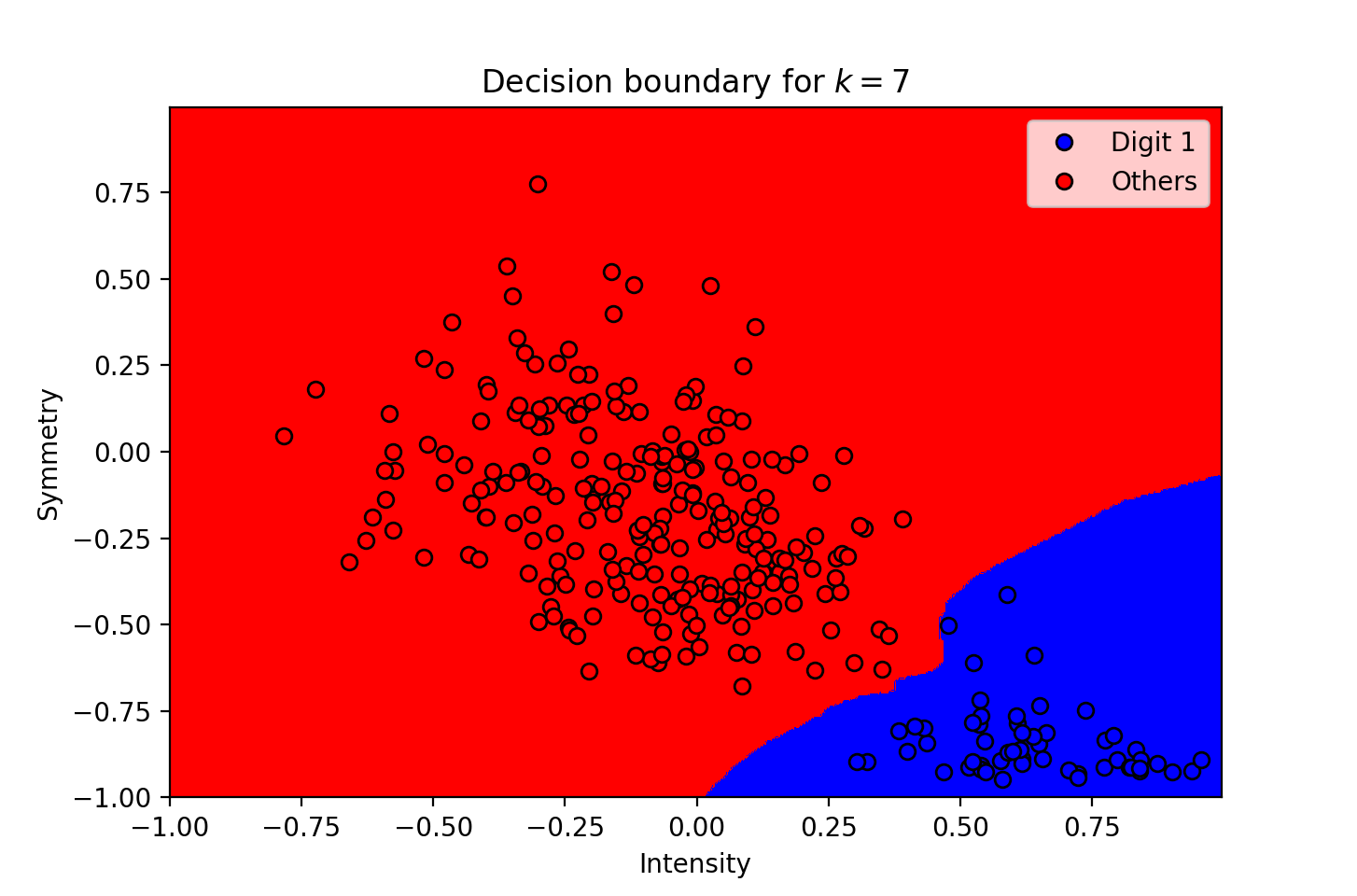
CSCI 4100 Assignment 11

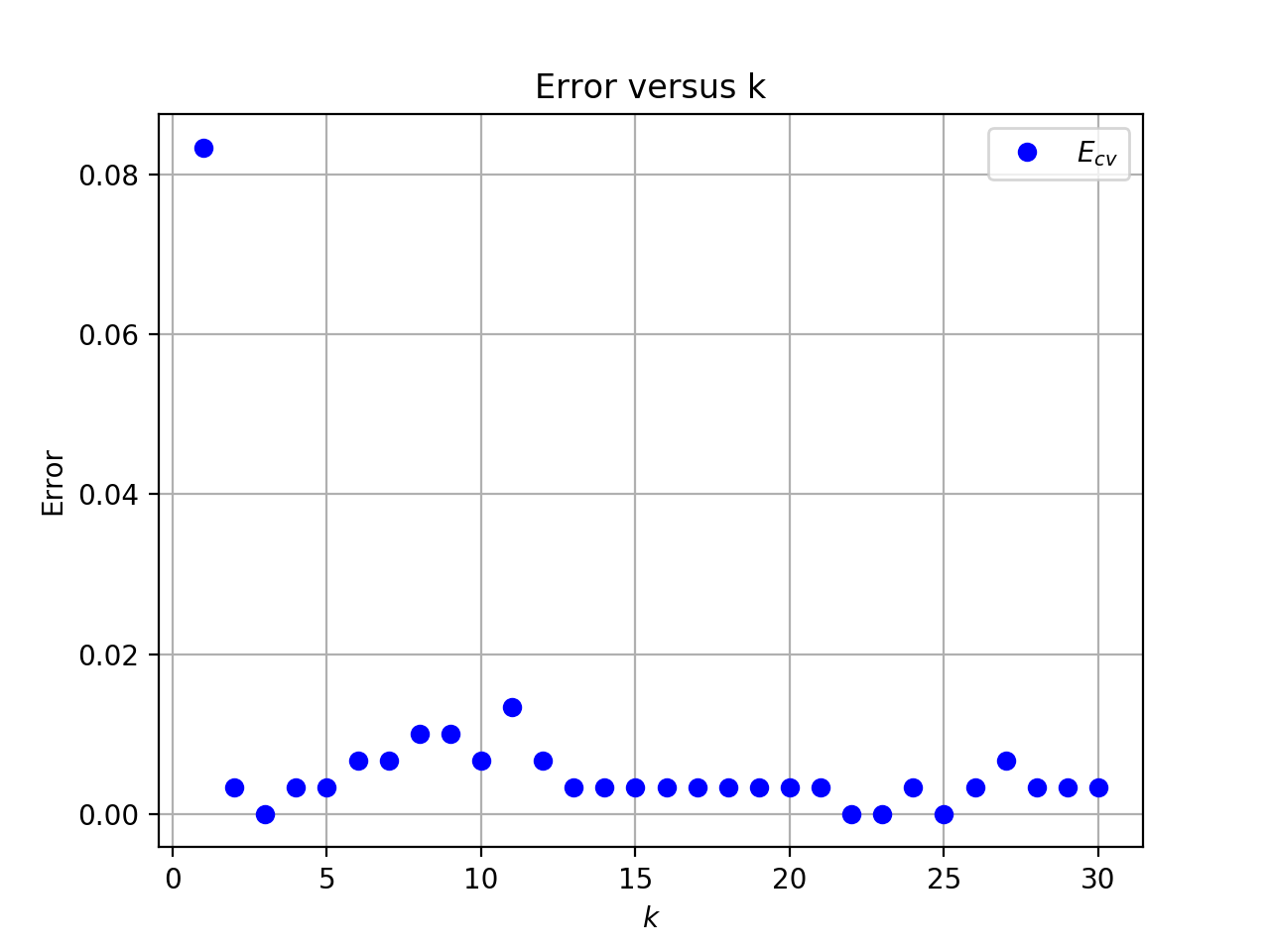
Boliang Yang 661541863

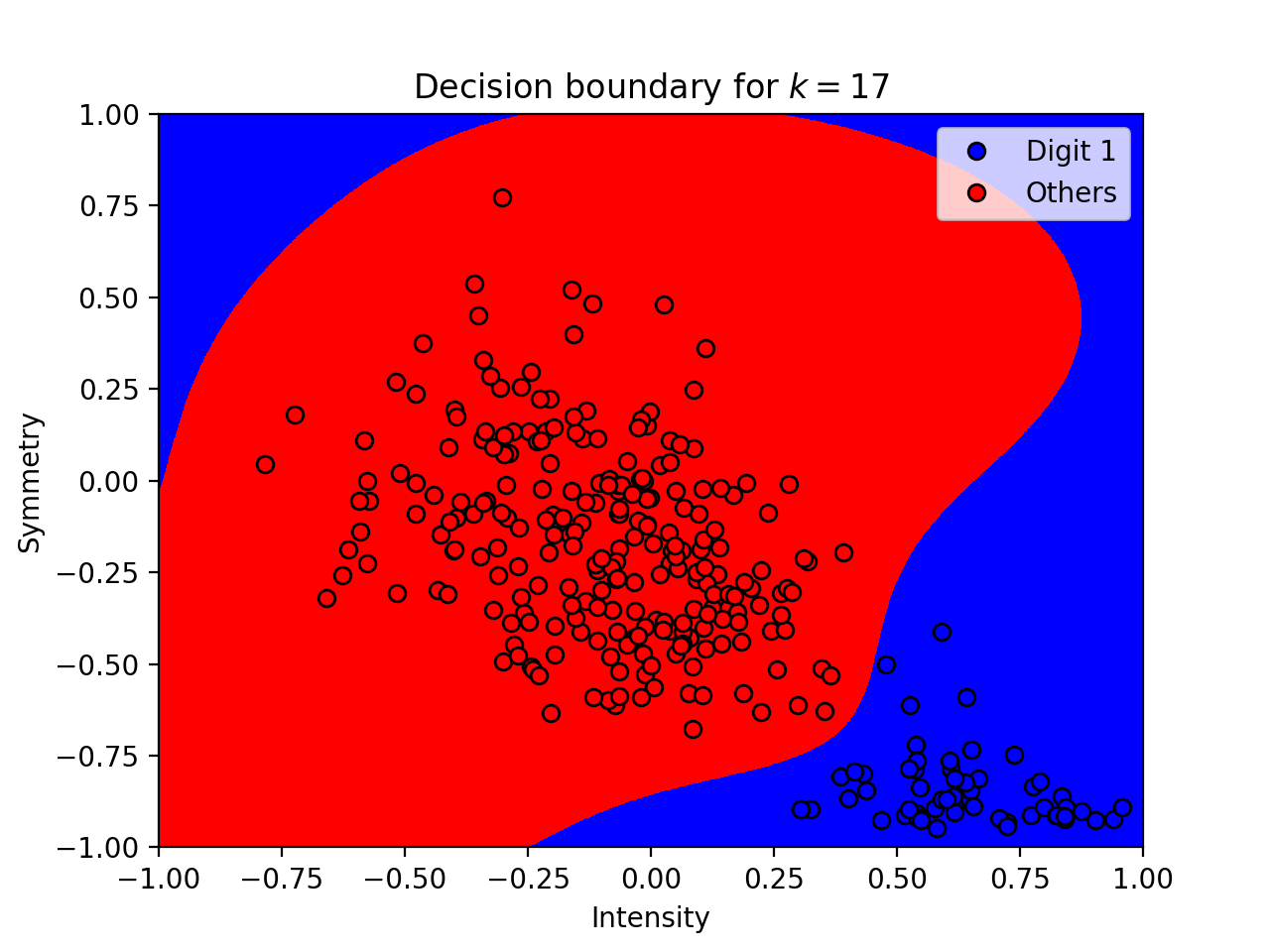
1. k-NN Rule
2. Plot of versus :

I choose because when , is smallest.

1. Plot of the decision boundary:

The in-sample error is , the cross validation error is .

1. The test error .
2. RBF-network
3. Plot of versus :

 I choose because when , is smallest.

1. Plot of the decision boundary:

The in-sample error is , the cross validation error is .

1. The test error .
2. Compare Linear, k-NN, RBF-network

The final test error from my three attempts are: for Linear model with 8th order polynomial transform, ; for k-NN rule, ; for RBF-network, . We can see that k-NN rule gives us the smallest test error, followed by RBF-network, and then the Linear model.

However, k-NN is the slowest among these three algorithms and requires the largest memory space. Thus, k-NN is not a good choice.

The Linear model with 8th order polynomial transform is not a good choice as well. Not only it has the largest test error, but it also has a higher order polynomial transform which results in an increase in complexity.

For RBF-network, the running time is fast and it has a small test error without requiring large memory. Therefore, RBF is the best among these three.