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CSCI5622
KNN Writeup

1) What is the relationship between number of training examples and accuracy?
As the number of training examples increases, so does the accuracy. Here are some figures from test runs which used the default k:

Training Examples	100	500	1000	2000	5000	10000
Accuracy	.675144	.837554	.882567	.916003	.946673	.978057

2) What is the relationship between k and accuracy?
The higher k was, the less accurate the classification, likely because of overfitting. The accuracy was also higher when k was odd instead of even, likely because there were more ties with an even number of nearest neighbors. The classifications below used 2000 training examples.

K	1	2	3	4	5	6	25	26
Accuracy	.916532	.850421	.916003	.895147	.904911	.897304	.876656	.874924

3) What numbers get confused with each other most easily?
8 and 9 were the numbers that got confused with the highest variety of others. The number that got confused the most for a single other number was 4 (Which was classified as 9 eighteen times) and just behind that was 2 which was classified as 7 seventeen times. 5 was classified as 3 and 6 fifteen times each.

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       0       1       2       3       4       5       6       7       8       9
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0:     981     0       2       0       0       0       1       0       0       1
1:     0       1059    0       0       0       0       0       0       0       0
2:     2       5       954     2       0       0       0       17      1       0
3:     0       0       3       1003    0       8       0       2       5       2
4:     0       8       0       0       950     0       0       3       0       18
5:     1       0       0       15      1       870     15      2       0       2
6:     0       0       0       0       0       1       963     0       0       0
7:     0       8       0       0       1       0       0       1072    0       5
8:     1       5       0       11      3       17      5       4       947     6
9:     1       1       0       7       10      4       0       10      2       918
Accuracy: 0.978057
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