

1.(1) No, the reason is that using decision tree only can deal with the data which is discrete, but when data is very very close to the decision boundary, we cannot judge them correctly.

1.(2) Yes. If we want to apply k-NN classification to Q. We can firstly use 1-NN to find the nearest P and record their label. Then remove the P from the points set. Repeat it for k times. In the end, the k-NN application to Q is the label we recorded most.

1.(3) Conditionally, when $j < k$, Yes, but when $k < j$, no. When $j < k$, we can repeat the process of removal and j-nearest test to find k-nearest.

2.(1) 100% error rate

2.(2) for all the k(3, 5, 9), they are all 100% error rate

3. become bigger, because it will enlarge both training data and test data.

4.choosering (b), because 3-NN error rate is 10%, but 1-NN is 40%.