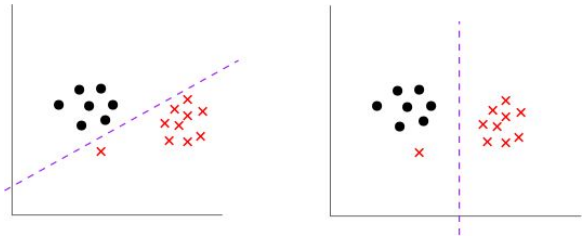
CSAL4243
Introduction to Machine Learning

Quiz 5

1. Which of the following is the output of an SVM classifier. Give reason?

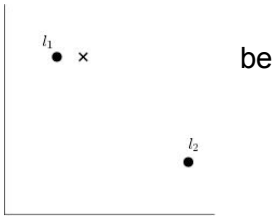
Ans: Can answer the question in multiple ways. Both of them can be output of SVM classifier depending upon the value of C in equation $J(\theta) = CA + B$



Where A is cost due to misclassification of data and B is regularization cost. So left is high C value and right is medium C value.

2. Comment on the similarity score of point marked x to landmarks l_1 and l_2 using gaussian kernel.

Ans: According to gaussian kernel similarity between x and l_1 is going to be high i.e. close to 1 and similarity between x and l_2 is going to be low i.e. close to 0.



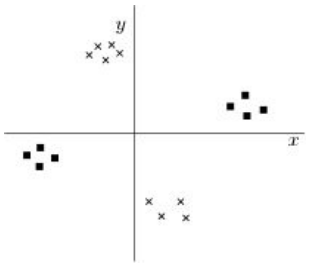
3. What's the advantage of using kernels in SVM ? Give one reason.

Ans: Gives advanced features that can let you separate classes using a linear classifier in high dimensions.

4. Hypothesis function h(x) of SVM is actually a linear classifier in high dimensional space. Yes/No. Give reason.

Ans: Yes, kernel gives us new features $f = [f_1 f_2 f_3 \ldots f_m]$ and hypothesis function of SVM $h(x) = \theta^T f$ is a linear classifier that predicts 1 if $h(x) = \theta^T f >= 0$

5. What kernel would result in linear separation of the following data. Give reason.
    a. $x^2 + y^2$
    b. |x|
    c. |y|



Ans: Both |x| or |y| can be used to linearly separate the data.