Quiz Submissions - Quiz 8

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Attempt 1

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Submission View

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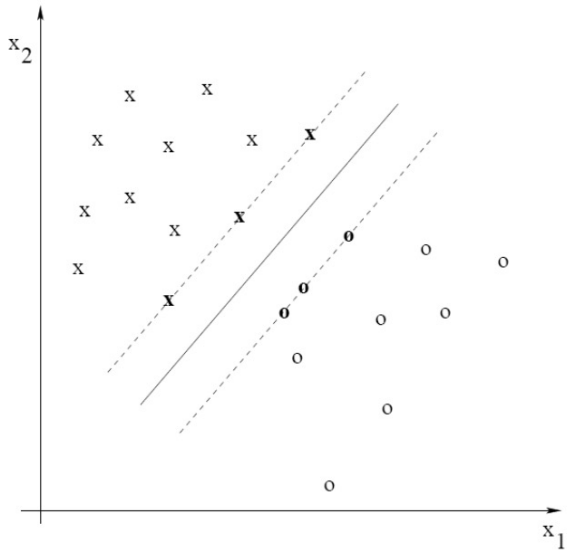
Linear SVM

Question 1 — 1 / 1 point

When we use leave-one-out-cross-validation for the SVM shown in the figure, what is the difference between the maximum and the minimum of the wrongly classified data points?



Answer:

0 ✔

Question 2 1 / 1 point

SVM computes P(y|x). Answer True/False.

- ○ True
- ✓ ○ False

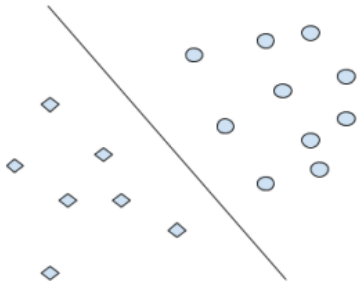
Question 3 1 / 1 point

Suppose there exists a sample which can be classified correctly and far away from the decision boundary. If we add this sample to the training data, it would affect the decision boundary made by any types of SVMs.

- ○ True
- ✓ ○ False

Question 4 1 / 1 point

In the following training data below, one possible separating hyperplane is shown below. Choose all the statements which are true.



- ✓ ☐ **Linear SVM is not sufficient for this problem.**
- ✓ ☐ Having a non-zero γ parameter (defines importance of constraints) is important for solving this problem.

✓ ☐ **It can be correctly classified using linear SVM.**

✓ ☐ **It can be correctly classified using Perceptron learning.**

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2. Perceptrons can learn linear classifiers for linearly separable problems.

4. γ parameter is not essential for the learning because it specifies the misclassification cost in the problem. Here, irrespective of the γ value, one can solve the optimization problem.

Question 5 **1 / 1 point**

If a hard margin linear SVM is able to achieve 100% accuracy on a training data set, then the perceptron algorithm is guaranteed to achieve 100% training accuracy on that same dataset. Answer True/False.

✓ ○ True

○ False

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The linear SVM will only achieve 100% accuracy if there is a linear decision boundary that perfectly separates the data. And the perceptron convergence theorem guarantees that the Perceptron will be able to successfully separate linearly separable data, so since we know that there is a linear decision boundary, the Perceptron algorithm will find it.

Question 6 1 / 1 point

When we finish training SVM, we can discard all training samples and classify new samples.

- ➡ ○ True
- ✗ ○ False

Question 7 1 / 1 point

In SVM, suppose the γ parameter (defines importance of constraints) is set to practically infinite. Which of the following is True.

- ○ **The soft-margin classifier will separate the data.**
- ✓ ○ **If the optimal hyperplane exists, then it will completely separate the data.**
- ○ **None of the above.**

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With high γ parameter value, the margin constraints become very important and the objective of the soft margin classifier gets close to that of hard margin SVM.

Perceptron

Question 8 1 / 1 point

Which of the following are true regarding the Perceptron classifier.

- ✔ ☐ For a linearly separable problem, there could exist some initialization of weights for which it can lead to a non-convergent case.
- ✔ ☐ **Can correctly learn XOR function (a function satisfying f(1,1)=-1, f(1,0)=1, f(0,1)=1, f(0,0)=+1)**
- ✔ ☐ The hyperplane obtained for perceptron learning depends on the order in which the data (input) is presented in training phase.
- ✔ ☐ **Can correctly learn OR function (a function satisfying f(1,1)=1, f(1,0)=1, f(0,1)=1, f(0,0)=-1)**

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1. OR is linearly separable.

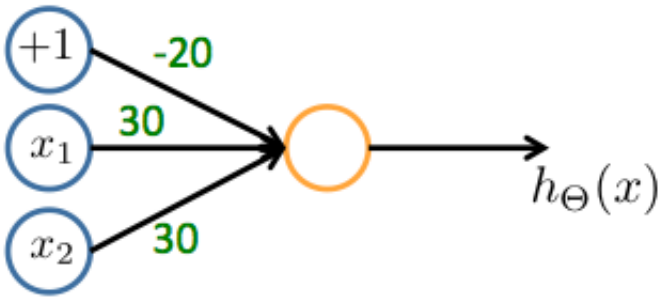
2. XOR in non-linear.

3. No, according to the perceptron convergence theorem, it is guaranteed to converge to problem that is linearly separable.

4. Perceptron learning depends on which the order of data is presented. There could exists multiple hyperplane, the one solution converges to depends on the order of input.

Question 9 1 / 1 point

Given a following net where x1,x2 ∈ 0,1 and hθ(x) is a sigmoid function, this net calculates (approximately) which of the following logical functions? Select the one which is True.



✔ OR

AND

NAND

XOR

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We could easily compute that

$x_1 = x_2 = 1 \quad h > 0 \quad -> 1$
$x_1 = 1 \quad x_2 = 0 \quad h > 0 \quad -> 1$
$x_1 = 0 \quad x_2 = 1 \quad h > 0 \quad -> 1$
$x_1 = 0 \quad x_2 = 0 \quad h < 0 \quad -> 0$

Attempt Score: 9 / 9 - 100 %

Overall Grade (highest attempt)**:** 9 / 9 - 100 %

Done