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5. The Perceptron Algorithm

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Exercises due Feb 15, 2023 08:59 -03 Completed

The Perceptron Algorithm



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Perceptron Concept Questions 1

1/1 point (graded)

Remember that the Perceptron Algorithm (without offset) is stated as the following:

Perceptron $\left(\{(x^{(i)}, y^{(i)}), i = 1, \dots, n\}, T\right) :$

initialize $\theta = \mathbf{0}$ (vector);

for $t = 1, \dots, T$ do

for $i = 1, \dots, n$ do

if $y^{(i)} (\theta \cdot x^{(i)}) \leq 0$ then

update $\theta = \theta + y^{(i)} x^{(i)}$

What does the Perceptron algorithm take as inputs among the following? Choose all the

Perceptron Update 1

1/1 point (graded)

Now consider the Perceptron algorithm with Offset. Whenever there is a "mistake" (or error) i.e. when the label y and \hat{y} do not match), perceptron updates

and

More formally, the Perceptron Algorithm with Offset is defined as follows:

Perceptron

```

initialize  $w$  (vector);  $b$  (scalar)
for each  $(x, y)$  in  $D$  do
    for  $i = 1$  to  $n$  do
        if  $y \neq \text{sign}(\sum_{j=1}^n w_j x_{ij} + b)$  then
            update  $w$ 
            update  $b$ 
  
```

In the next set of problems, we will try to understand why such an update is a reasonable

When a mistake is spotted, do the updated values of w and b provide a better prediction

always greater than or equal to



Yes, because

$\sum_{j=1}^n w_j x_{ij} + b$ is always larger than

For a given example x , we defined the training error as $\epsilon(x)$ if $y(x) \neq \hat{y}(x)$, and 0 otherwise.

Say we have a linear classifier given by w . After the perceptron update using example x , the new weight vector w' for that example can (select all those apply):

☒ Increase

☒ Stay the same

☐ Decrease



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You have used 2 of 2 attempts

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Topic: Unit 1. Linear Classifiers and Generalizations (2 weeks), Lecture 2. Linear Classifier and Perceptron / 5. The Perceptron Algorithm



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? Not able to answer the quiz, it is not Feb 15, 2023 05:59 CST yet



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