

Unit 1 Linear Classifiers and

Lecture 2. Linear Classifier and

> Perceptron

Course > Generalizations (2 weeks)

3. Linear Classifiers Mathematically

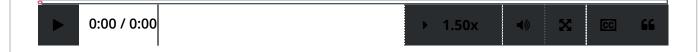
Revisited

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3. Linear Classifiers Mathematically Revisited Linear Classifiers Mathematically Revisited





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Inner product and Orthogonal vectors

1/1 point (graded)

What is the inner product of [0,1,1] and [1,1,1] ?

2

✓ Answer: 2

Solution:

$$0\cdot 1 + 1\cdot 1 + 1\cdot 1 = 2$$

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You have used 1 of 3 attempts

1 Answers are displayed within the problem

Linear Classifier Practice

1/1 point (graded)

We saw in the lecture above that for a linear classifier h, $h\left(x;\theta\right)=sign\left(\theta\cdot x\right)$, i.e. the sign of the dot product of θ and x. Now consider θ which is given by

$$\theta = (1, -1) \tag{3.1}$$

Which of the following points would be classified as positive by heta? Please choose all correct answers.





 \bigcirc (0,1)

(0,0)



Solution:

X is positively classified by the classifier if and only if $x\cdot \theta>0$. The dot product of (1,-1) with θ is positive. Also, $(1,0)\cdot \theta$ is positive. On the other hand, $(0,1)\cdot \theta$ and $(0,0)\cdot \theta$ are nonpositive. Thus the first and second points are positively classified by θ .

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Offset Added

1/1 point (graded)

Again, we have a linear classifier with heta given by

$$\theta = (1, -1) \tag{3.2}$$

and the offset, θ_0 given by $\theta_0=-1$ Now which of the following points would be classified as positive by θ ? Please choose all correct answers.

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Solution:

X is positively classified by the classifier if and only if $x\cdot \theta + \theta_0 > 0$. The dot product of (1,-1) with θ is 2, and adding -1 makes it still positive. However, $x\cdot \theta + \theta_0 \leq 0$ for other data points.

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You have used 1 of 3 attempts

1 Answers are displayed within the problem

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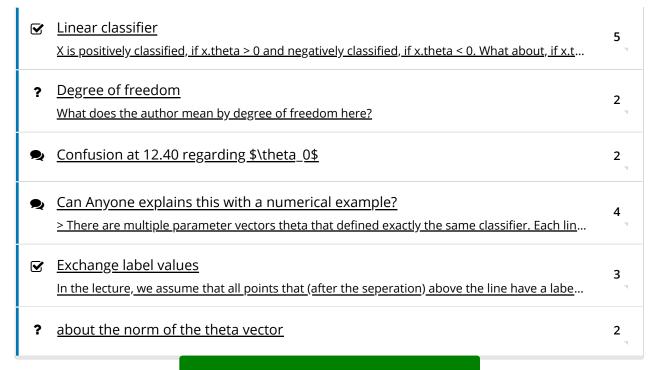
? why theta is orthogonal to the decision boundary?

Sorry if you are dissapointed, but I do not understand why theta is orthogonal to the decision...

Suggestion
It would be more didactic if drawings of both cenarios (Linear Classifier Practice and Offset A...

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