4. Hinge Loss and Objective Function

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Exercises due Sep 23, 2020 05:29 IST *Completed*

Hinge Loss and Objective Function

Start of transcript. Skip to the end.

OK.

So now, our regularization goal here

is to maximize the distance that the margin boundaries are

from the decision boundaries.

This will be our regularization type, OK?

Now, we can proceed to define the

0:00 / 0:00 1.25x

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Hinge Loss Exercise 1

3/3 points (graded)

Compute the output of Hinge Loss function (as described in the video) for the following values:

$\text{Loss}_h\,(0) =$ 1 ✓

$\text{Loss}_h\,(0.2) =$ 0.8 ✓

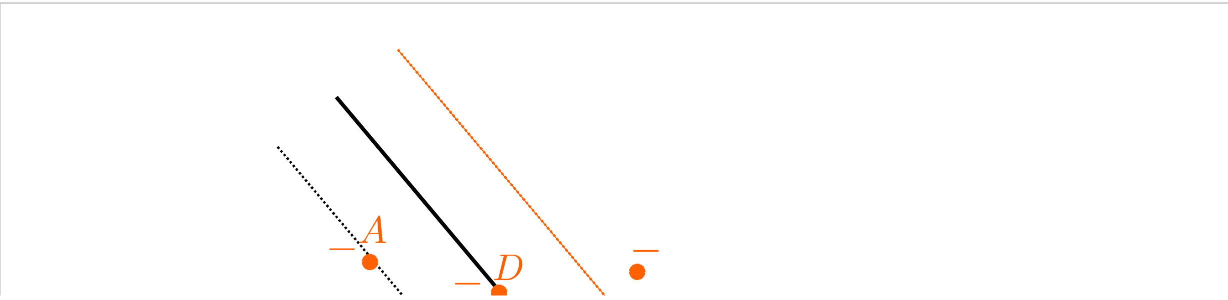
$\text{Loss}_h\,(-10) =$ 11 ✓

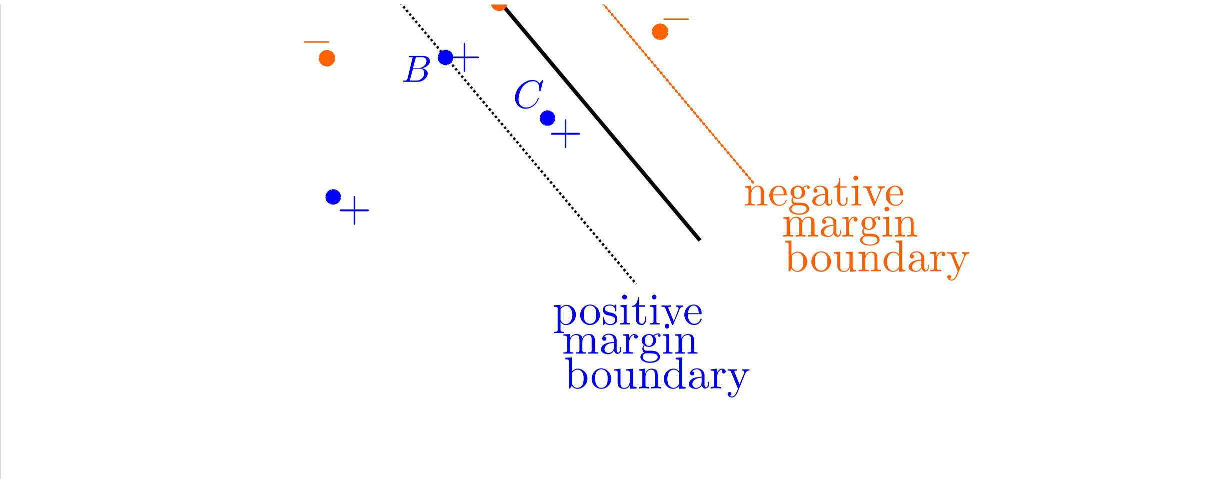
Submit You have used 1 of 2 attempts

Hinge Loss Exercise 2

4/4 points (graded)

In a 2 dimensional space, there are points A, B, C, D as depicted below. Let $A = (x_a, y_a)\,, B = (x_b, y_b)\,, C = (x_c, y_c)\,, D = (x_d, y_d)$.





What is the hinge loss of point A, $\text{Loss}_h\left(y^{(a)}\left(\theta \cdot x^{(a)} + \theta_0\right)\right)$?

- ○ 0
- ○ between 0 and 1
- ○ 1
- ◉ 2

✓

What is the hinge loss of point B, $\text{Loss}_h\left(y^{(b)}\left(\theta \cdot x^{(b)} + \theta_0\right)\right)$?

- ◉ 0
- ○ between 0 and 1
- ○ 1

✓

What is the hinge loss of point C, $\text{Loss}_h\left(y^{(c)}\left(\theta \cdot x^{(c)} + \theta_0\right)\right)$?

- ○ 0
- ◉ between 0 and 1
- ○ 1

✓

What is the hinge loss of point D, $\text{Loss}_h\left(y^{(d)}\left(\theta \cdot x^{(d)} + \theta_0\right)\right)$?

- ○ 0
- ○ between 0 and 1
- ◉ 1

✓

Submit You have used 3 of 3 attempts

Regularization

1/1 point (graded)

Remember that for points (x, y) on the boundary margin, the distance from the decision boundary to (x, y) is $\frac{1}{||\theta||}$. Thus

$$y^{(i)}\left(\theta \cdot x^{(i)} + \theta_0\right) = 1.$$

And

$$\frac{y^{(i)}\left(\theta \cdot x^{(i)} + \theta_0\right)}{\mid\mid \theta \mid\mid} = \frac{1}{\mid\mid \theta \mid\mid}.$$

Now our goal is to maximize the margin, that is to maximize $\frac{1}{||\theta||}$. Which of the following is **NOT** equivalent to maximizing $\frac{1}{||\theta||}$?

- ( ) maximizing $\frac{1}{||\theta||^2}$
- ( ) minimizing $\mid\mid \theta \mid\mid$
- (•) maximizing $\sqrt{\mid\mid \theta \mid\mid}$

✔

Submit You have used 1 of 2 attempts

Objective

1/1 point (graded)

Remember that our objective is given as

$$J\left(\theta, \theta_0\right) = \frac{1}{n}\sum_{i=1}^{n} \text{Loss}_h\left(y^{(i)}\left(\theta \cdot x^{(i)} + \theta_0\right)\right) + \frac{\lambda}{2} \mid\mid \theta \mid\mid^2.$$

Our goal is to minimize this objective J. Now, which of the following is true if we have a large λ?

- (•) We put more importance on maximizing the margin than minimizing errors
- ( ) We put more importance on minimizing the margin than minimizing errors
- ( ) We put more importance on maximizing the margin than maximizing errors
- ( ) We put more importance on minimizing the margin than maximizing errors

✔