4. Empirical Risk

Exercises due Mar 8, 2023 08:59 -03 Completed

the Objective: Empirical Risk

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Compute Hinge Loss

1/1 point (graded)

The empirical risk R_n is defined as

$$R_n(\theta) = \frac{1}{n}\sum_{t=1}^{n} \text{Loss}\left(y^{(t)} - \theta \cdot x^{(t)}\right)$$

where $(x^{(t)}, y^{(t)})$ is the tth training example (and there are n in total), and Loss is son hinge loss.

Recall from a previous lecture that the definition of hinge loss:

Also, we have .

Compute the value of

1.2500 ✔

Submit You have used 1 of 3 attempts

Compute Squared Error Loss

1/1 point (graded)

Now, we will calculate the empirical risk with the squared error loss. Remember that the

given by

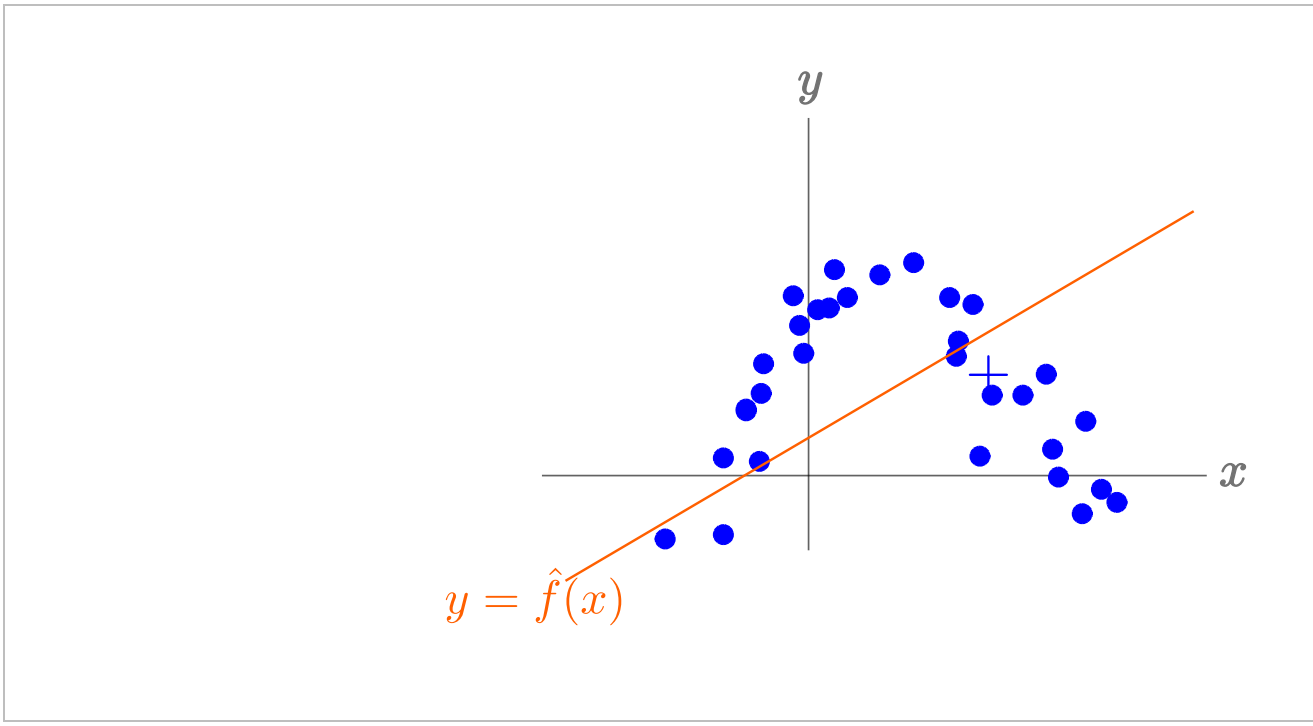
The 4 training examples are as in the previous problem:

Geometrically Identifying Error

1/1 point (graded)

What type of error does the figure below depict? The blue dots are the training exampl

the predictor



- [x] Structural error
- [ ] Estimation error

✔

Submit You have used 1 of 1 attempt

Increasing the Number of Training Examples

0/1 point (graded)

If we increase , the number of training examples, which of the following types of error

- [x] Structural error
- [ ] Estimation error

✖

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(Optional) Error decomposition and the bias-variance trade-off

Discussion

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- ? Squaring only magnifies differences if they are larger than one
- ? Why do we use Hinge Loss here?
  Why do we penalize for deviation that is <1 and do not penalize for deviation that is >=1? It doesn't make sen
- ? Error decomposition and the bias-variance trade-off
  the third term : is E [(error)^2] independent of the bias-variance trade-off. if so, then why. The whole idea of
- ? How to get the result in optional part
- Wrhat is the exact definiation of z ?
  In the explanation of the problems they always refer to the Loss function L(z), but nowhere is defined what z
- ? Empirical risk
  What does she mean by "projected empirical risk"?
- ? (Optional) Error decomposition and the bias-variance trade-off
- Last Problem
  I believe the definition of 'large amount of training data' is quite arbitrary which, in my opinion, somewhat con
- Confusing explanation about Empirical Risk Rn
  Rn is defined as: Sum(Loss(y(t) - theta.X(t)) / n and then they mention Loss can be for instance the hinge los
- Confusion about the deviation
- Rationale of choosing square function
  Imho, in addition to what the professor mentioned(tolerate small deviation, truly penalize large deviation), as

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