Errors

Thursday, September 5, 2019 1:59 PM

Learning a Function

$(X_1, X_2, X_3 \ldots X_n) \Rightarrow (Y_1, Y_2, Y_3, Y_4, \ldots, Y_n)$

Input features — Output features.

Examples: collection of inputs with corresponding outputs

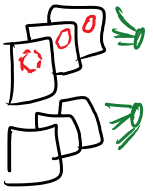
Y_i are discrete: classification

Y_i are continuous: regression

Example: regression:

- (# bedroom, # bathrooms, size of house backyard) $\Rightarrow$ $price
  - bedroom, bathrooms: discrete
  - backyard: continuous
  - $price: continuous
- Y_i = Like or dislike
  - (Explosions, Romance, Animated, subtitles.) $\Rightarrow$ 95 %
    - T, T, F, T
    - 95 %: continuous

classification:



$\Rightarrow Y_i$ (Stop / ¬Stop)

Y_i: discrete.

Measurement of Improvement: Error

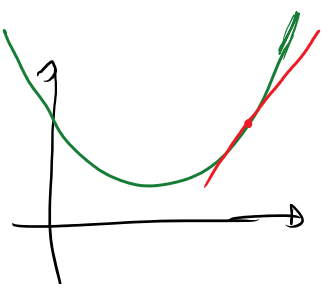
simplify $(X_1, X_2, X_3 \ldots) \Rightarrow Y$

example e: $Y(e)$ compare with $\hat{Y}(e)$

given $(X_1(e), X_2(e), \ldots)$ example says / agent says

E = set of all examples

- absolute error $L_1(E) = \sum_{e \in E} |Y(e) - \hat{Y}(e)|$
- Sum-of-squares $L_2^2(E) = \sum_{e \in E} (Y(e) - \hat{Y}(e))^2$

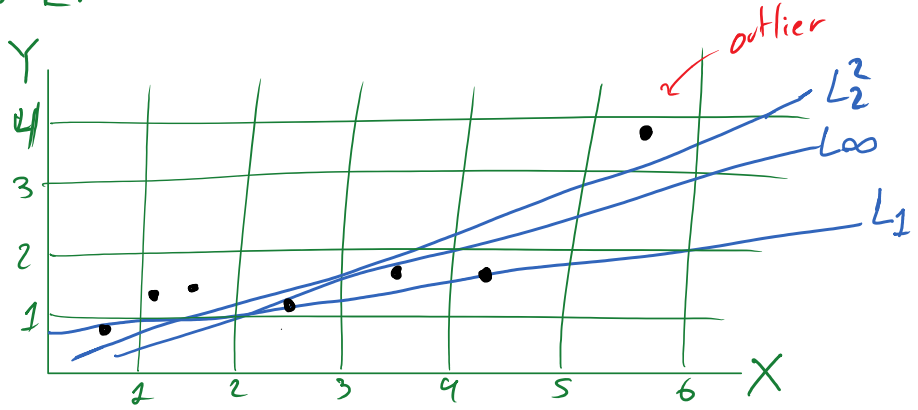


$\sum_{e \in E}$ ( ))

- Worst-case error $L_\infty(E) = \max_{e \in E} \left(|Y(e) - \hat{Y}(e)| \right)$
- Error Count $L_0(E) = |\{e : Y(e) \neq \hat{Y}(e)\}|$ $e \in E$.

Example: $X \Rightarrow Y$

examples E:



different Error Measures
different outcomes

Examples → split → Training Examples:
→ Test Examples:

Keep separate!