Lecture 11/26: Boosting

Tuesday, November 26, 2019 2:47 PM

$$\frac{x \text{ is wrong}}{P(x)}$$

If $h(x) =$ sure. then ε_t fraction can be wrong ε_t: $\frac{\text{mistakes.}}{P(h_t = \text{sure})}$

h_{DL} : $h_1 \to h_2 \to - - - t \to$

$h: X \to Y$ $\quad$ $h_{DL}: X \to Y$

Remark on Warmup:

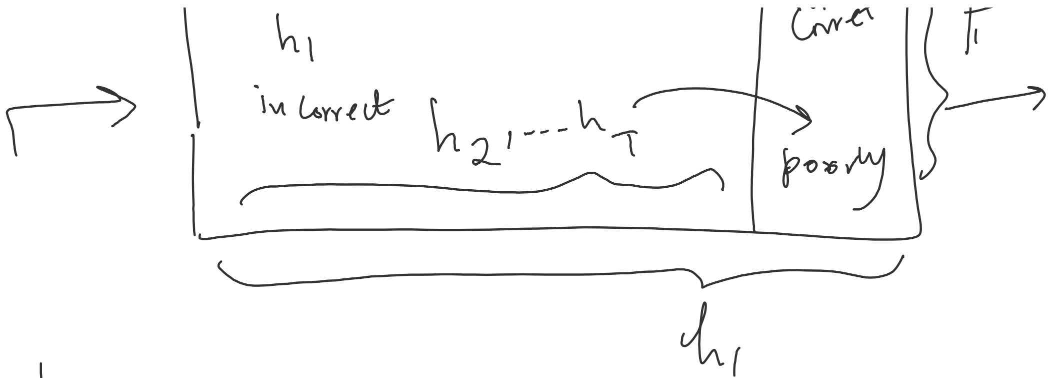
1- Ingeneral, we don't know the "not sure" region.

2- We can't conditionally apply a classifier h_i to some part and h_2 to others.

3. Let all h_t make a prediction for a given X, just combine them, i.e. by weighted Majority.

4: P_{t+1} to decrease the weight on points if $h_t(x) =$ correct?

h_1 : h



h_1 correct
$h_2, \ldots h_T$ incorrect } Maj incorrect

→ We should not completely remove x even if some classifie in the past knew how to answer

→ Instead, slowly decrease the weight if h_t was correct. and
" " " increase the weight if h_t wasn't correct.

Total weight of P_{t+1} puts on $x : h_t(x) = y$

$$\frac{1}{Z_t}(1-\varepsilon_t)\cdot \exp\left(-\frac{1}{2}\ln\left(\frac{1-\varepsilon_t}{\varepsilon_t}\right)\right) = \frac{1}{Z_t}(1-\varepsilon_t) \times \exp\left(\ln\left(\frac{1-\varepsilon}{\varepsilon}\right)^{-1/2}\right)$$

h_t was correct on

$$= \frac{1}{Z_t}(1-\varepsilon_t) \times \left(\frac{\varepsilon_t}{1-\varepsilon_t}\right)^{1/2} = \frac{1}{Z_t}\sqrt{(1-\varepsilon_t)\cdot\varepsilon_t}$$