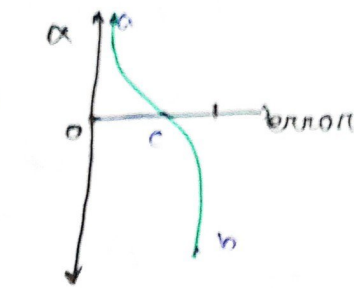


# Ada Boost

| $X_1$ | $X_2$ | $Y$ | $Y_{pred}$ | weight |
|-------|-------|-----|------------|--------|
| 3     | 3     | 1   | 1          | 0.2    |
| 2     | 9     | 0   | 1 x        | 0.2    |
| 1     | 4     | 1   | 0 x        | 0.2    |
| 5     | 4     | 0   | 0          | 0.2    |
| 6     | 2     | 0   | 0          | 0.2    |

$$wt = \frac{1}{n}$$



$$\text{step-1 } \alpha = \frac{1}{2} \ln \left( \frac{1 - \text{error}}{\text{error}} \right)$$

$$\alpha_1 = \frac{1}{2} \ln \left( \frac{1 - 0.6}{0.4} \right) = 0.20$$

step-2

For misclassified For correctly classified  
 $\text{new-wt} = \text{current wt} \cdot e^{\alpha_1}$   $\text{new-wt} = \text{current wt} \cdot e^{-\alpha_1}$

| $X_1$ | $X_2$ | $Y$ | $Y_{pred}$ | wt | updated | normalized | range         |
|-------|-------|-----|------------|----|---------|------------|---------------|
|       |       |     |            |    | 0.16    | 0.166      | 0 - 0.166     |
|       |       |     |            |    | 0.24    | 0.25       | 0.166 - 0.416 |
|       |       |     |            |    | 0.24    | 0.25       | 0.416 - 0.666 |
|       |       |     |            |    | 0.16    | 0.166      | 0.666 - 0.832 |
|       |       |     |            |    | 0.16    | 0.166      | 0.832 - 1.0   |
|       |       |     |            |    | 0.96    |            |               |

up sampling  
 find the 5 Random  
 number [0,1]

Due to the Range  
 is high of  
 error rows  
 those rows come  
 more of this steps  
 happens again  
 to find  $\alpha_2$

$$P_{\text{prediction}} = \alpha_1 h_1 x + \alpha_2 h_2 x \dots \dots \alpha_n h_n x$$

Sun Jun 15  
 2:47pm

$a \rightarrow 0\%$  error

$b \rightarrow 100\%$  error

$c \rightarrow 50\%$  error

don't rely  
 on this  
 c model

# Bagging Vs Boosting

1. Type of model used  $\rightarrow$  LBHV (max depth none) | LBLV (max depth = 1)

2. Sequential vs Parallel  $\rightarrow$  Parallel



3. wt based

Same weightage

seq.



weight dependent upon accurate model