

$$\underline{D} = \{(\underline{x}_i, y_i)\}$$

$$\underline{x}_i = \begin{matrix} \{x_1, x_2\} \\ \underline{q} \quad \underline{T} \end{matrix}$$

Error fkt

$$L \rightarrow f(x) = \frac{\|y - \hat{y}\|}{2}$$

$\hat{y}$   $\downarrow$  Output  
 $y$   $\downarrow$  yes

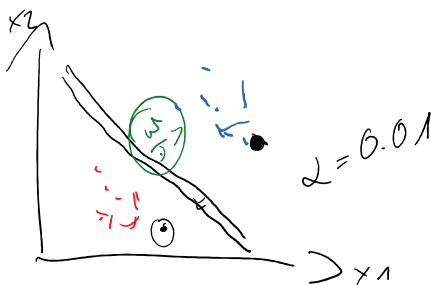
$$f(x) = \frac{1}{2} \|y - \hat{y}\|_2^2$$

it determine if given prediction is correct or not

$$d(x) = \begin{cases} 1 & \text{if } \underline{w} \cdot x + b \geq 0 \\ 0 & \text{else} \end{cases}$$

$$\hat{y}(x) = \underline{w}^T x + b$$

$\underline{w} = \begin{bmatrix} w_1 & w_2 \end{bmatrix}$      $\underline{x} = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$



Training

$$d(x) = 1$$

$$L \rightarrow \text{into Error } f(1) = \|1 - 1\| = 0$$

$$L \rightarrow d(x) = 0$$

$$\frac{\Delta f(x)}{\Delta w}$$

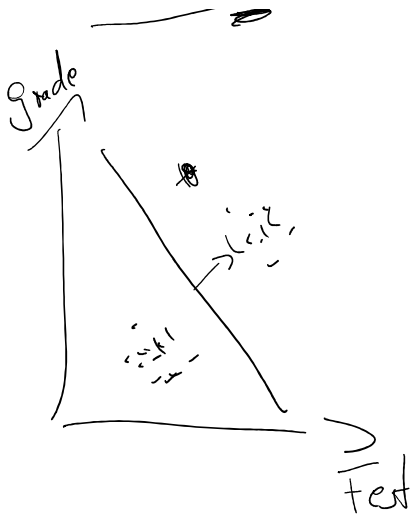
$$\text{Error} = 1$$

$$\Delta w = \alpha (y - \hat{y}) \cdot x$$

$$\Delta w = \alpha \cdot 1 \cdot x$$

$$\underline{w}_{i+1} = \underline{w}_i + \underline{\Delta w}$$

$\alpha = 0.1 \rightarrow$  Very fast  
 $= 0.0001$  very slow



$$w = \begin{bmatrix} 2 \\ 1 \end{bmatrix} \quad b = -18$$

$$x = \begin{bmatrix} 8 \\ 6 \end{bmatrix}$$

$$\begin{aligned} o(\lambda) &= \begin{bmatrix} 2 & 1 \end{bmatrix} \begin{bmatrix} 8 \\ 6 \end{bmatrix} - 18 \\ &= 24 - 18 = \underline{\underline{6}} \end{aligned}$$

$$\underline{d(6) = 1}$$

$$\rightarrow \underline{\underline{f(1) = ||1 - 1|| = 0}}$$

10 students

$L_5 \quad 8/10 \rightarrow \underline{\text{acc: 80\%}}$