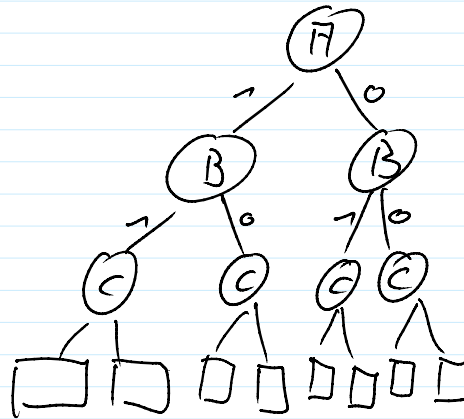


$$VS(H, S) = \{h \in H : h \text{ is consistent with } S\}$$



$$N = 3$$

ϵ updates

$$R = \max_i \|x_i\| \leq 1$$

$$\epsilon \leq \frac{R^2}{\delta^2} \rightarrow \delta^2 \leq \frac{R^2}{\epsilon} \leq \frac{1}{\epsilon}$$

$$\rightarrow \delta \leq \sqrt{\frac{1}{\epsilon}}$$

$$x_i = \begin{pmatrix} x_{i1} \\ \vdots \\ x_{iN} \\ 0 \\ \vdots \\ 0 \end{pmatrix} \leftarrow N+1\text{-th position}$$

$$w = \begin{pmatrix} 0 \\ \vdots \\ 0 \\ y_1 \\ y_2 \\ \vdots \\ y_m \end{pmatrix} \rightarrow (\text{long} \rightarrow \text{bad margin})$$

$$\rightarrow x_i \cdot w = y_i \rightarrow \text{sign}(x_i \cdot w) = y_i$$

Perceptron: keep last n features only

$$R^2 = 1 \quad \|w\|^2 = n$$

$$= \sqrt{k(x_i, x_i) - 2k(x_i, x_j) + k(x_j, x_j)}$$

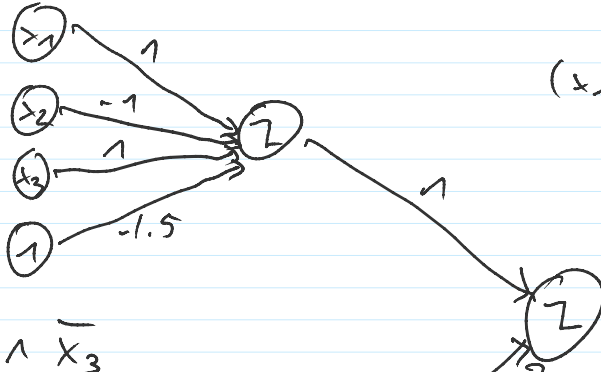
$$k(x_i, x_j) = (x_i \cdot x_j + 1)^{100}$$

x_1, x_2, x_3 boolean $\{0, 1\}$

sign activation

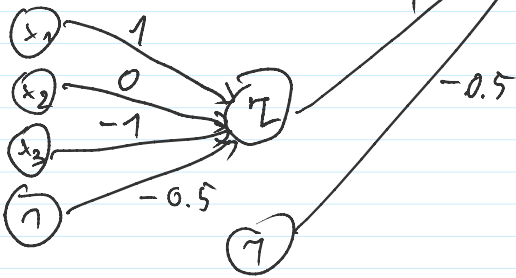
$$x_1 \wedge \bar{x}_2 \wedge x_3$$

$$\text{sign}(x) = \begin{cases} 1 & \text{if } x > 0 \\ 0 & \text{if } x \leq 0 \end{cases}$$



$$(x_1 \wedge \bar{x}_2 \wedge x_3) \vee (x_1 \wedge \bar{x}_3)$$

$$x_1 \wedge \bar{x}_3$$



$$w \cdot x_i \geq b$$

$$w \cdot x + b \geq 0$$