linear Classifier

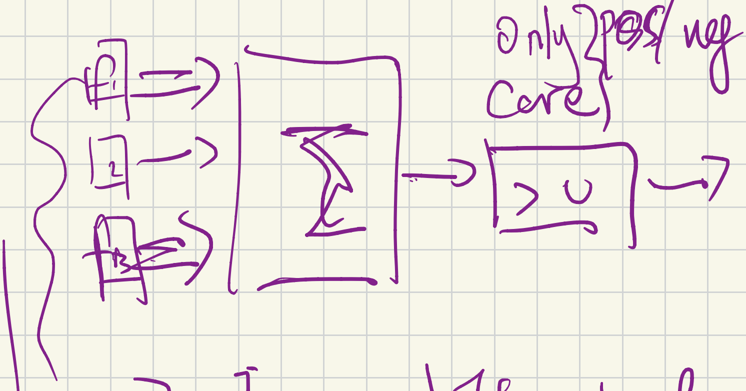
Input: feature value
+
Each weight (Features): weight

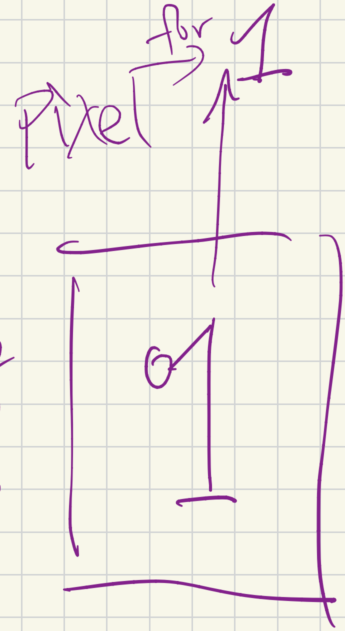
= Sum is: activation

Binary Case activation

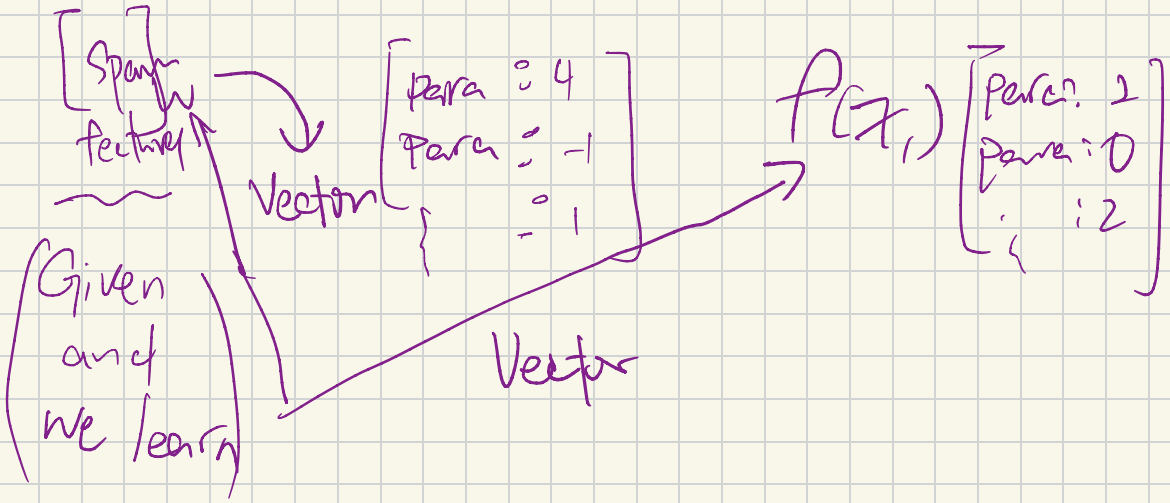
~~Pos → output +1~~

Neg → output -1



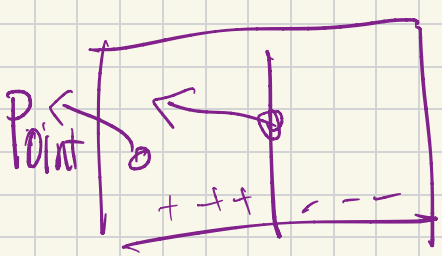


→ Just different features



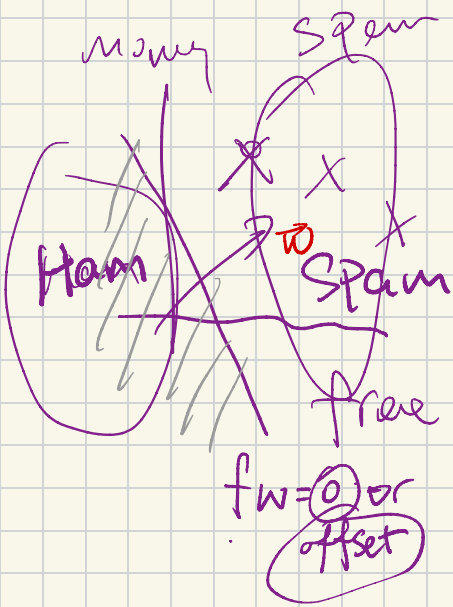
multiplete w. f(x_1) vector (dot Product)

Binary Decision



Pos Neg

P.w ≥ 0



◦ Binary Perceptron

Start weight = 0

Prediction correction

$y \longrightarrow y^*$

Weight vector ← If wrong

$$y \begin{cases} +1 & \text{if } w \cdot f(x) \geq 0 \\ -1 & \text{if } w \cdot f(x) < 0 \end{cases}$$

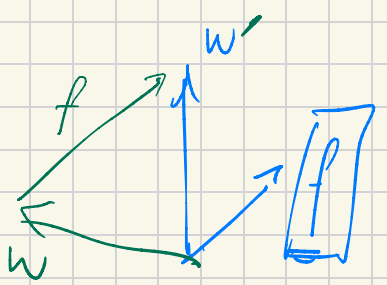
If wrong

$$w' = w + \boxed{y^*} f$$

→ It's In train

It's Correction

$$(w + f) \cdot f = wf + ff > 0$$

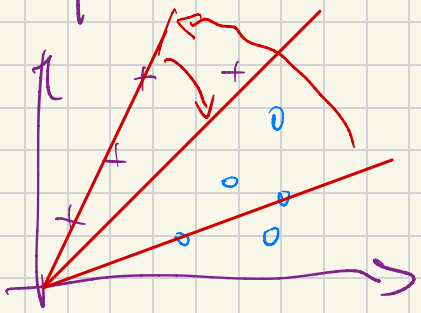


I told you

It's Spam

Eg. Perceptron

- Separable Case



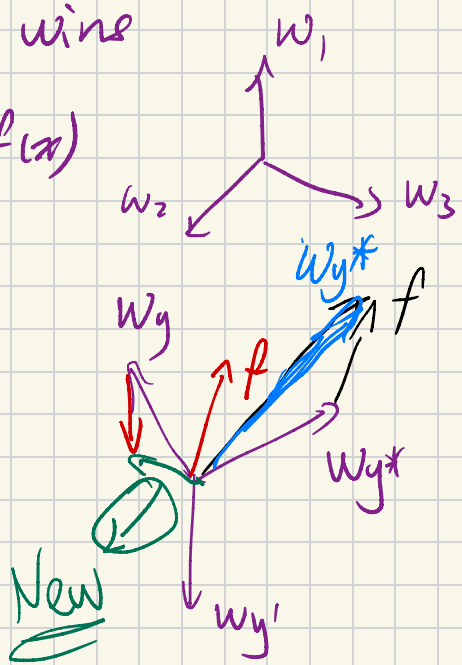
Multiclass Decision Rule

Prediction highest score wins

$$y = \arg\max_y w_y \cdot f(x)$$

Also start 0

$$y = \arg\max_y w_y f(x)$$



Eg. Multiclass Perceptron

"win the vote"

"win the election"

"win the game"

W_{sports}

BIAS:

win:

game

vote

the

$W_{politics}$

BIAS: 0