Perceptron

$$a = W^T X$$

$$= W_1 X_1 + W_2 X_2 + \ldots + W_n X_n + W_0 X_0$$

$$\underset{b}{\|} \quad \underset{\text{"bias"}}{\|} \quad \underset{1}{\|}$$

observe an example in traing $(x, y)^{=1}$

model made a mistake, namely $a < 0$.

↘ for simplicity
we suppose thi's is
a positive example
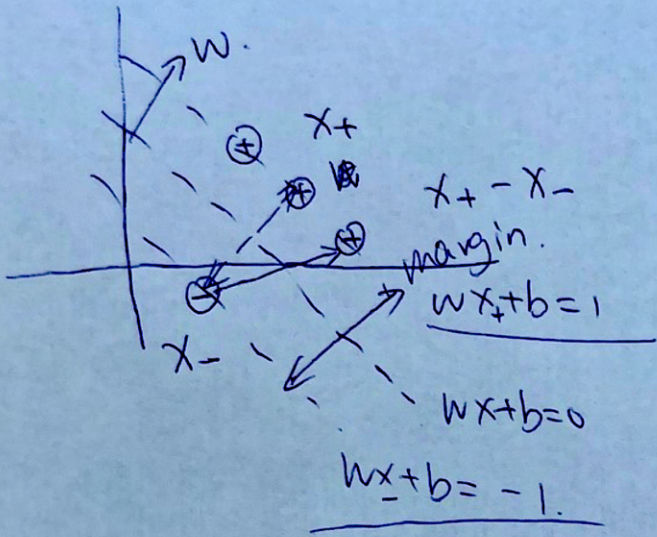
so, we make a update $W' = W + X$.

observe this example again

$$a' = W'^T X = (W + X)^T X = W^T X + X^T X \qquad > a + 1$$

$$\underset{a}{\|} \qquad \underset{\sum_{i=0}^{n} X_i^2}{\|}$$

$$\underset{X_0 = 1.}{\vee}$$

SVM

margin

$$= (X_+ - X_-) \cdot \frac{w}{||W||_2}$$

↑
unit
vector.

$wx_+ + b = 1$

$wx + b = 0$

$w\underline{x} + b = -1.$

$$= \cancel{wx_+} \frac{2}{w} \cdot \frac{w}{||W_\bullet||_2}$$

$$= \frac{2}{||W||_2}$$

$$\sqrt{w_1^2 + w_2^2 + \cdots w_n^2}$$

$$X_+ - X_- = \frac{2}{w}$$

$wx_+ + b = 1$
$wx_- + b = -1$

$w \, x_+ - w \, x_- = 1 - b - (-1 - b) = 2.$