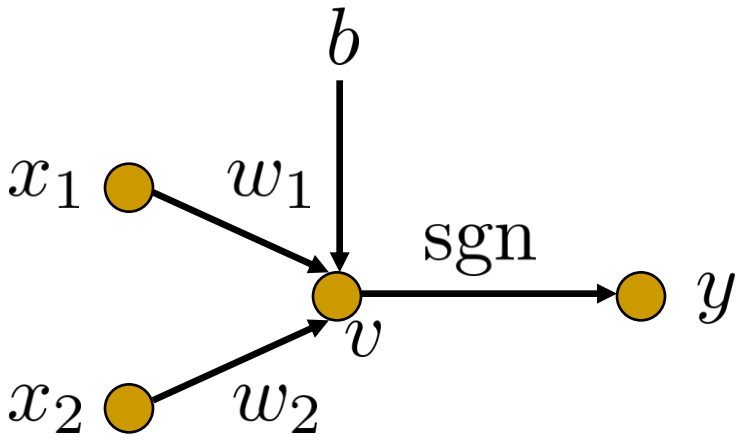
Perceptron

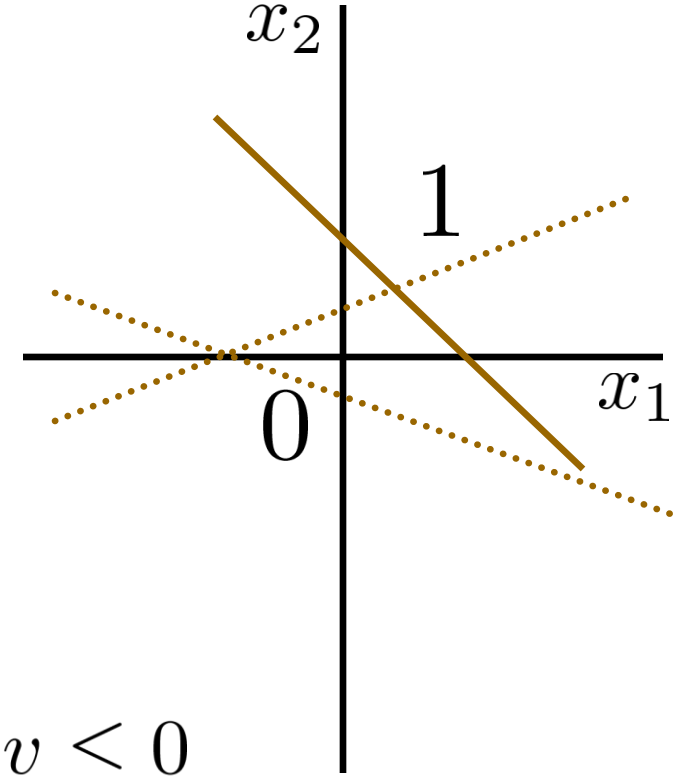
Neuron

- McCulloch–Pitts neuron is a logic unit



$$v = \sum_{i=1}^{2} w_i x_i + b$$

$y = 1$ if $v > 0$ and 0 if $v \leq 0$

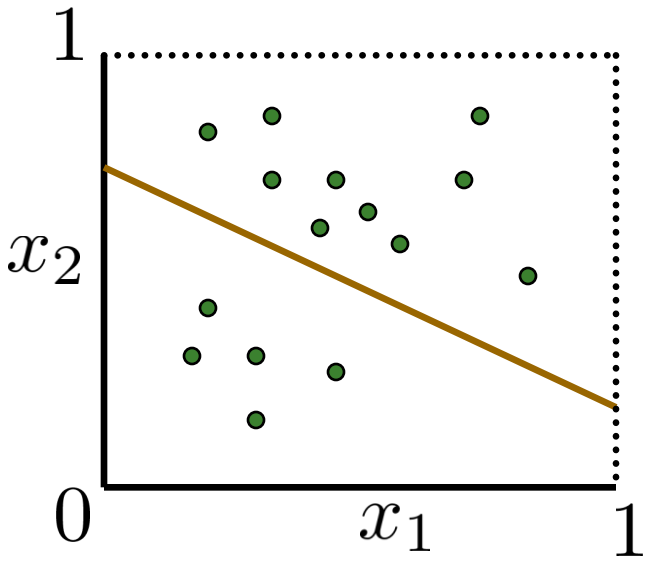


Decision

x_1 : Dr. Principe present index $[0, 1]$

x_2 : Goodness of sleep index $[0, 1]$

y : Come to the NN class $\{-1, 1\}$



Training

- Given samples $\{\mathbf{x}(n), d(n)\}_{n=1}^{n_m}$

$$\mathbf{w}(n+1) = \mathbf{w}(n) + \eta(d(n) - y(n))\mathbf{x}(n)$$

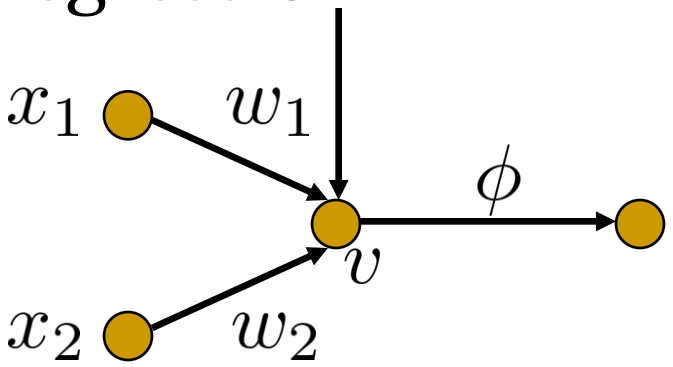
- How it works?

  If $\eta||\mathbf{x}(n)||^2 > |\mathbf{w}^\top(n)\mathbf{x}(n)|$

  then right decision in next iteration!!

Delta rule

- Regression



$$y = \phi\left(\sum_{i=1}^{2} w_i x_i + b\right)$$

- Chain rule $\xi = e^2, e = d - y$

$$\Delta w_i = \eta \frac{\partial \xi}{\partial w_i} = \eta \frac{\partial \xi}{\partial e} \frac{\partial e}{\partial v} \frac{\partial v}{\partial w_i} = \eta[2(d-y)\phi'(v)x_i]$$