# ADALINE & MADALINE

ADALINE: (Adaptive Linear Neuron) 1959 by Bernard Widrow



☆single processing element
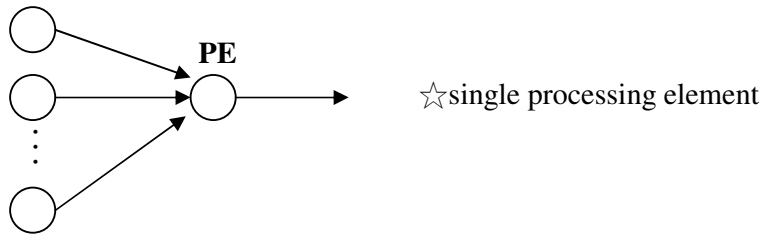
Method : ① The value in each unit must +1 or −1 (perception 為 1 )

$$\text{net} = \sum X_i W_i$$

其中　$X_0 = 1$　∴ $\text{net} = W_0 + W_1 X_1 + W_2 X_2 + \cdots \cdots + W_n X_n$

$$Y = \begin{cases} 1 & \text{net} \geqq 0 \\ & \text{if} \\ \boxed{-1} & \text{net} < 0 \end{cases}$$
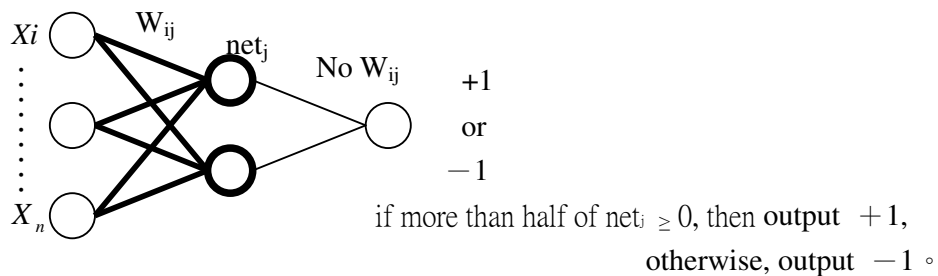
→ different from perceptron's transfer function.

$$\Delta W_i = \eta\,(T - Y)\,Xi \qquad\qquad T = \text{expected output}$$

$$W_i = W_i + \Delta W_i$$

※ADALINE can solve only linear problem(the limitation)

MADALINE： It is composed of many ADALINE（Multilayer Adaline.）



No $W_{ij}$　+1 or −1

if more than half of $net_j \geq 0$, then output ＋1,
otherwise, output −1。

After the second layer, the mojority vote is used.