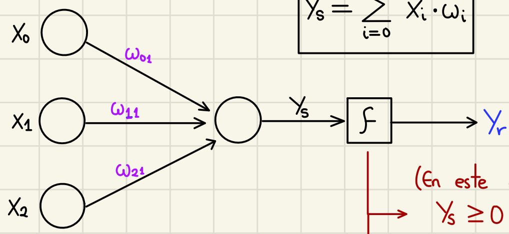
SANTIAGO GARCÍA ARANGO

EJEMPLO CASO 1 (COMPUERTA AND)

→ Bias (Siempre 1: porque permite agregar "offset")

K	X_0	X_1	X_2	Y_d
1	1	1	1	1
2	1	1	0	0
3	1	0	1	0
4	1	0	0	0

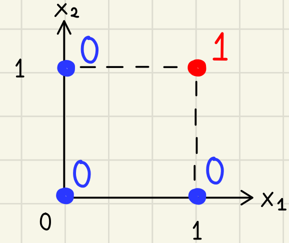


$$Y_s = \sum_{i=0}^{n} X_i \cdot \omega_i$$

(En este caso)

→ $Y_s \geq 0 \longrightarrow Y_r = 1$

→ $Y_s < 0 \longrightarrow Y_r = 0$



Solución clásica:

1) $\omega_0 \cdot 1 + \omega_1 \cdot 1 + \omega_2 \cdot 1 = 1$

2) $\omega_0 \cdot 1 + \omega_1 \cdot 1 + \omega_2 \cdot 0 = 0$

3) $\omega_0 \cdot 1 + \omega_1 \cdot 0 + \omega_2 \cdot 1 = 0$

4) $\omega_0 \cdot 1 + \omega_1 \cdot 0 + \omega_2 \cdot 0 = 0$

Solución ML:

1) $n_d = 4$

$n_e = 3$

$n_s = 1$

Elegidos por nosotros

2) $\omega_{01} = 0.2$

$\omega_{11} = 1$

$\omega_{21} = 0.9$

$\alpha = 1$

entries

3x4 double

	1	2	3	4	5
X_0 → 1	1	1	1	1	
X_1 → 2	0	1	0	1	
X_2 → 3	0	0	1	1	
4					
5					
6					

desired

1x4 double

	1	2	3	4	5
Y_d → 1	0	0	0	1	
2					
3					
4					

$$* \quad \omega_i := \omega_i + \alpha\,(\underbrace{Y_d - Y_r}_{\text{error}}) \cdot X_i$$

Bias

K	X_0	X_1	X_2	ω_{01}	ω_{11}	ω_{21}	Y_d	Y_r	e	e_K^2
1	1	1	1	0,2	1	0,9	1	1	0	0
2	1	0	1	0,2	1	0,9	0	1	-1	0,5
3	1	1	0	-0,8	1	-0,1	0	1	-1	0,5
4	1	0	0	-1,8	0	-0,1	0	0	0	0

Total $e_K^2 = 1$

K	X_0	X_1	X_2	ω_{01}	ω_{11}	ω_{21}	Y_d	Y_r	e	e_K^2
1	1	1	1	-1,8	0	-0,1	1	0	1	0,5
2	1	0	1	-0,8	1	0,9	0	1	-1	0,5
3	1	1	0	-1,8	1	-0,1	0	0	0	0
4	1	0	0	-1,8	1	-0,1	0	0	0	0

Total $e_K^2 = 1$

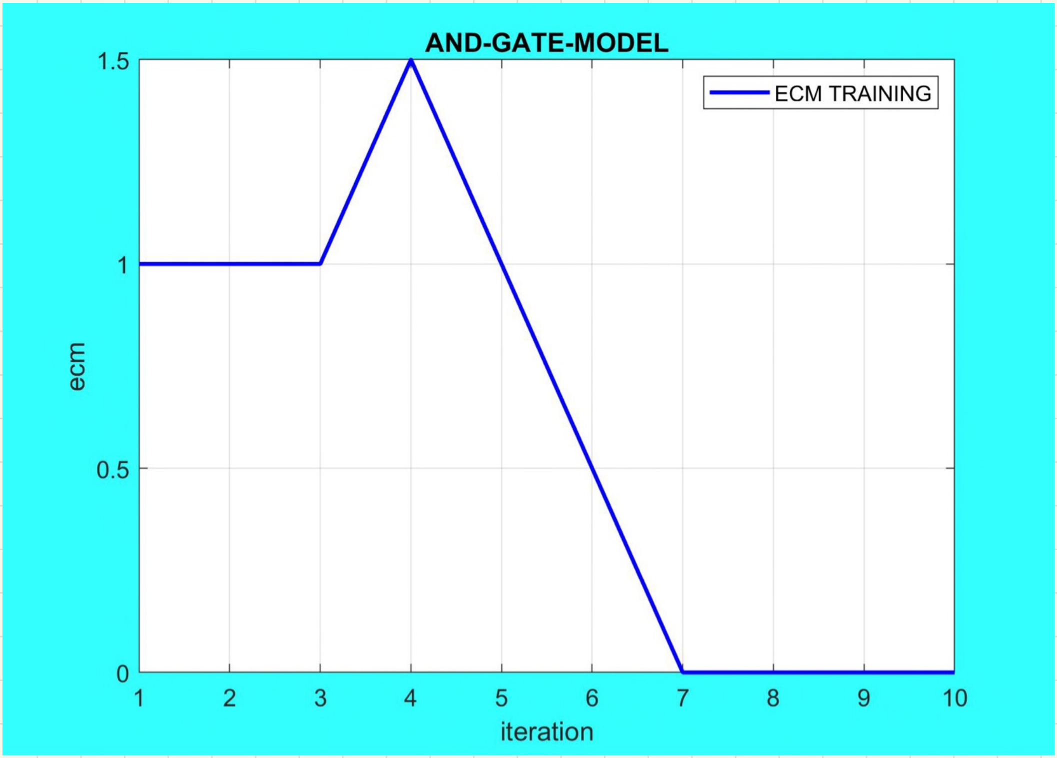
↓ Continuar iterando...

* Resultados:

$\omega_0 = -2,16$

$\omega_1 = 0,440$

$\omega_2 = 2,002$


AND-GATE-MODEL
ECM TRAINING
ecm
iteration
1.5
1
0.5
0
1
2
3
4
5
6
7
8
9
10


TRAINING RESULT FOR EACH DATA
Desired Output
Neural Network Output
ouput
data
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1
1.5
2
2.5
3
3.5
4