AI for All

HW 5 : Train for AND function

x_1	x_2	T
0	0	0
0	1	0
1	0	0
1	1	1

$w_1 = 0.1$, $w_2 = 0.5$

$w_0 = -0.8$

First input : $(0, 0)$

Net input : $(0.1)(x_1 = 0) + (0.5)(x_2 = 0) + (-0.8)(x_0 = 1)$

$= -0.8$

This is not greater than 0, so o/p of TLU '0' $= 0$,

$T = 0$, $O = 0$ $\Rightarrow$ no weight adjustment.

2nd i/P : $(0, 1)$

Net i/P : $(0.1)(0) + (0.5)(1) + (-0.8)(1) = -0.3$

o/p of TLU '0' $= 0$

$T = 0$, $O = 0$, ~~Eave~~ $\Rightarrow$ no weight adjustment.

$\underline{3^{rd}}$ i/p : $(1,0)$

Net i/p : $(0.1)(1) + (0.5)(0) + (-0.8)(1) = -0.7$

$T = 0$, $0 = 0 \implies$ No weight adjustment.

$\underline{4^{th}}$ i/p : $(1,1)$

Net i/p : $(0.1)(1) + (0.5)(1) + (-0.8)(1) = -0.2$

$T = 1$, $0 = 0 \implies$ Error $= T - 0 = 1 - 0 = 1$

$\Delta w_1 = \alpha(T-0) x_1 = (0.2)(1)(1) = 0.2$

$\Delta w_2 = \alpha(T-0) x_2 = (0.2)(1)(1) = 0.2$

$\Delta w_0 = \alpha(T-0) x_0 = (0.2)(1)(1) = 0.2$

updated w values :

$w_1 = 0.1 + 0.2 = 0.3$

$w_2 = 0.5 + 0.2 = 0.7$

$w_0 = -0.8 + 0.2 = -0.6$

Training Steps of Learning AND

x_1	x_2	T	O	Δw_1	w_1	Δw_2	w_2	Δw_0	w_0
					0.1		0.5		-0.8
0	0	0	0	0	0.1	0	0.5	0	-0.8
0	1	0	0	0	0.1	0	0.5	0	-0.8
1	0	0	0	0	0.1	0	0.5	0	-0.8
1	1	1	0	0.2	0.3	0.2	0.7	0.2	-0.6
0	0	0	0	0	0.3	0	0.7	0	-0.6
0	1	0	1	0	0.3	0.2	0.9	0.2	-0.4
1	0	0	0	0	0.3	0	0.9	0	-0.4
1	1	1	1	0	0.3	0	0.9	0	-0.4
0	0	0	0	0	0.3	0	0.9	0	-0.4
0	1	0	1	0	0.3	0.2	1.1	0.2	-0.2
1	0	0	1	0.2	0.5	0	1.1	0.2	0
1	1	1	1	0	0.5	0	1.1	0	0