



INSTITUTO POLITÉCNICO NACIONAL



Escuela Superior de Cómputo

“Ingeniería en Inteligencia Artificial”

Unidad de aprendizaje:

Redes Neuronales y

Aprendizaje Profundo

Tarea:

Perceptrón con épocas

Alumno:

Flores Pulido Esteban

I. Capturas de pantalla

Compuerta AND con valores $w_1 = 1.0$, $w_2 = 0.0$ y $\theta = -0.5$

```
Epoca 0
Error: w1 = 0.900000 - w2 = 0.000000 - bias = -0.600000

Epoca 1
Error: w1 = 0.800000 - w2 = 0.000000 - bias = -0.700000

Epoca 2
Error: w1 = 0.700000 - w2 = 0.000000 - bias = -0.800000
Error: w1 = 0.800000 - w2 = 0.100000 - bias = -0.700000

Epoca 3
Error: w1 = 0.700000 - w2 = 0.100000 - bias = -0.800000
Error: w1 = 0.800000 - w2 = 0.200000 - bias = -0.700000

Epoca 4
Error: w1 = 0.700000 - w2 = 0.200000 - bias = -0.800000

Epoca 5
Sin errores
Pesos finales [w1 = 0.700000 | w2 = 0.200000 | bias = -0.800000]
```

Compuerta AND con valores aleatorios

```
Epoca 0
Error: w1 = 0.320000 - w2 = 0.320000 - bias = 0.440000
Error: w1 = 0.320000 - w2 = 0.220000 - bias = 0.340000
Error: w1 = 0.220000 - w2 = 0.220000 - bias = 0.240000

Epoca 1
Error: w1 = 0.220000 - w2 = 0.220000 - bias = 0.140000
Error: w1 = 0.220000 - w2 = 0.120000 - bias = 0.040000
Error: w1 = 0.120000 - w2 = 0.120000 - bias = -0.060000

Epoca 2
Error: w1 = 0.120000 - w2 = 0.020000 - bias = -0.160000
Error: w1 = 0.220000 - w2 = 0.120000 - bias = -0.060000

Epoca 3
Error: w1 = 0.220000 - w2 = 0.020000 - bias = -0.160000
Error: w1 = 0.120000 - w2 = 0.020000 - bias = -0.260000
Error: w1 = 0.220000 - w2 = 0.120000 - bias = -0.160000

Epoca 4
Error: w1 = 0.120000 - w2 = 0.120000 - bias = -0.260000
Error: w1 = 0.220000 - w2 = 0.220000 - bias = -0.160000

Epoca 5
Error: w1 = 0.220000 - w2 = 0.120000 - bias = -0.260000

Epoca 6
Sin errores
Pesos finales [w1 = 0.220000 | w2 = 0.120000 | bias = -0.260000]
```

Compuerta OR con valores $w_1 = 0.0$, $w_2 = 1.0$ y $\theta = -1.5$

```
Epoca 0
Error: w1 = 0.000000 - w2 = 1.100000 - bias = -1.400000
Error: w1 = 0.100000 - w2 = 1.100000 - bias = -1.300000
Error: w1 = 0.200000 - w2 = 1.200000 - bias = -1.200000

Epoca 1
Error: w1 = 0.300000 - w2 = 1.200000 - bias = -1.100000

Epoca 2
Error: w1 = 0.400000 - w2 = 1.200000 - bias = -1.000000

Epoca 3
Error: w1 = 0.500000 - w2 = 1.200000 - bias = -0.900000

Epoca 4
Error: w1 = 0.600000 - w2 = 1.200000 - bias = -0.800000

Epoca 5
Error: w1 = 0.700000 - w2 = 1.200000 - bias = -0.700000

Epoca 6
Sin errores
Pesos finales [w1 = 0.700000 | w2 = 1.200000 | bias = -0.700000]
```

Compuerta OR con valores aleatorios

```
Epoca 0
Error: w1 = 0.320000 - w2 = 0.320000 - bias = 0.440000

Epoca 1
Error: w1 = 0.320000 - w2 = 0.320000 - bias = 0.340000

Epoca 2
Error: w1 = 0.320000 - w2 = 0.320000 - bias = 0.240000

Epoca 3
Error: w1 = 0.320000 - w2 = 0.320000 - bias = 0.140000

Epoca 4
Error: w1 = 0.320000 - w2 = 0.320000 - bias = 0.040000

Epoca 5
Error: w1 = 0.320000 - w2 = 0.320000 - bias = -0.060000

Epoca 6
Sin errores
Pesos finales [w1 = 0.320000 | w2 = 0.320000 | bias = -0.060000]
```

Compuerta XOR con valores $w_1 = 1.0$, $w_2 = 0.0$ y $\theta = -0.5$

```
Epoca 96
Error: w1 = -0.100000 - w2 = -0.000000 - bias = -0.000000
Error: w1 = -0.100000 - w2 = 0.100000 - bias = 0.100000
Error: w1 = -0.000000 - w2 = 0.100000 - bias = 0.200000
Error: w1 = -0.100000 - w2 = -0.000000 - bias = 0.100000

Epoca 97
Error: w1 = -0.100000 - w2 = -0.000000 - bias = -0.000000
Error: w1 = -0.100000 - w2 = 0.100000 - bias = 0.100000
Error: w1 = -0.000000 - w2 = 0.100000 - bias = 0.200000
Error: w1 = -0.100000 - w2 = -0.000000 - bias = 0.100000

Epoca 98
Error: w1 = -0.100000 - w2 = -0.000000 - bias = -0.000000
Error: w1 = -0.100000 - w2 = 0.100000 - bias = 0.100000
Error: w1 = -0.000000 - w2 = 0.100000 - bias = 0.200000
Error: w1 = -0.100000 - w2 = -0.000000 - bias = 0.100000

Epoca 99
Error: w1 = -0.100000 - w2 = -0.000000 - bias = -0.000000
Error: w1 = -0.100000 - w2 = 0.100000 - bias = 0.100000
Error: w1 = -0.000000 - w2 = 0.100000 - bias = 0.200000
Error: w1 = -0.100000 - w2 = -0.000000 - bias = 0.100000
```

Compuerta XOR con valores aleatorios

```
Epoca 96
Error: w1 = -0.080000 - w2 = 0.020000 - bias = -0.060000
Error: w1 = -0.080000 - w2 = 0.120000 - bias = 0.040000
Error: w1 = 0.020000 - w2 = 0.120000 - bias = 0.140000
Error: w1 = -0.080000 - w2 = 0.020000 - bias = 0.040000

Epoca 97
Error: w1 = -0.080000 - w2 = 0.020000 - bias = -0.060000
Error: w1 = -0.080000 - w2 = 0.120000 - bias = 0.040000
Error: w1 = 0.020000 - w2 = 0.120000 - bias = 0.140000
Error: w1 = -0.080000 - w2 = 0.020000 - bias = 0.040000

Epoca 98
Error: w1 = -0.080000 - w2 = 0.020000 - bias = -0.060000
Error: w1 = -0.080000 - w2 = 0.120000 - bias = 0.040000
Error: w1 = 0.020000 - w2 = 0.120000 - bias = 0.140000
Error: w1 = -0.080000 - w2 = 0.020000 - bias = 0.040000

Epoca 99
Error: w1 = -0.080000 - w2 = 0.020000 - bias = -0.060000
Error: w1 = -0.080000 - w2 = 0.120000 - bias = 0.040000
Error: w1 = 0.020000 - w2 = 0.120000 - bias = 0.140000
Error: w1 = -0.080000 - w2 = 0.020000 - bias = 0.040000
```