Willson Melo Merchan

Carnet: 2133541

1. Mention one supervised and unsupervised task that neural networks could perform. Mention the input and output for each case.

Supervisado: clasificación.

Entrada, input y output para entrenar

Entrada, input un elemento

Salida, output la clasificación a la que pertenece ese elemento.

No supervisado: agrupamiento.

Entrada, Un vector de datos.

Salida, un conjunto de datos agrupados.

2. Interpret and explain in your own words: what is the effect of the parameter theta on the sigmoid

activation function? You can use plots to support your answer.

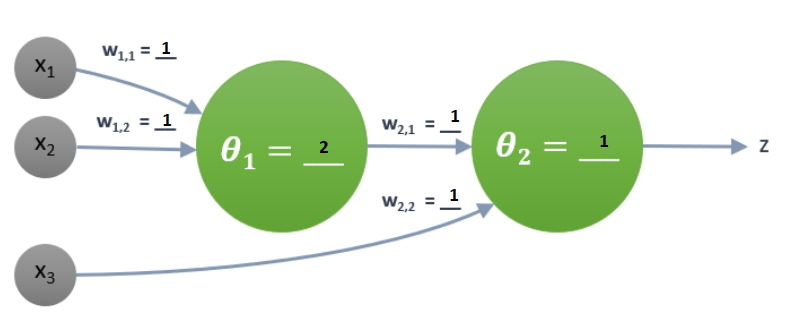
Pienso que el efecto de theta en la función sigmoid es que a mayor theta menor incertidumbre al momento de seleccionar para que valores de x es 0 o 1.

3. Using McCulloh-Pitts neurons, implement the following logic function x1 and x2 or x3. Write the

truth table, find the values for the weights and thresholds of each neuron, draw the model, and

verify that the value of z is equal to the function output in the truth table. Show all your work

|  |  |  |  |
| --- | --- | --- | --- |
| x1 | x2 | x3 | (x1 and x2) or x3 |
| 1 | 1 | 1 | 1 |
| 1 | 1 | 0 | 1 |
| 1 | 0 | 1 | 1 |
| 1 | 0 | 0 | 0 |
| 0 | 1 | 1 | 1 |
| 0 | 1 | 0 | 0 |
| 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 0 |



|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| x1 | x2 | x1\*w(1,1) + x2 \*w(1,2) | z1 = (x1\*w1 + x2 \*w2 > 1) | x3 | z1\*w(2,1) + x3\*w(2,2) | z2 |
| 1 | 1 | 2 | 1 | 1 | 2 | 1 |
| 1 | 1 | 2 | 1 | 0 | 1 | 1 |
| 1 | 0 | 1 | 0 | 1 | 1 | 1 |
| 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 0 | 1 | 1 | 1 |
| 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 |

4. Using the Hebb learning rule, design a neural network for performing the task of classifying

samples of two input variables with the NOR logic function. Write the truth table, find the values

for the weights of each neuron, draw the model, and verify that the value of z is equal to the

function output in the truth table. Show all your work.







