

# Neural Network

How can a computer take a decision? Let's imagine:

$$z = x_1 * w_1 + x_2 * w_2 + b$$

- $x_1$  and  $x_2$ : How much do I want to do the activity?
- $w_1$  and  $w_2$ : What benefits am I getting when doing these activities?
- $b$ : What is my mood right now?

You can add as many variables as you want. Suppose you girlfriend got pregnant, what are you going to do?

- $x_1$ : Do I want to have a baby? Not really "0.1"
- $w_1$ : Benefits of having a baby "-0.3"
- $x_2$ : Do I love this girl? Yes "0.9"
- $w_2$ : Benefits of love a girl? A lot of oxytocin "0.5"
- $b$ : What is my mood right now? "0.5"

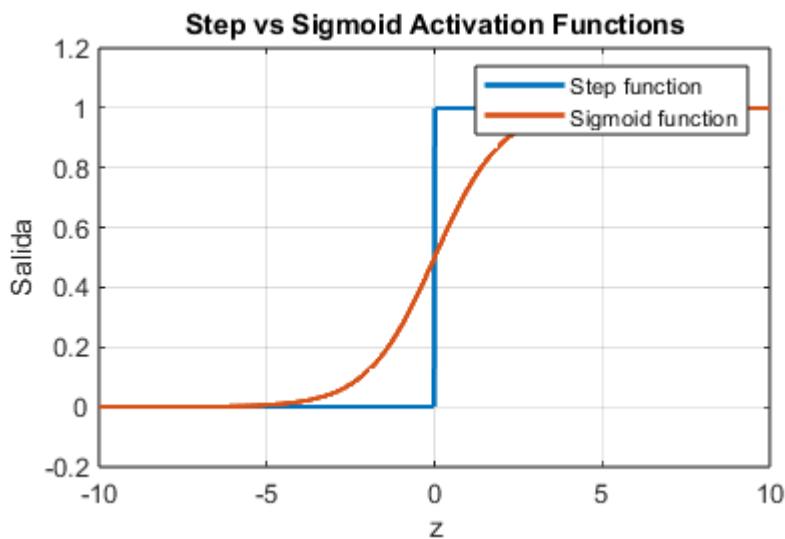
$$z = 0.1 * -0.3 + 0.9 * 0.5 + 0.5$$

$$z = 0.92$$

We can use the step function to decide rapidly /'ræpɪdli/ what my decision is or just to use the sigmoid function to give a porcentage of how willing i am.

$$u(z) = \begin{cases} 0 & (\text{to move abroad}) & \text{if } z < 0 \\ 1 & (\text{to take care of the child}) & \text{if } z \geq 0 \end{cases}$$

$$\sigma(z) = \frac{1}{1 + e^{-z}}; \text{ How willing } i \text{ am to take care of the child}$$



## Sigmoid Function in C

Let's implement the sigmoid function in C:

```
#include <stdio.h>
#include <math.h>

float sigmoid_function(float z_value){
    z_value = 1.0 / (1.0 + expf(-1.0 * z_value) );
    return z_value;
}

int main(void){
    float z = 0.92;
    float new_z = sigmoid_function(z);
    printf("The value of z between 0 and 1 is: %.3f\n",new_z);
}
```