



Motivations

Neural Networks

Applications



Video: Examples and Intuitions I
7 min



Reading: Examples and Intuitions I
2 min



Video: Examples and Intuitions II
10 min



Reading: Examples and Intuitions II
3 min



Video: Multiclass Classification
3 min



Reading: Multiclass Classification
3 min

Review



Examples and Intuitions I

A simple example of applying neural networks is by predicting x_1 AND x_2 , which is the logical 'and' operator and is only true if both x_1 and x_2 are 1.

The graph of our functions will look like:

$$\begin{array}{l} x_0 \\ x_1 \rightarrow g(z^{(2)}) \rightarrow h_{\theta}(x) \\ x_2 \end{array}$$

Remember that x_0 is our bias variable and is always 1.

Let's set our first theta matrix as:

$$\Theta^{(1)} = \begin{bmatrix} -30 & 20 & 20 \end{bmatrix}$$

This will cause the output of our hypothesis to only be positive if both x_1 and x_2 are 1. In other words:

$$\begin{array}{l} h_{\theta}(x) = g(-30 + 20x_1 + 20x_2) \\ x_1 = 0 \text{ and } x_2 = 0 \text{ then } g(-30) \approx 0 \\ x_1 = 0 \text{ and } x_2 = 1 \text{ then } g(-10) \approx 0 \\ x_1 = 1 \text{ and } x_2 = 0 \text{ then } g(-10) \approx 0 \\ x_1 = 1 \text{ and } x_2 = 1 \text{ then } g(10) \approx 1 \end{array}$$

So we have constructed one of the fundamental operations in computers by using a small neural network rather than using an actual AND gate. Neural networks