



## 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 II

The  $\Theta^{(1)}$  matrices for AND, NOR, and OR are:

*AND:*

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

*NOR:*

$$\theta^{(1)} = \begin{bmatrix} 10 & -20 & -20 \end{bmatrix}$$

*OR:*

$$\theta^{(1)} = \begin{bmatrix} -10 & 20 & 20 \end{bmatrix}$$

We can combine these to get the XNOR logical operator (which gives 1 if  $x_1$  and  $x_2$  are both 0 or both 1).

$$\begin{matrix} x_0 & & a_1^{(2)} \\ x_1 & \rightarrow & a_1^{(2)} \\ x_2 & & a_2^{(2)} \end{matrix} \rightarrow a^{(3)} \rightarrow h_{\theta}(x)$$

For the transition between the first and second layer, we'll use a  $\Theta^{(1)}$  matrix that combines the values for AND and NOR:

$$\Theta^{(1)} = \begin{bmatrix} -30 & 20 & 20 & 10 & -20 & -20 \end{bmatrix}$$

For the transition between the second and third layer, we'll use a  $\Theta^{(2)}$  matrix that uses the value for OR:

$$\Theta^{(2)} = \begin{bmatrix} -10 & 20 & 20 \end{bmatrix}$$