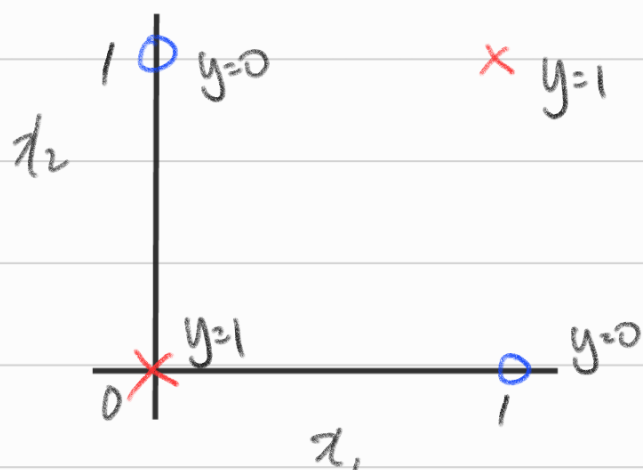


Examples and Intuitions

Non-linear classification example: XOR/XNOR

x_1, x_2 are binary (0,1)



$$y = x_1 \text{ XOR } x_2$$

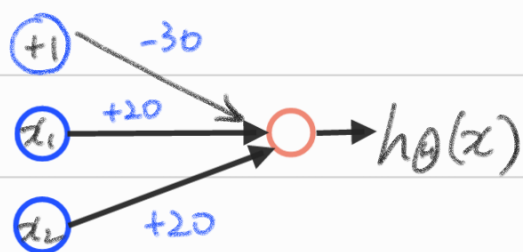
$$x_1 \text{ XNOR } x_2$$

$$\text{NOT}(x_1 \text{ XOR } x_2)$$

Simple ex.: AND

$$x_1, x_2 \in \{0, 1\}$$

$$y = x_1 \text{ AND } x_2$$



$$h_{\theta}(x) = g(-30 + 20 \cdot x_1 + 20 \cdot x_2)$$

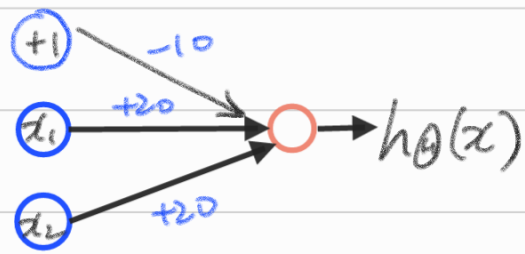
$$\theta_{1,0}^{(1)} \quad \theta_{1,1}^{(1)} \quad \theta_{1,2}^{(1)}$$

x_1	x_2	$h_{\theta}(x)$
0	0	$g(-30) \rightarrow 0$
0	1	$g(-10) \rightarrow 0$
1	0	$g(-10) \rightarrow 0$
1	1	$g(10) \rightarrow 1$

Simple ex. : OR

$$x_1, x_2 \in \{0, 1\}$$

$$y = x_1 \text{ OR } x_2$$

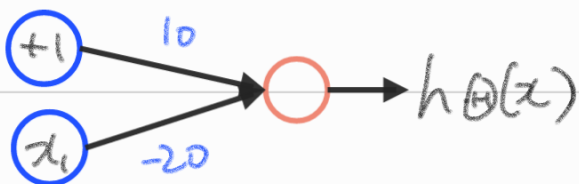


$$h_{\theta}(x) = g(-10 + 20 \cdot x_1 + 20 \cdot x_2)$$

$\theta_{1,0}^{(1)} \quad \theta_{1,1}^{(1)} \quad \theta_{1,2}^{(1)}$

x_1	x_2	$h_{\theta}(x)$
0	0	$g(-10) \rightarrow 0$
0	1	$g(10) \rightarrow 1$
1	0	$g(10) \rightarrow 1$
1	1	$g(30) \rightarrow 1$

Negation : NOT x_1



$$h_{\theta}(x) = 10 - 20 \cdot x_1$$

x_1	$h_{\theta}(x)$
0	$g(10) \rightarrow 1$
1	$g(-10) \rightarrow 0$

layer $\frac{2}{5}$, deeper layers

compute more complex features

Multiclass Classification

one-vs-all 확장

4가지 카테고리 - Pedestrian, Car, Motorcycle, Truck

$$h_{\theta}(x) \in \mathbb{R}^4$$

○ Pedestrian $\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \end{bmatrix}$

○ Car $\begin{bmatrix} 0 \\ 1 \\ 0 \\ 0 \end{bmatrix}$

○ Motorcycle $\begin{bmatrix} 0 \\ 0 \\ 1 \\ 0 \end{bmatrix}$

○ Truck $\begin{bmatrix} 0 \\ 0 \\ 0 \\ 1 \end{bmatrix}$

Output
layer