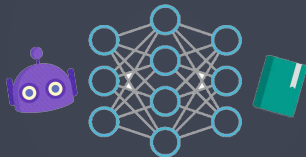


Deep Learning

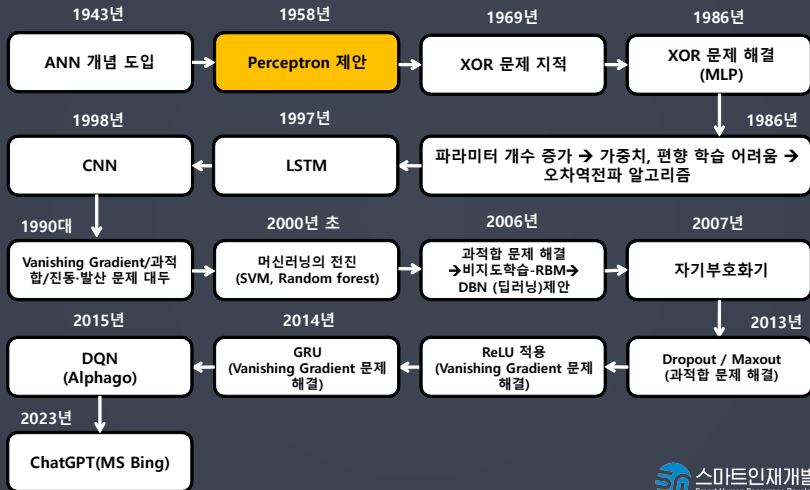
Chapter 2 퍼셉트론, 다층 퍼셉트론(Perceptron, MLP)

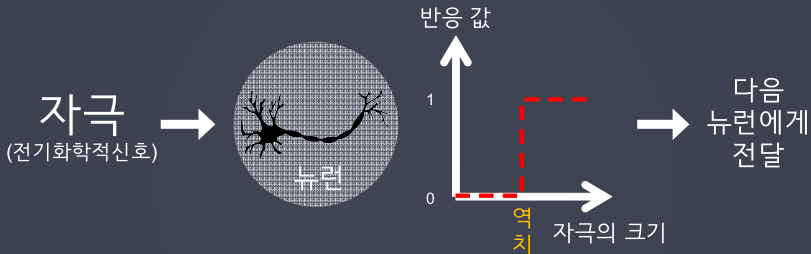


START



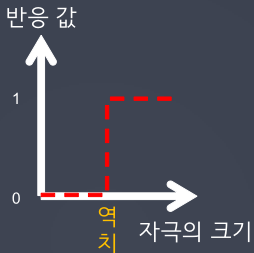
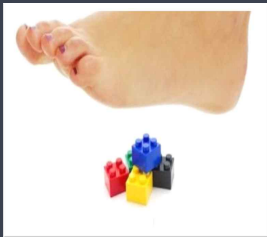
- 퍼셉트론의 개념을 이해 할 수 있다.
- 다층 퍼셉트론의 개념을 이해 할 수 있다.





신경의 흥분이 전달되기 위해서는 뉴런에 전달되는 자극의 크기가 **역치 이상**이 되어야함

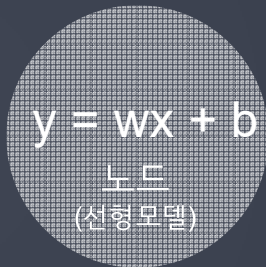
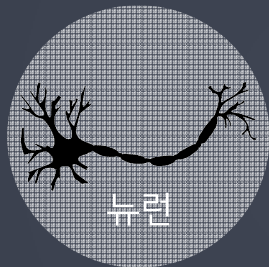
인공신경망 – 퍼셉트론(Perceptron)



자극
(전기화학적신호)



반응

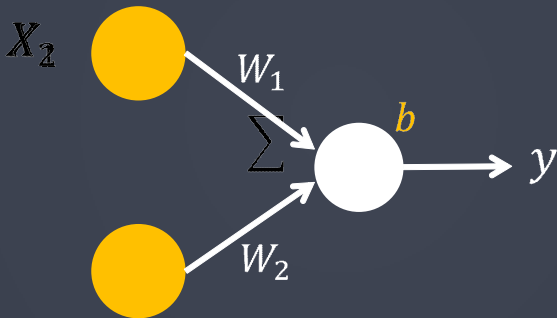


퍼셉트론 (Perceptron)

프랑크 로젠블라트가 1957년에 고안한 개념

The Perceptron: A Probabilistic Model for Information Storage and Organization in the Brain

$$y = W_1X_1 + W_2X_2 + b$$



$$y = W_1X_1 + W_2X_2 + b$$



반응 값



==

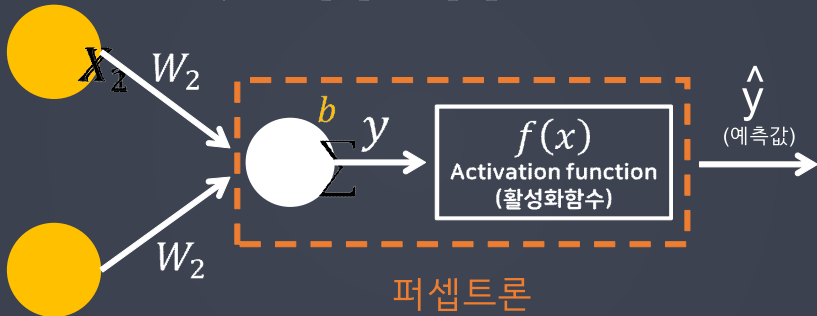
역
치

자극의 크기

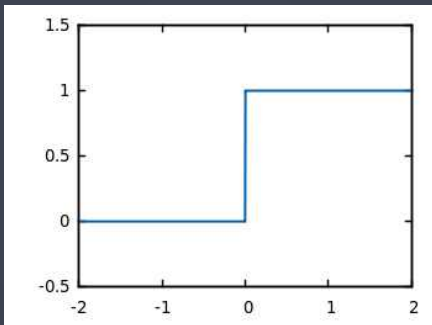
$$f(x)$$

Activation function
(활성화함수)

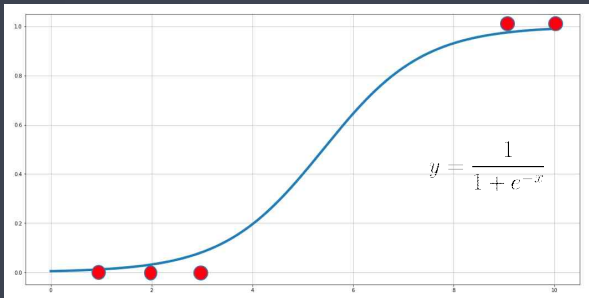
$$y = W_1X_1 + W_2X_2 + b$$



Step function(계단함수)



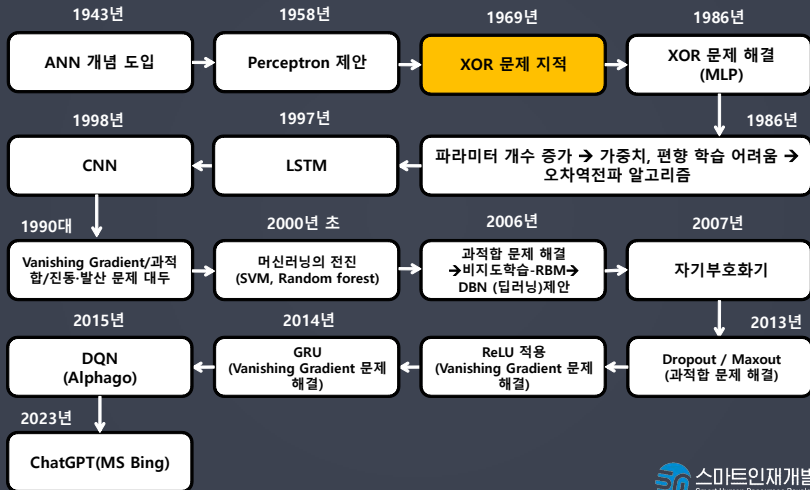
Sigmoid function(시그모이드 함수)



$$y = \begin{cases} 0, & (W_1X_1 + W_2X_2 + b \leq 0) \\ 1, & (W_1X_1 + W_2X_2 + b > 0) \end{cases}$$

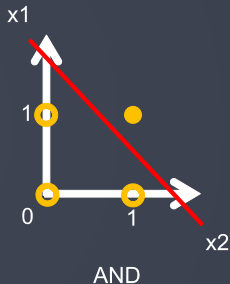
W_1, W_2 : 가중치 (weight) - 각 입력 신호가 결과에 주는 영향력을 조절하는 매개변수

b : 편향 (bias) - 뉴런이 얼마나 쉽게 활성화하느냐를 조절하는 매개변수



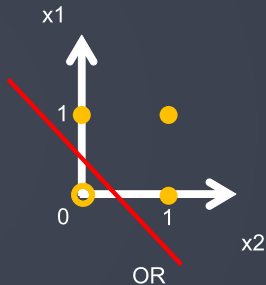
AND 게이트

x1	x2	AND
0	0	0
0	1	0
1	0	0
1	1	1



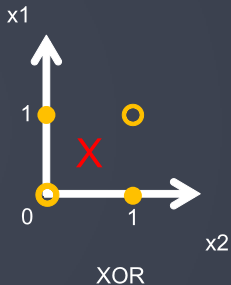
OR 게이트

x1	x2	OR
0	0	0
0	1	1
1	0	1
1	1	1



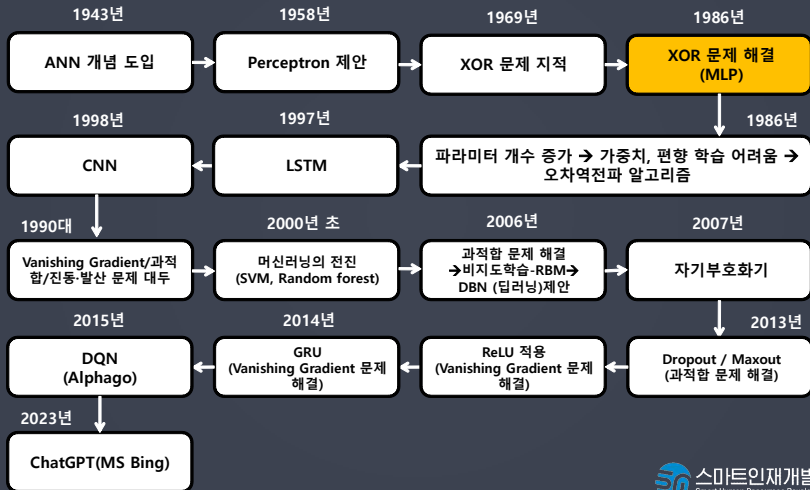
XOR 게이트

x1	x2	XOR
0	0	0
0	1	1
1	0	1
1	1	0

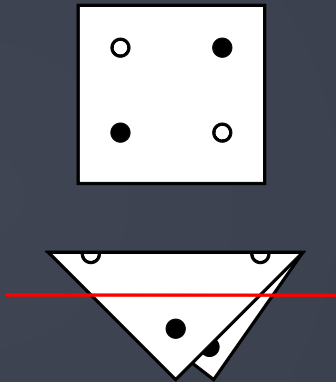
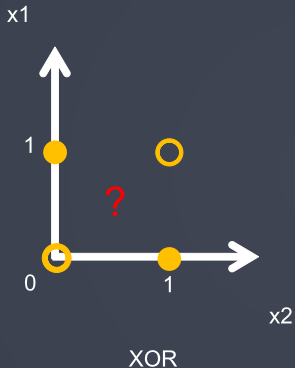


AND, OR는 해결이 가능하지만
간단한 XOR 문제를 해결 할 수 없었다.

딥러닝 역사 – XOR 문제 해결(MLP)

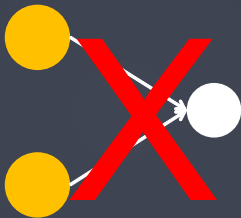


딥러닝 역사 – XOR 문제 해결(MLP)

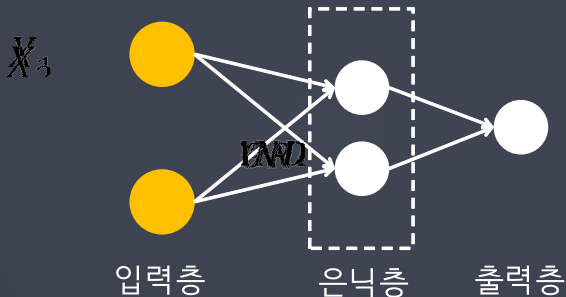


다층 퍼셉트론(Multi Layer Perceptron)

단층 퍼셉트론의 차원 수를 확장시켜
여러 개의 층으로 구성하여 만든 신경망.

X_1
 X_2 R 

다층 퍼셉트론



NAND 게이트

x1	x2	NAND
0	0	1
0	1	1
1	0	1
1	1	0

x1	x2	NAND
0	0	1
0	1	1
1	0	1
1	1	0

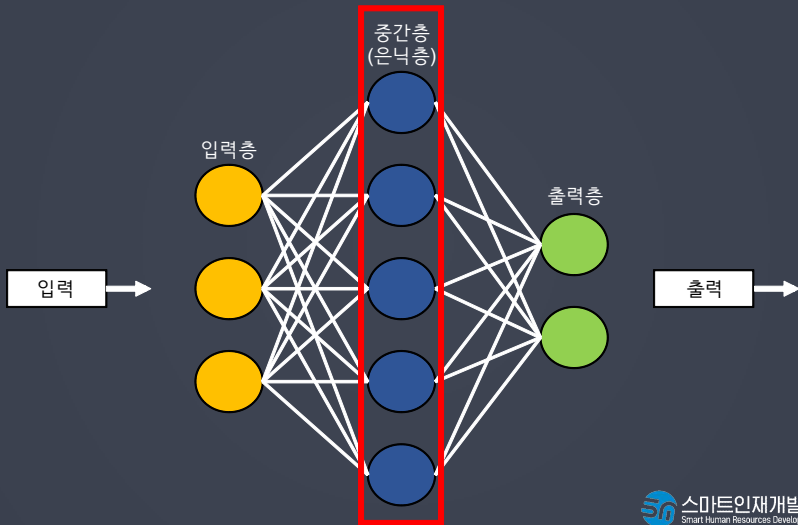
x1	x2	OR
0	0	0
0	1	1
1	0	1
1	1	1

NAND	OR	AND
1	0	0
1	1	1
1	1	1
0	1	0

==

XOR
0
1
1
0

다층 퍼셉트론(Multilayer Perceptron)



- 한 번의 연산으로 해결되지 않는 문제를 해결할 수 있다.
- = **문제(인명량) 학습 복잡해지므로 계산량이 늘어난다** (파라미터가 많아)
- 학습시 과대적합되기 쉽다.