

The background features a close-up of a woman's face, looking slightly to the side. Overlaid on this are various digital and technological elements: a grid of binary code (0s and 1s) in blue and white, and a collage of small, semi-transparent images on the right side. These images include a globe, a city at night, a person working on a laptop, a rocket launch, a satellite, and various abstract digital patterns. The overall color palette is dominated by blues, greys, and warm oranges from the collage.

딥러닝

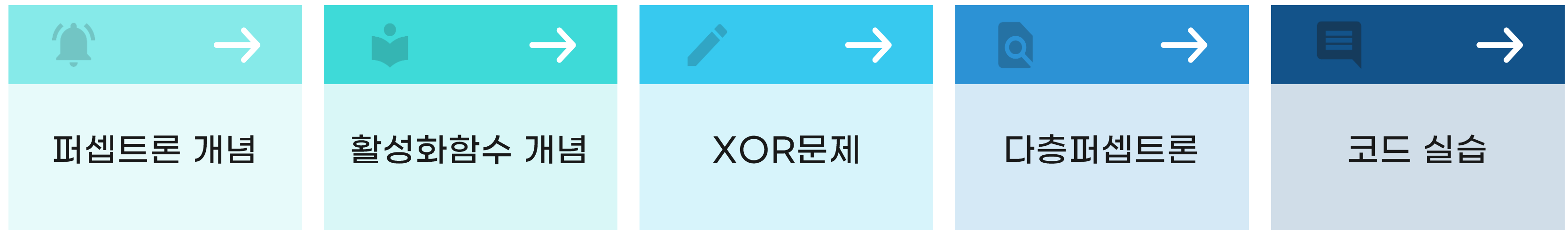
(Deep Learning)

최성우

학습목표

- 퍼셉트론과 활성화함수의 개념을 이해할 수 있다
- 다층퍼셉트론(MLP)의 개념을 이해할 수 있다
- 딥러닝 역사 중 XOR문제를 이해할 수 있다
- 다층퍼셉트론(MLP)을 사용한 실습을 진행할 수 있다



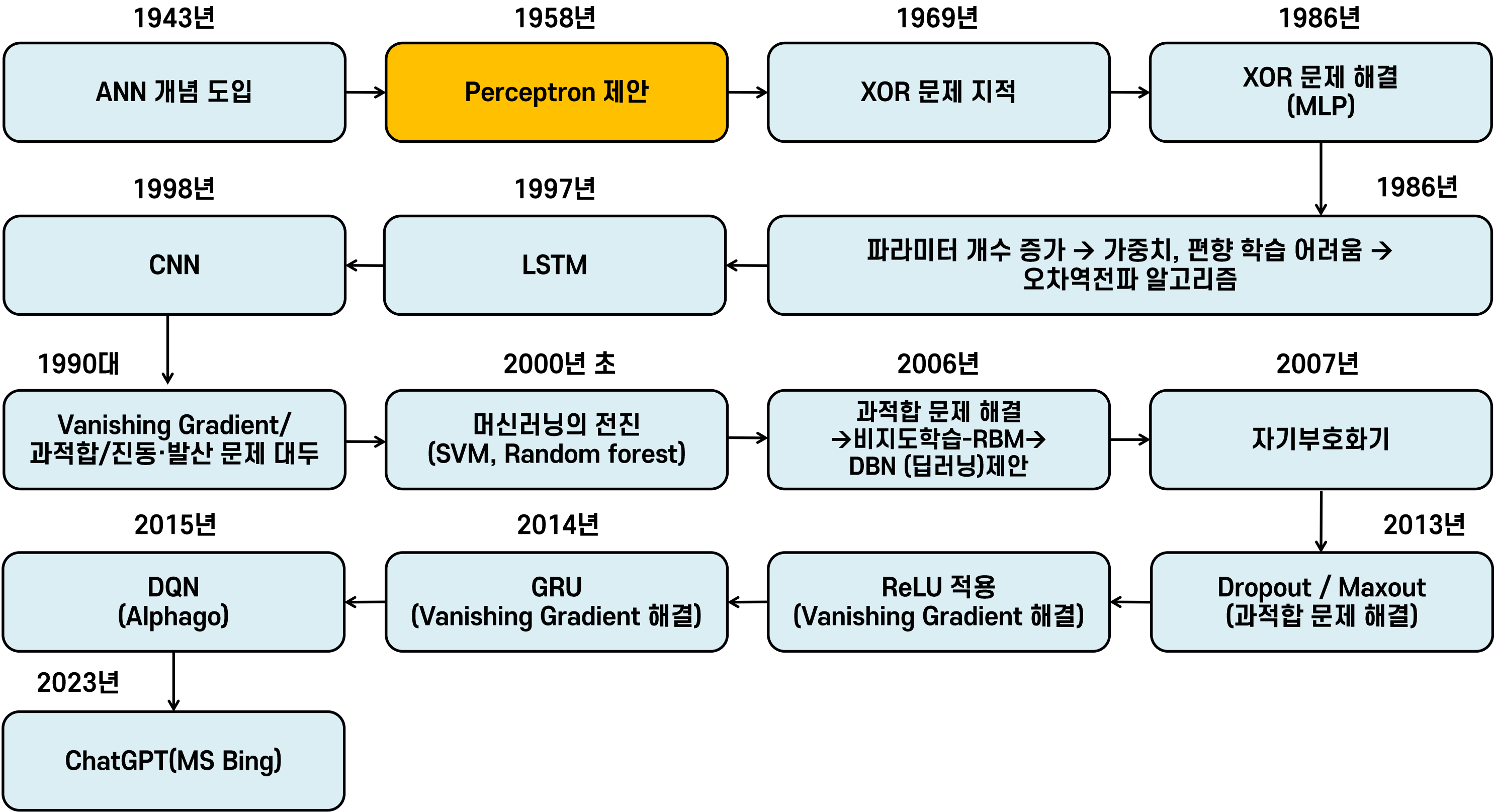


퍼셉트론

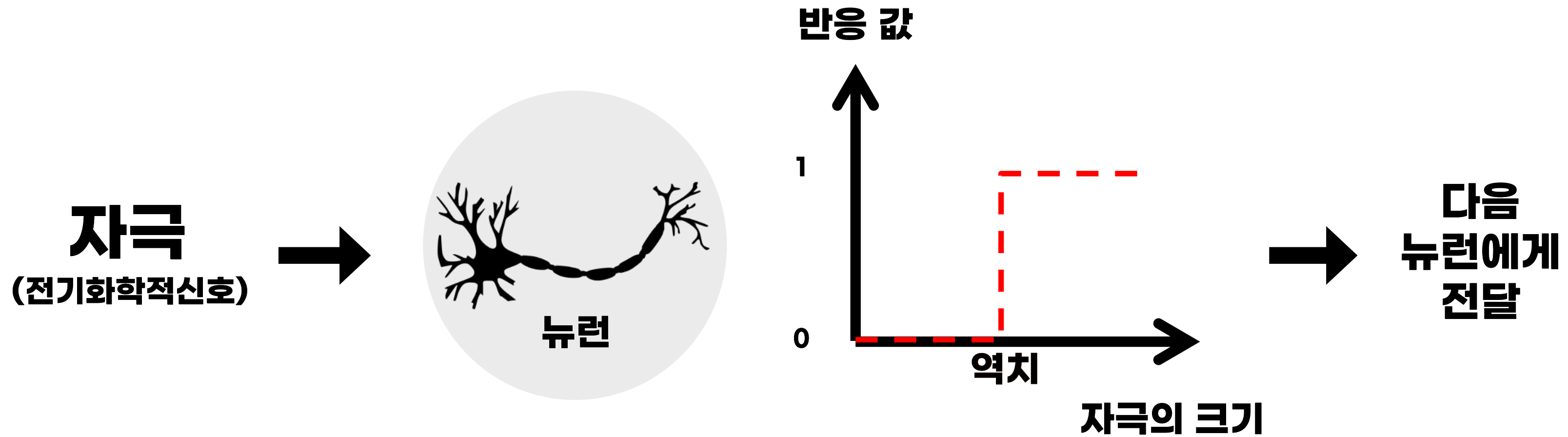
인공신경망을 구성하는 가장 기본 단위



딥러닝 역사 - 퍼셉트론 제안

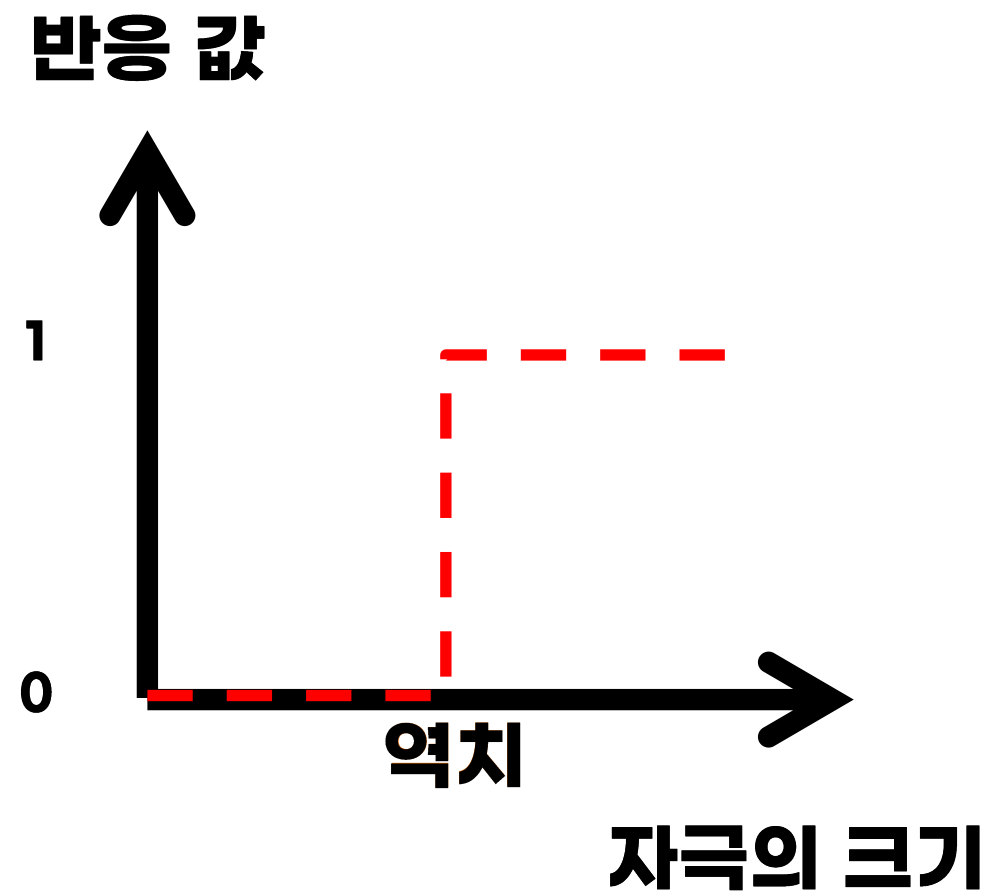


퍼셉트론(Perceptron)

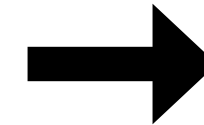
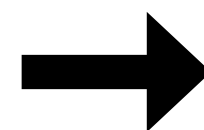
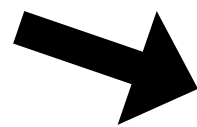
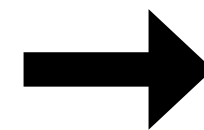
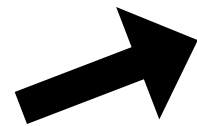
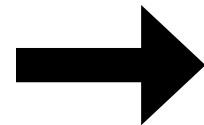


신경의 흥분이 전달되기 위해서는 뉴런에 전달되는 자극의 크기가 **역치 이상**이 되어야함

퍼셉트론(Perceptron)

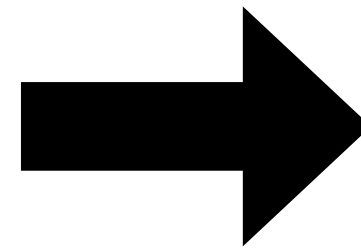


자극
(전기화학적신호)



반응

퍼셉트론(Perceptron)



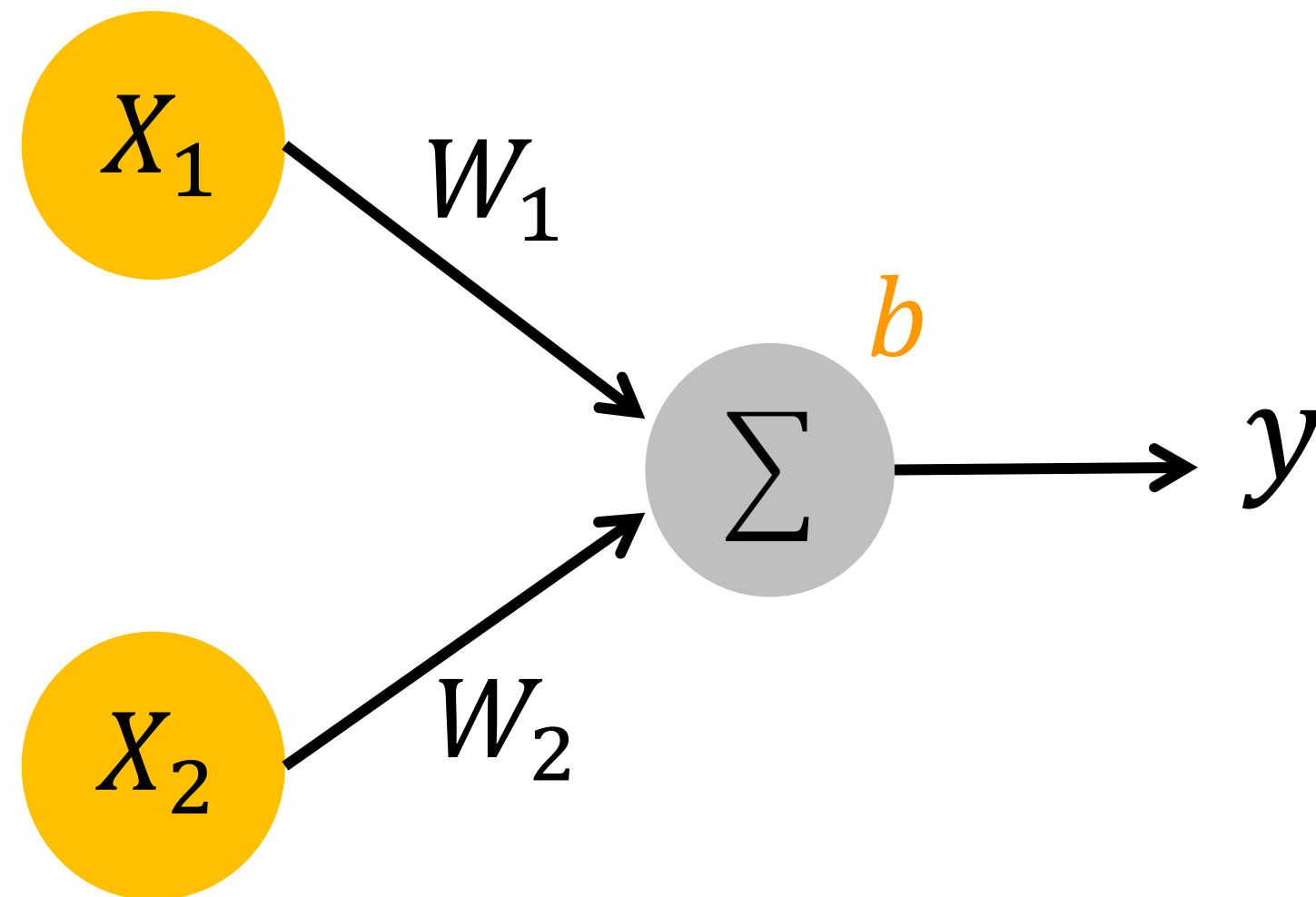
퍼셉트론 (Perceptron) perception + neuron

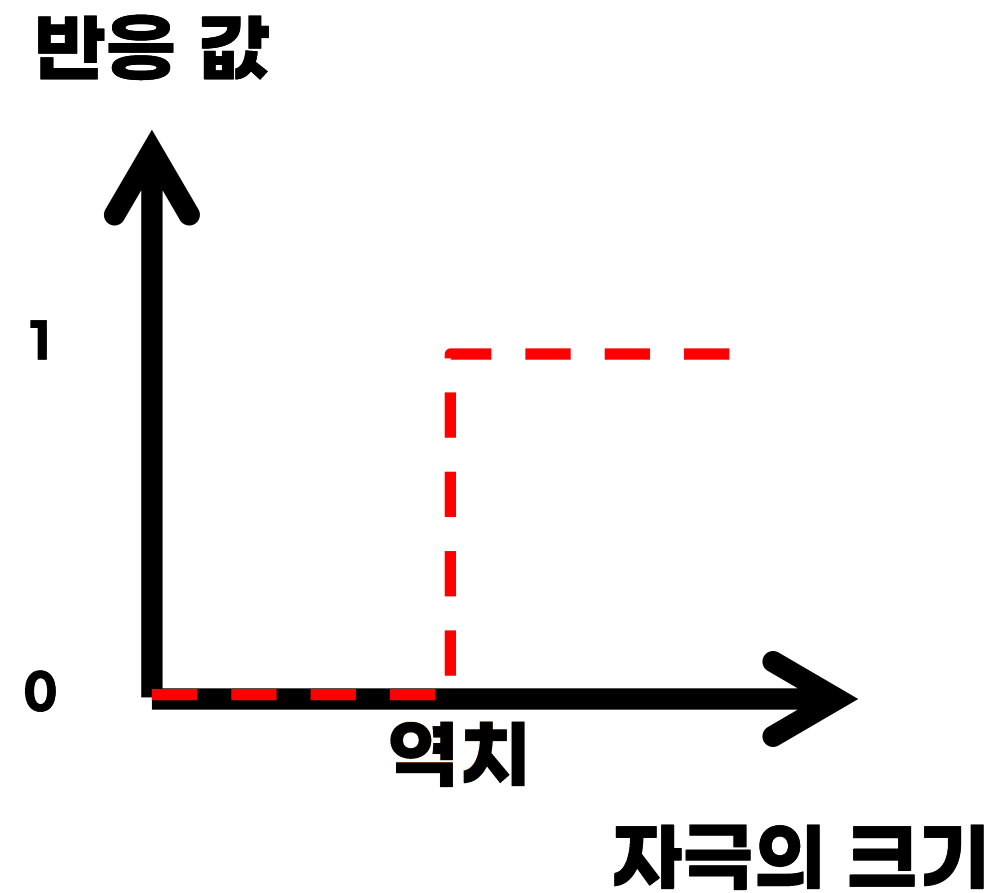
프랑크 로젠블라트가 1957년에 고안한 개념

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

퍼셉트론(Perceptron)

$$y = W_1X_1 + W_2X_2 + b$$





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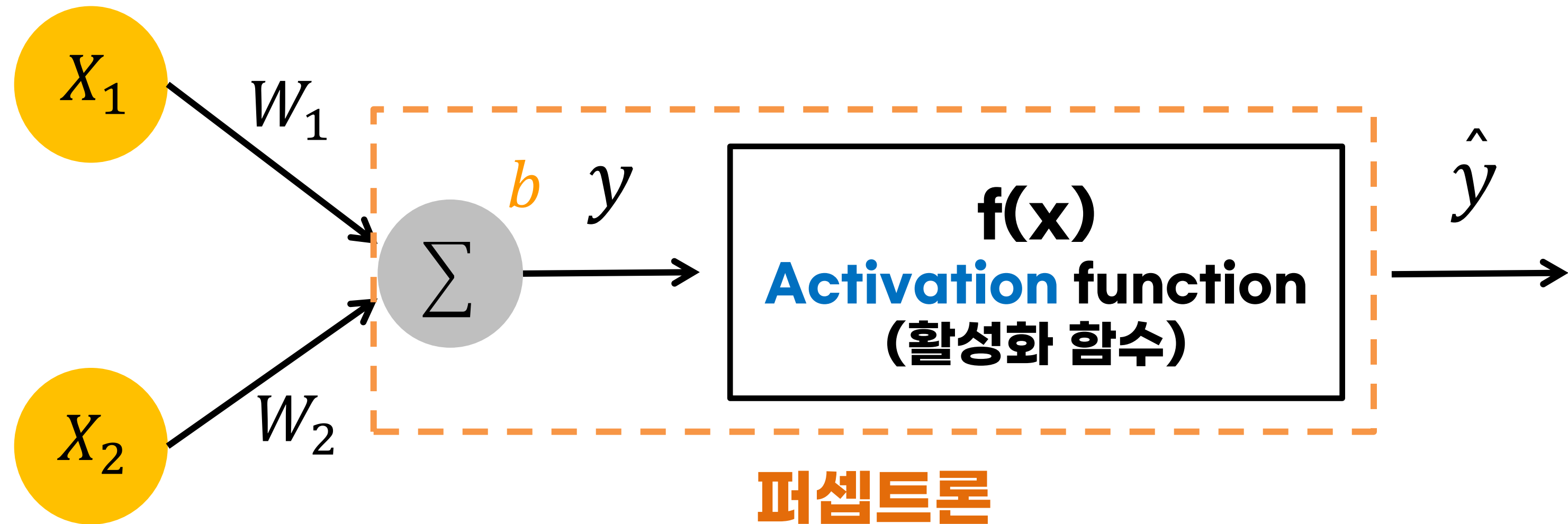
$$y = W_1X_1 + W_2X_2 + b$$



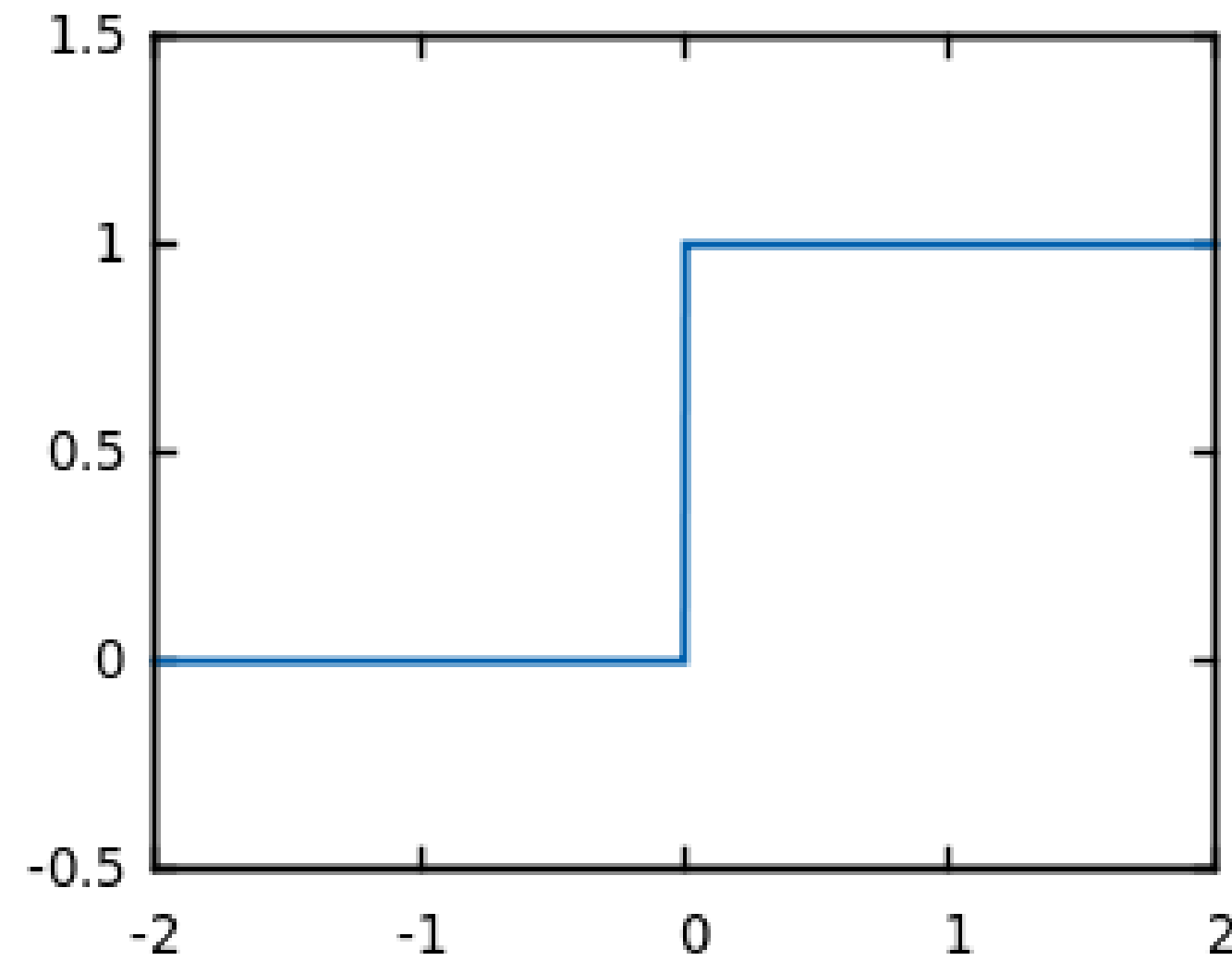
f(x)
Activation function(활성화 함수)

퍼셉트론(Perceptron)

$$y = W_1X_1 + W_2X_2 + b$$



Step function(계단함수)

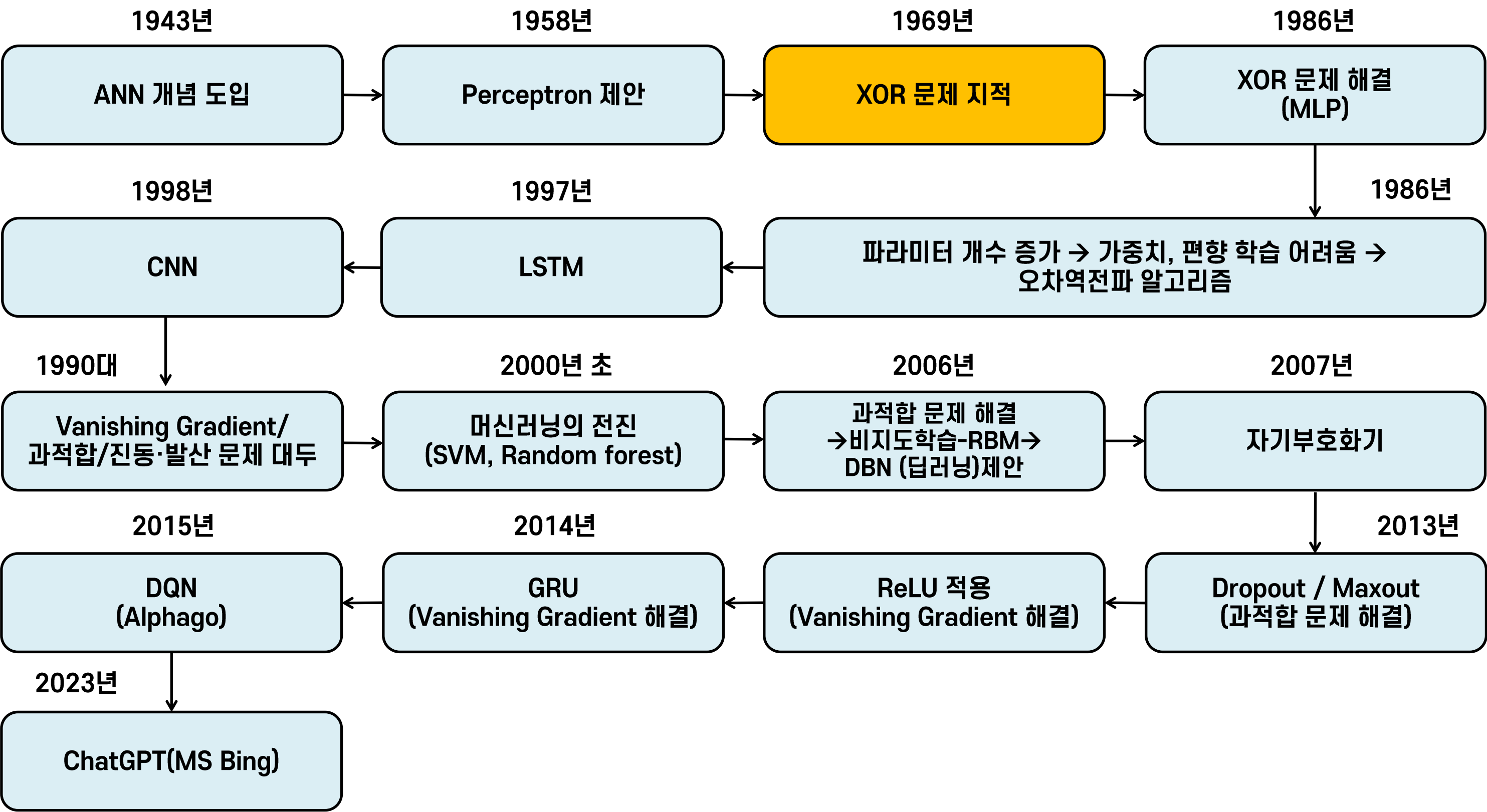


$$y = \begin{cases} 0, & (W_1X_1 + W_2X_2 + b \leq 0) \\ 1, & (W_1X_1 + W_2X_2 + b > 0) \end{cases}$$

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

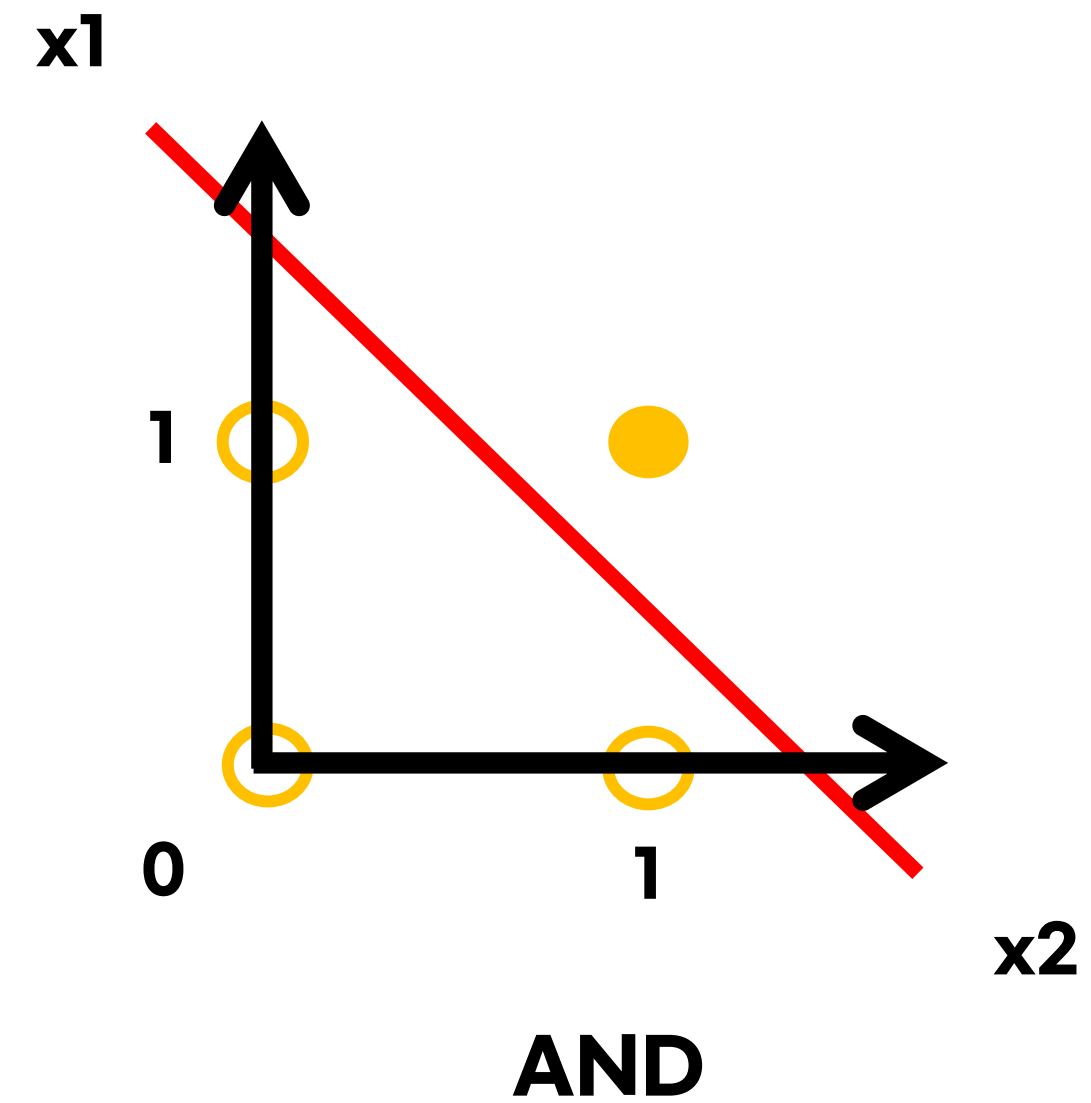
b : 편향 (bias) - 뉴런이 얼마나 쉽게 활성화하느냐를 조절하는 매개변수

딥러닝 역사 - XOR 문제



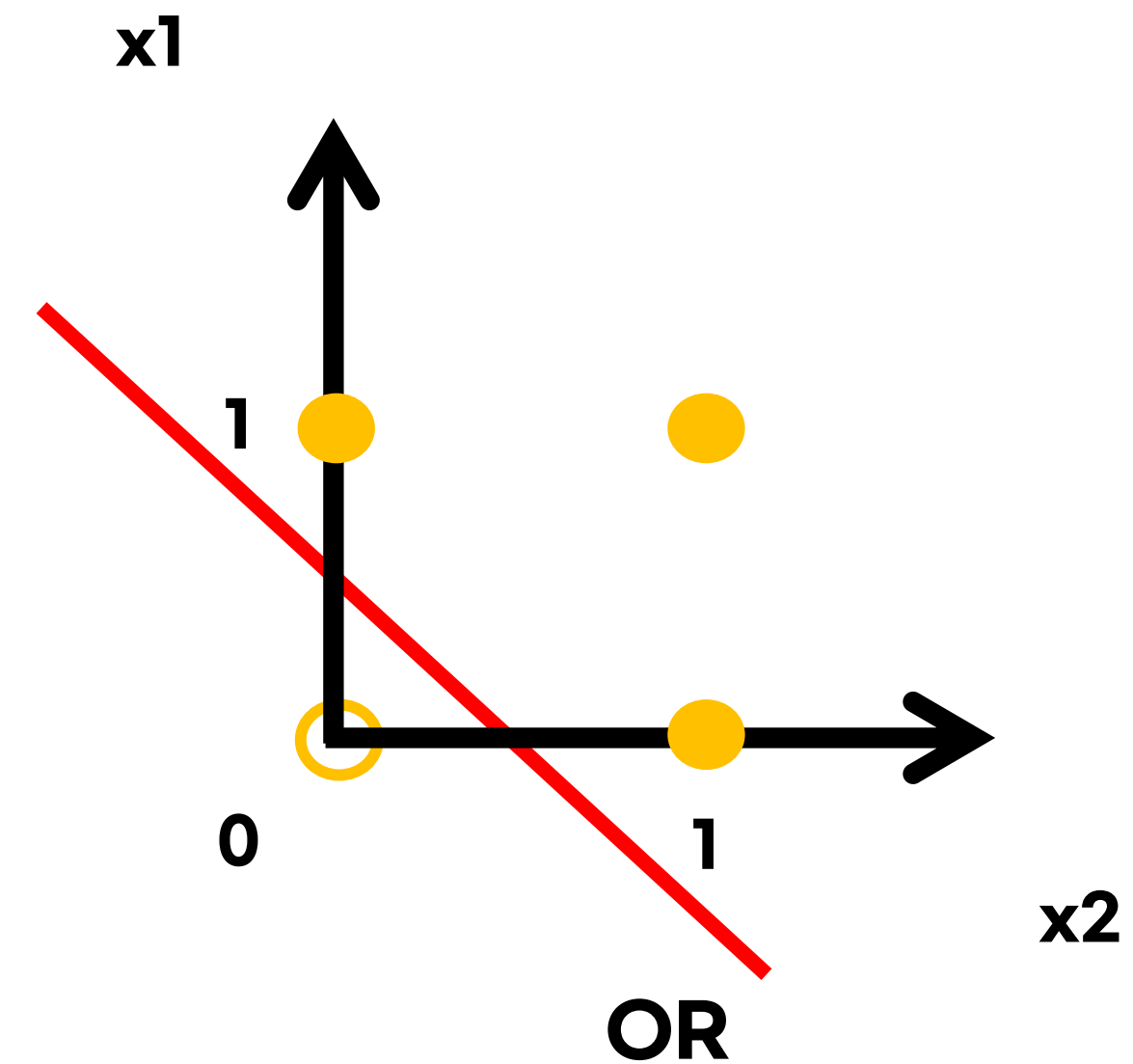
AND 게이트

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



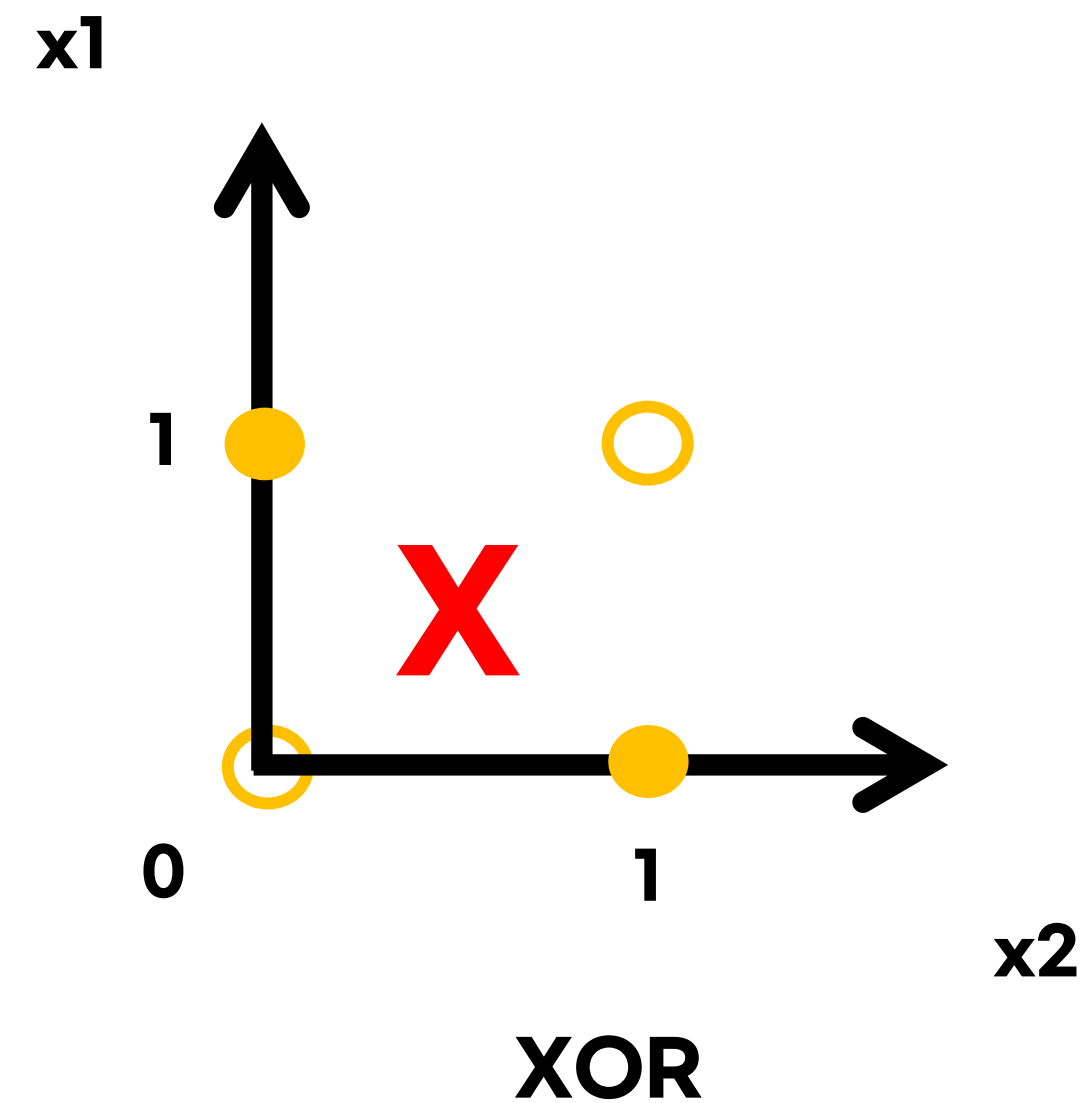
OR 게이트

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



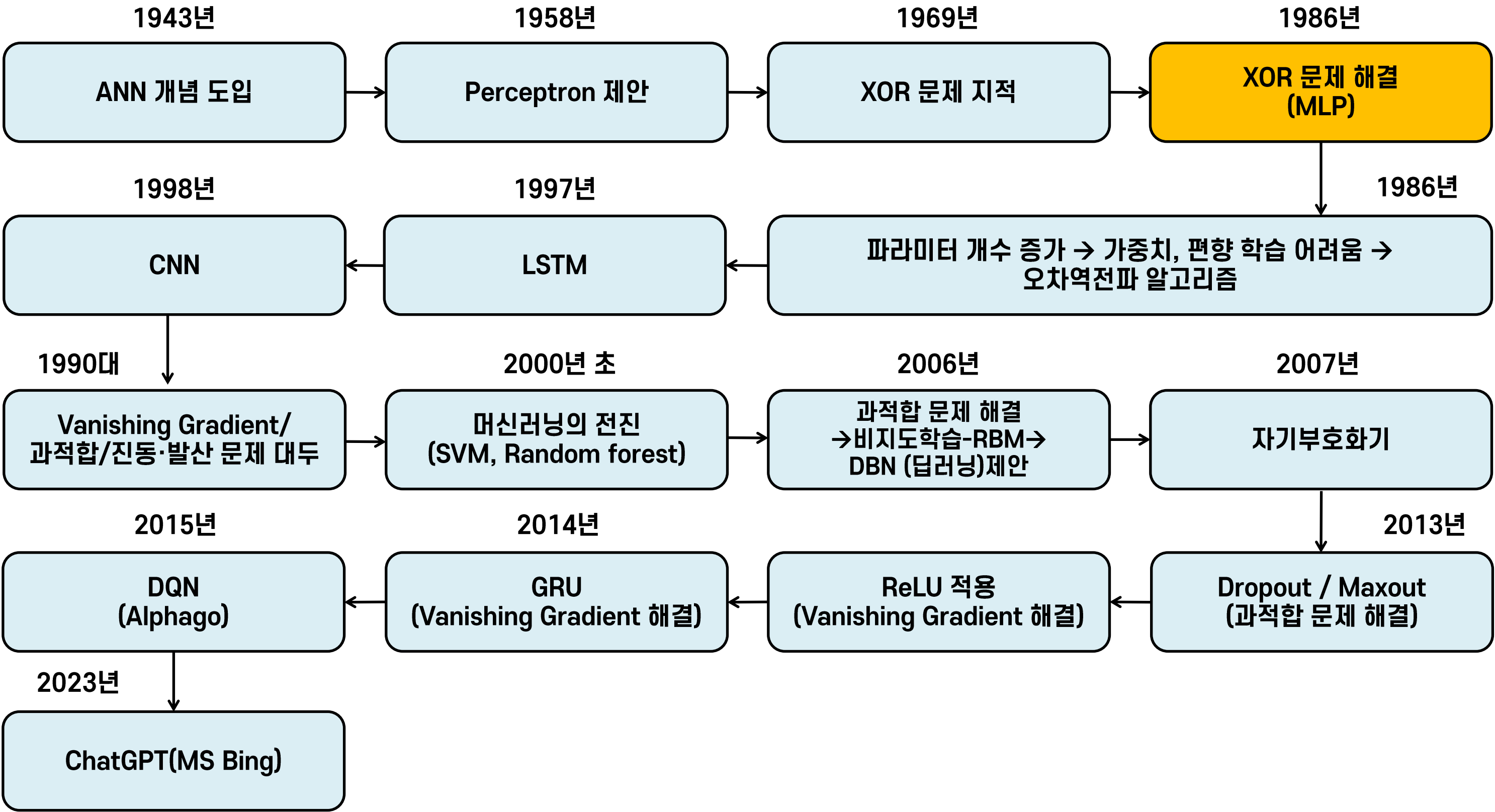
XOR 게이트

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

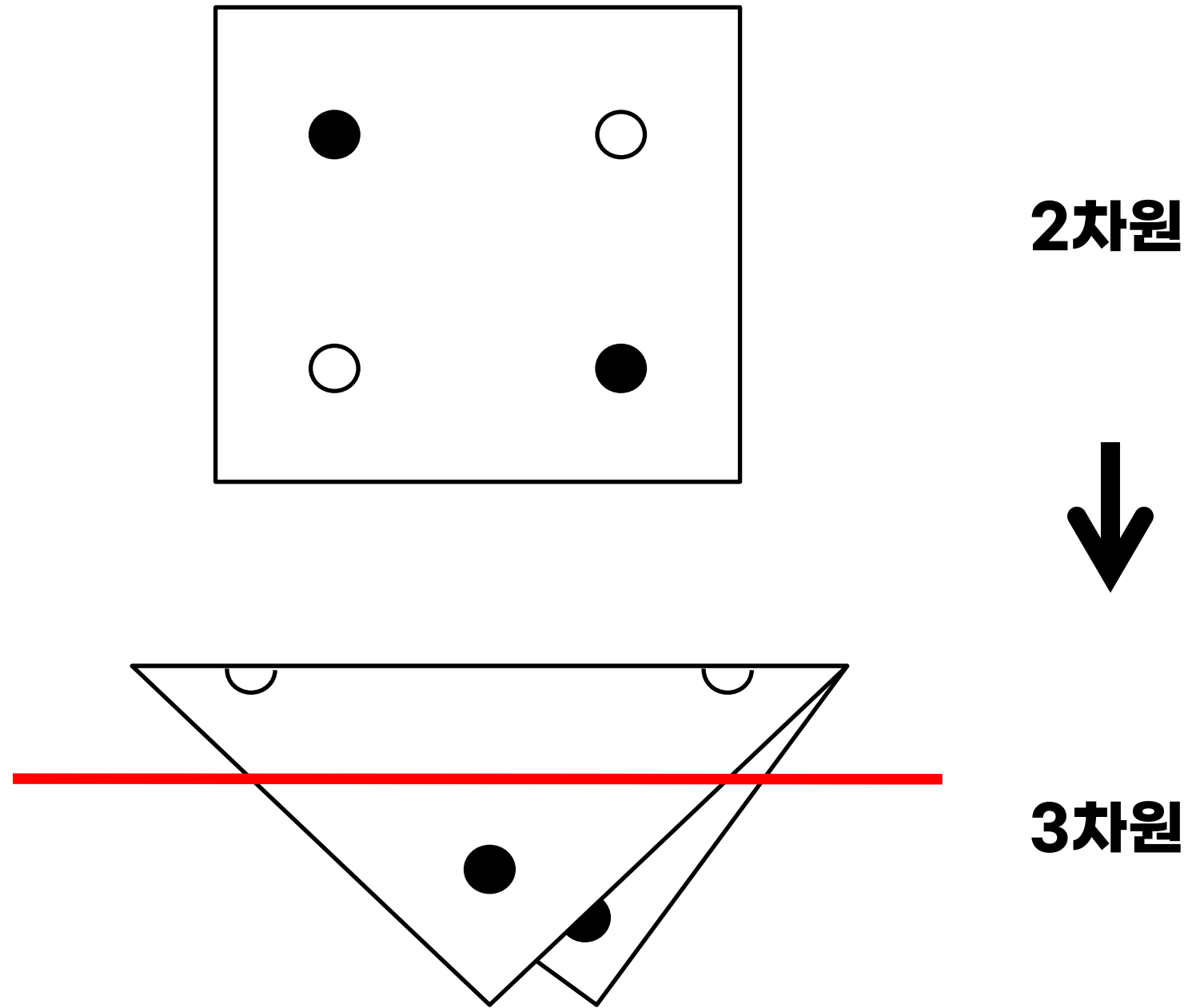
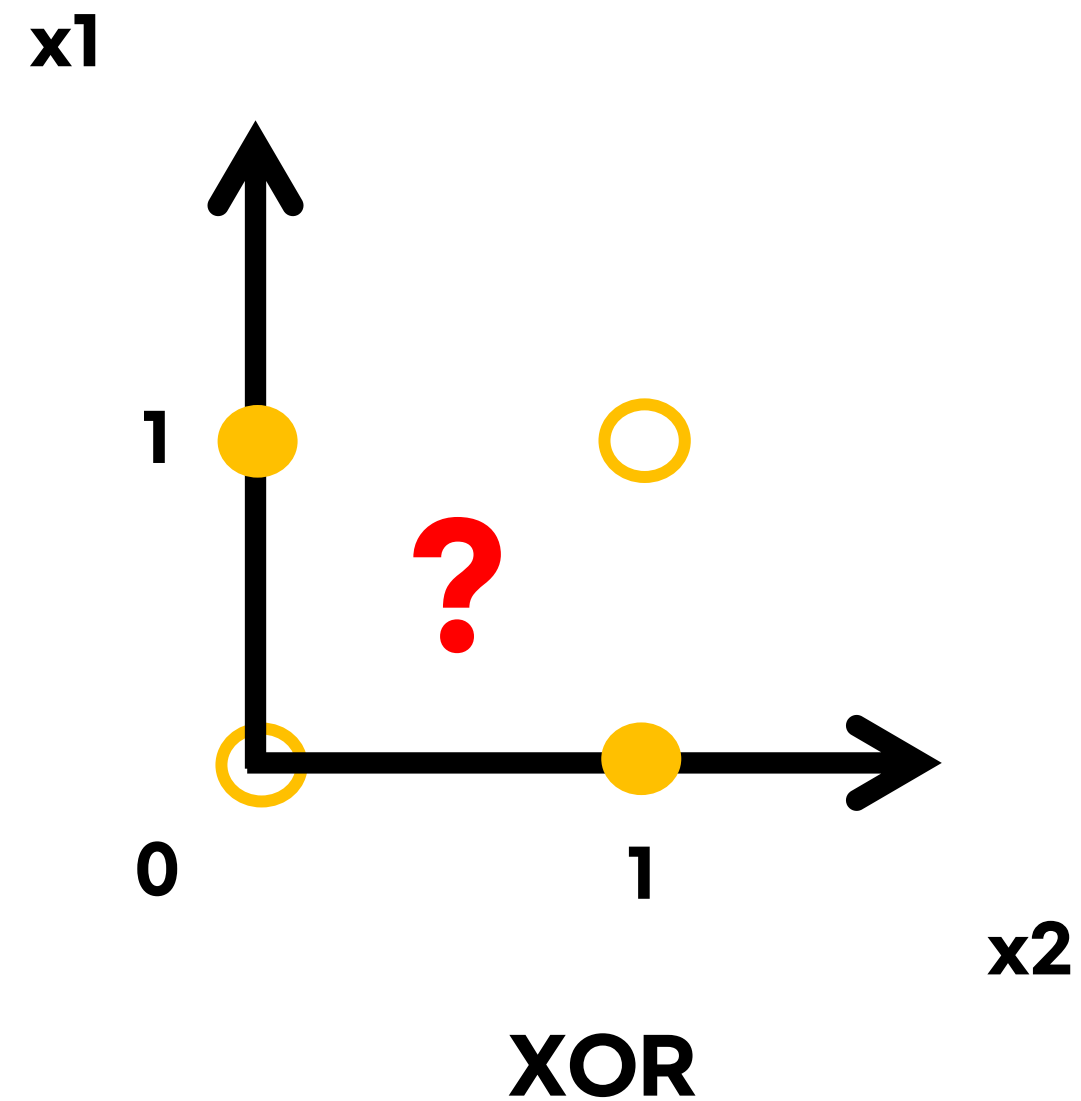


**AND, OR는 해결이 가능하지만
머신러닝으로도 간단히 풀리는
XOR 문제를 해결할 수 없었다**

딥러닝 역사 - XOR 문제 해결(MLP)



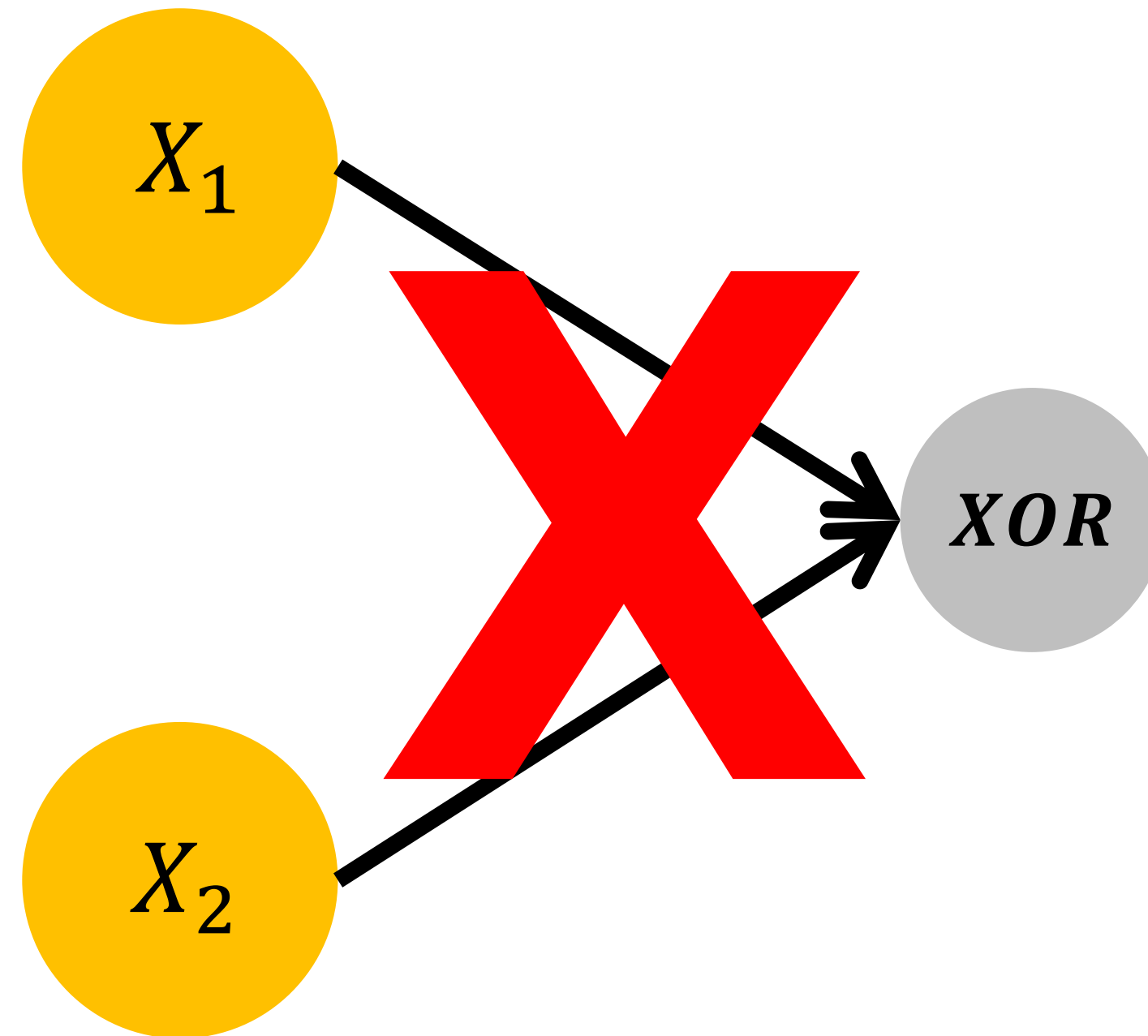
딥러닝 역사 - XOR 문제 해결(MLP)



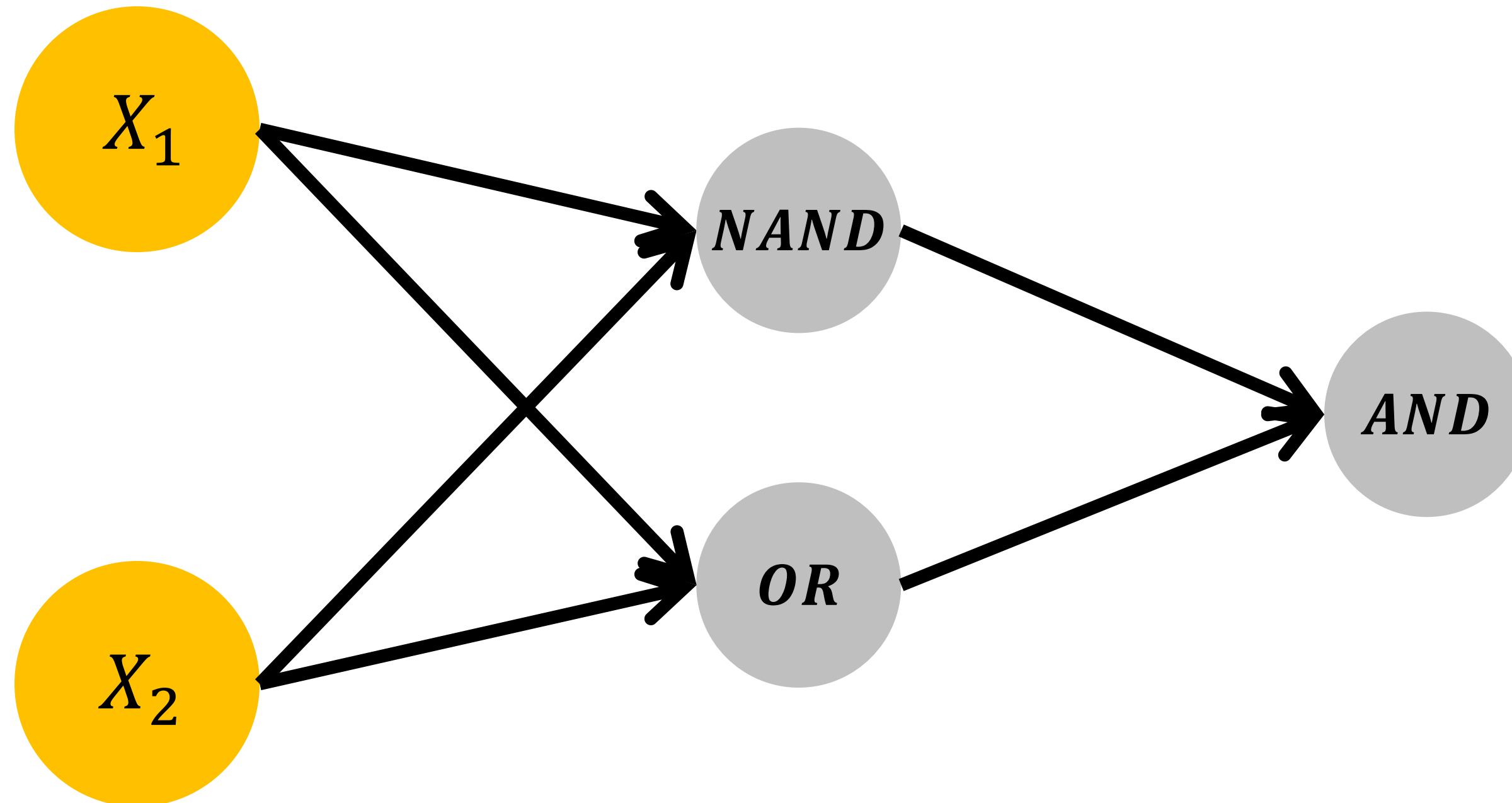
다층퍼셉트론(Multi Layer Perceptron)

단층 퍼셉트론의 차원수를 확장시켜
여러 개의 층으로 구성하여 만든 신경망

딥러닝 역사 - XOR 문제 해결(MLP)



딥러닝 역사 - XOR 문제 해결(MLP)



XOR 게이트

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

딥러닝 역사 - XOR 문제 해결(MLP)

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

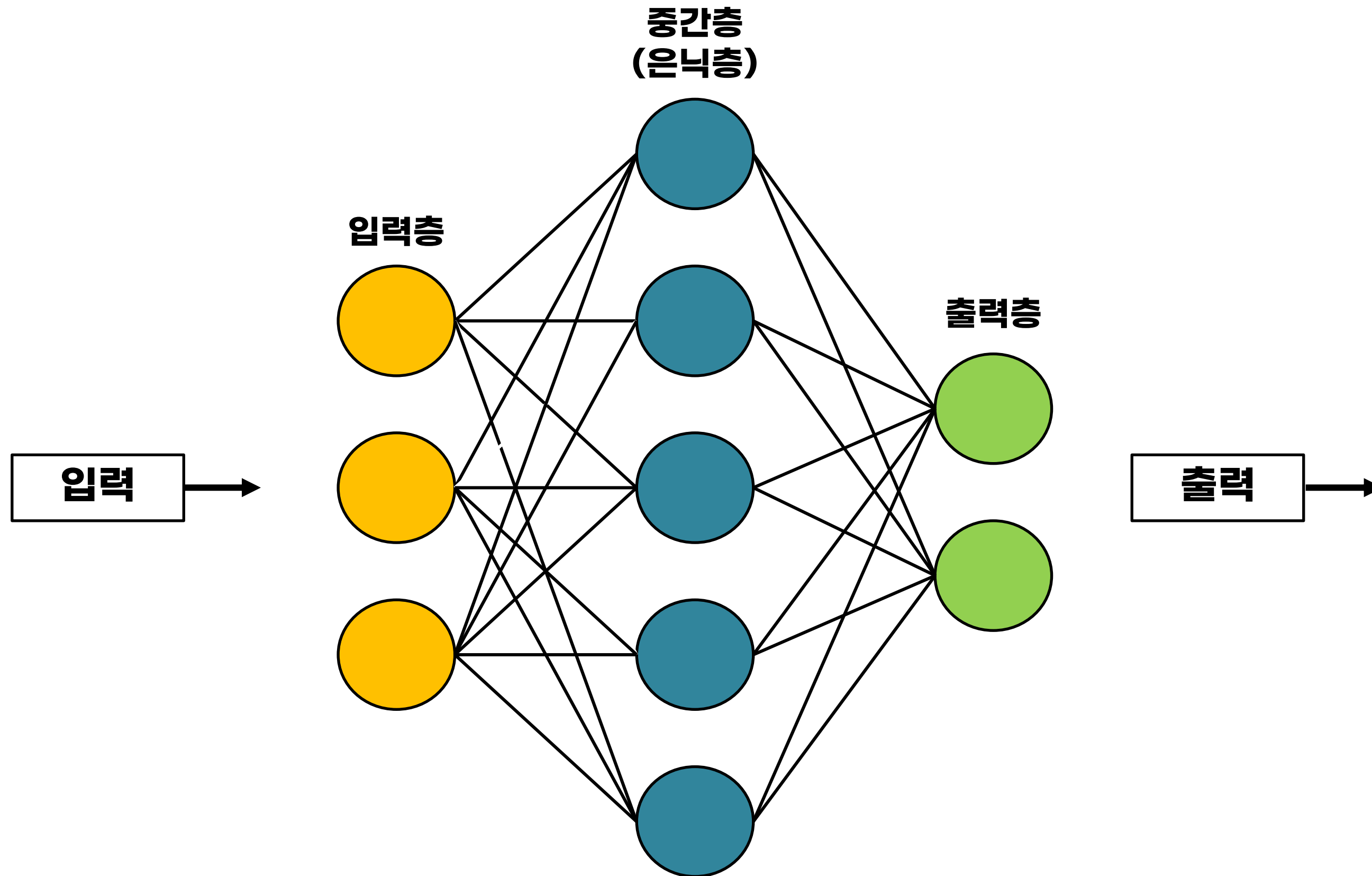
x1	x2	OR
0	0	0
0	1	1
1	0	1
1	1	1

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

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XOR
0
1
1
0

다층 퍼셉트론(Multilayer Perceptron)



- 한 번의 연산으로 해결되지 않는 문제를 해결할 수 있다
- 단층에 비해 학습시간이 오래 걸린다
- 모델(신경망)이 복잡해지면 학습시 과대적합되기 쉽다

keras 맛보기 : 폐암 환자 생존 예측 실습



다음시간에

복습 없이 전부를 이해하려는 것은 정신병 초기 증상이다