AI and Deep Learning

6. Logistic Regression(3)

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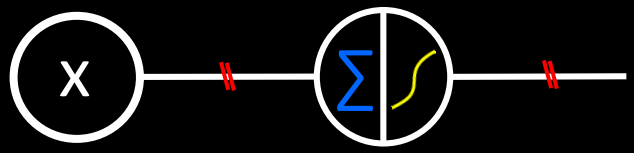
- 학습(파라미터 뉴닝)이 끝나 내가 원하는 데이터를 넣어(x_data) 테스트 해보자.
  - 실패! 처음 할당한 값이 이미 계산 그래프 안으로 복사되어 사용되었고, 이후 x_data를 변경하여도 이를 사용하지 못함.
- 학습 데이터가 매우 클 경우
  - 조금씩 잘라서 넣을 수 있어야 함.

(실습) 15.py

신경 세포 (1 입력)

- 결정 경계는(점)?



$wx = 0$

$x = 0$

"바이어스가 있을 경우 역할은?"
만일 w와 바이어스가 각각 1이면?

$x + 1 = 0$

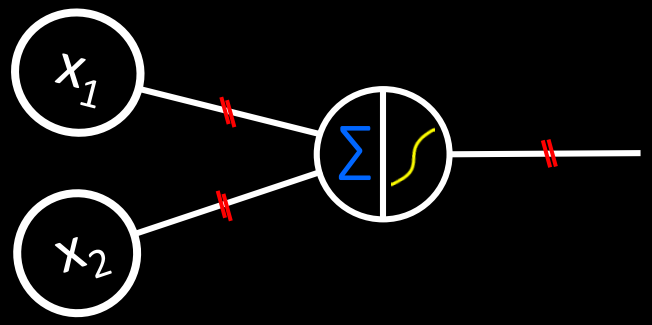
$x = -1$ **결정경계**

신경 세포 (2 입력)

- 결정 경계는(선)?

$$w_1 x_1 + w_2 x_2 = 0$$

$$x_1 + x_2 = 0$$



"바이어스가 있을 경우 역할은?"

신경 세포 (3 입력)

- 결정 경계는(면)?

$$w_1x_1 + w_2x_2 + w_3x_3 = 0$$

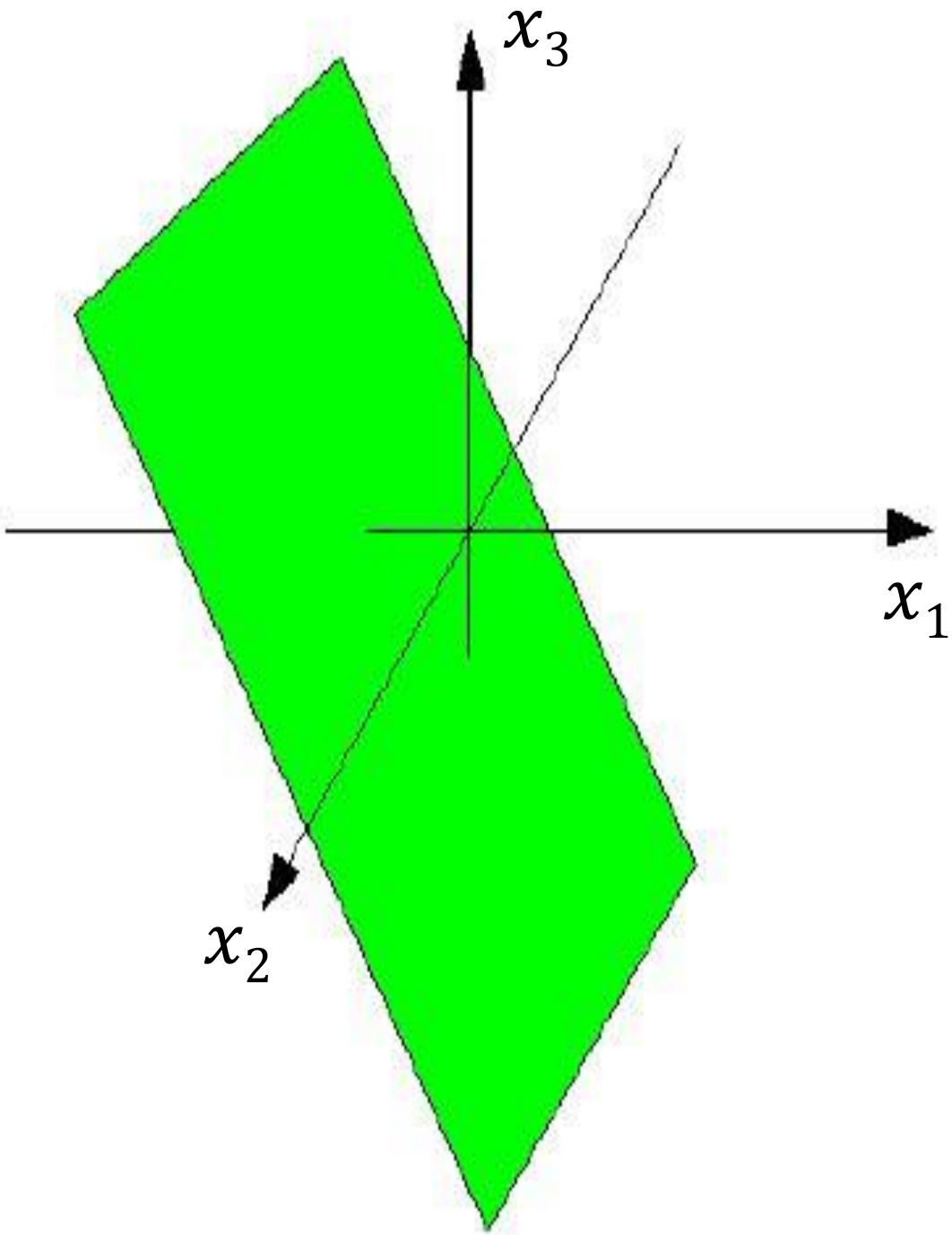
$$x_1 + x_2 + x_3 = 0$$

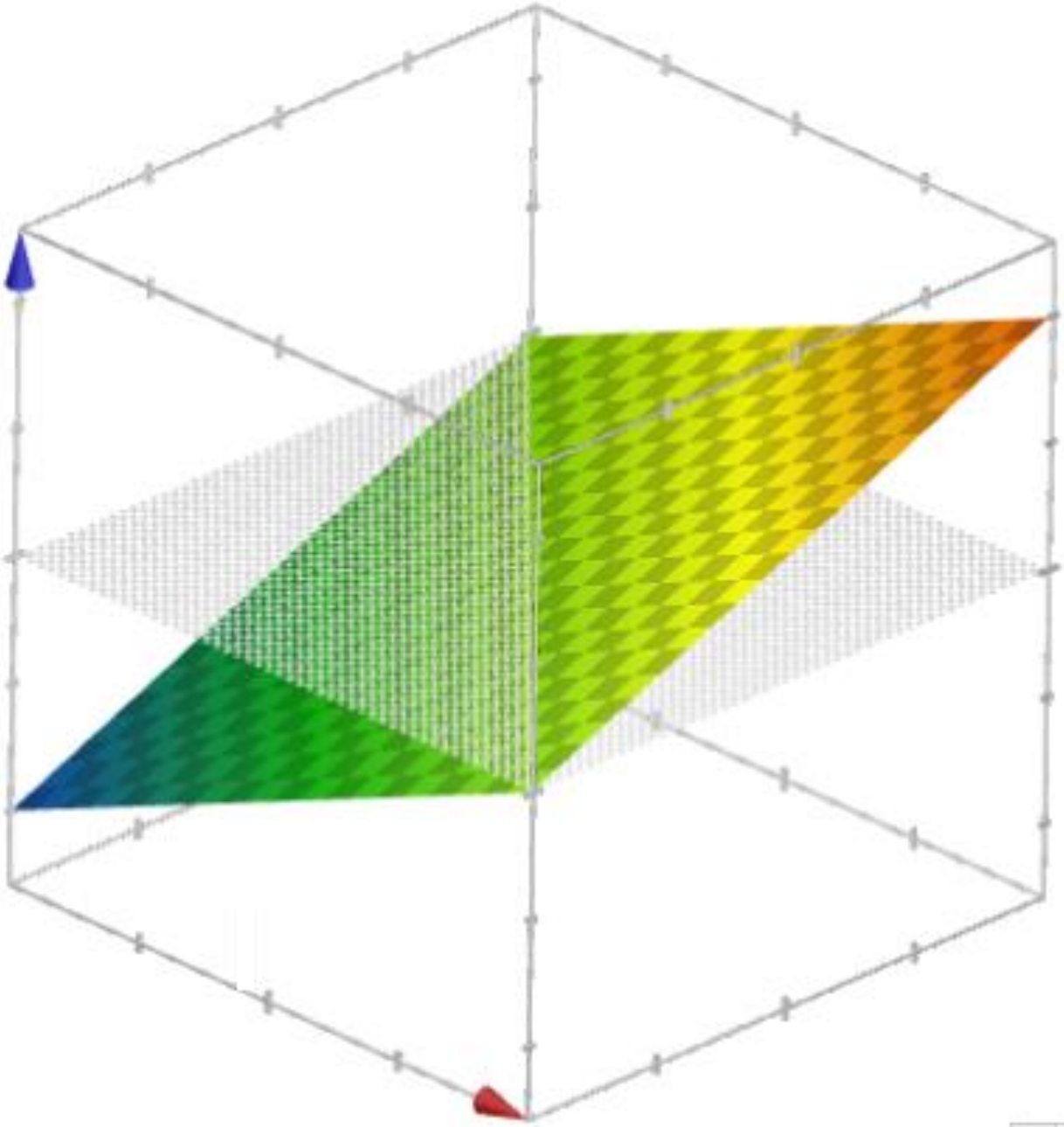
"바이어스가 있을 경우 역할은?"

입력이 3개인 신경 세포 1개는
이런 **결정 경계**를 만든다!

$$x_1 + x_2 + x_3 + 1 = 0$$

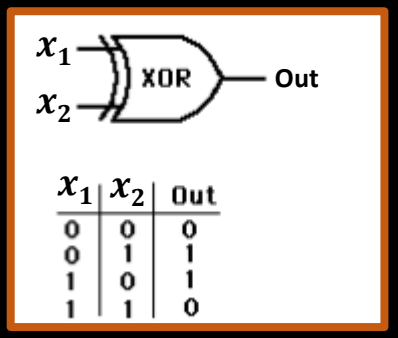
"바이어스 = 1"



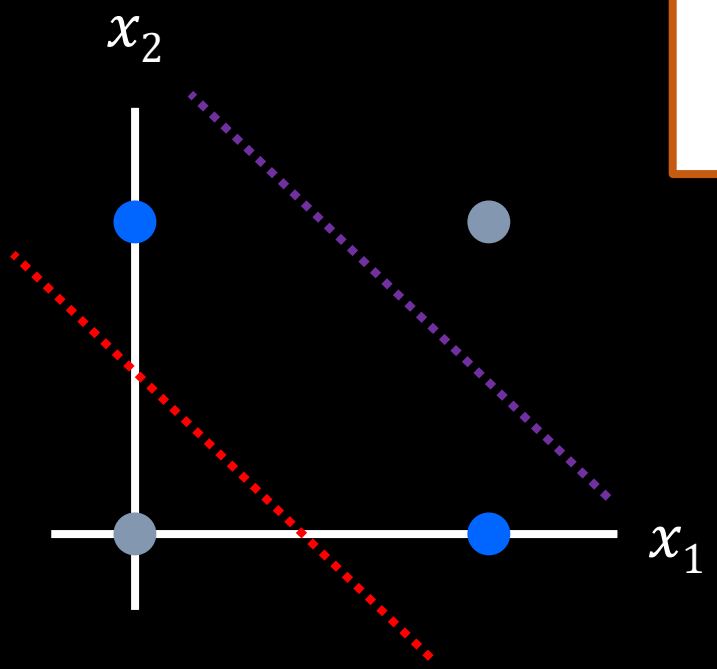

Fron

이제까지는 모두
선형 결정경계 분류 문제

XOR 문제



x_1	x_2	Out
0	0	0
0	1	1
1	0	1
1	1	0



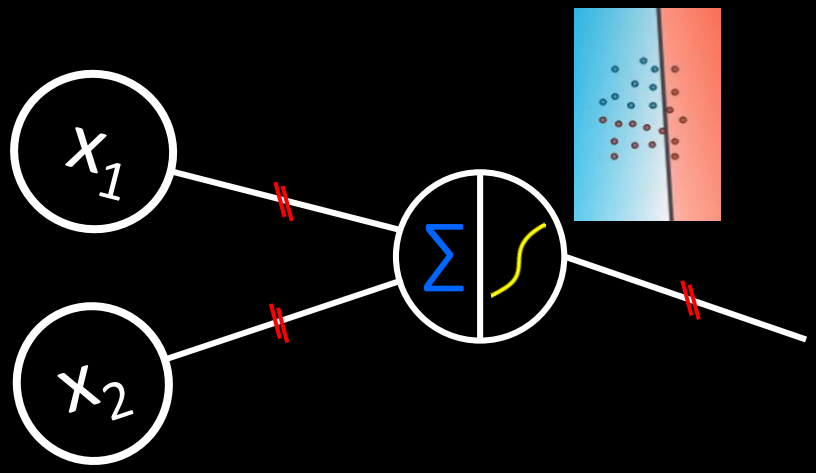
{위에서 본 모습}

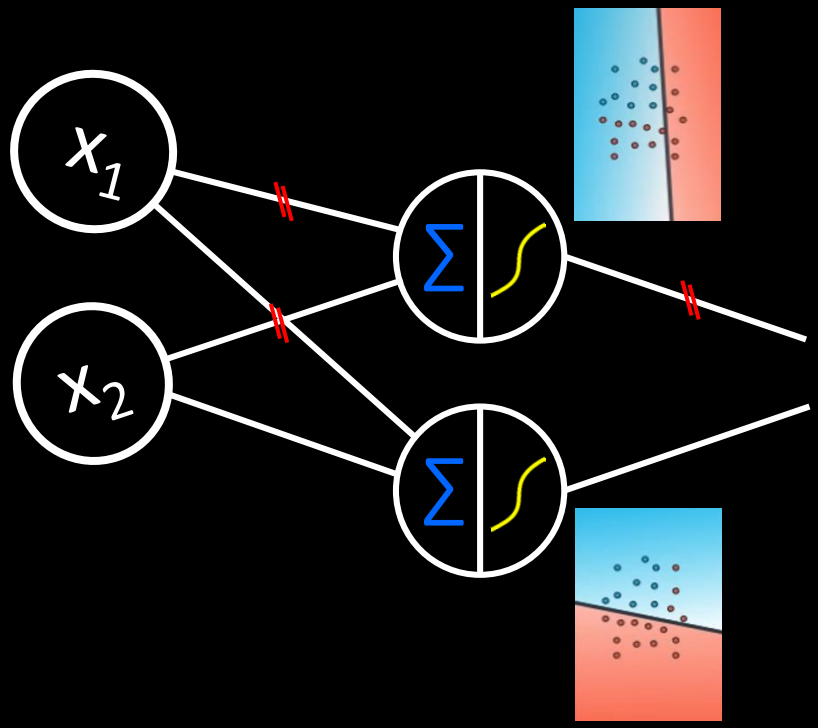
XOR 문제

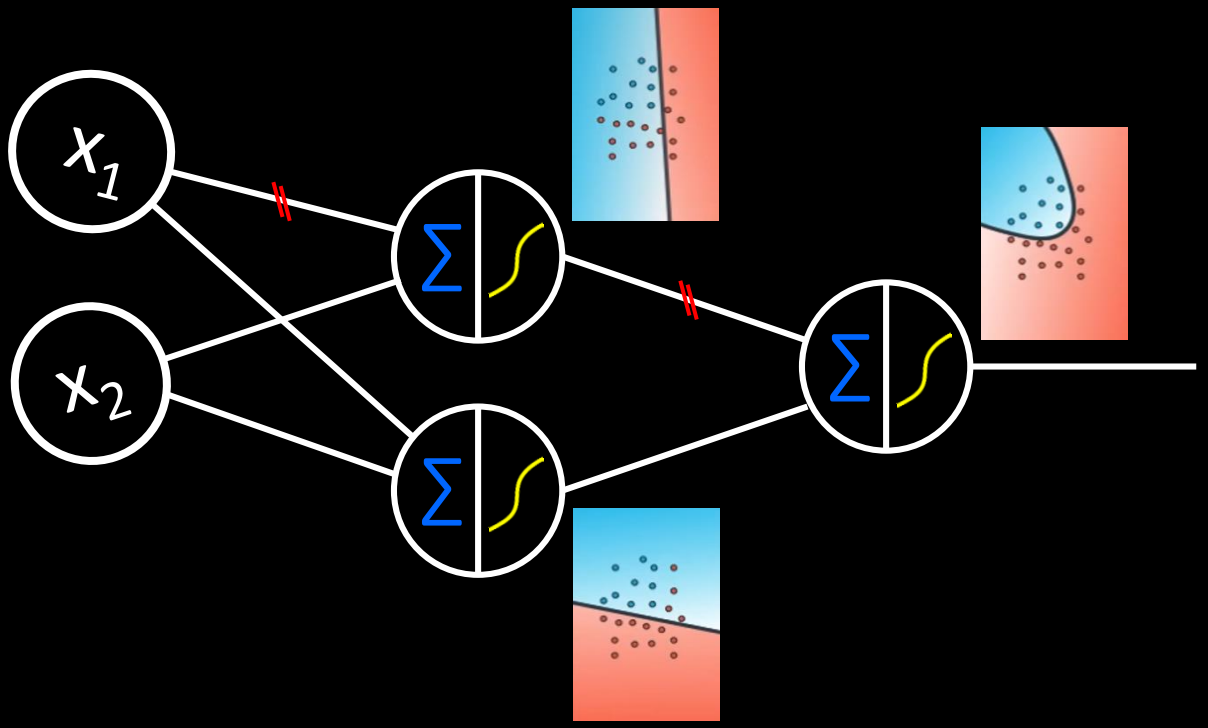
- 클래스 수는?
- 따라서 필요한 결정경계의 수는?
- 선형 결정경계 1개로는 불가능
- 선형 결정경계 2개로도 불가능 (왜?)
- 비선형 결정경계 1개가 필요

(실습) 16.py

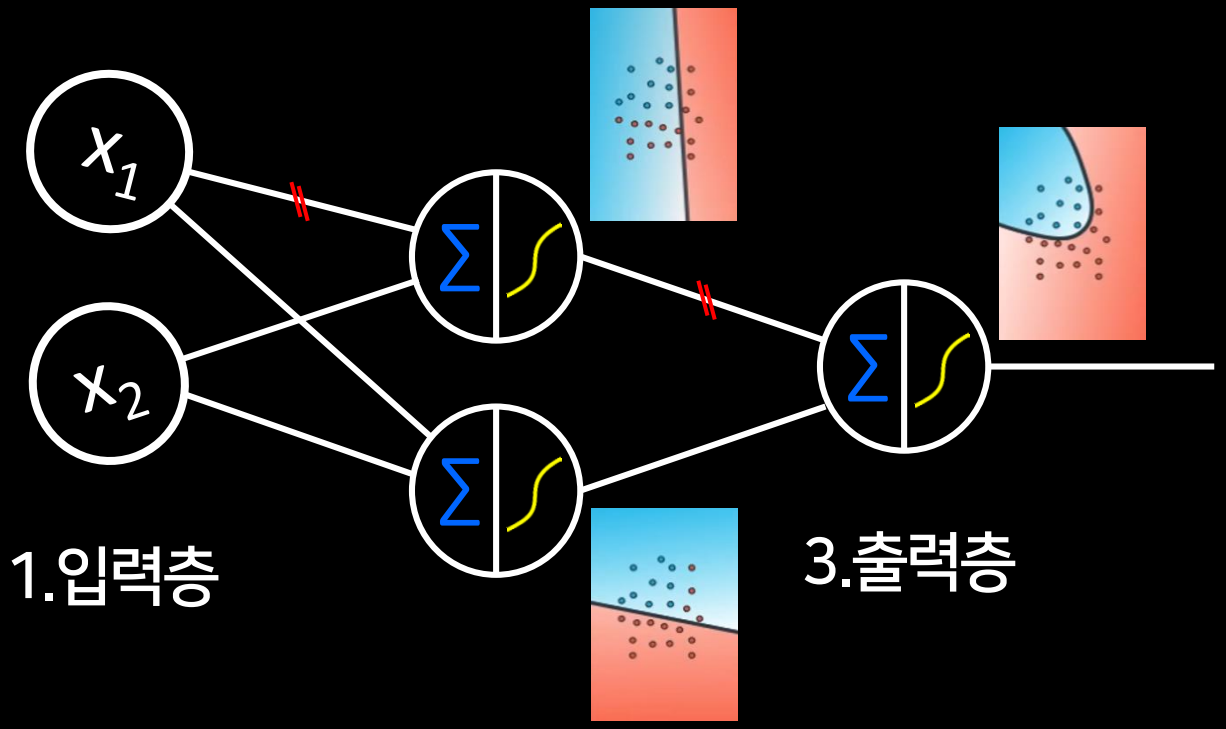
- 신경세포 하나
- 선형 결정 경계 1개
- 해결 불가능

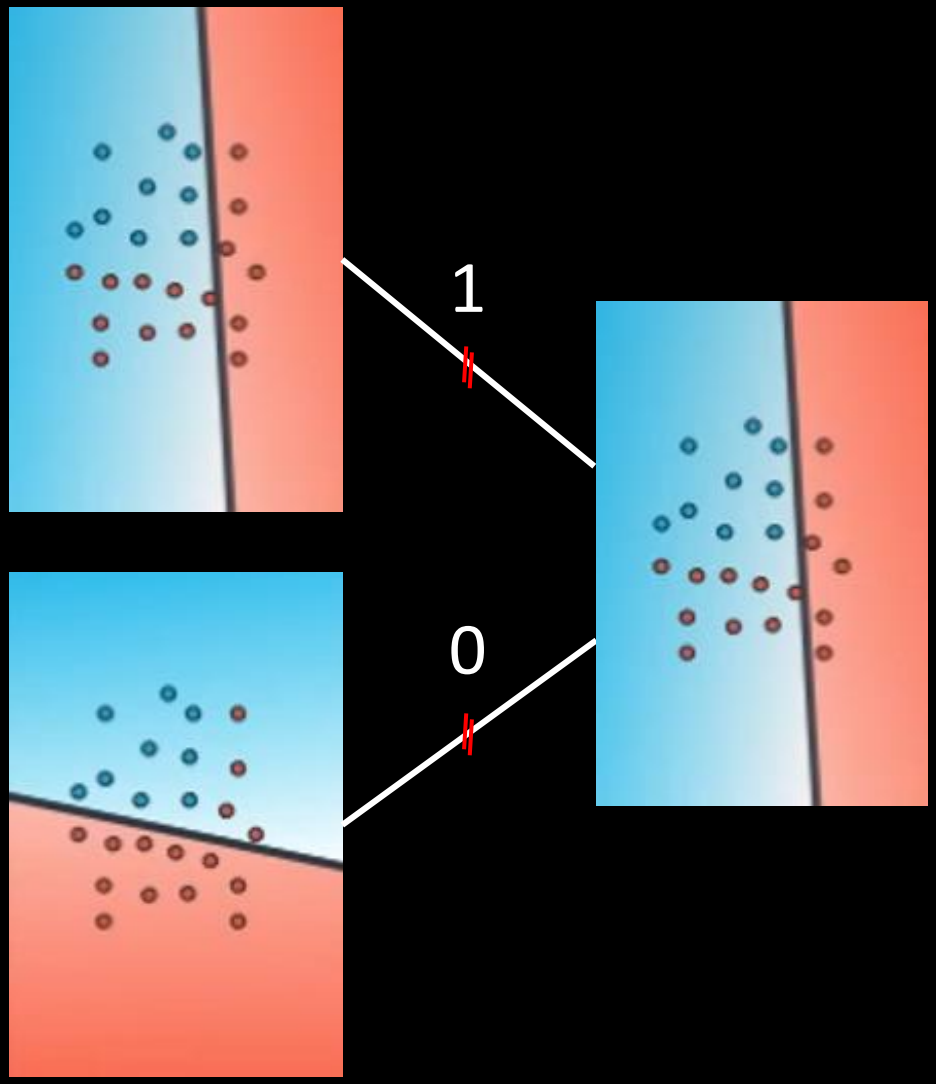

x_1
x_2
Σ

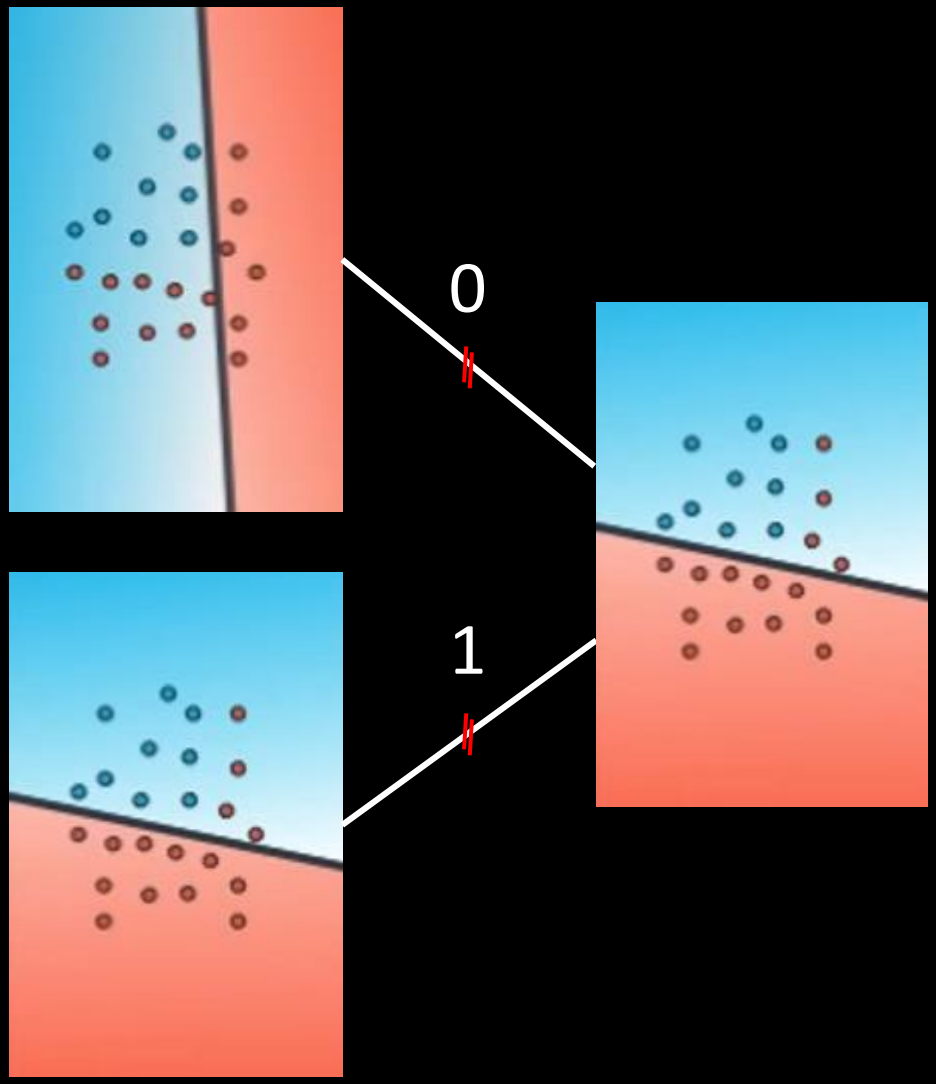

x_1
x_2
Σ
Σ

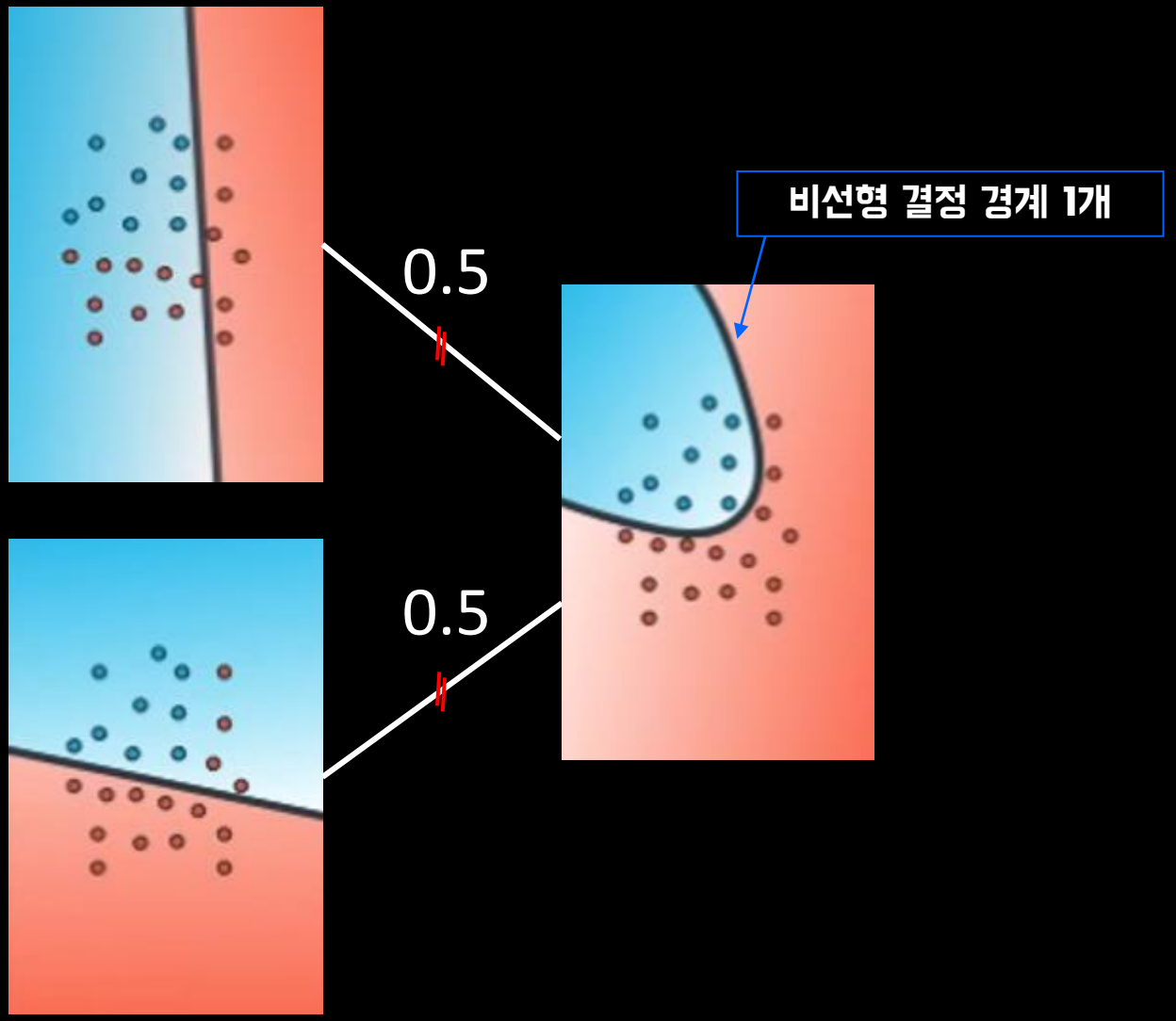

x_1
x_2

"3층"

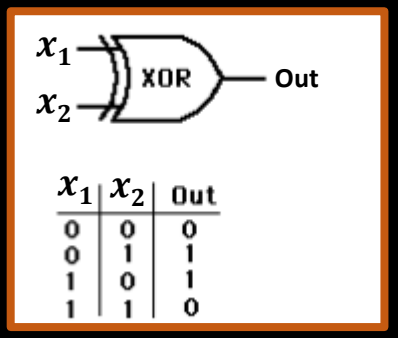



1
0

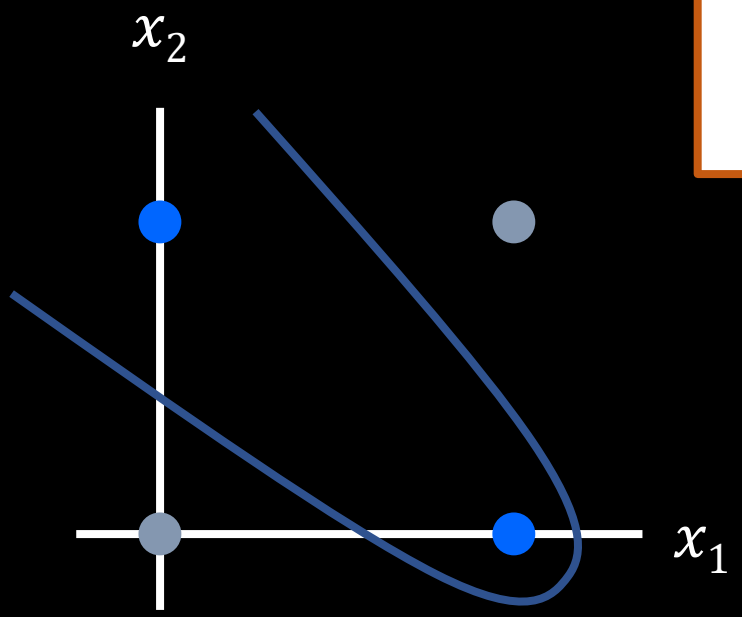

0
1


비선형 결정 경계 1개
0.5
0.5

XOR 문제

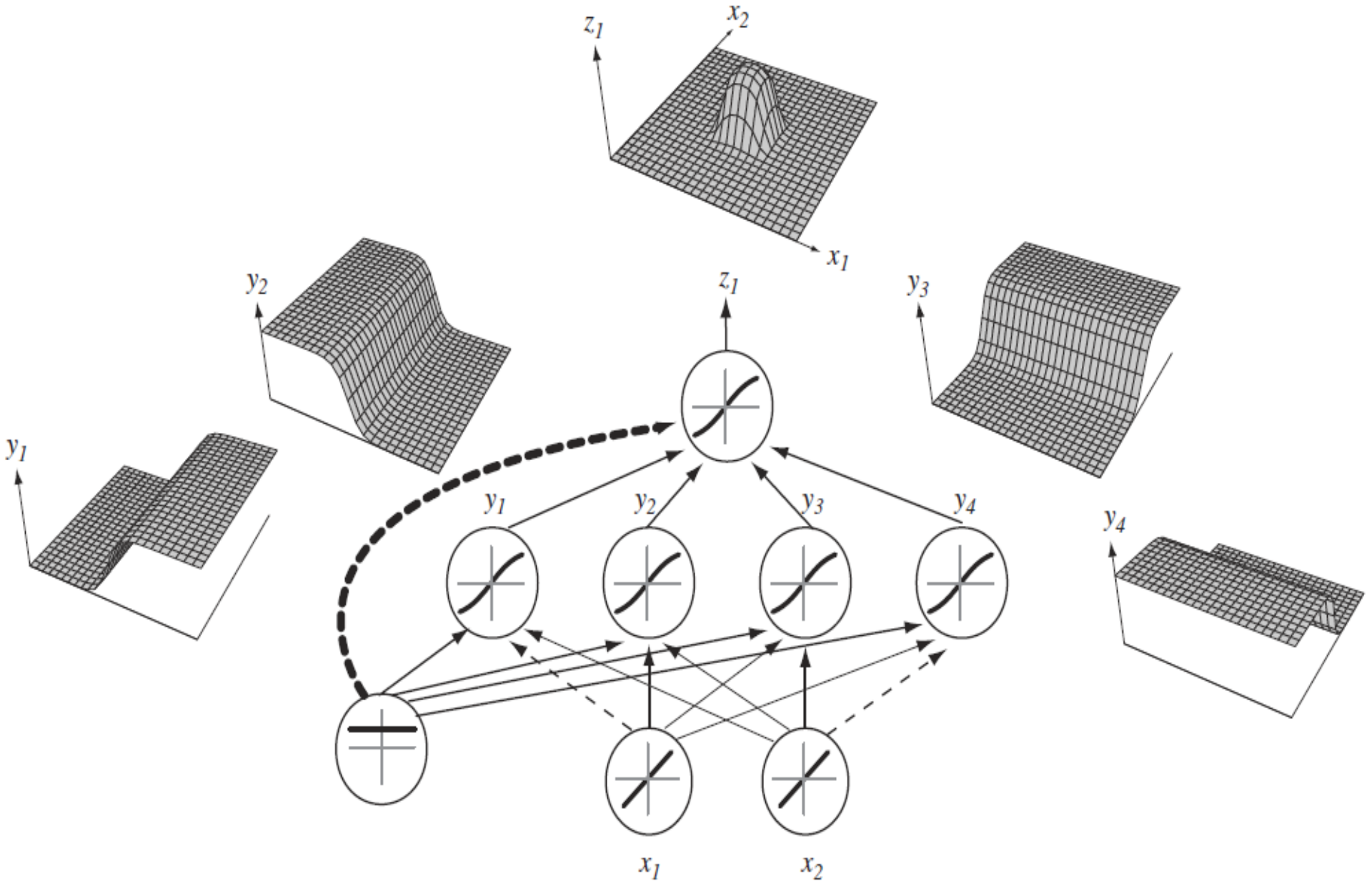


x_1	x_2	Out
0	0	0
0	1	1
1	0	1
1	1	0



{위에서 본 모습}

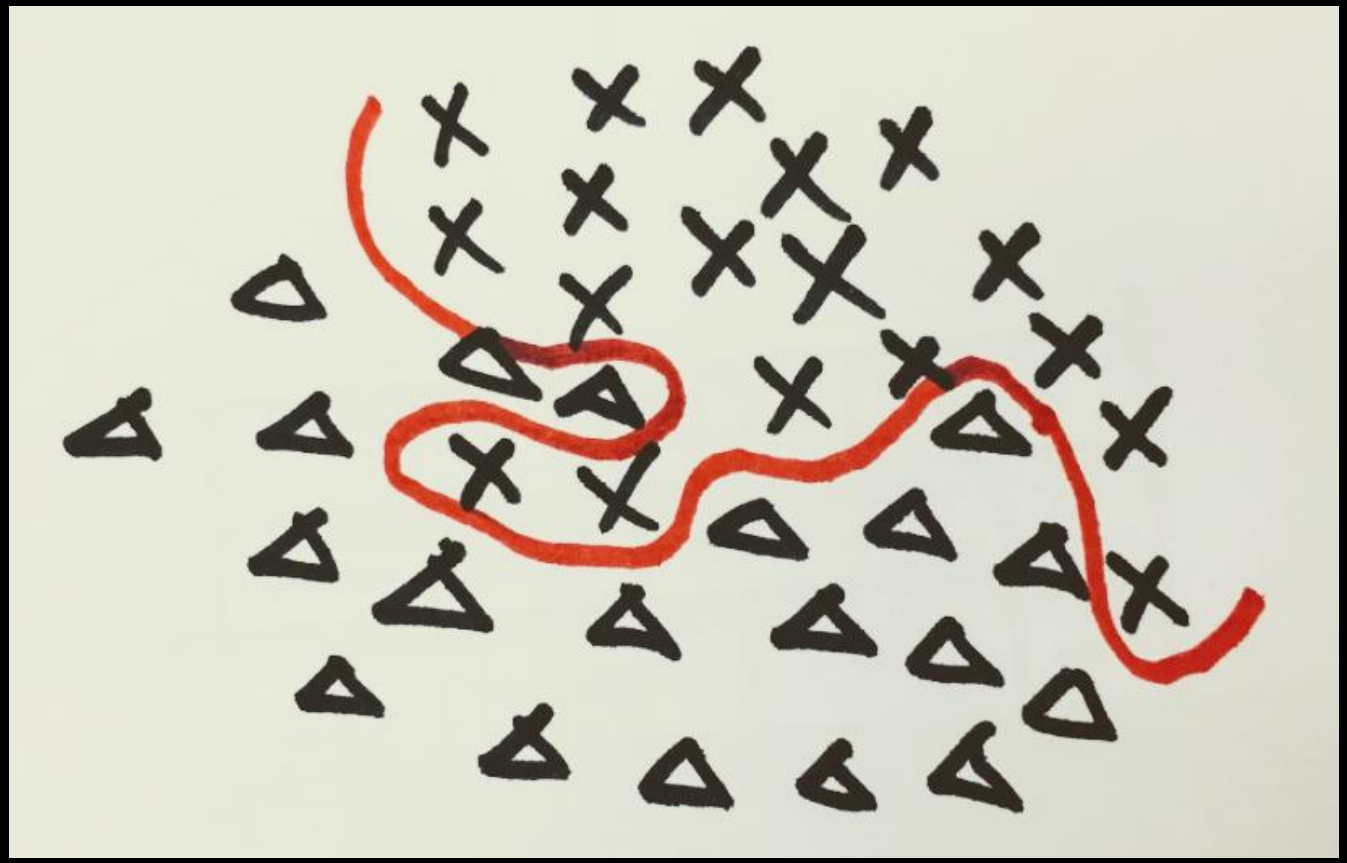
옆에서 본 모습은?
‘미끄럼틀’


z_1
x_2
x_1
y_2
z_1
y_3
y_1
y_1
y_2
y_3
y_4
y_4
x_1
x_2

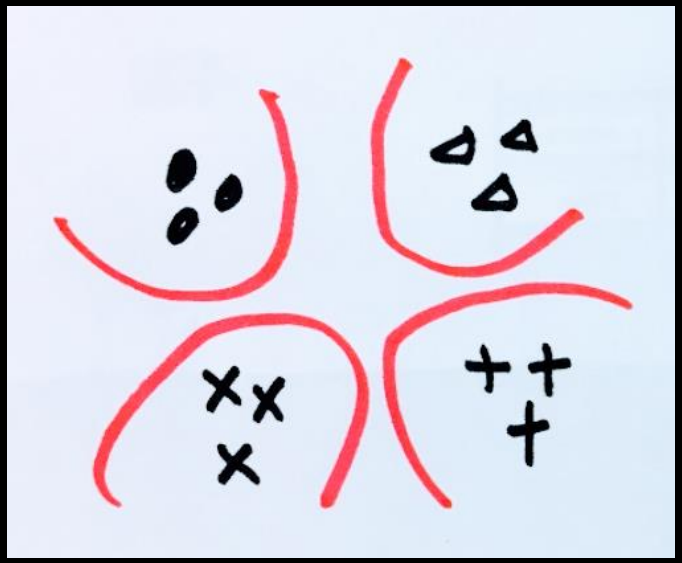
(실습) 17.py

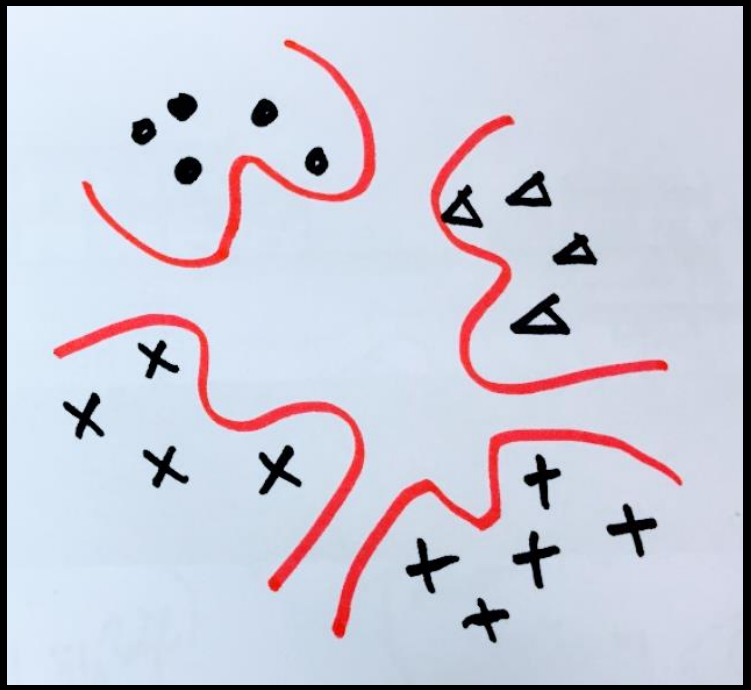
- XOR 문제
- 3층: 입력층 – 은닉층 - 출력층

결정 경계 내 맘대로



결정 경계 내 맘대로





결정 경계 내 맘대로

- 더 복잡하고 섬세한 결정 경계를 만들려면 신경망을 Deep하게
- 4층 신경망으로 XOR 문제 해결

(실습) 18.py

- 3층: 입력층 – 은닉층 - 출력층
- 따라서 필요한 결정 경계의 수는?
- 선형 결정 경계 1개로는 불가능
- 비선형 결정 경계가 필요

The way of machine learning

- is sort of learns over and over again just like human being
- If it misrecognizes, we need tell it ‘Nope, you were wrong!’ which makes it update its weights to do better next time.
- Try it over and over again just like a child.

Learning or Programming

"This (machine learning) is the next transformation…the programming paradigm is changing. Instead of programming a computer, you teach a computer to learn something and it does what you want"

— Eric Schmidt, Google

“

Not programming,
but learning(teaching) with data

“Change of programming paradigm”

Coding Instructions
→ data-driven learning,
→ parameter tuning