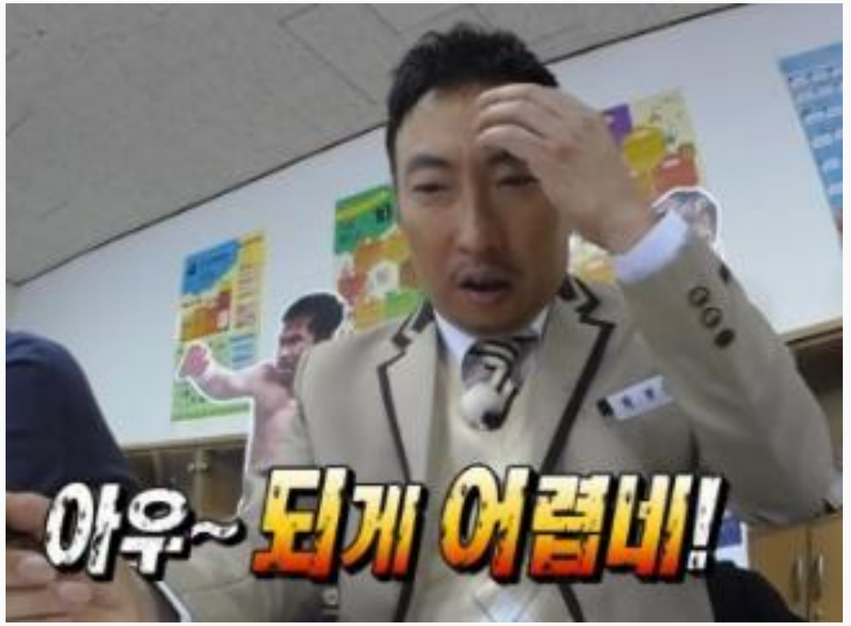
TaeEun KIL

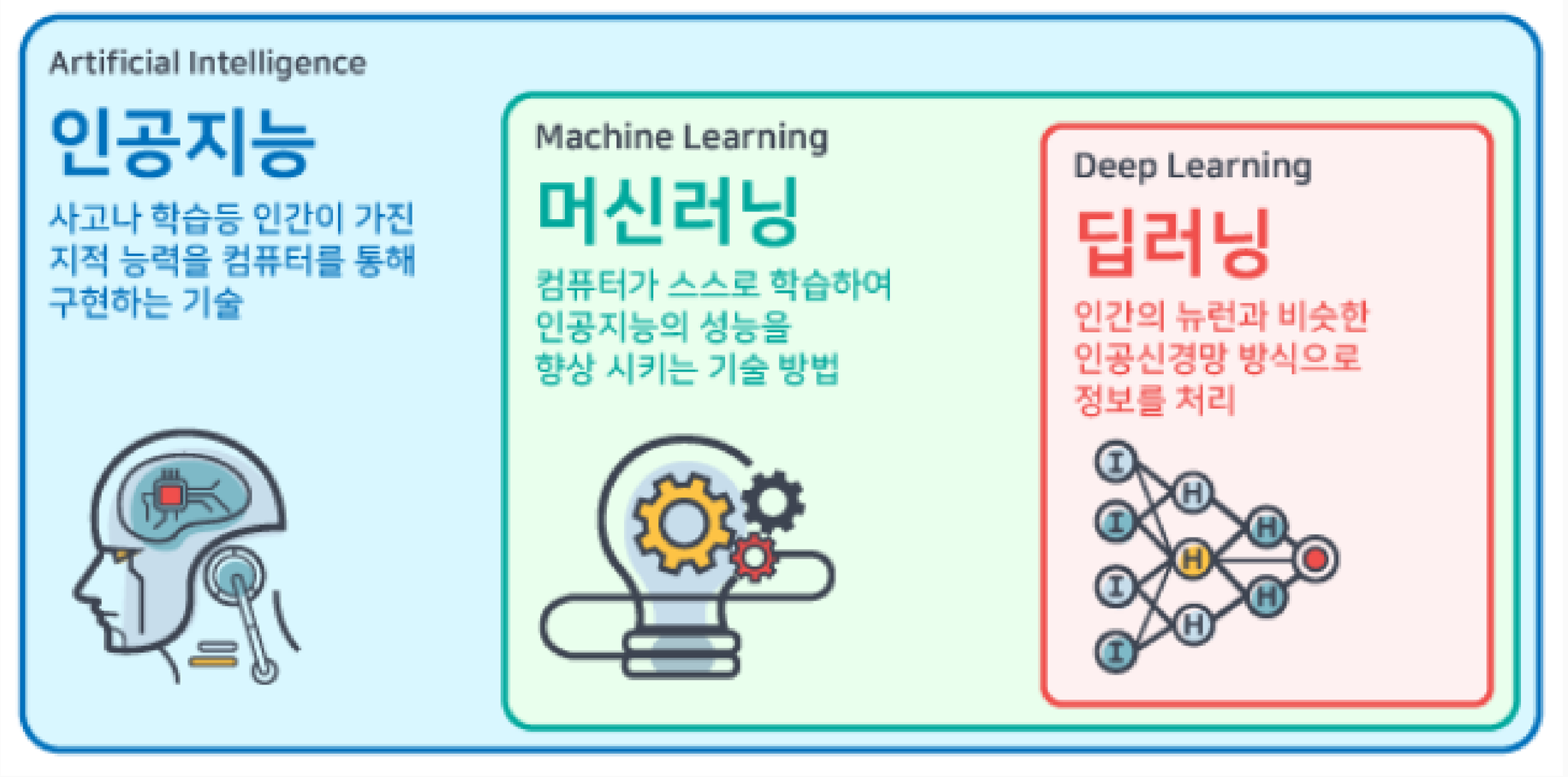
Deep Learning



With 무도

Index.

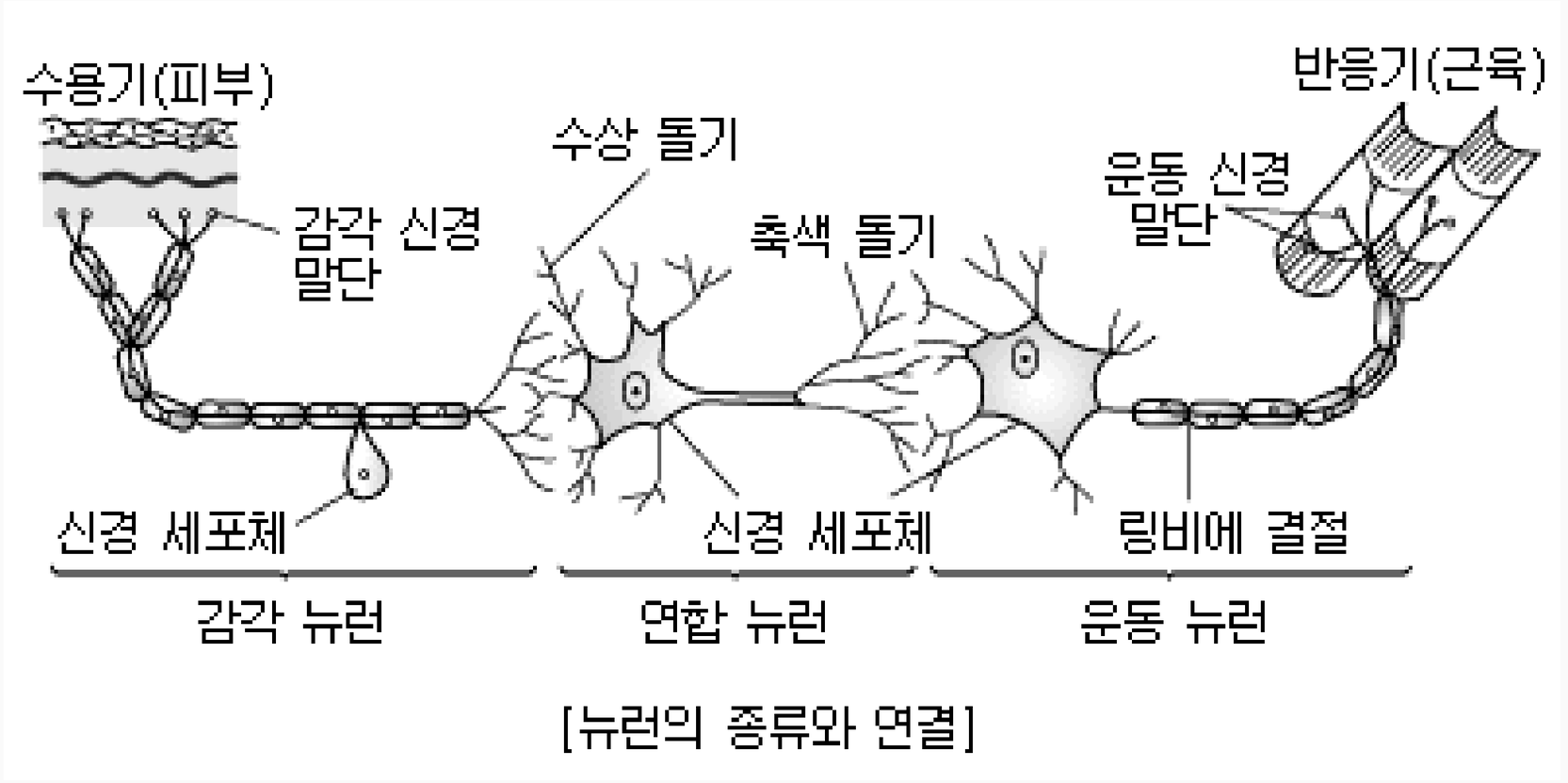
Ai
ML
Deep Learning.



Neuron

Neuron

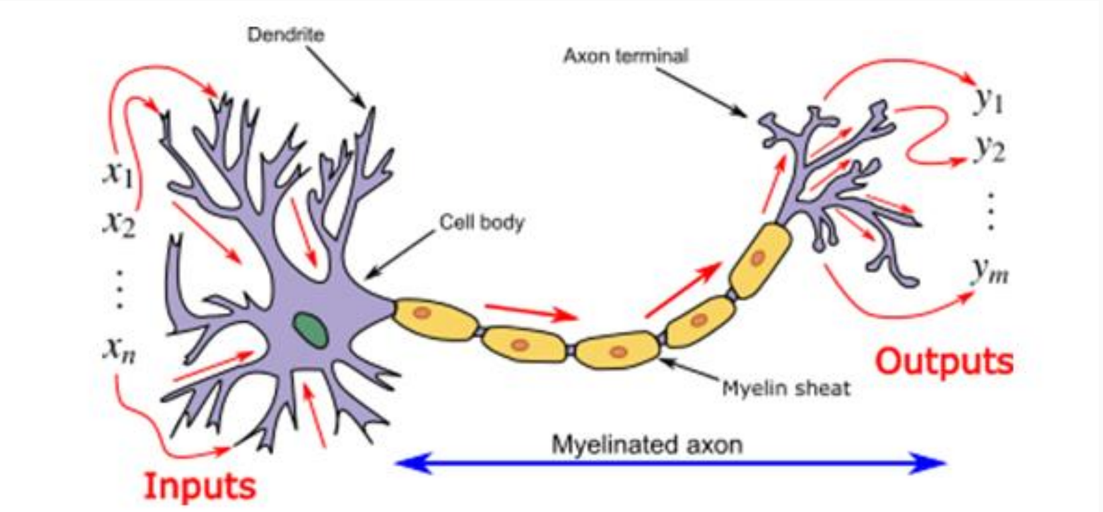
Neuron



[뉴런의 종류와 연결]

Neuron

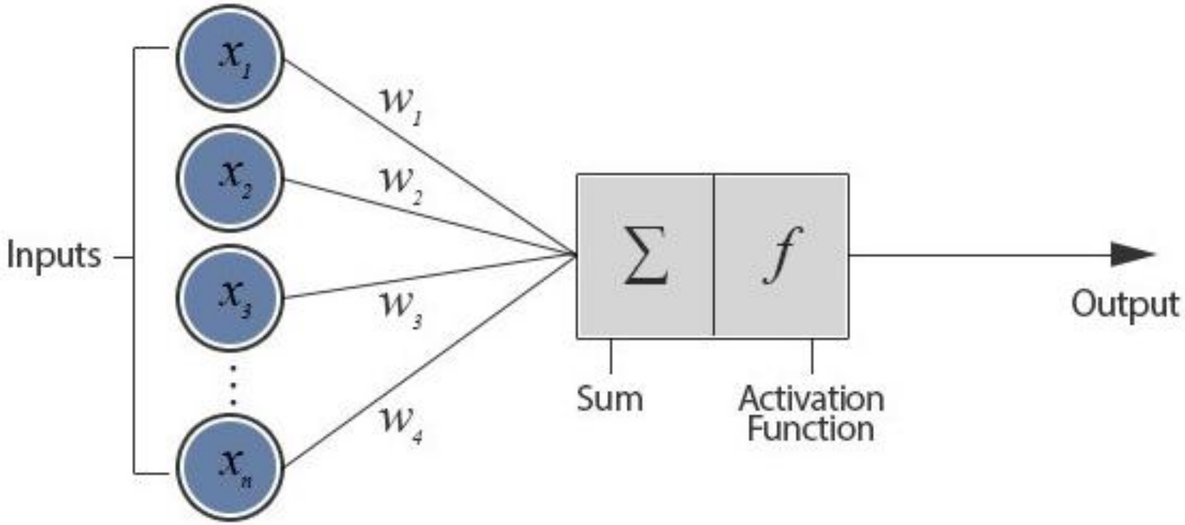

MBC
어머


Dendrite
Axon terminal
x_1
x_2
x_n
Cell body
y_1
y_2
y_m
Myelin sheat
Outputs
Myelinated axon
Inputs

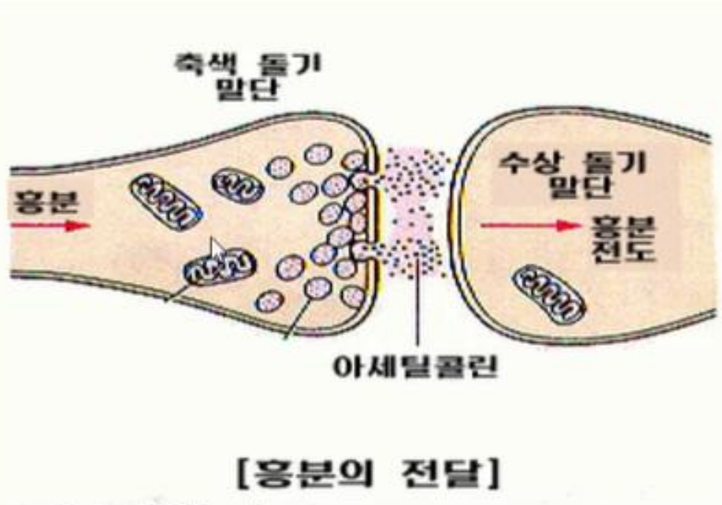
Artificial Neuron

Perceptron

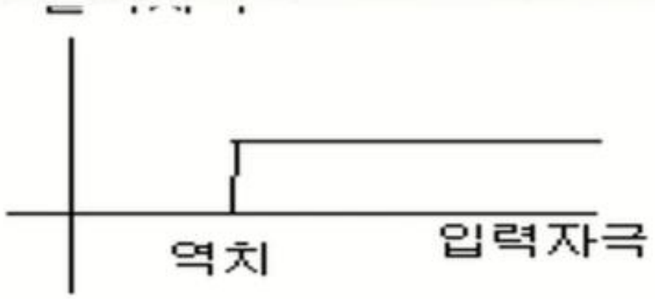

MH
무한상사
자...이게
클릭이야


Inputs
x_1
x_2
x_3
x_n
w_1
w_2
w_3
w_4
Σ
f
Sum
Activation Function
Output

Activation Function

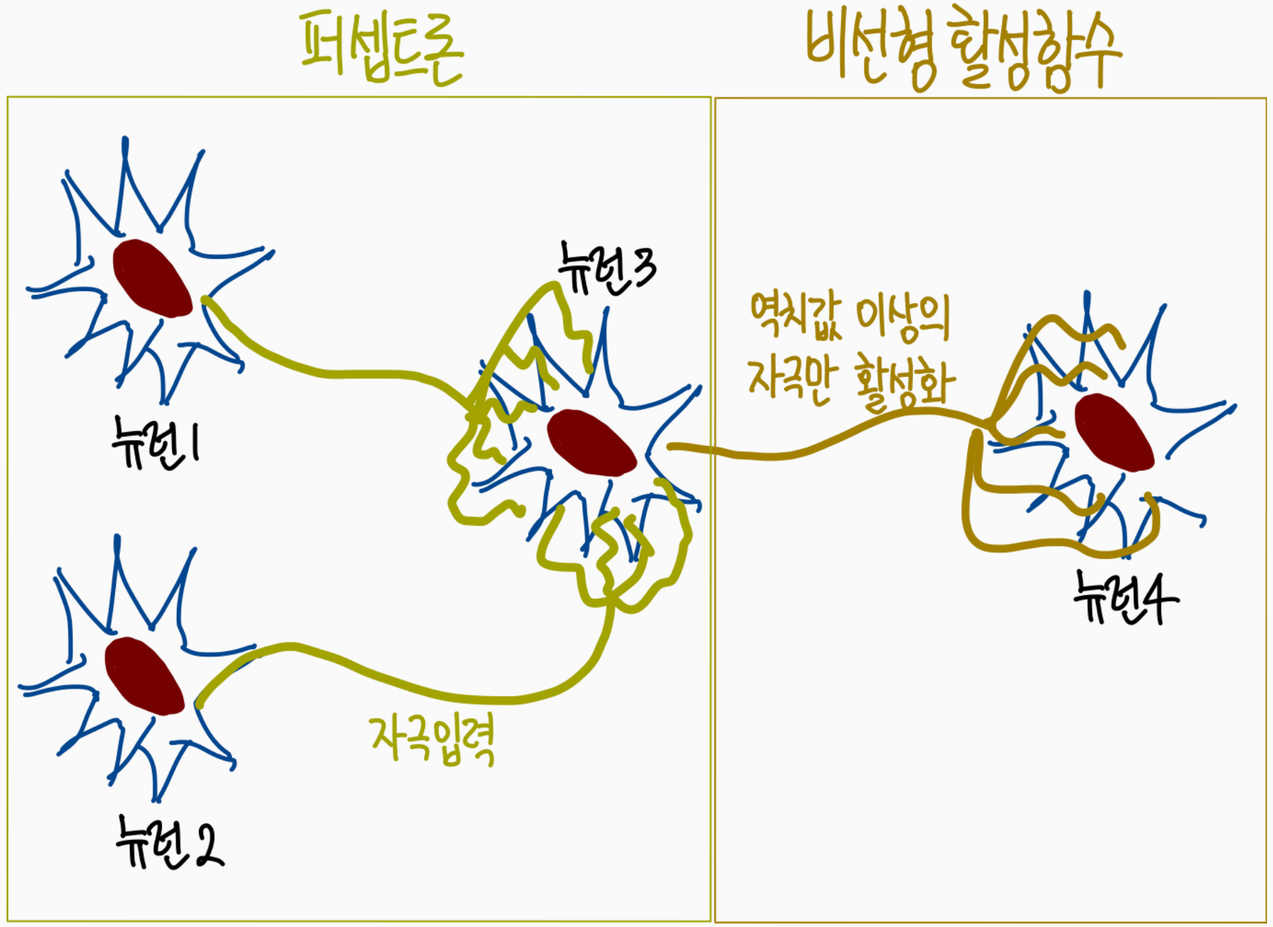


[흥분의 전달]



https://www.youtube.com/watch?v=2kWfWo8_7vA&t=421s

Activation Function

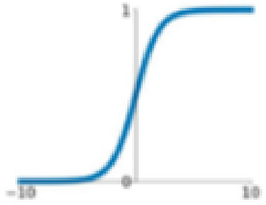


Activation Function

Activation Functions

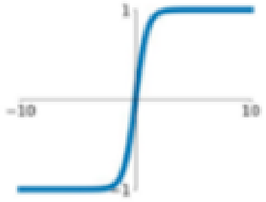
Sigmoid

$$\sigma(x) = \frac{1}{1+e^{-x}}$$



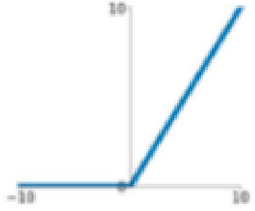
tanh

$$\tanh(x)$$



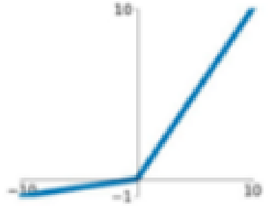
ReLU

$$\max(0, x)$$



Leaky ReLU

$$\max(0.1x, x)$$

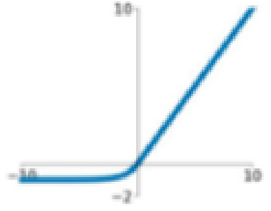


Maxout

$$\max(w_1^T x + b_1, w_2^T x + b_2)$$

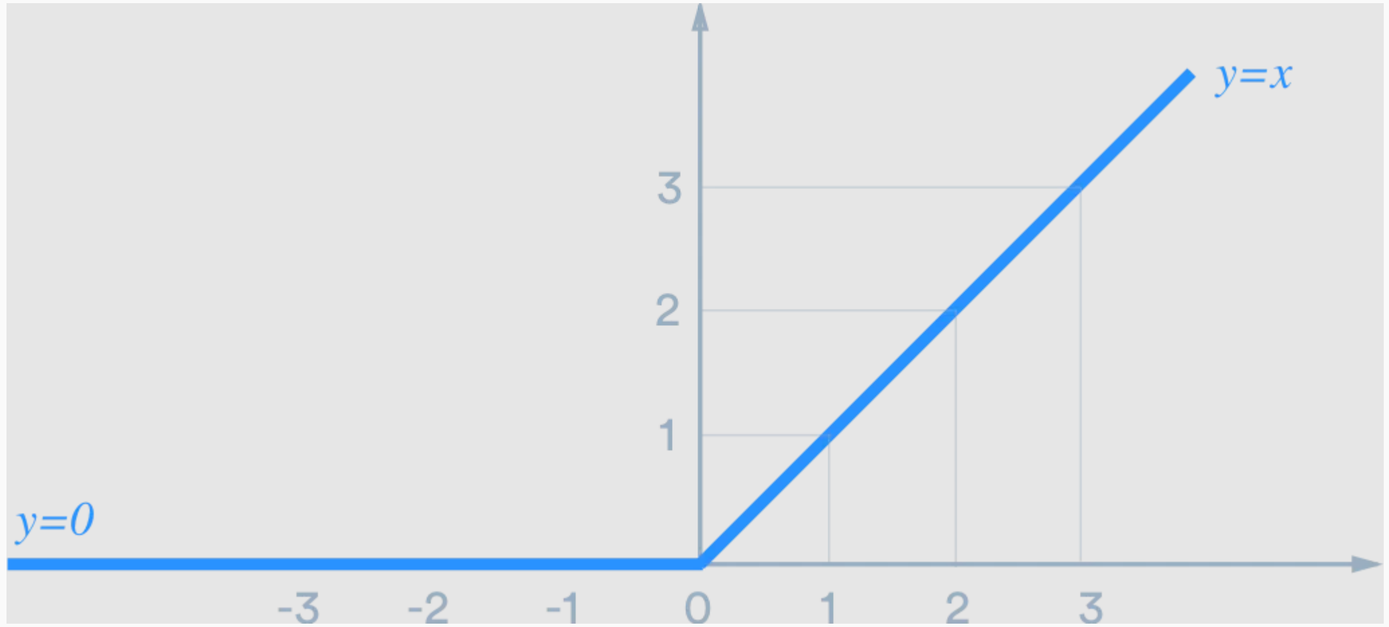
ELU

$$\begin{cases} x & x \geq 0 \\ \alpha(e^x - 1) & x < 0 \end{cases}$$

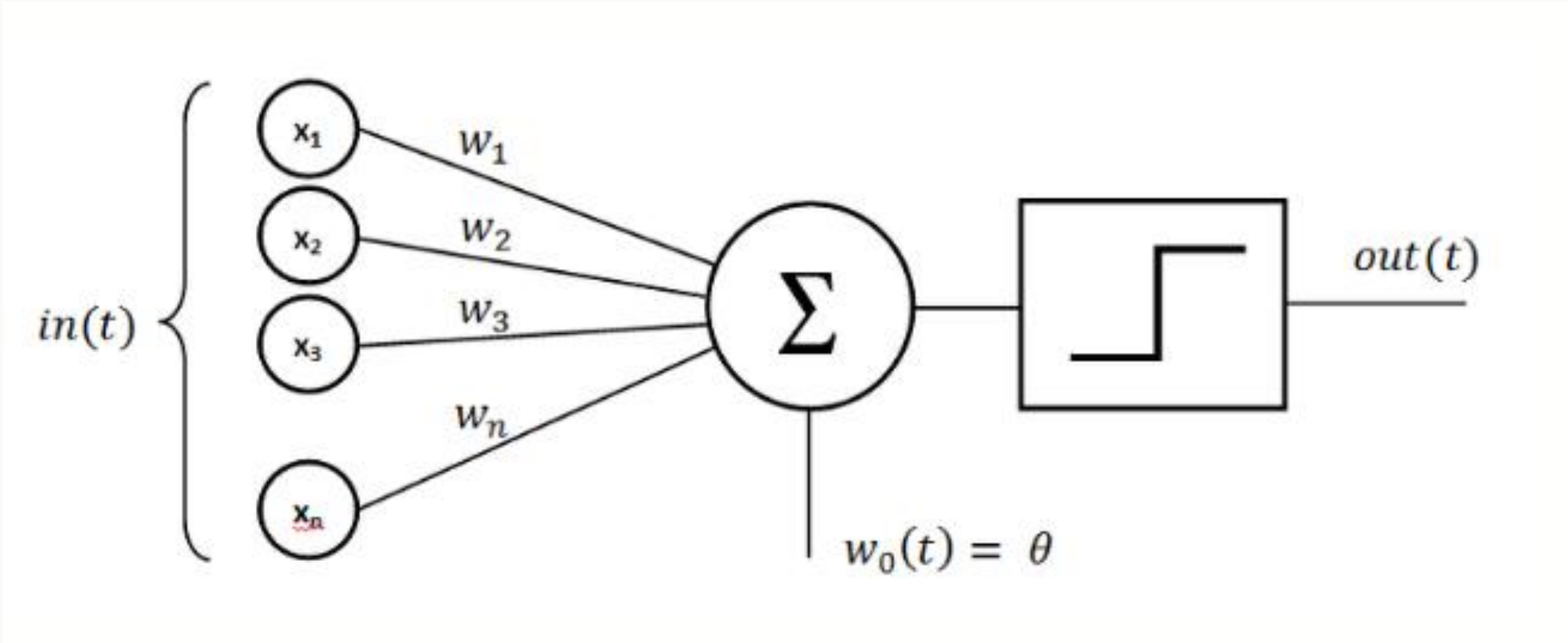


Different Activation Functions and their Graphs

Activation Function

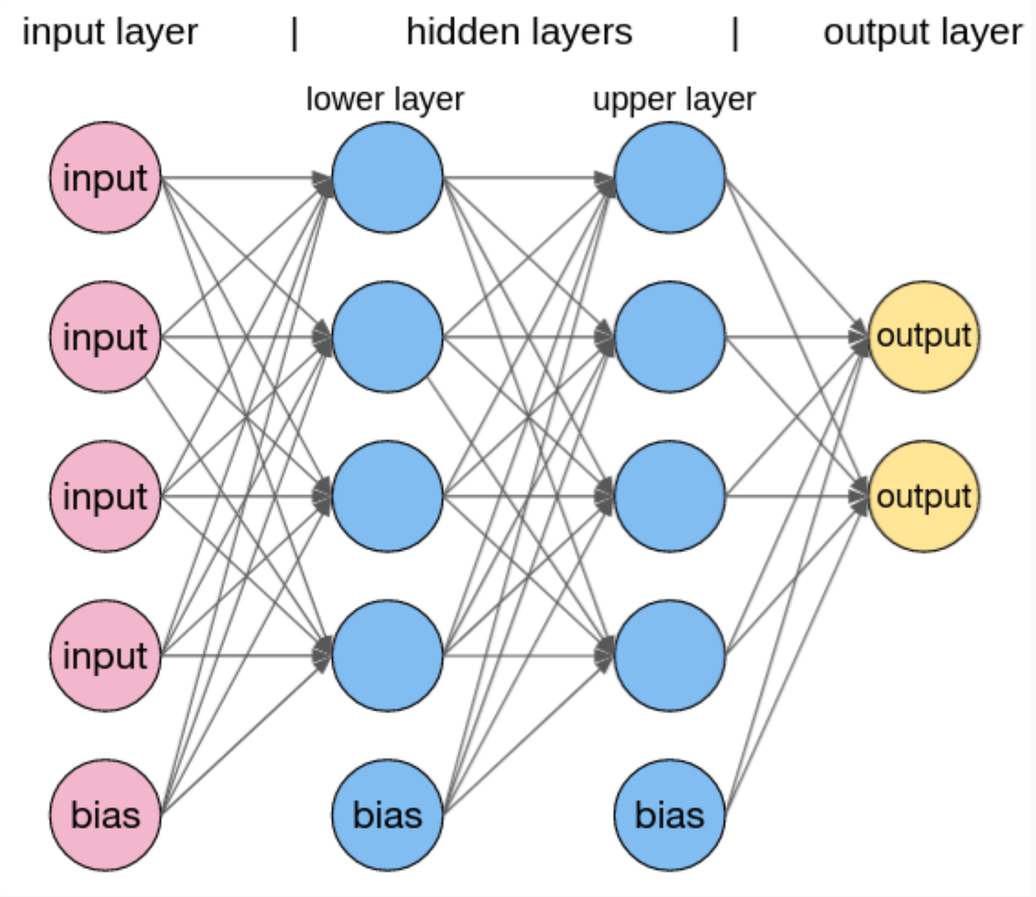


Perceptron

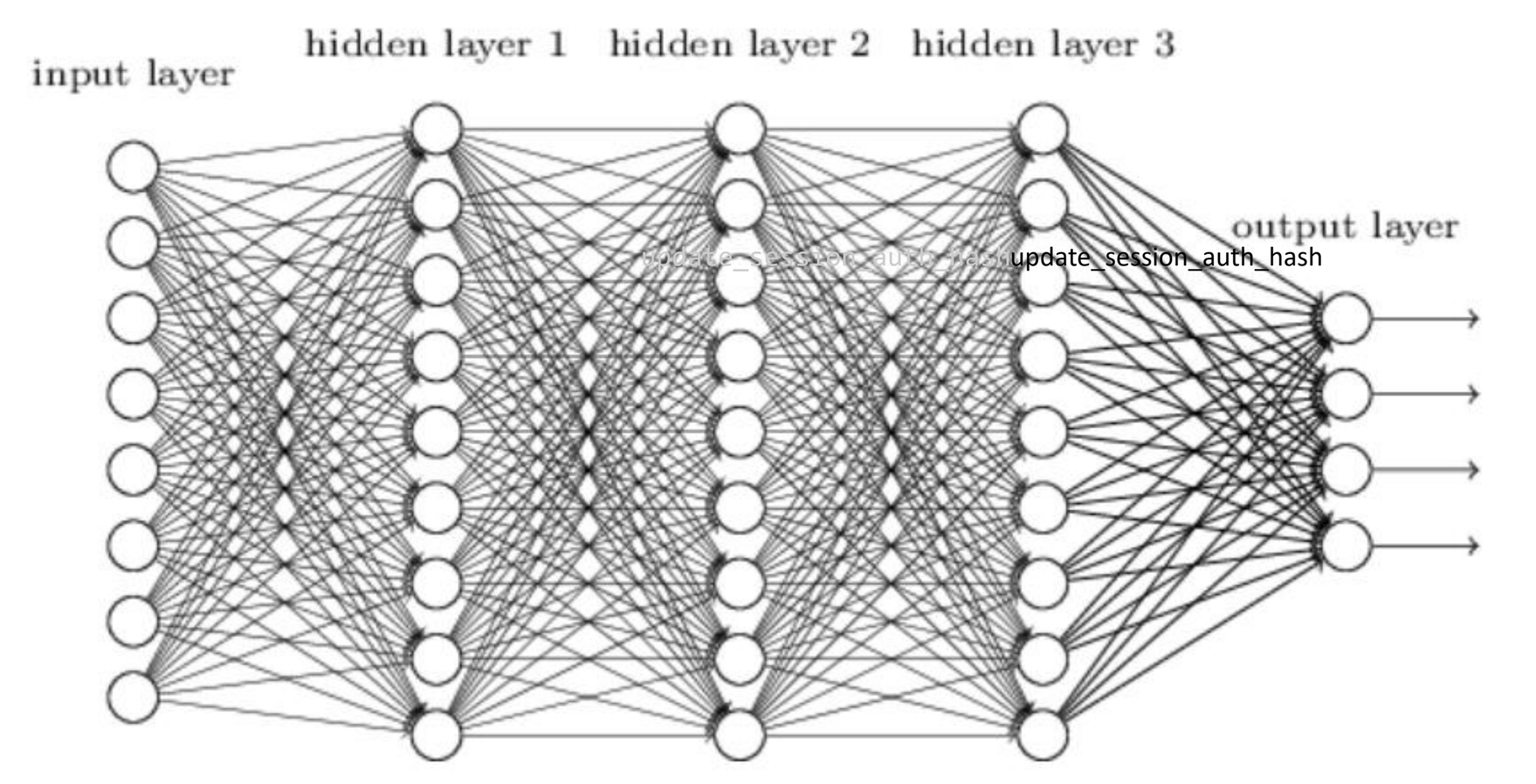


Artificial Neuron Network

Multi Layer Perceptron

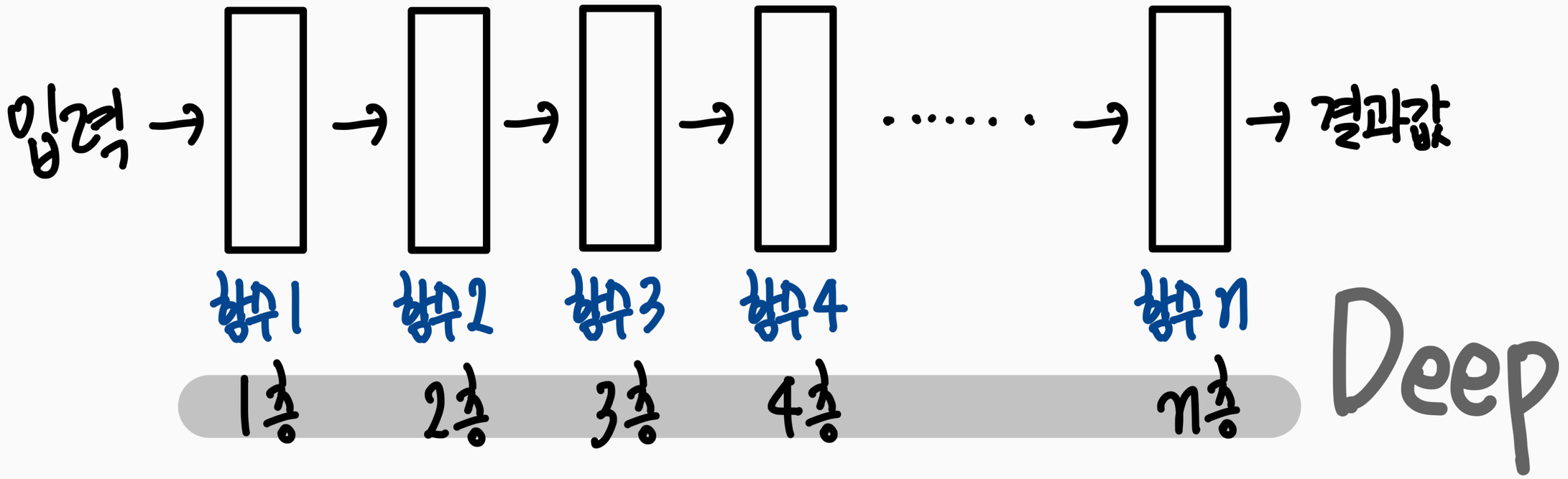


Multi Layer Perceptron



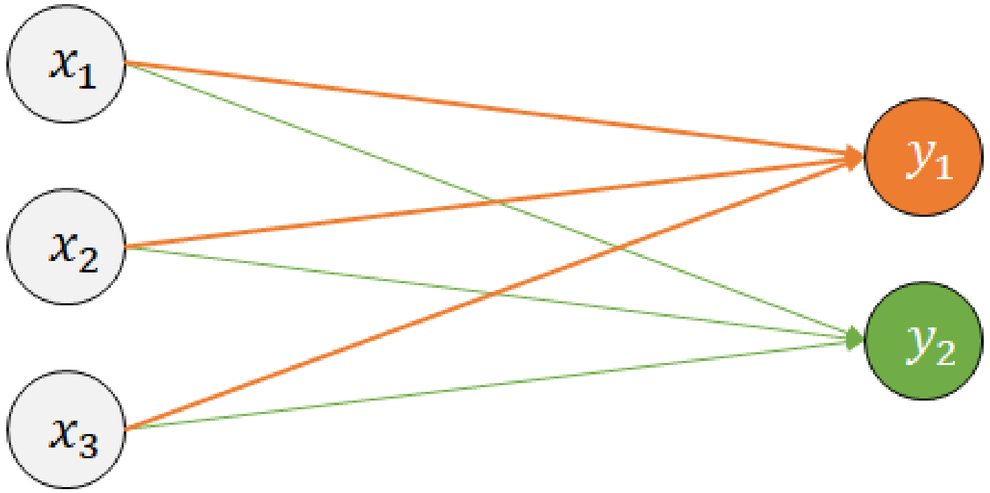
Deep

Deep



Calculation

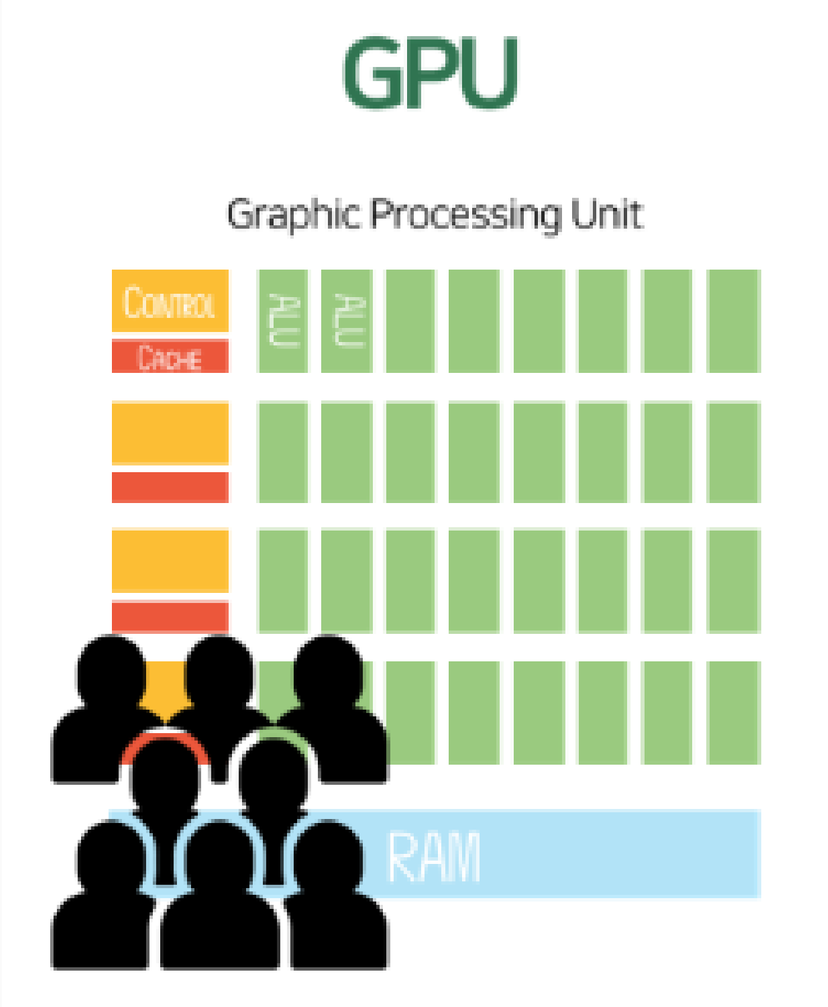
Matrix calculation

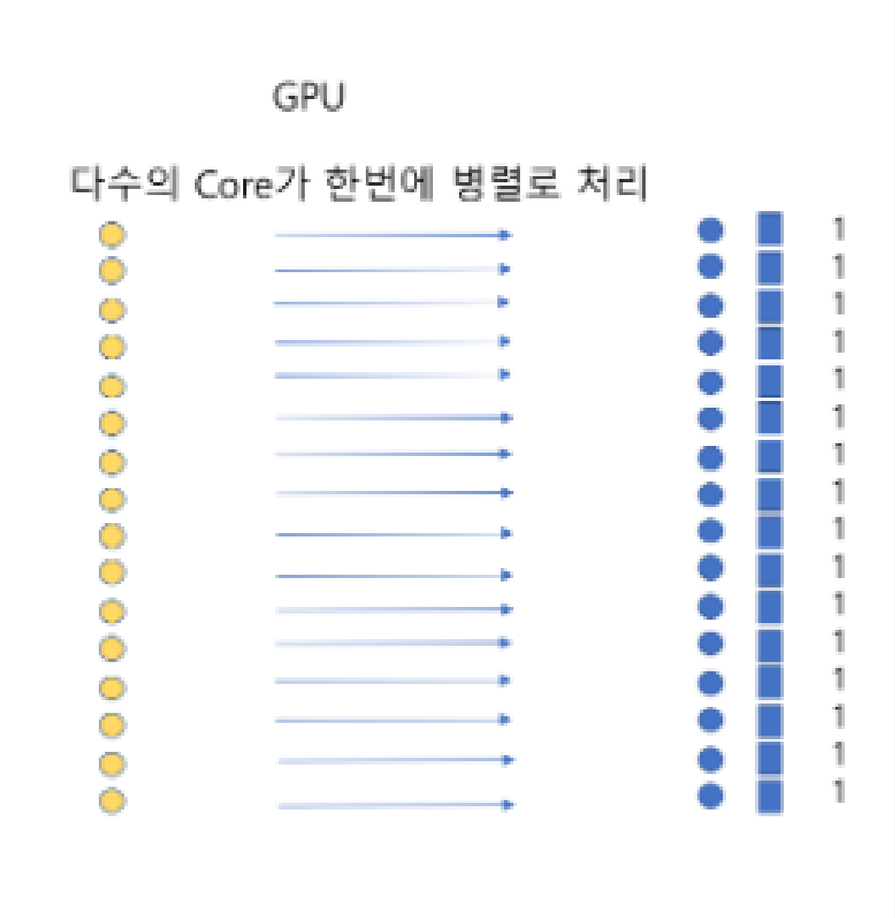


$$\begin{bmatrix} x_1 & x_2 & x_3 \end{bmatrix} \times \begin{bmatrix} w_1 & w_4 \\ w_2 & w_5 \\ w_3 & w_6 \end{bmatrix} + \begin{bmatrix} b_1 & b_2 \end{bmatrix} = \begin{bmatrix} y_1 & y_2 \end{bmatrix}$$

Matrix calculation

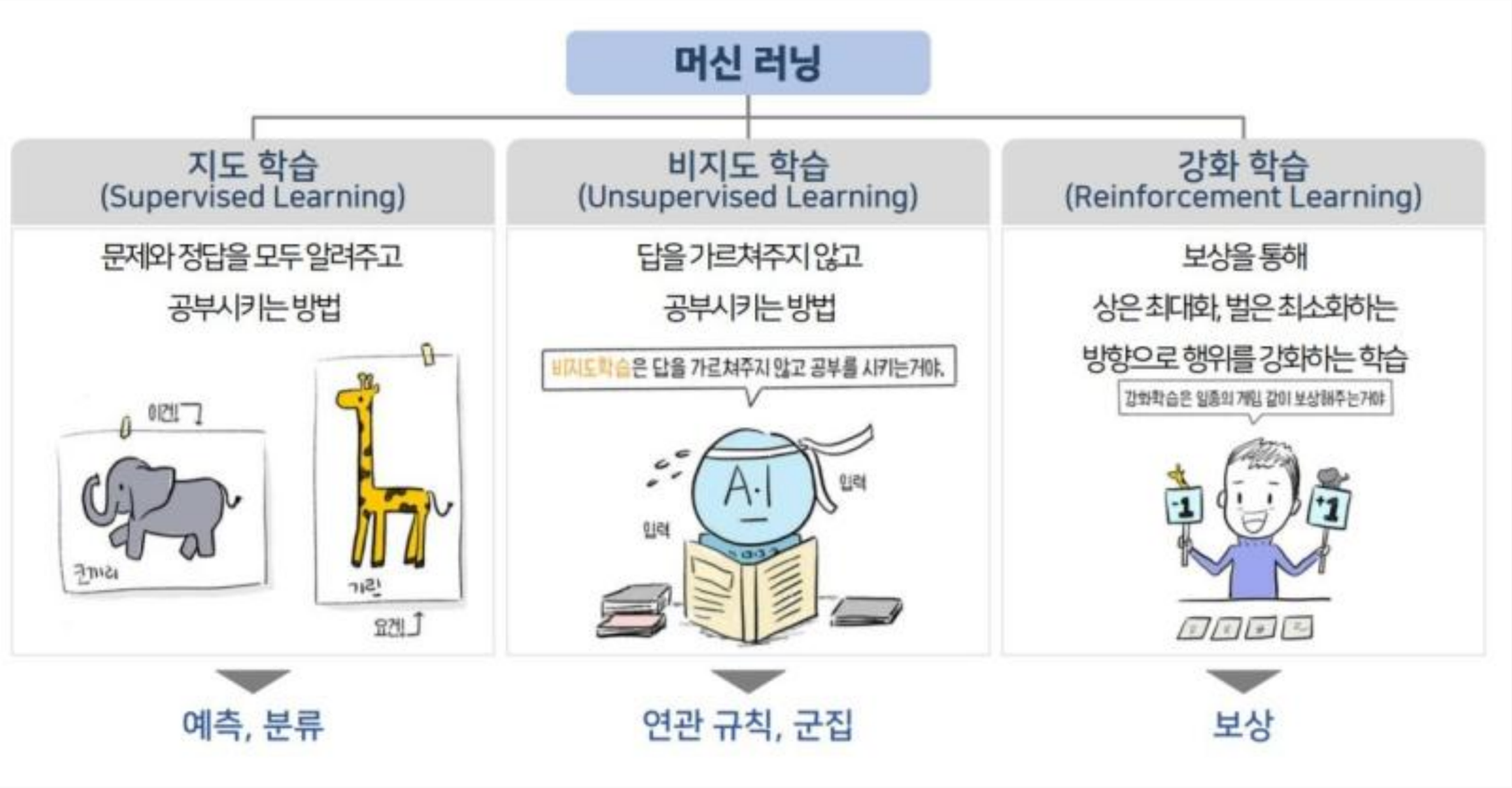
GPU


GPU
Graphic Processing Unit
CONTROL
CACHE
ALU
ALU
RAM


GPU
다수의 Core가 한번에 병렬로 처리
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1

Learning

Learning Paradigms

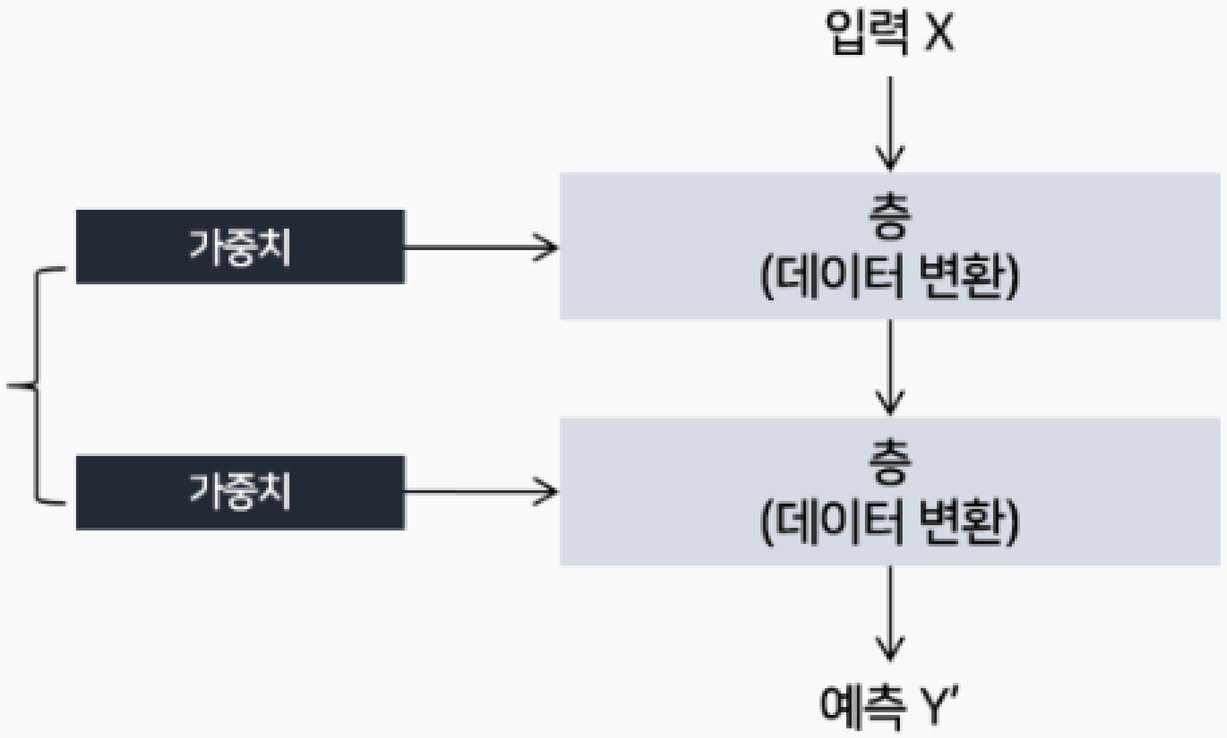



MH
무한상사
MBC
아유... 하기 싫어...

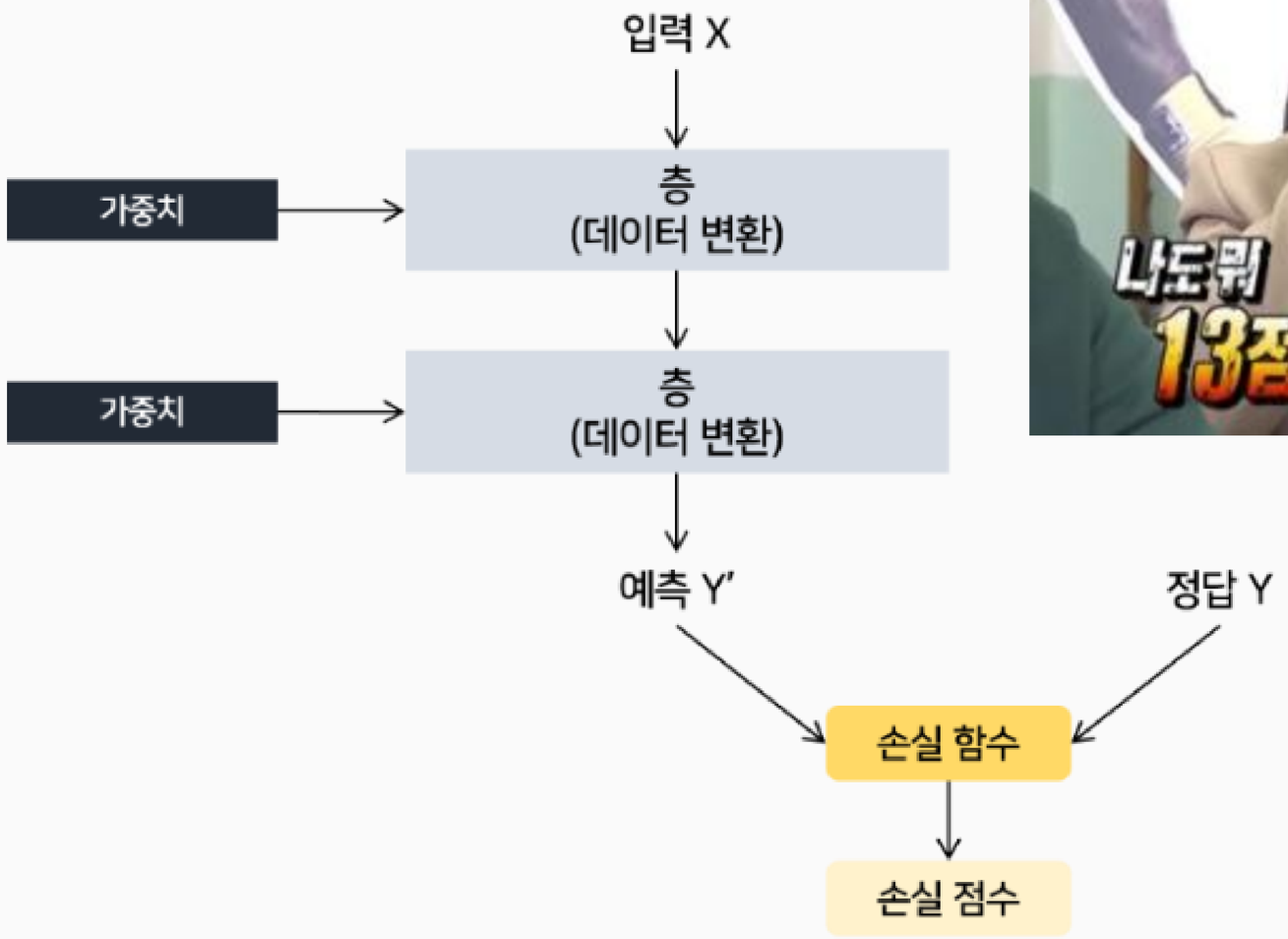
Learning

딥러닝의 목표

정확한 가중치 값을 찾는 것



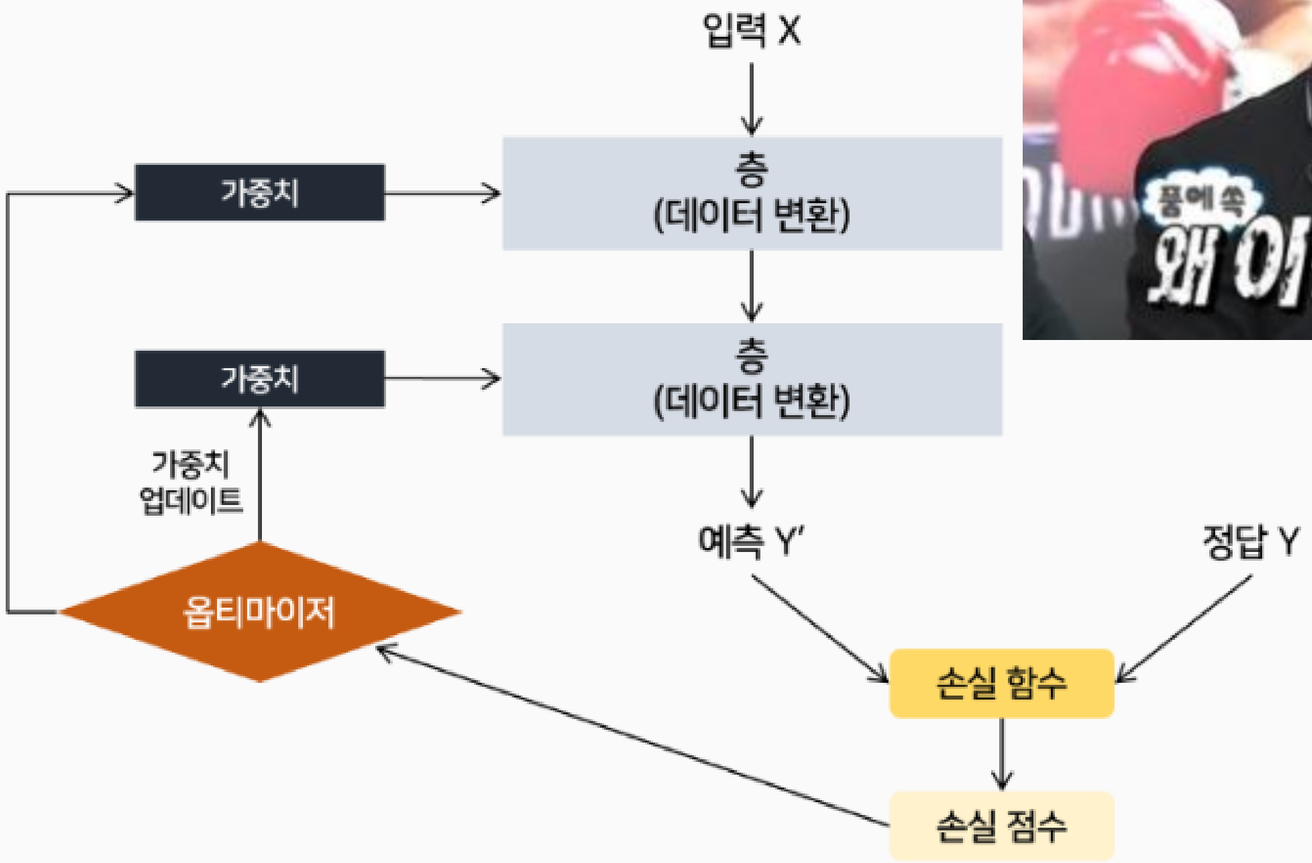
Learning


입력 X
가중치
층
(데이터 변환)
가중치
층
(데이터 변환)
예측 Y'
정답 Y
손실 함수
손실 점수

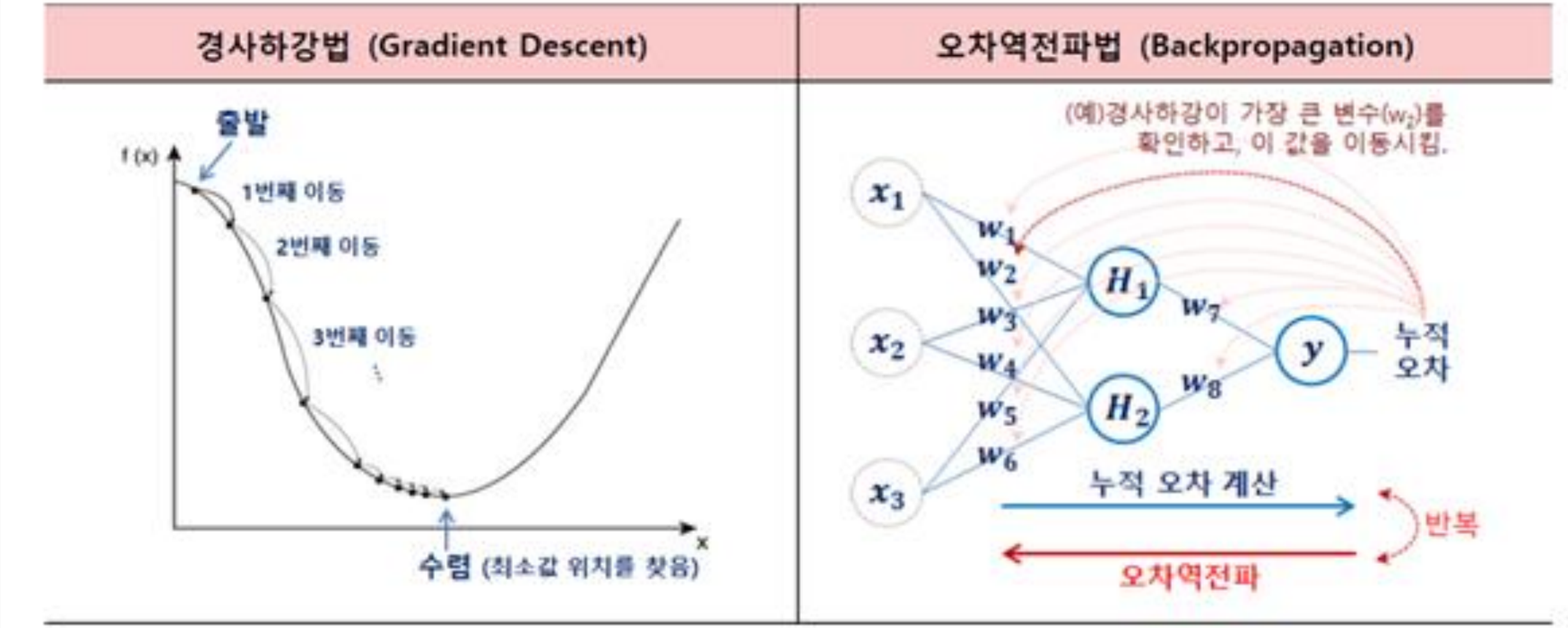

나도 뭐
13점 맞히고 싶어서 맞았겠나

Learning


풍예속
왜 이렇게 채점을 숨어서 해


입력 X
가중치
층
(데이터 변환)
가중치
층
(데이터 변환)
가중치
업데이트
예측 Y'
정답 Y
옵티마이저
손실 함수
손실 점수

HOW


경사하강법 (Gradient Descent)
오차역전파법 (Backpropagation)
출발
f(x)
1번째 이동
2번째 이동
3번째 이동
수렴 (최소값 위치를 찾음)
x
(예)경사하강이 가장 큰 변수(w2)를
확인하고, 이 값을 이동시킴.
x1
x2
x3
w1
w2
w3
w4
w5
w6
H1
H2
w7
w8
y
누적
오차
누적 오차 계산
반복
오차역전파

Framework

Framework

PyTorch

Meta

Framework

TensorFlow

Keras

Google

To be continued...

Fig. 4. Size-normalized examples from the MNIST database.


예능의 神
오늘은 여기까지

THANK YOU!

TO BE CONTINUED…

TaeEun