딥러닝의
기본 개념, 문제, 해결

까지 요약(모두의 딥러닝)

20213108021 정현일

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XOR Problem

XOR Problem

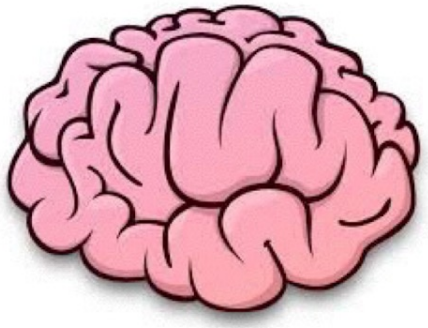
딥러닝의 출발점

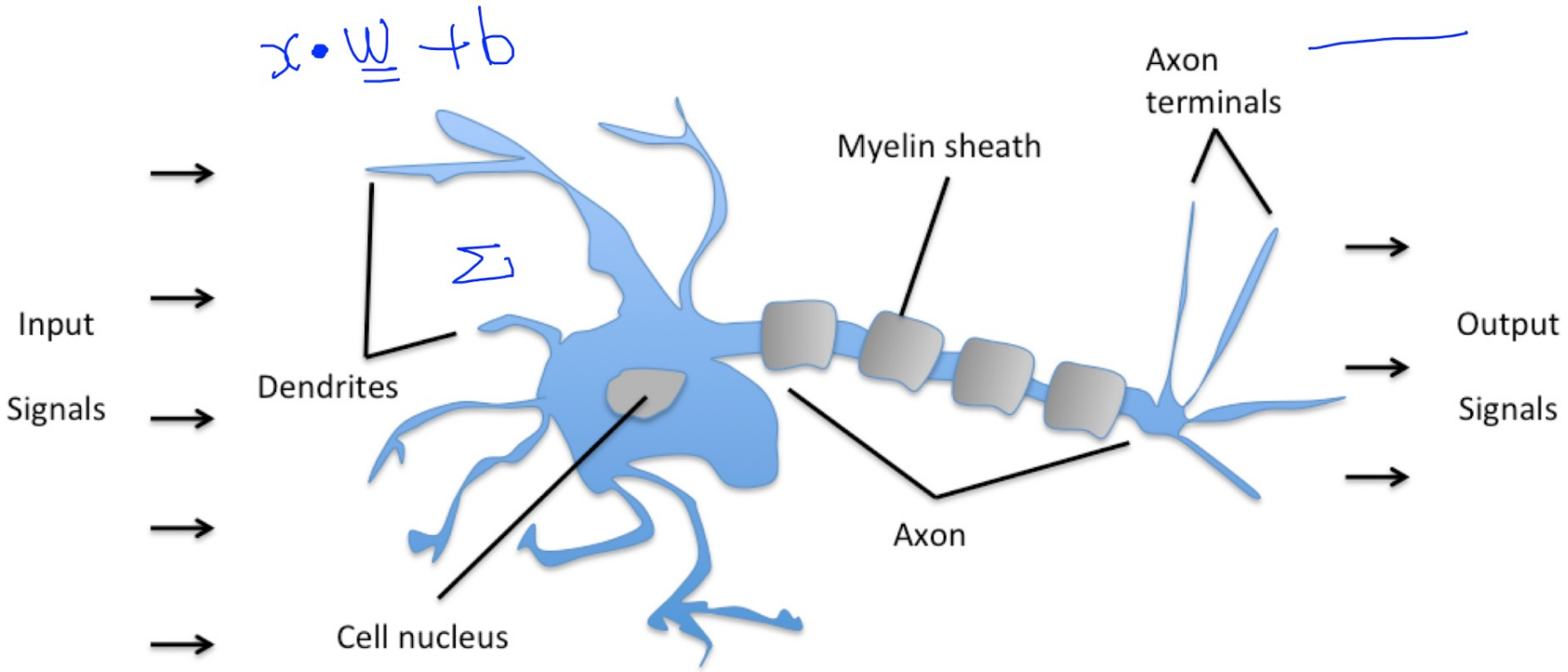
XOR Problem

딥러닝의 출발점

Thinking machine

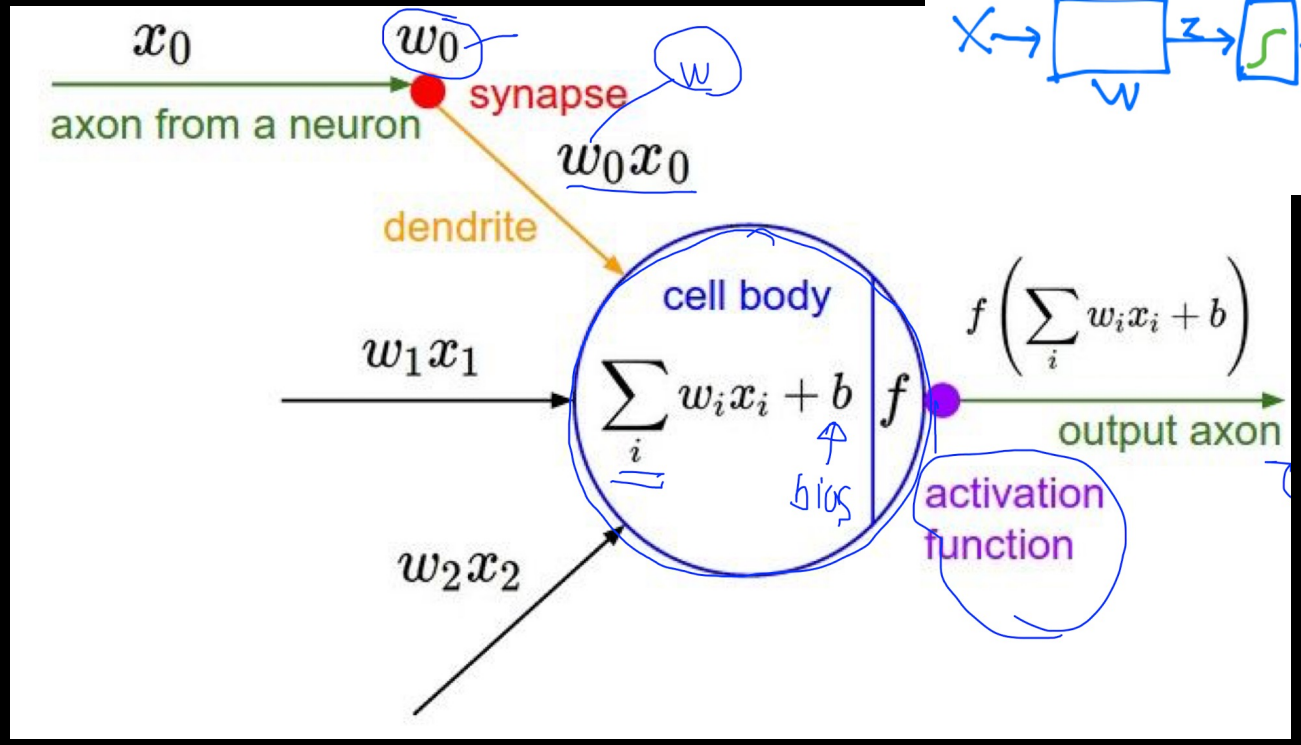
XOR Problem

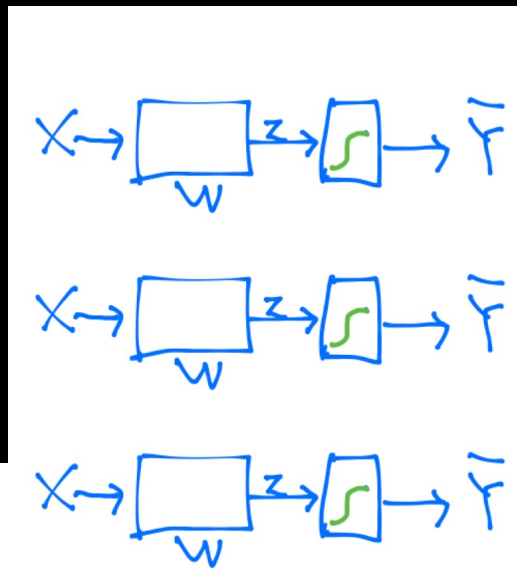


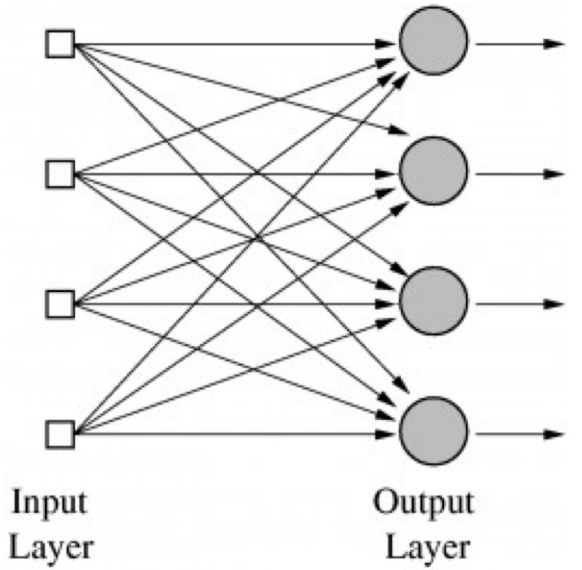


Schematic of a biological neuron.

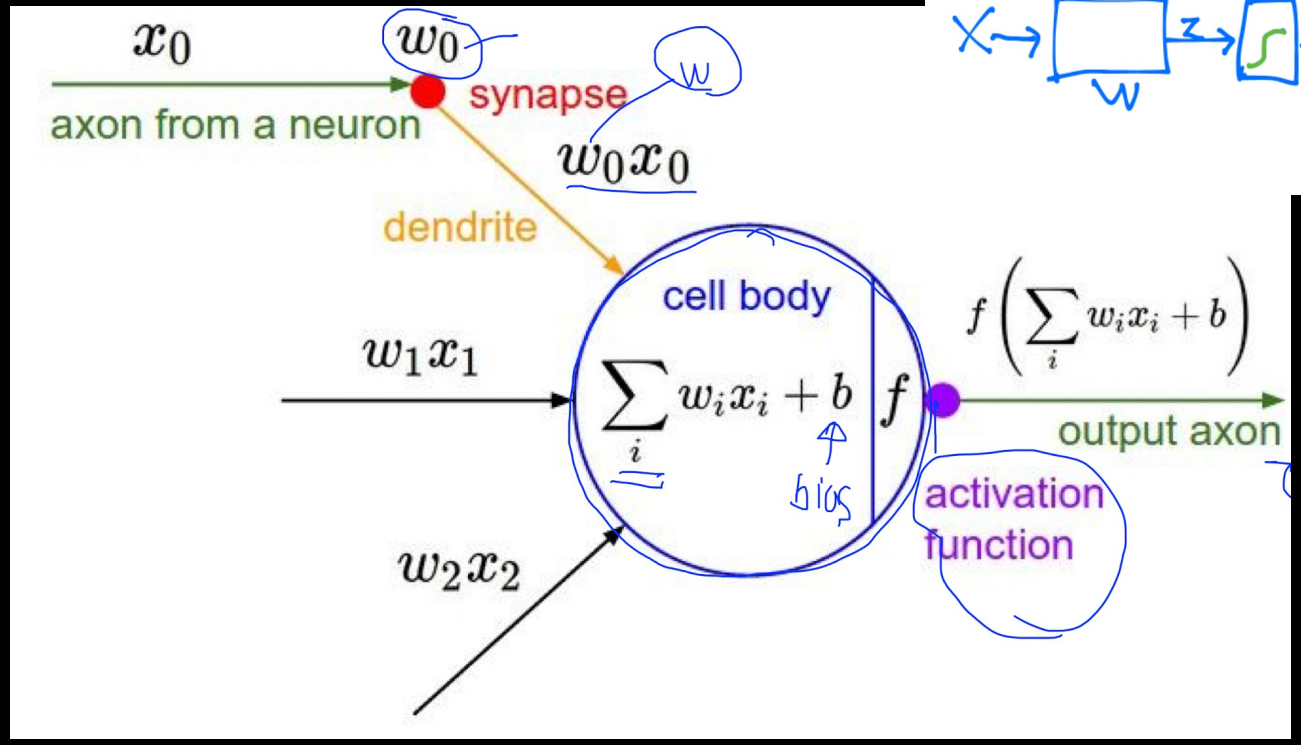
XOR Problem


x_0
w_0
synapse
axon from a neuron
$w_0 x_0$
dendrite
cell body
$w_1 x_1$
$\sum_i w_i x_i + b$
f
$f\left(\sum_i w_i x_i + b\right)$
output axon
bias
activation function
$w_2 x_2$




Input Layer
Output Layer

XOR Problem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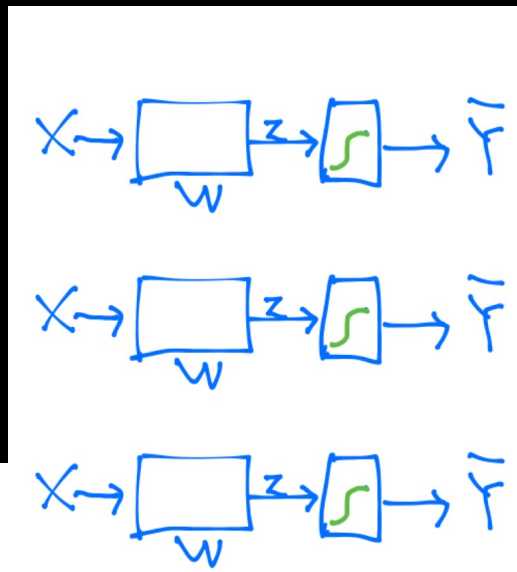
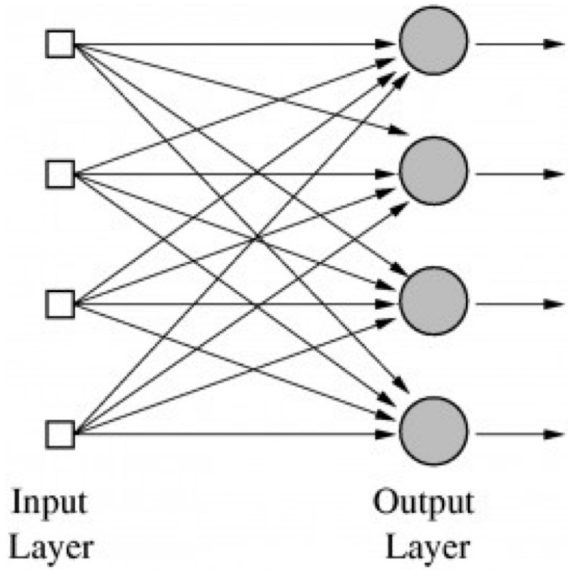
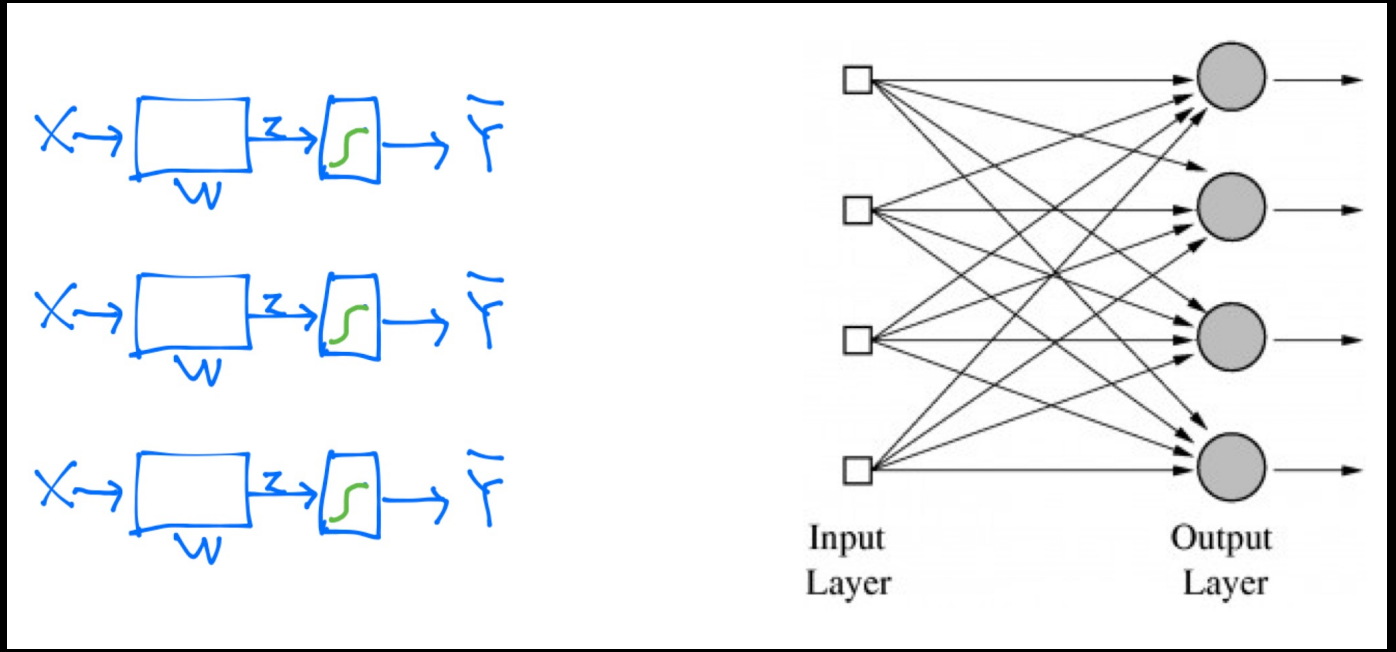



Input Layer
Output Layer

XOR Problem

1 Layer



XOR Problem

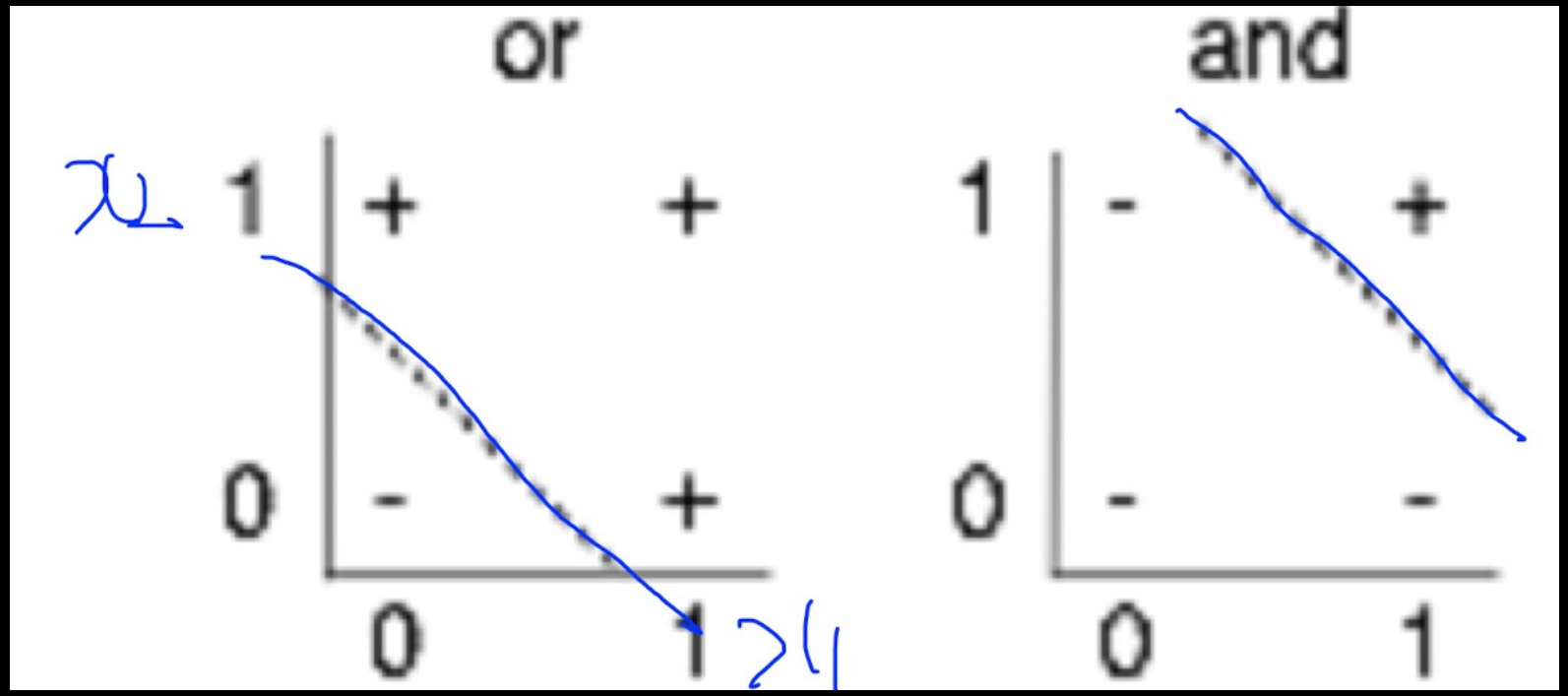
1 Layer

AND/OR Problem

XOR Problem

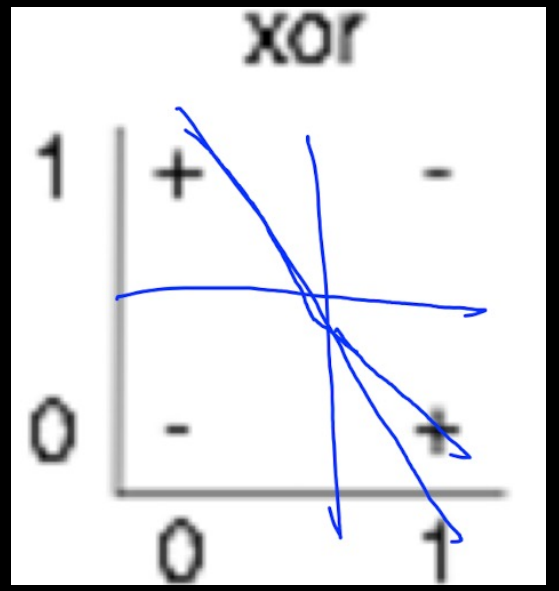
AND/OR Problem

(Linearly separable)



XOR Problem

XOR Problem ~~Linearly separable~~



MLP/BackPropagation /Big Problem

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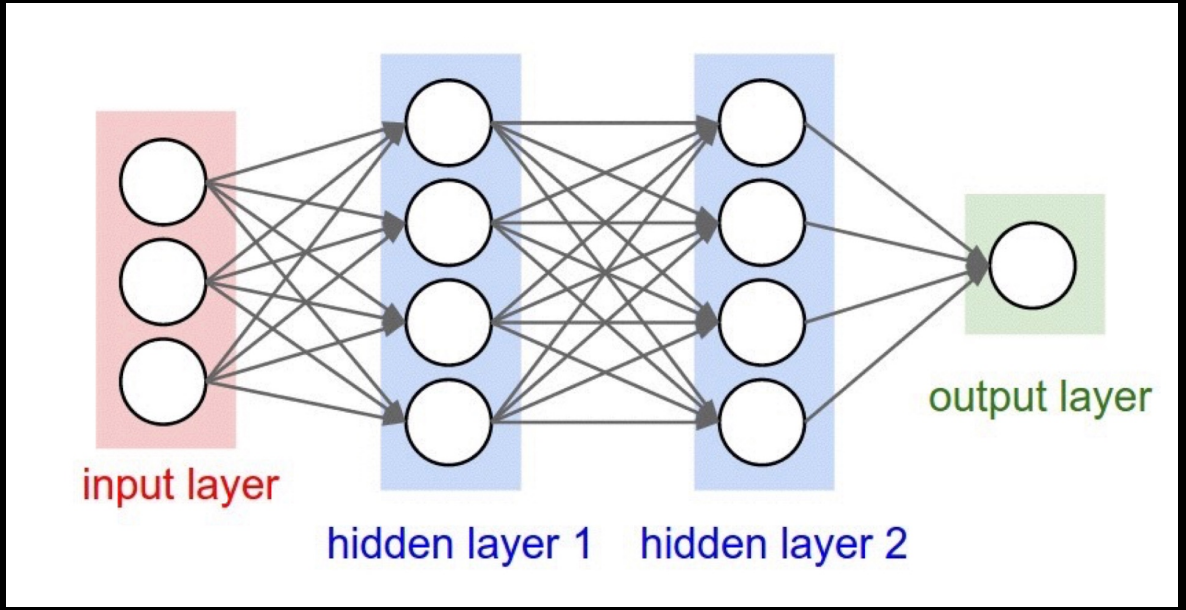
MLP : Multi Layer Perceptron 1969



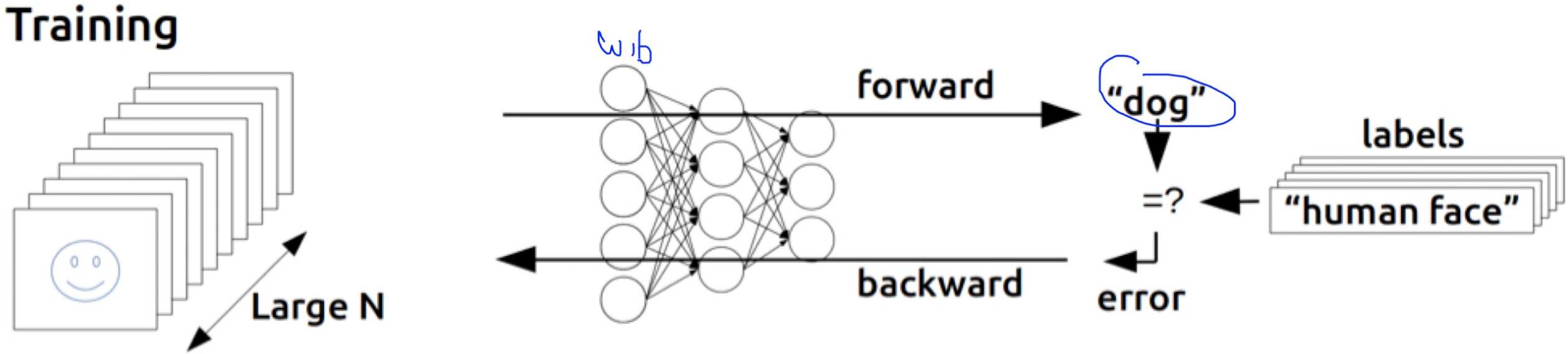
MLP/BackPropagation /Big Problem

MLP : Multi Layer Perceptron

No way to train all weights of multi layer

MLP/BackPropagation /Big Problem

Back Propagaton 1974, 1982, 1986

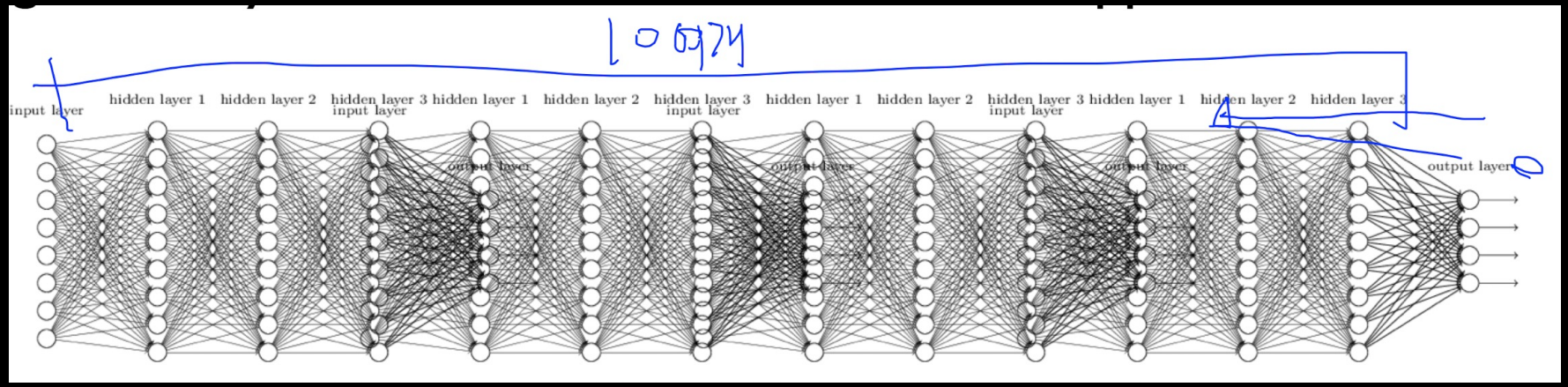


MLP/BackPropagation /Big Problem

Big Problem 1995

MLP/BackPropagation /Big Problem

Big Problem 1995



Deep Learning

Deep Learning

CIFAR

Deep Learning

Breakthrough 2006, 2007

Deep Learning

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Neural networks with many layers really could be trained well, if the weights are initialized in a clever way rather than randomly.

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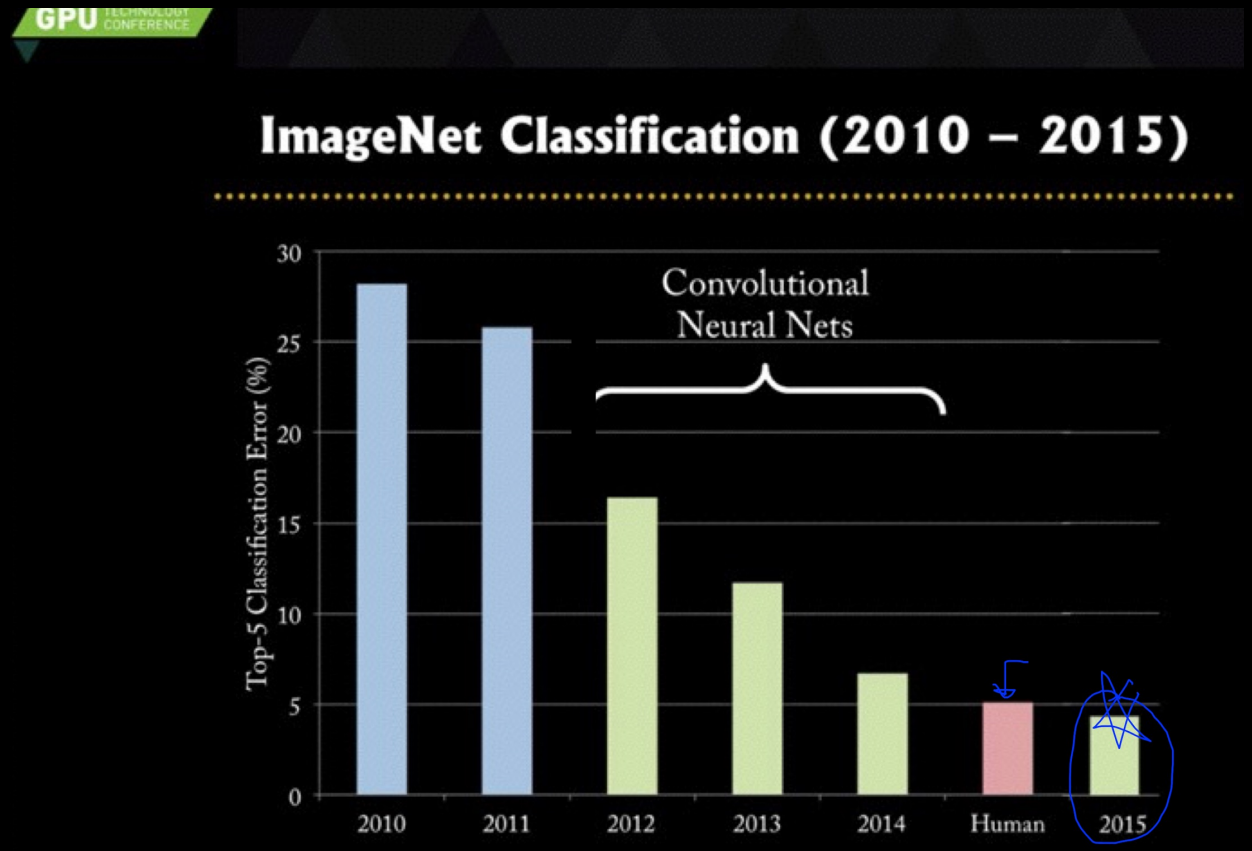
Rebranding : Deep Learning

Deep Learning



Hinton's Summary / Examples

Hinton's Summary / Examples

1. Our labeled datasets were thousands of times too small.
2. Our computers were millions of times too slow.
3. We initialized the weights in a stupid way.
4. We used the wrong type of non-linearity.

Hinton's Summary / Examples

1. 유튜브 자막 생성
2. 페이스북 피드에 표시되는 게시물
3. 구글의 검색 결과 정렬 순위
4. 넷플릭스 추천 작품