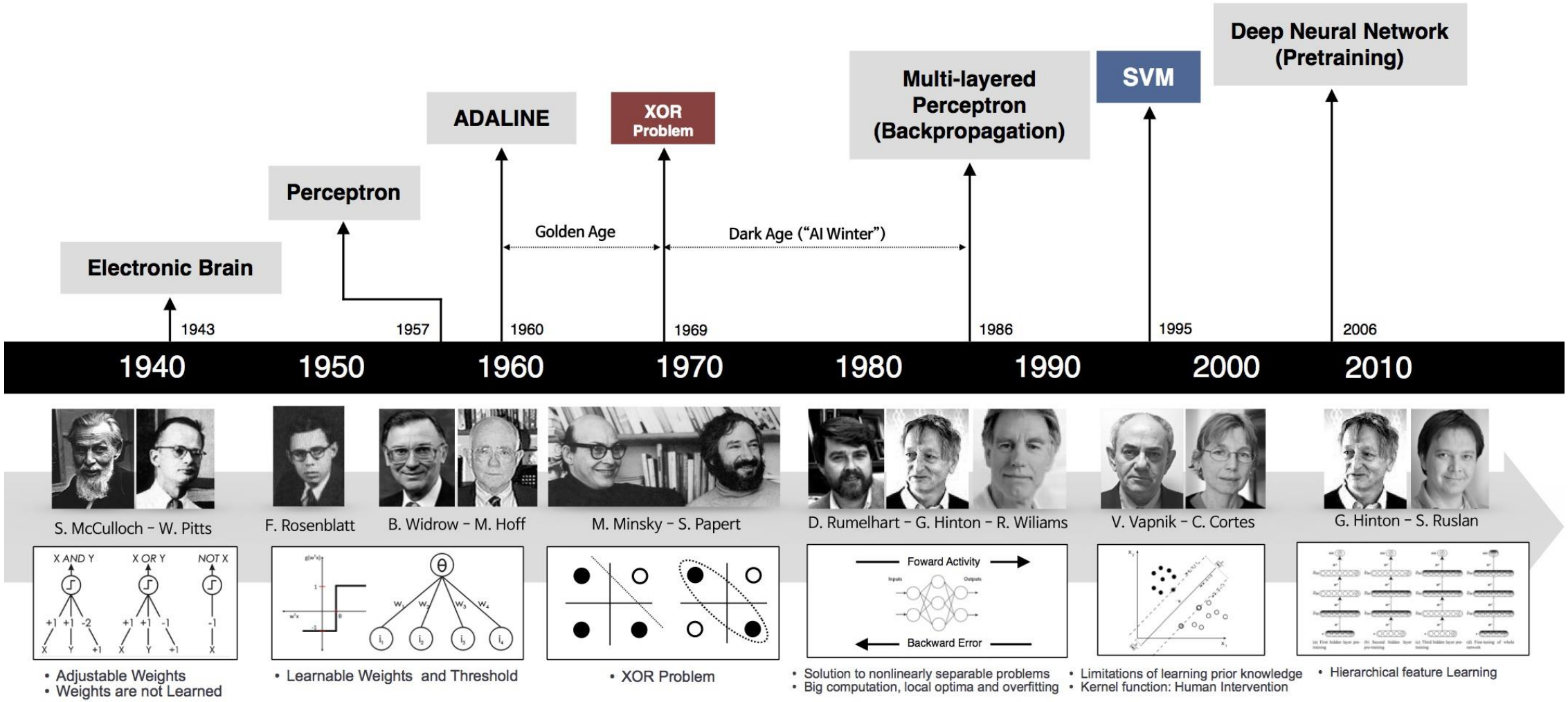
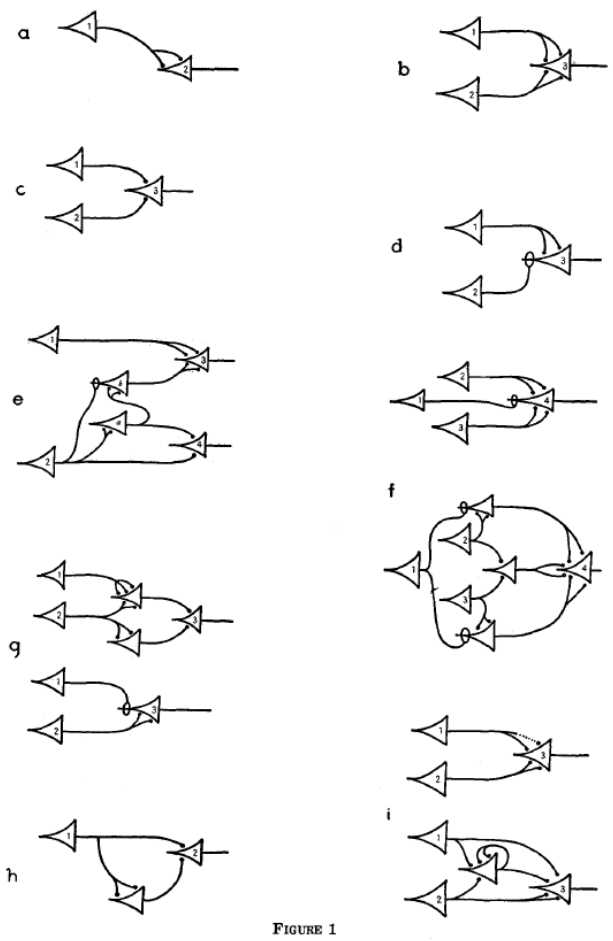
Chapter 01. 딥러닝이 무엇인가요?

딥러닝의 역사

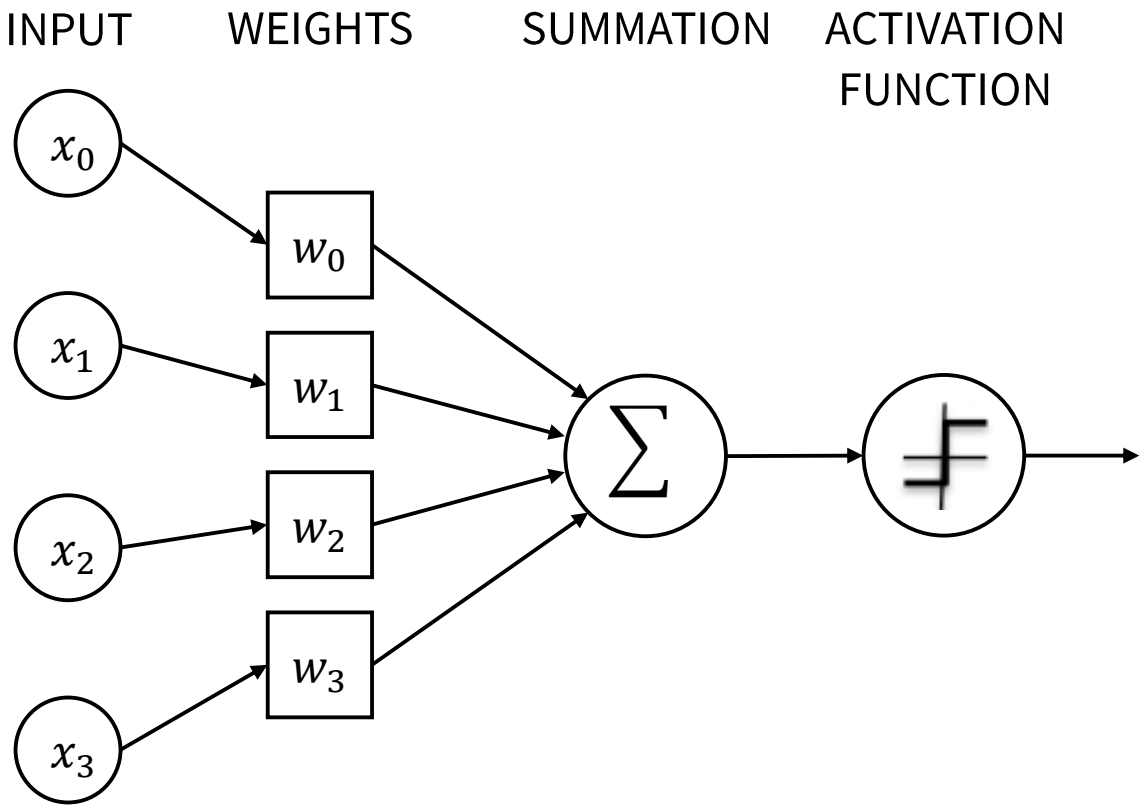
딥러닝 역사의 흐름



딥러닝의 뿌리를 찾아서

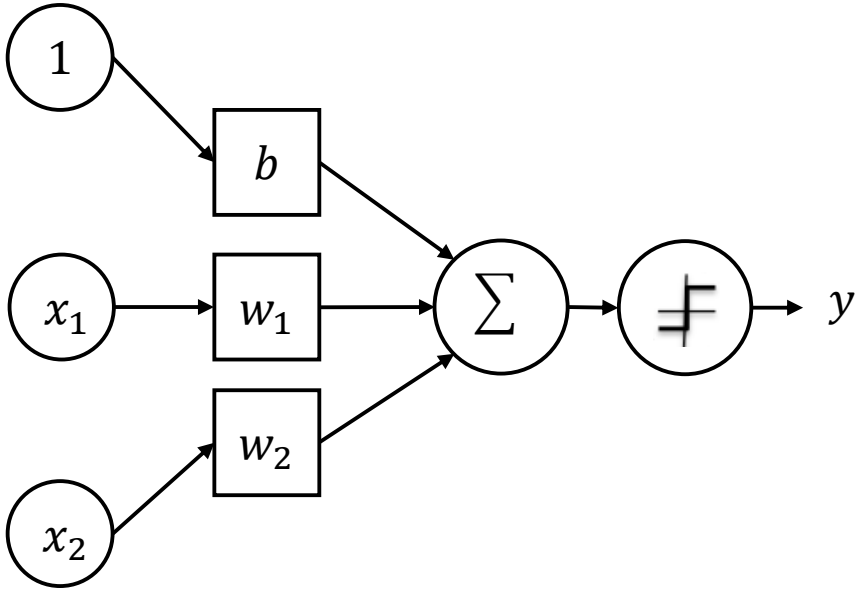


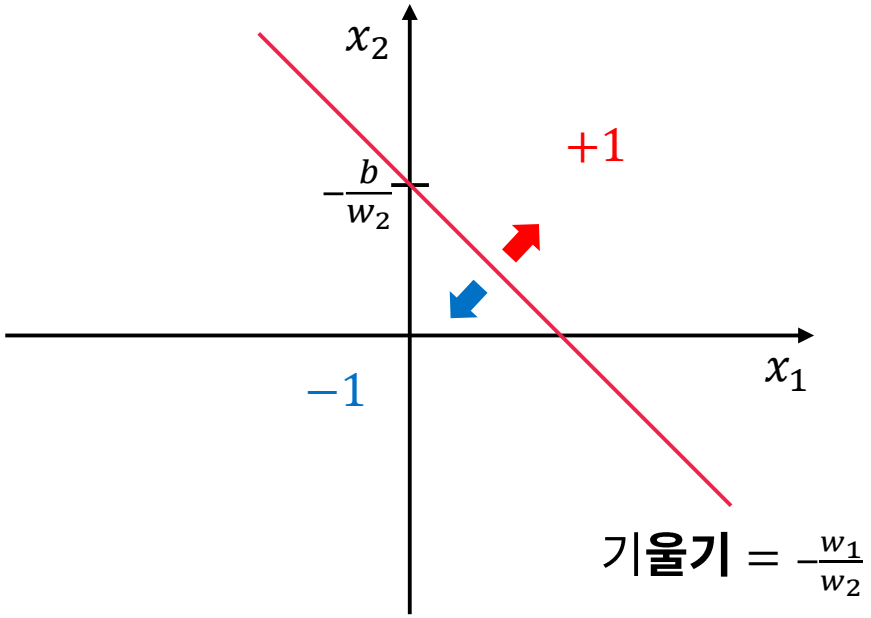
최초의 인공신경망 개념
(McCulloch and Pitts, 1943)



Rosenblatt의 퍼셉트론 구조
(Rosenblatt, 1958)

퍼셉트론의 동작



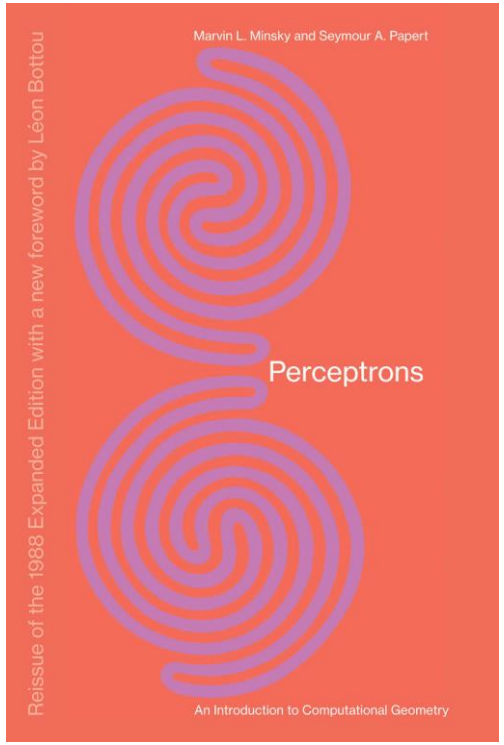


$$y = \begin{cases} +1, & b + w_1 x_1 + w_2 x_2 \geq 0 \\ -1, & b + w_1 x_1 + w_2 x_2 < 0 \end{cases}$$

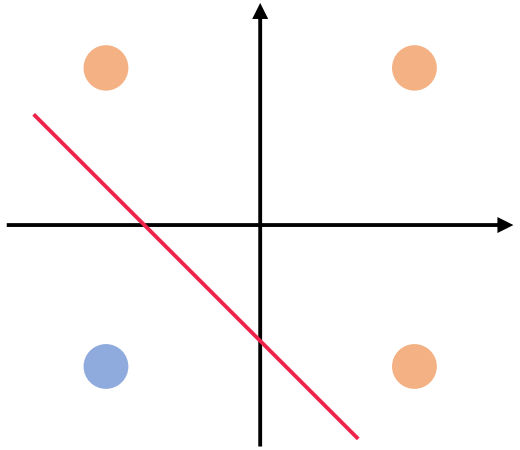
$$x_2 = -\frac{w_1}{w_2} x_1 - \frac{b}{w_2}$$

퍼셉트론의 수식과 시각적 표현

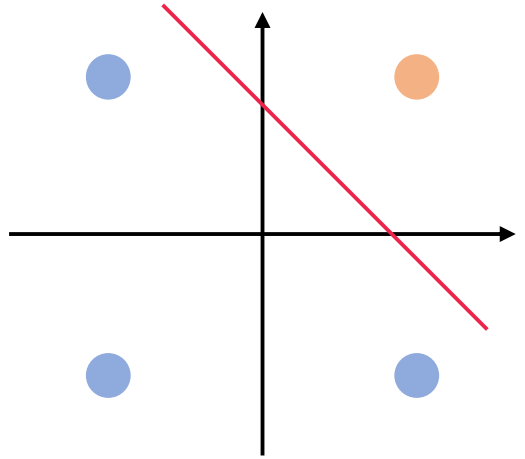
XOR 문제와 AI Winter



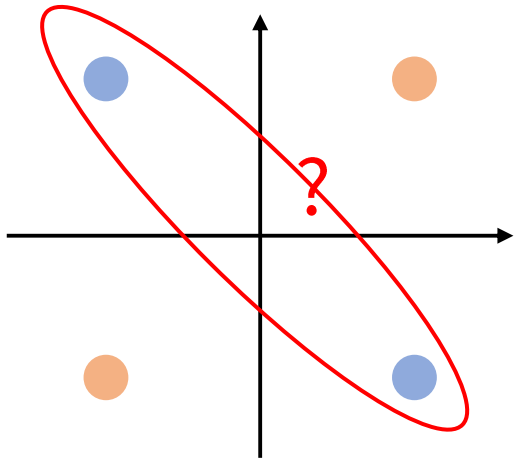
Perceptrons
(Minsky and Papert, 1969)



OR

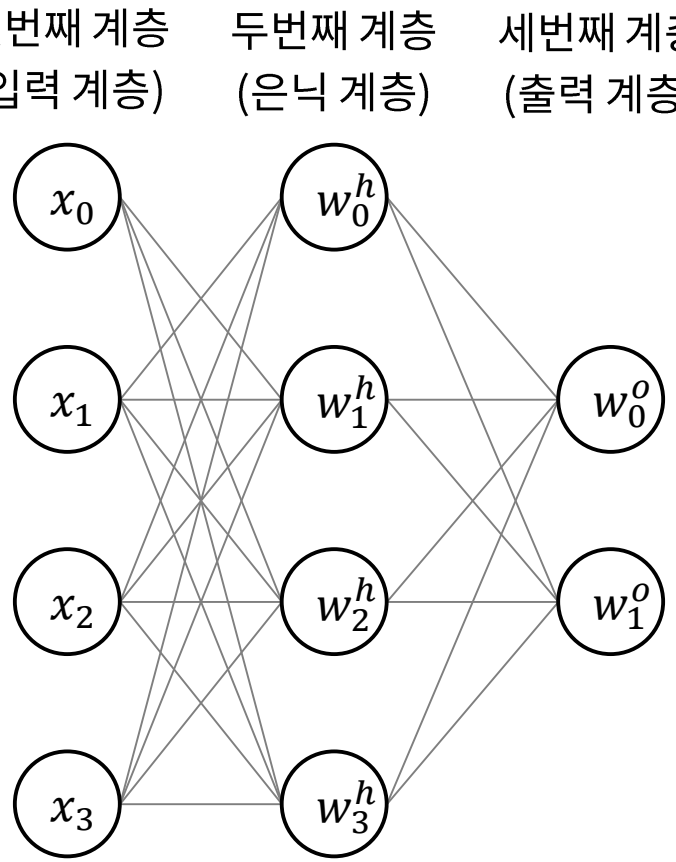


AND

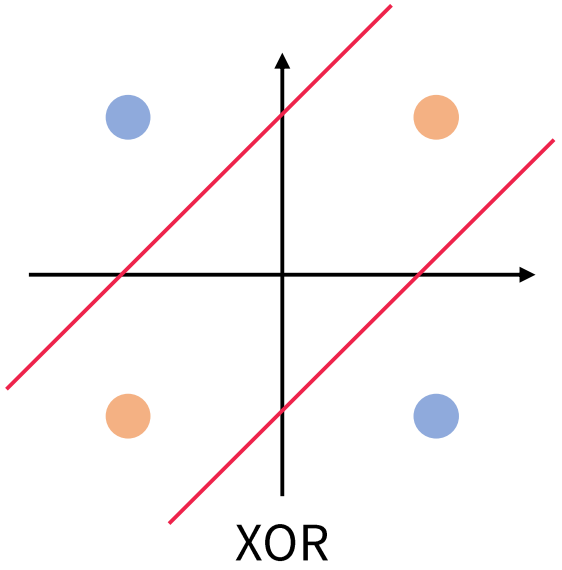


XOR

다층 퍼셉트론 (첫 번째 Breakthrough)

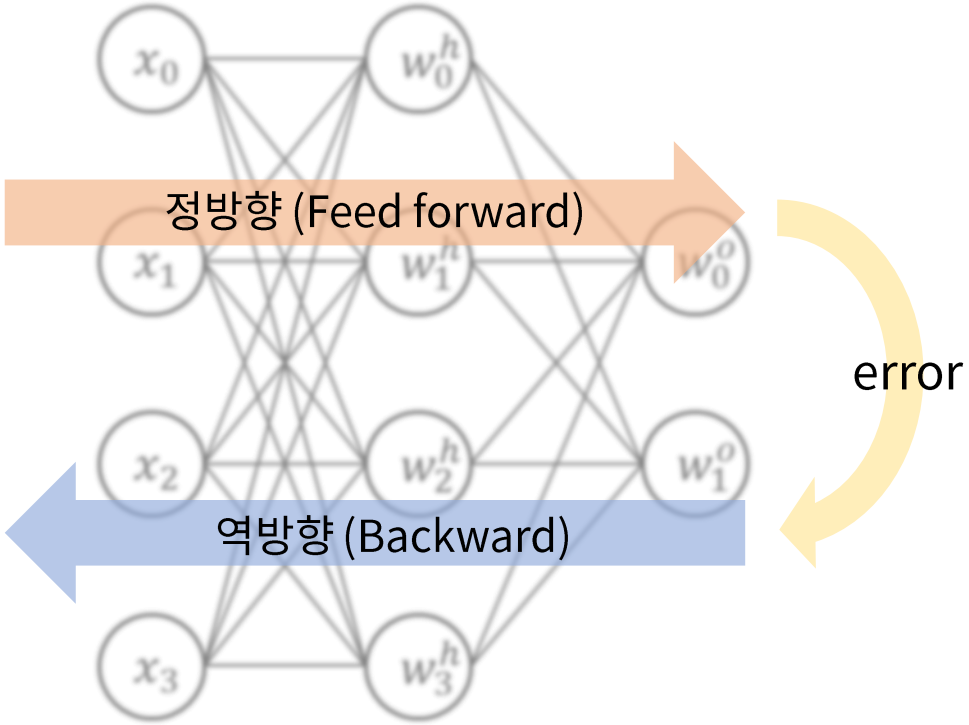


다층 퍼셉트론 (1986)
(Multi-Layered Perceptrons; MLP)

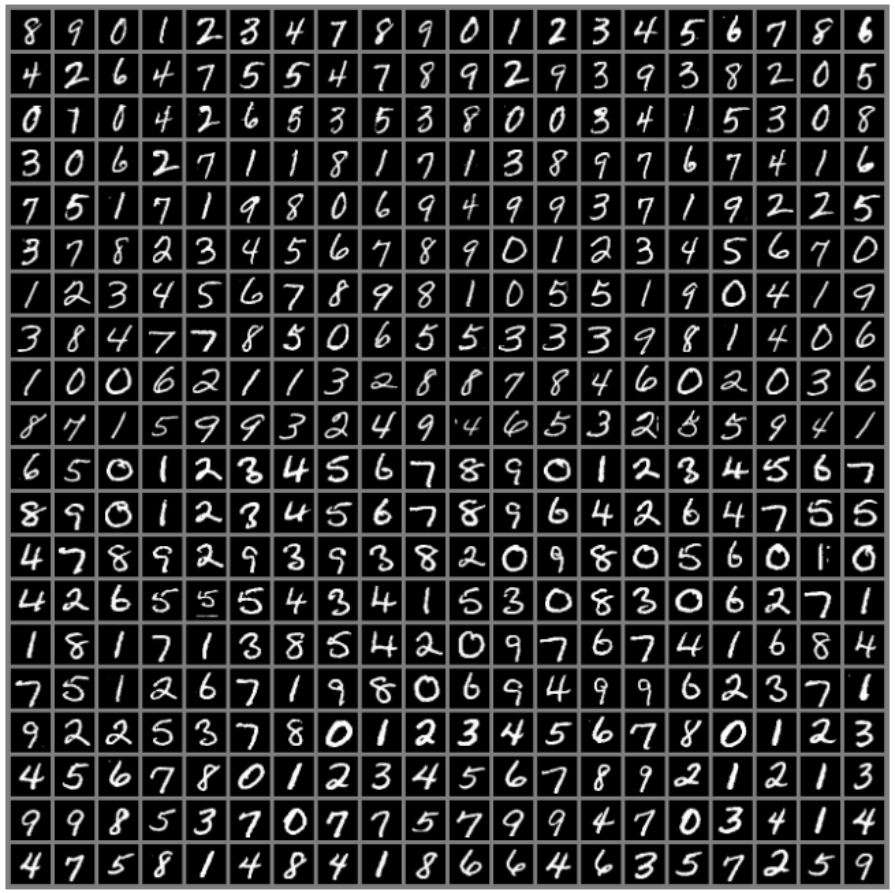


MLP로 XOR 문제를 해결한 예

역전파 알고리즘과 MNIST

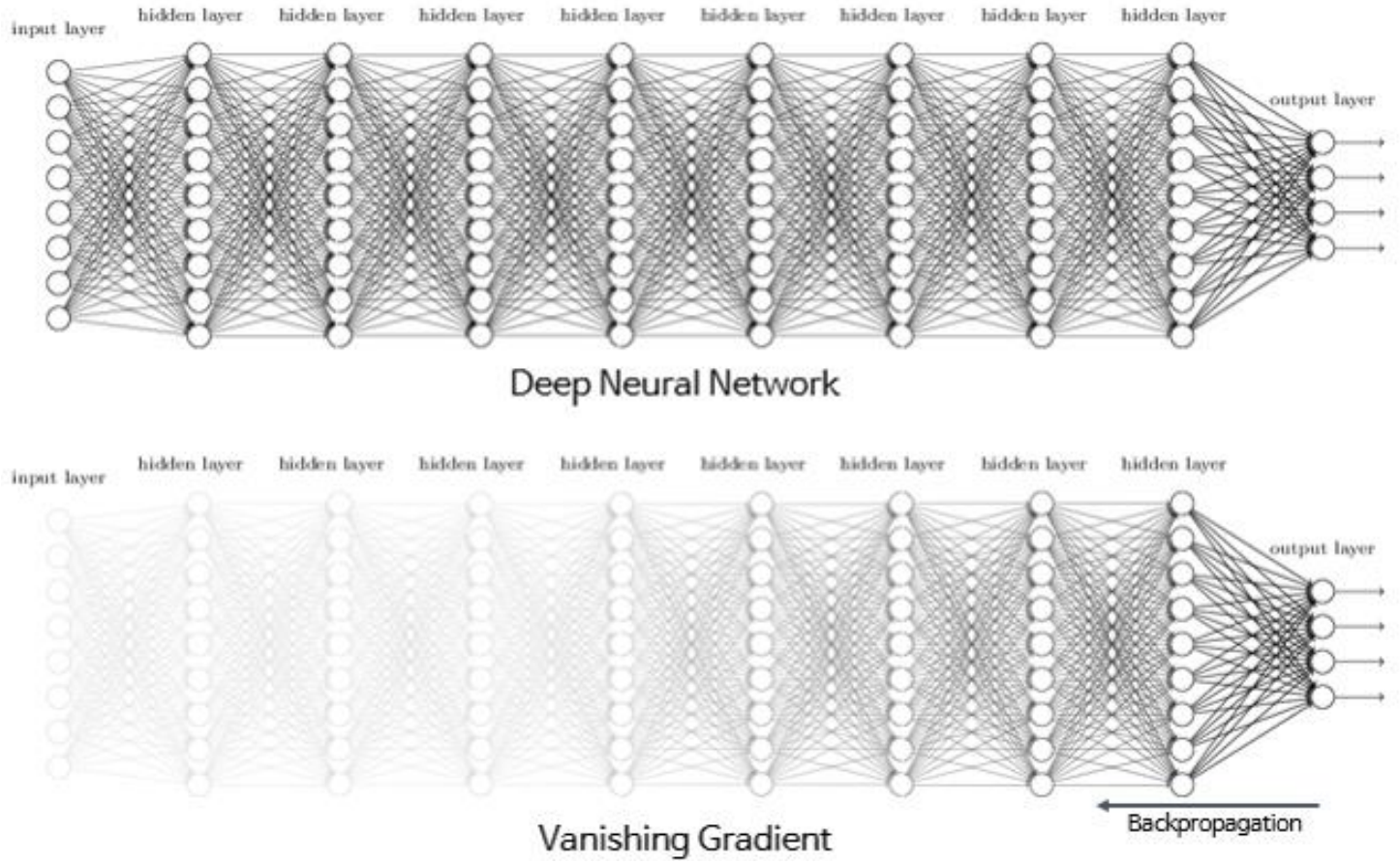


오류 역전파 알고리즘
(Backpropagation Algorithm; BP)



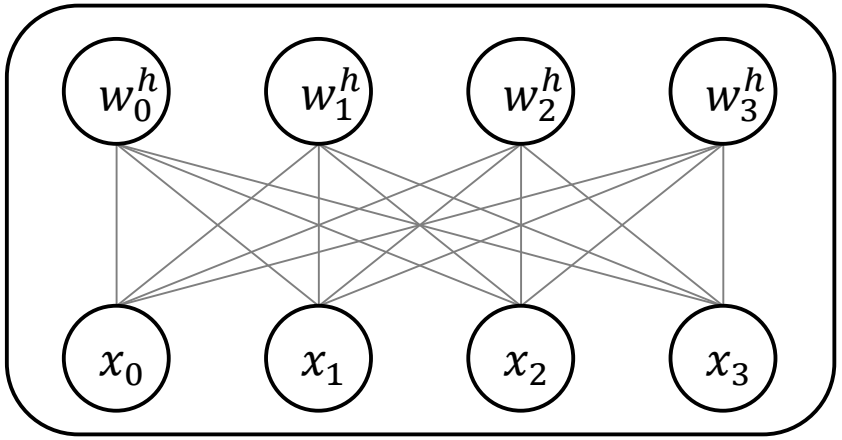
MLP와 BP 알고리즘으로 해결한 필기숫자 인식(MNIST) 문제
(LeCun, 1989)

기울기 소실 문제 (두 번째 AI Winter)

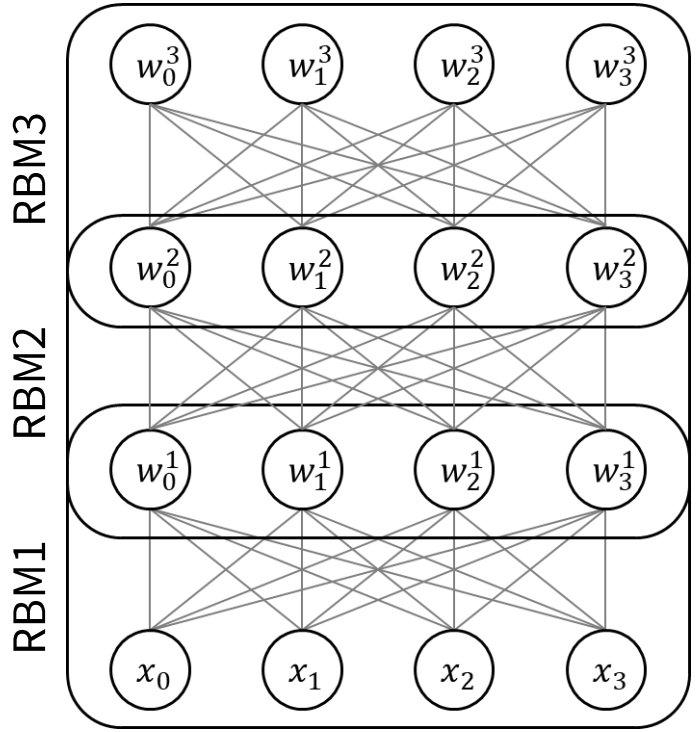


계층이 깊어질 수록 학습이 어려운 기울기 소실 (Vanishing Gradient) 문제

심층 믿음 신경망의 등장 (두 번째 Breakthrough)



RBM (Restricted Boltzmann Machine) 비지도 학습법



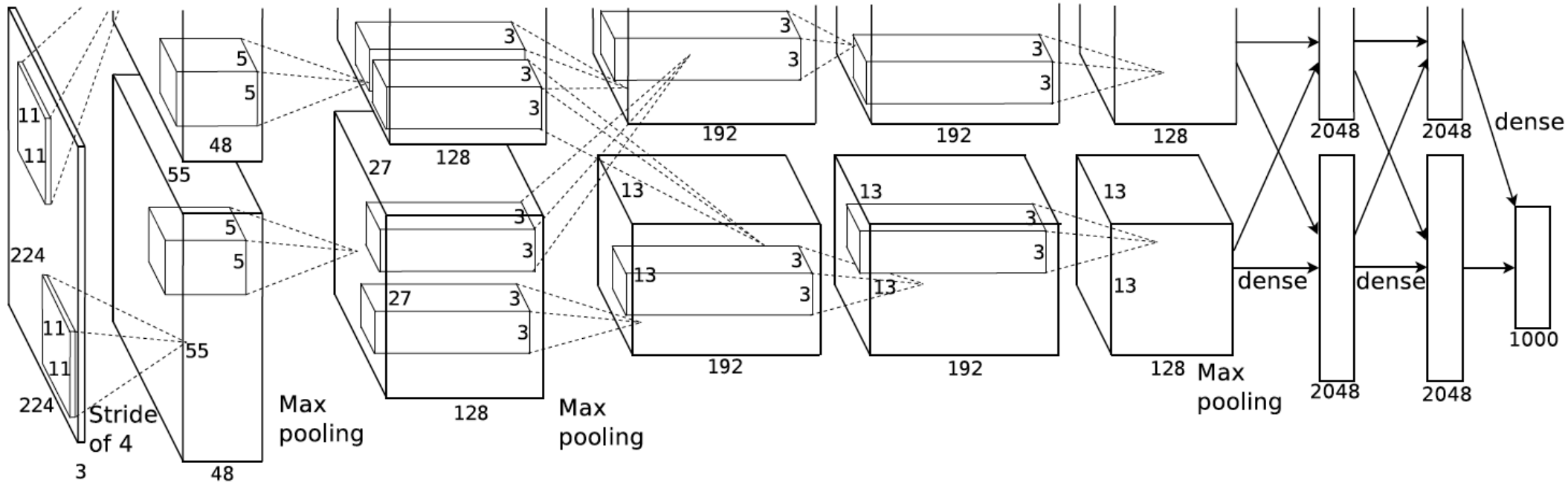
RBM을 쌓아 올린 DBN (Deep Belief Network)
(Hinton, 2006)

ImageNet Large Scale Visual Recognition Challenges

Fei-Fei Li 교수의 대규모 영상 분류 데이터셋 ImageNet과 경연대회 ILSVRC

AlexNet과 딥러닝의 비상

2012 ILSVRC (ImageNet Large Scale Visual Recognition Competition) 우승과 함께 시작된 딥러닝의 급부상



AlexNet (Krizhevsky *et al.*, 2012)

AlexNet과 딥러닝의 비상