Part. 01

Deep Learning

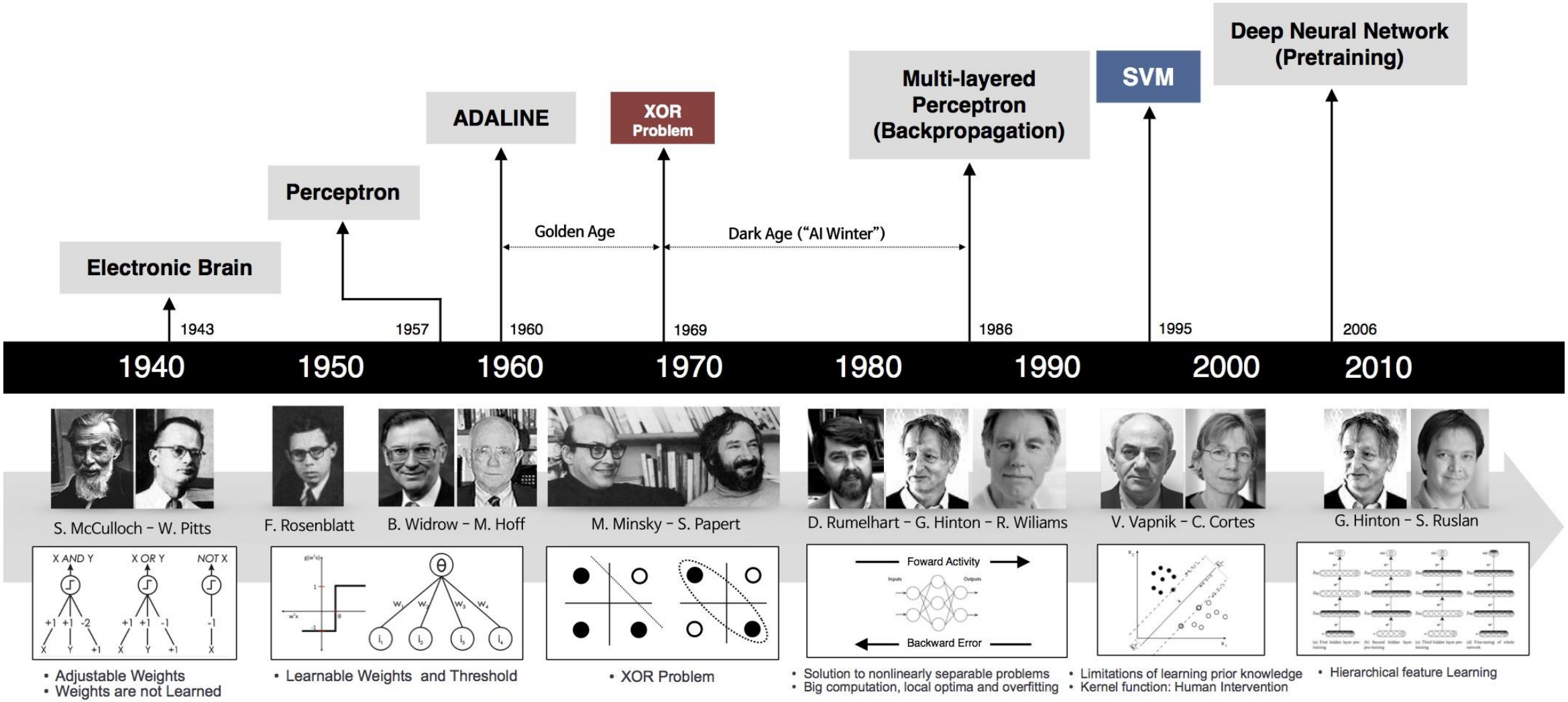
Deep Learning의 시작과 현재

FASTCAMPUS

ONLINE

강사. 신제용

I 딥러닝의 역사



I 딥러닝의 뿌리를 찾아서

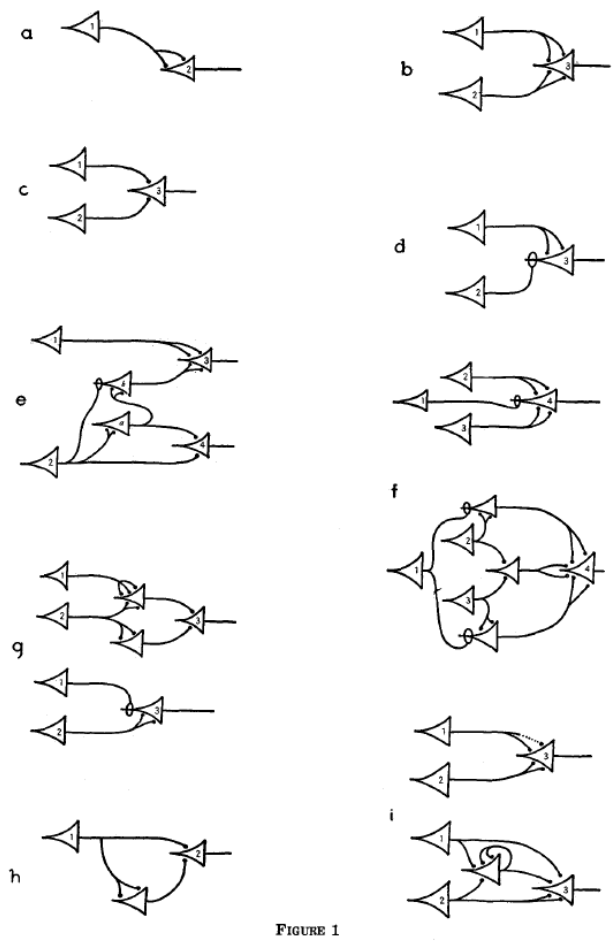
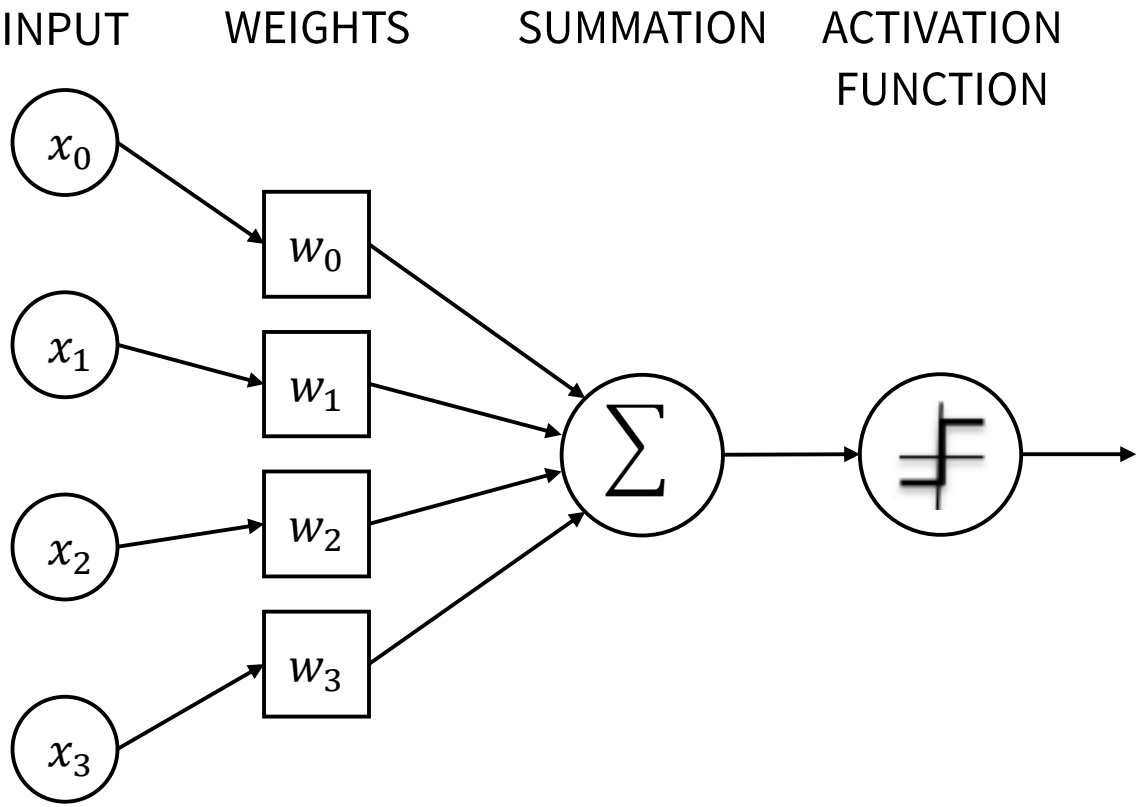


FIGURE 1

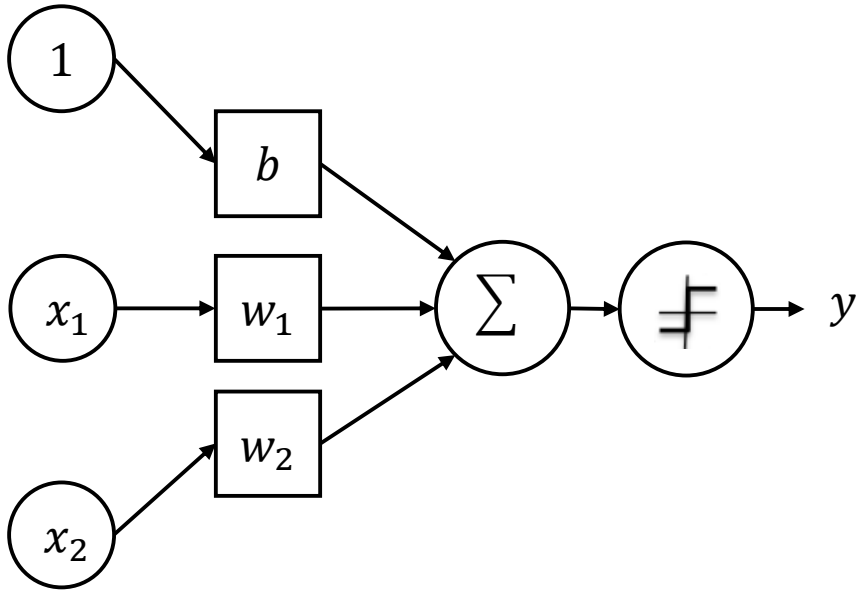
최초의 인공신경망 개념
(McCulloch and Pitts, 1943)

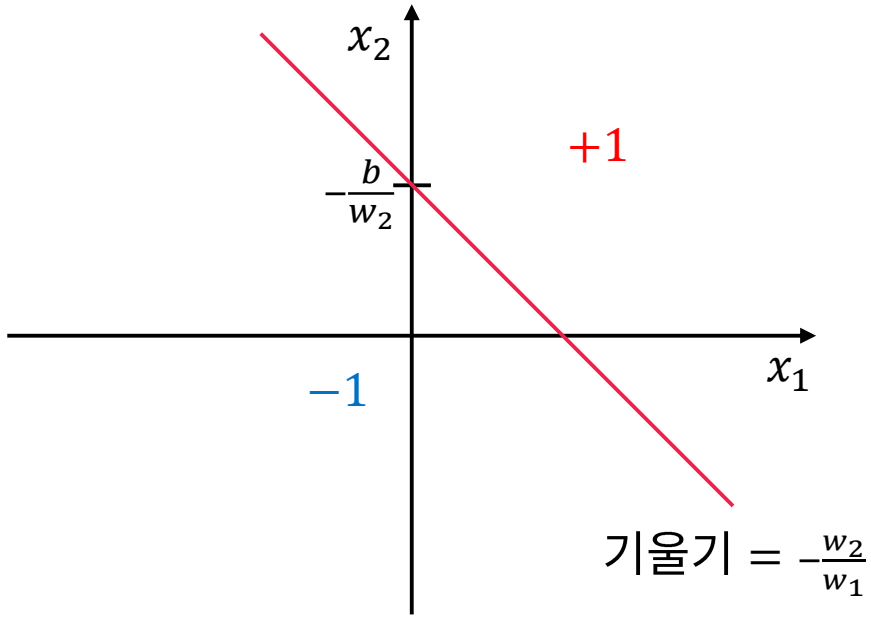


Rosenblatt의 퍼셉트론 구조
(Rosenblatt, 1958)

FAST CAMPUS
ONLINE
신제용 강사.

퍼셉트론의 동작





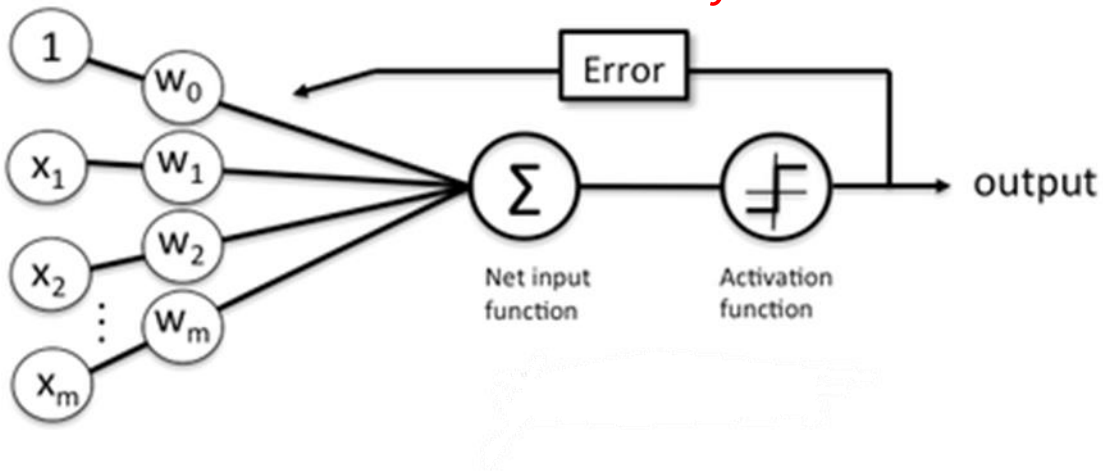
$$y = \begin{cases} +1, & b + w_1 x_1 + w_2 x_2 \geq 0 \\ -1, & b + w_1 x_1 + w_2 x_2 < 0 \end{cases}$$

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

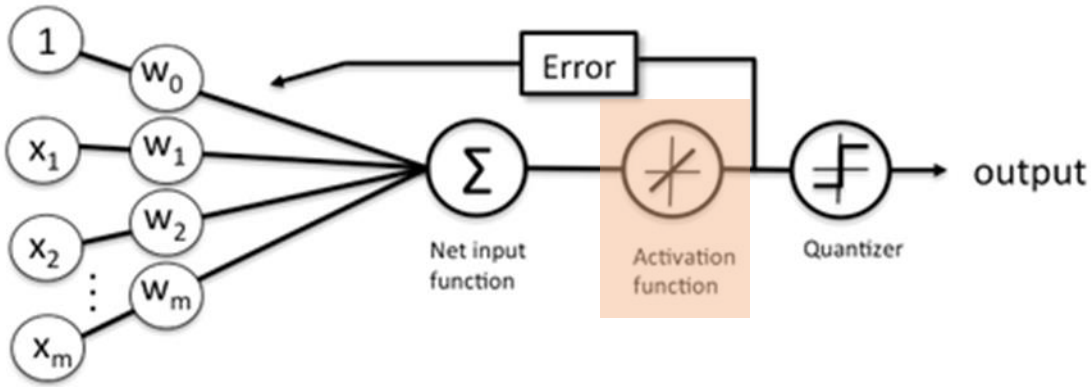
퍼셉트론의 수식과 시각적 표현

ADALINE (Adaptive Linear Element)

How Many?

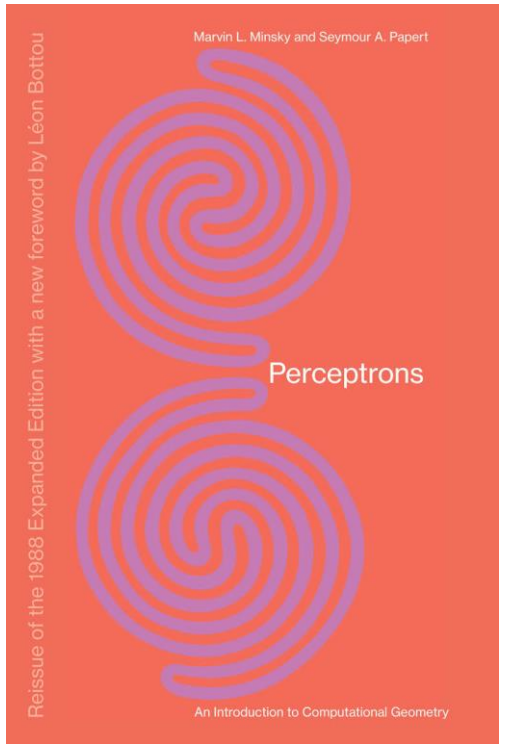


How Much?

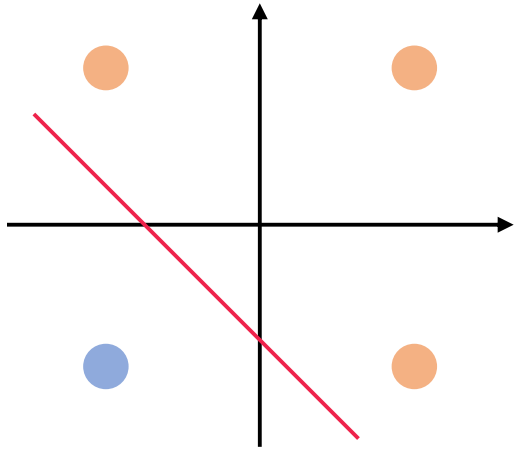


퍼셉트론과 ADALINE의 비교

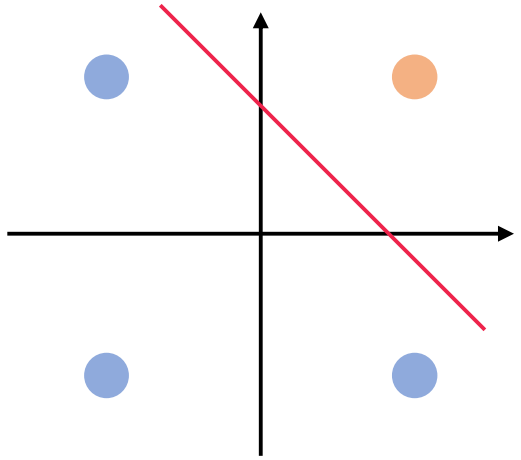
I XOR 문제와 AI Winter



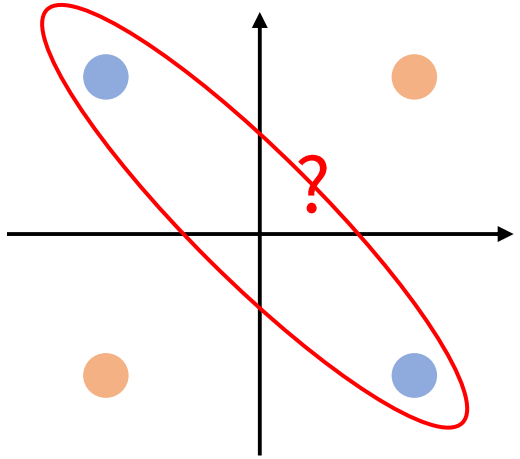
Perceptrons
(Minsky and Papert, 1969)



OR

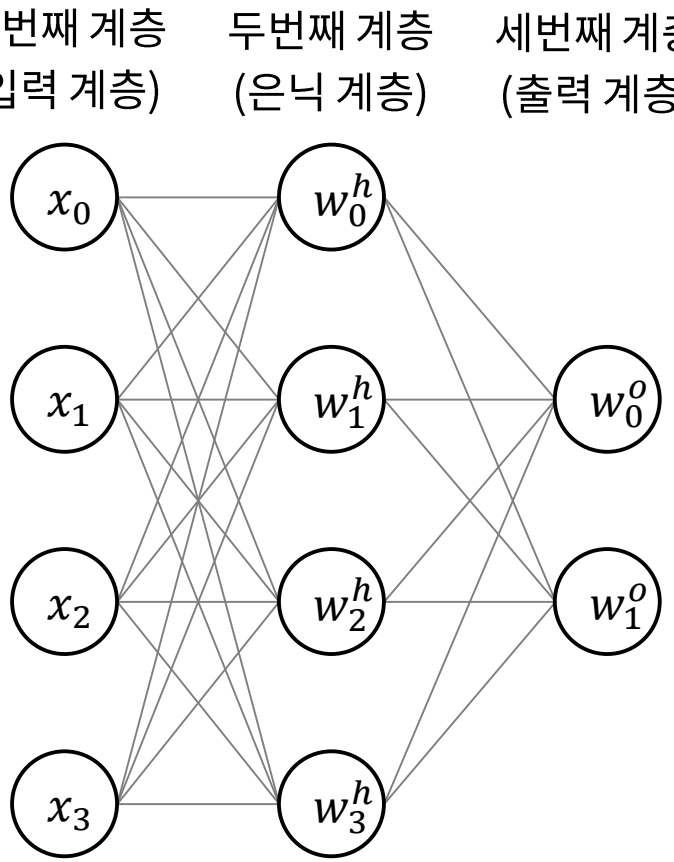


AND

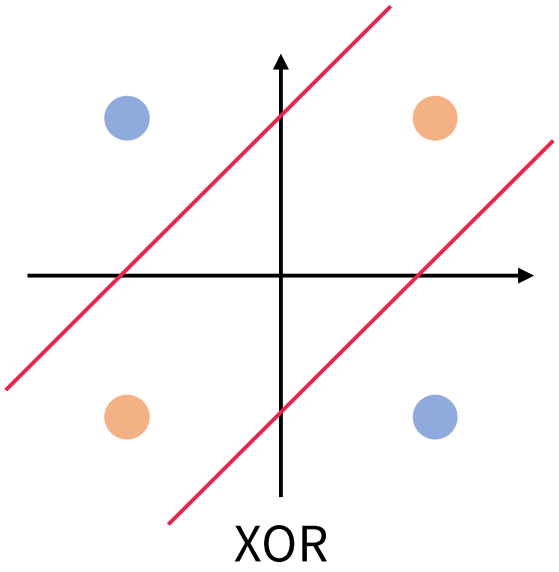


XOR

I 다층 퍼셉트론 (첫 번째 Breakthrough)

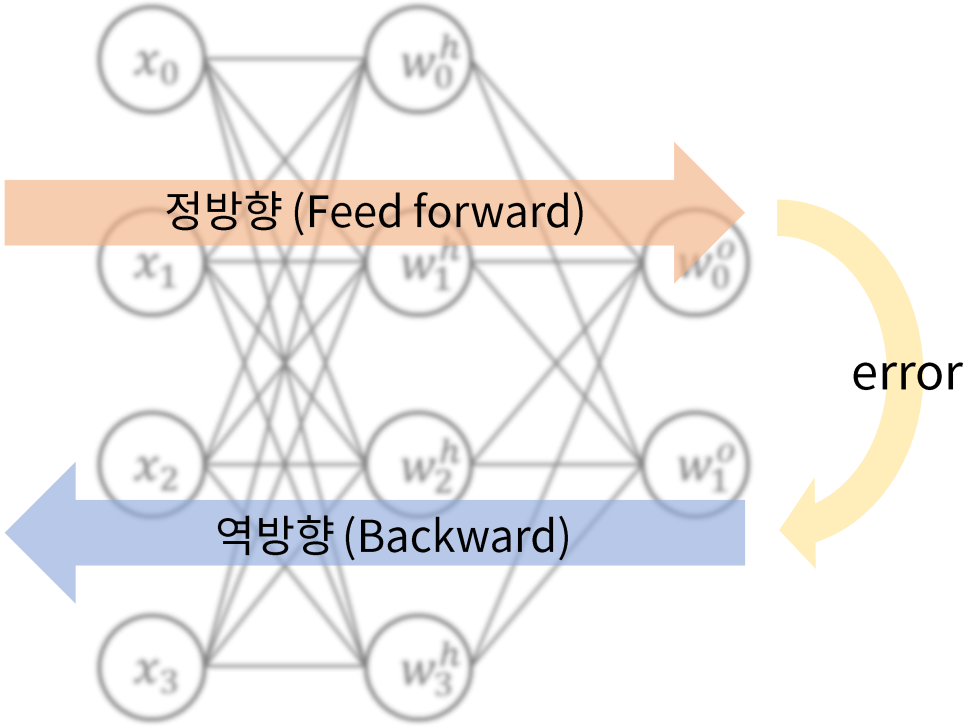


다층 퍼셉트론 (1986)
(Multi-Layered Perceptrons; MLP)

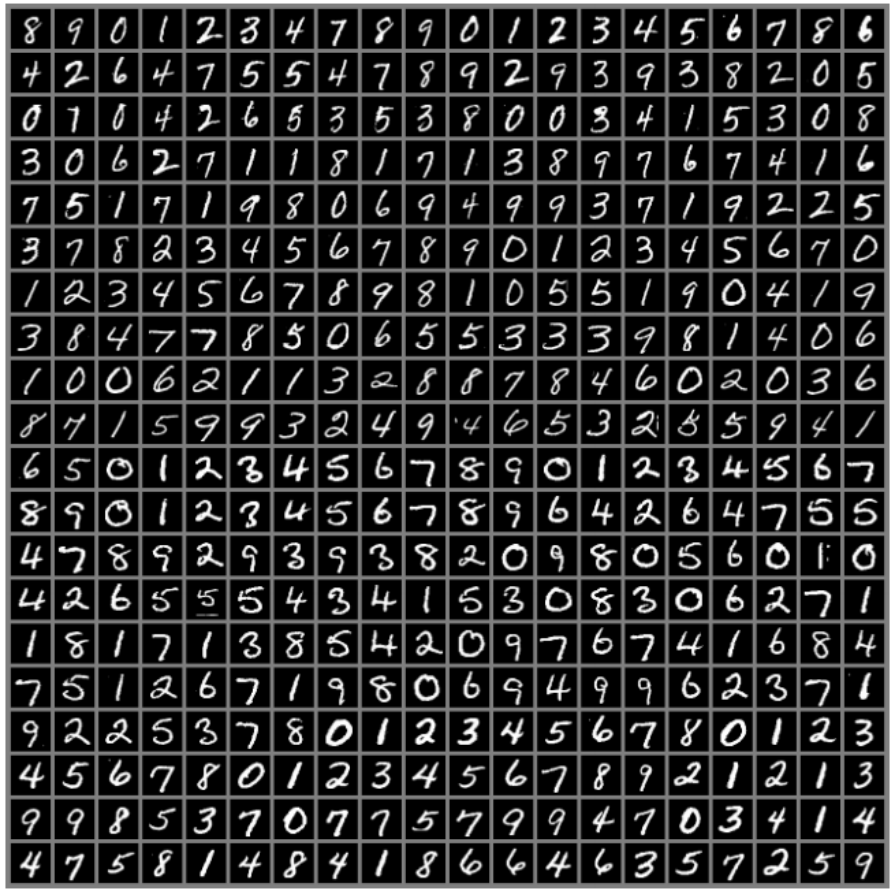


MLP로 XOR 문제를 해결한 예

역전파 알고리즘과 MNIST

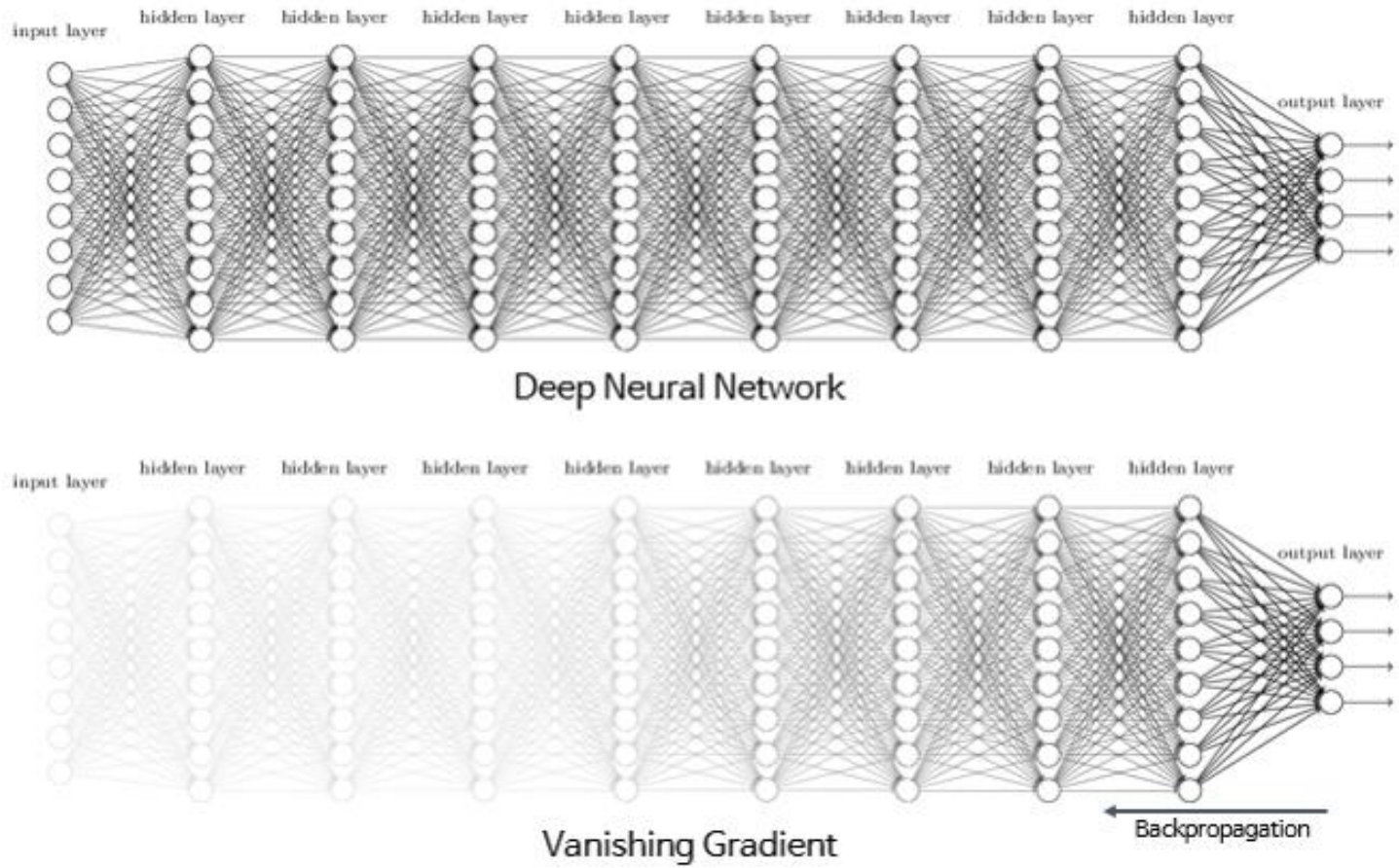


오류 역전파 알고리즘
(Backpropagation Algorithm; BP)



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

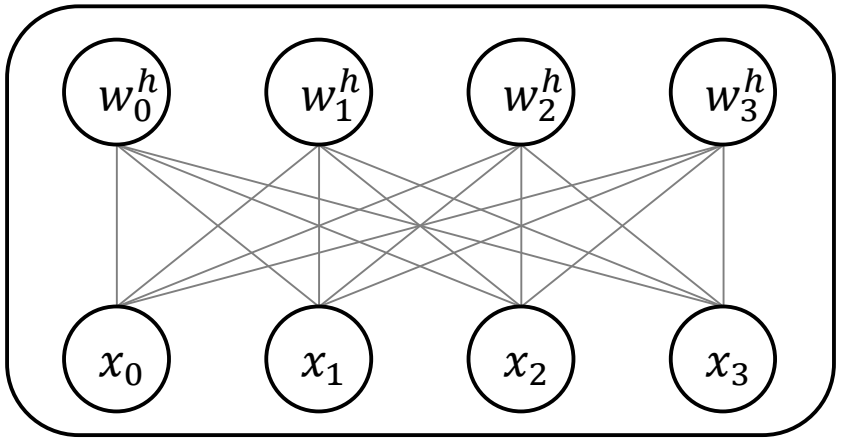
I 기울기 소실 문제 (두 번째 AI Winter)



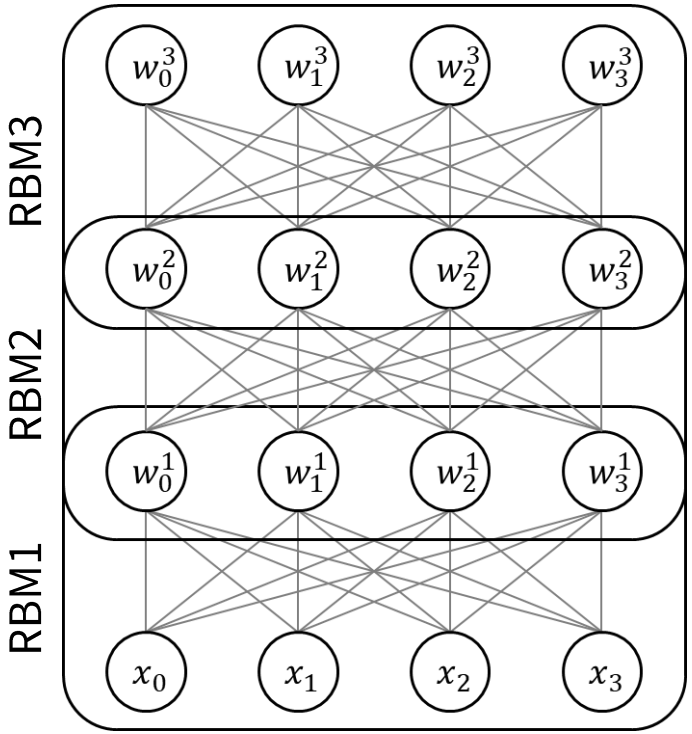
계층이 깊어질 수록 학습이 어려운 기울기 소실 (Vanishing Gradient) 문제

FAST CAMPUS
ONLINE
신제용 강사.

I 심층 믿음 신경망의 등장 (두 번째 Breakthrough)



RBM (Restricted Boltzmann Machine) 비지도 학습법



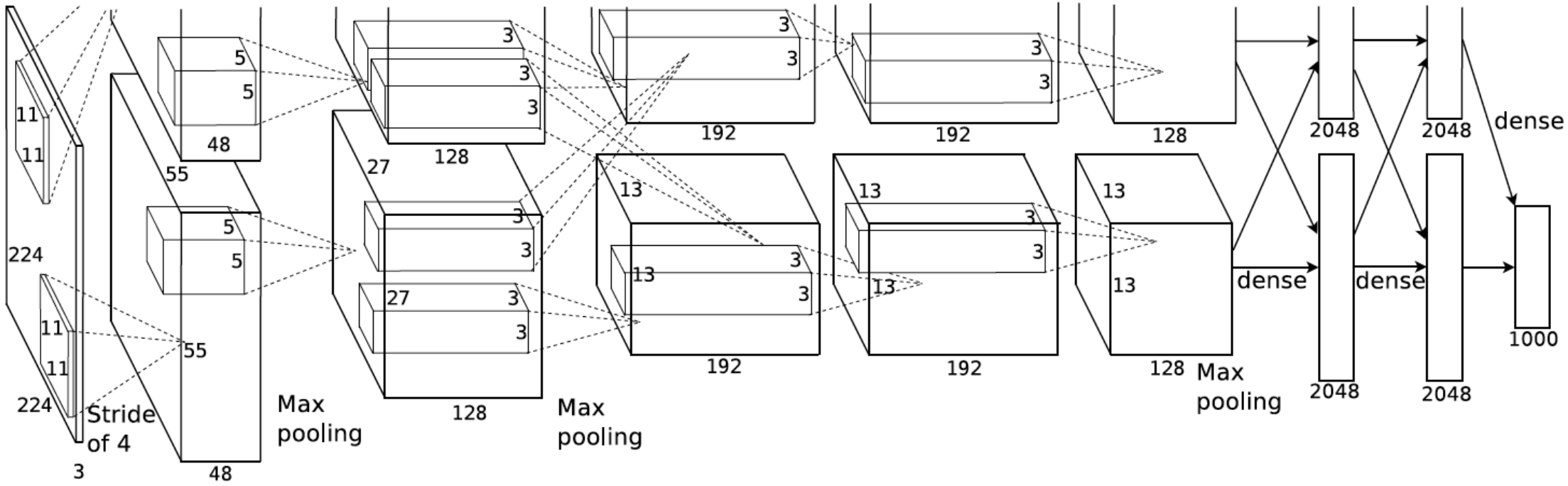
RBM을 쌓아 올린 DBN (Deep Belief Network)
(Hinton, 2006)

I ImageNet Large Scale Visual Recognition Challenges

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

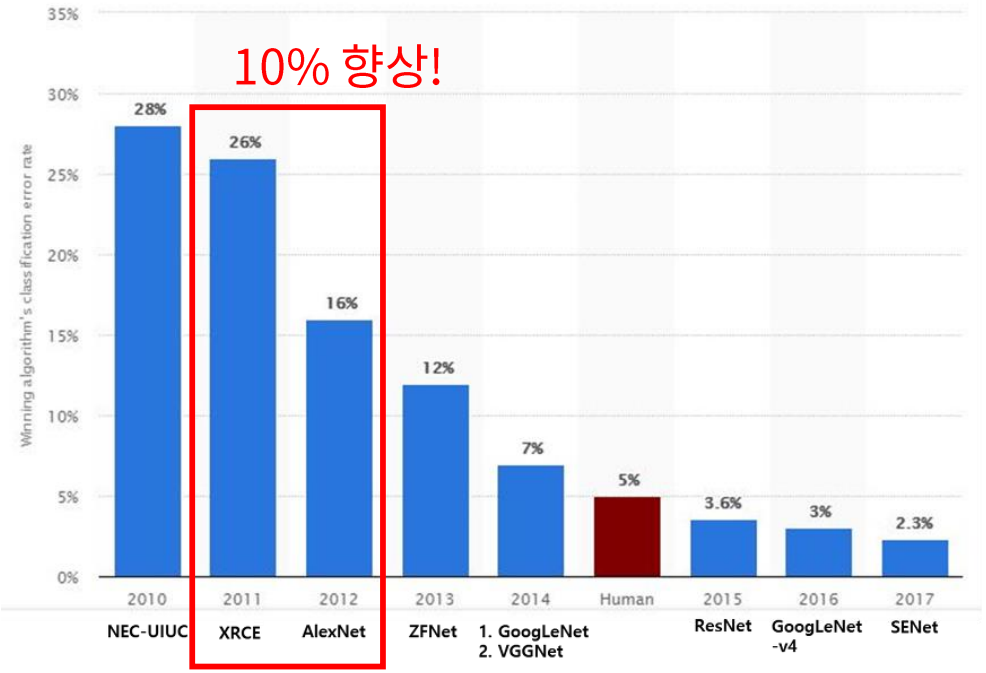
AlexNet과 딥러닝의 비상

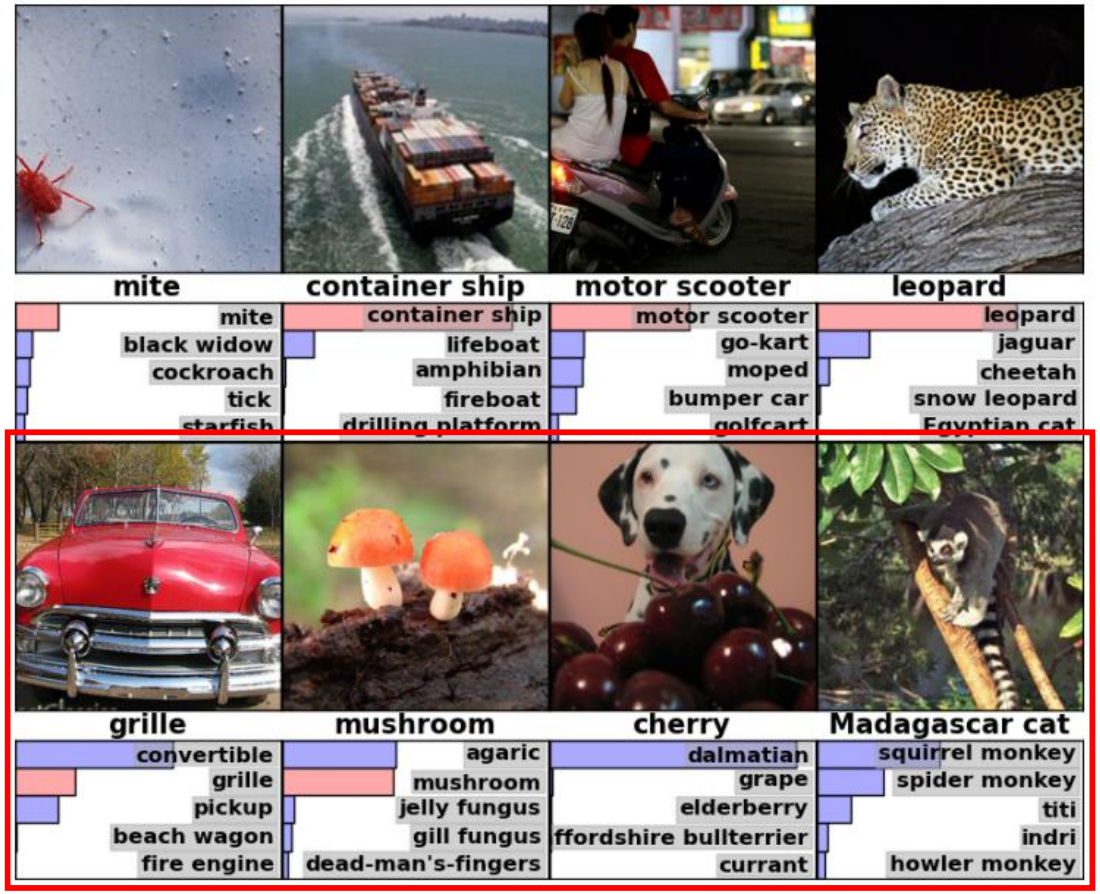
2012 ILSVRC (ImageNet Large Scale Visual Recognition Competition) 우승과 함께 시작된 딥러닝의 급부상



AlexNet (Krizhevsky *et al.*, 2012)

AlexNet과 딥러닝의 비상





FAST CAMPUS
ONLINE
신제용 강사.