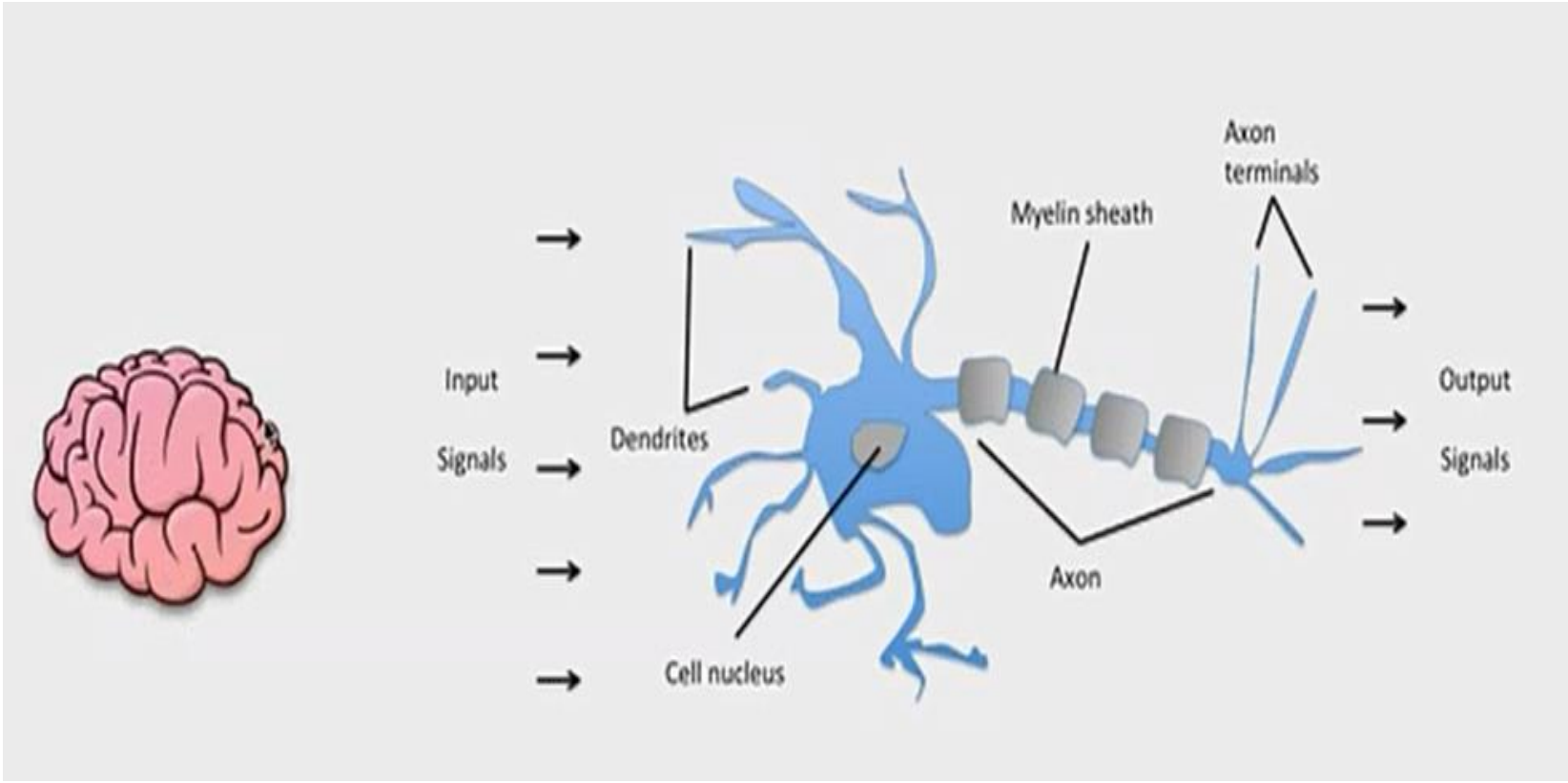
SUN SOFTWARE MAESTRO

딥러닝 개요 및 활용사례

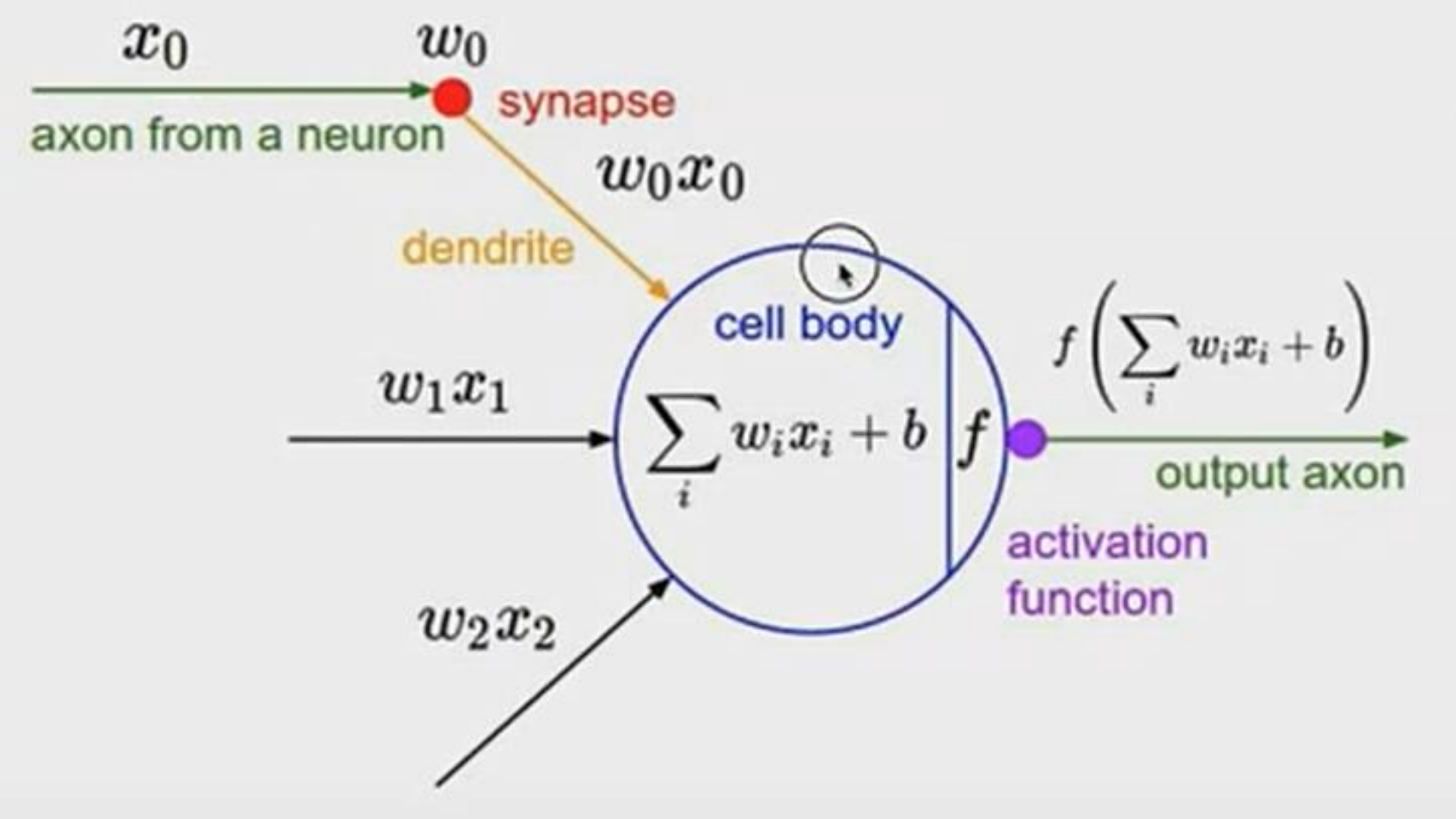
Artificial Neural Network 개요

인간 두뇌의 신경망(860억개의 뉴런과 5000조개의 시냅스로 구성)을 모델링



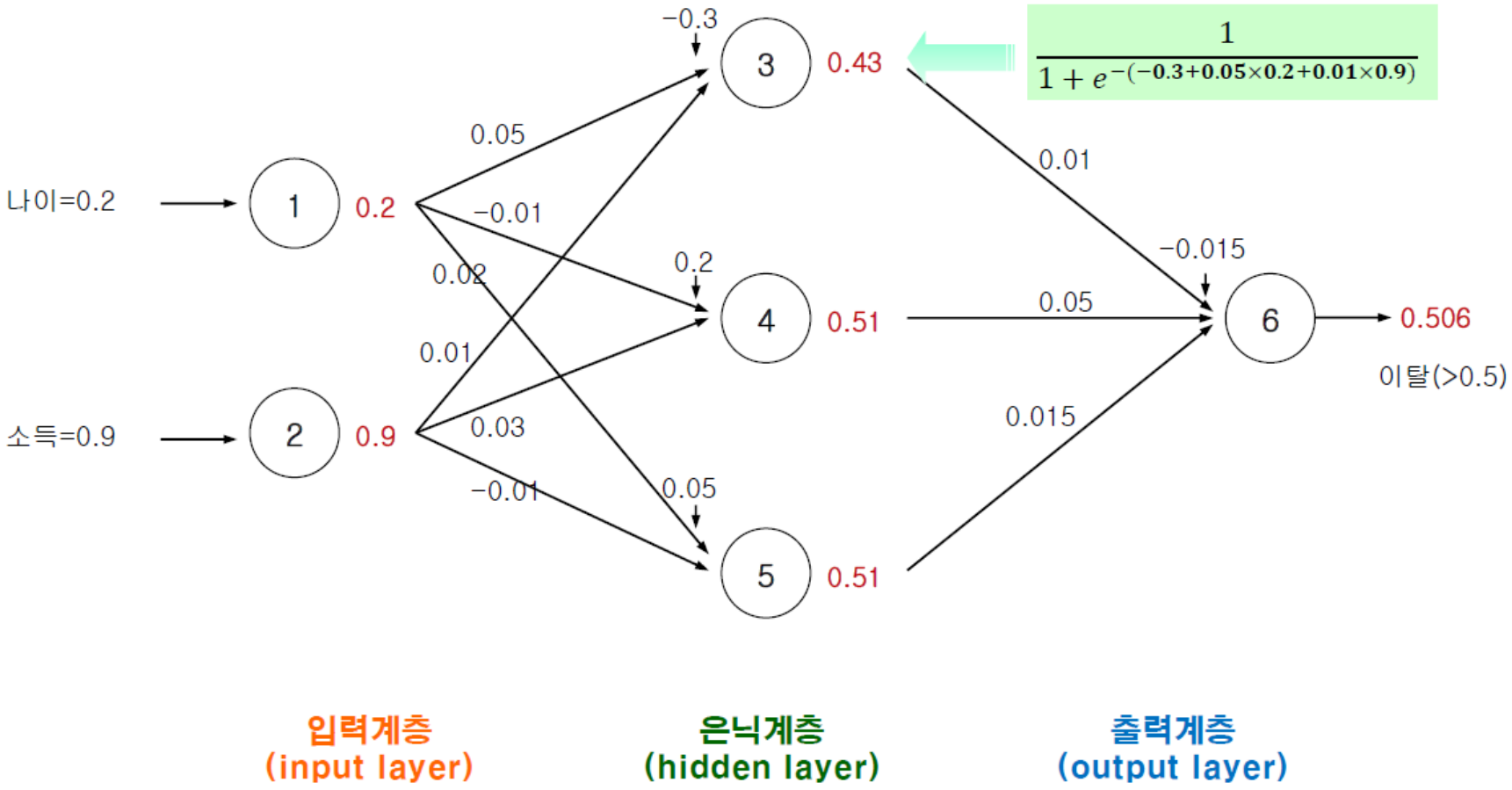
출처 : https://sebastianraschka.com/Articles/2015_singlelayer_neurons.html

Artificial Neural Network 개요



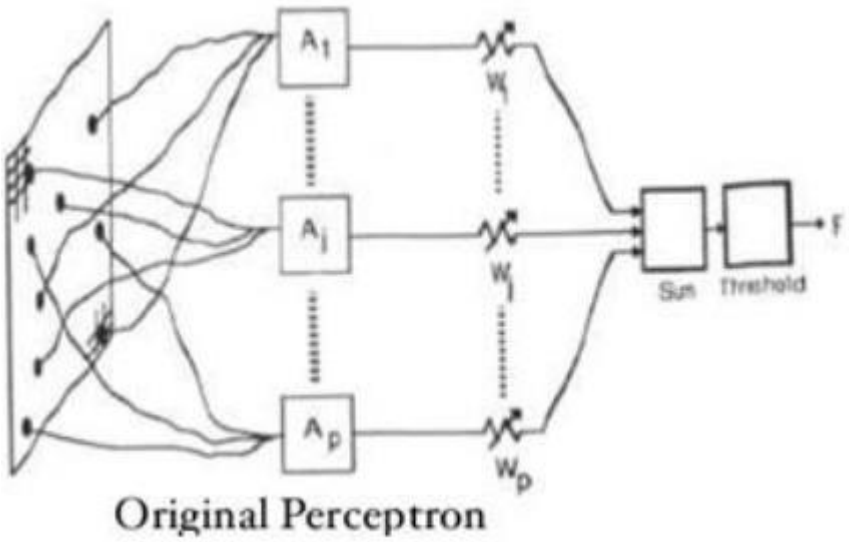
출처 : http://cs231n.stanford.edu/slides/2016/winter1516_lecture5.pdf

Artificial Neural Network 개요



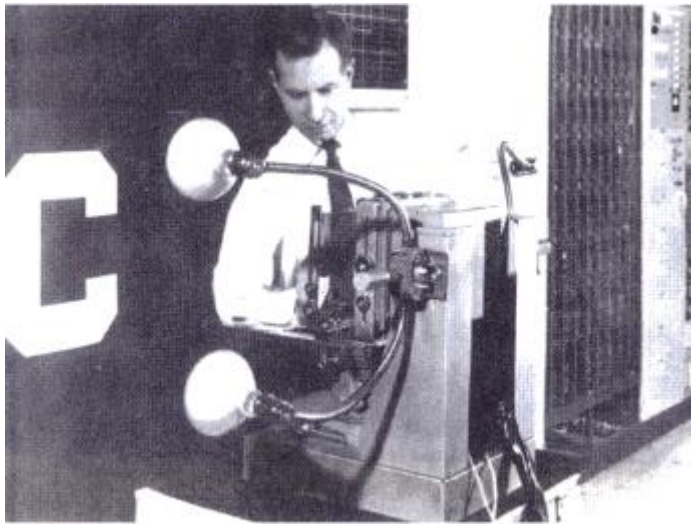
Artificial Neural Network – Perceptron

- McCulloch와 Pitts는 인간의 두뇌가 수 많은 신경세포들로 구성된 점에 착안하여 최초의 신경망의 모델 제안(1943년)
- Edmonds와 Minsky는 학습기능이 있는 최초의 신경망 구축(1951년)
- Frank Rosenblatt는 Perceptron이라는 신경망 모델 제안(1957년)



Original Perceptron

출처 : https://www.slideshare.net/roelofp/220115dlmeetup



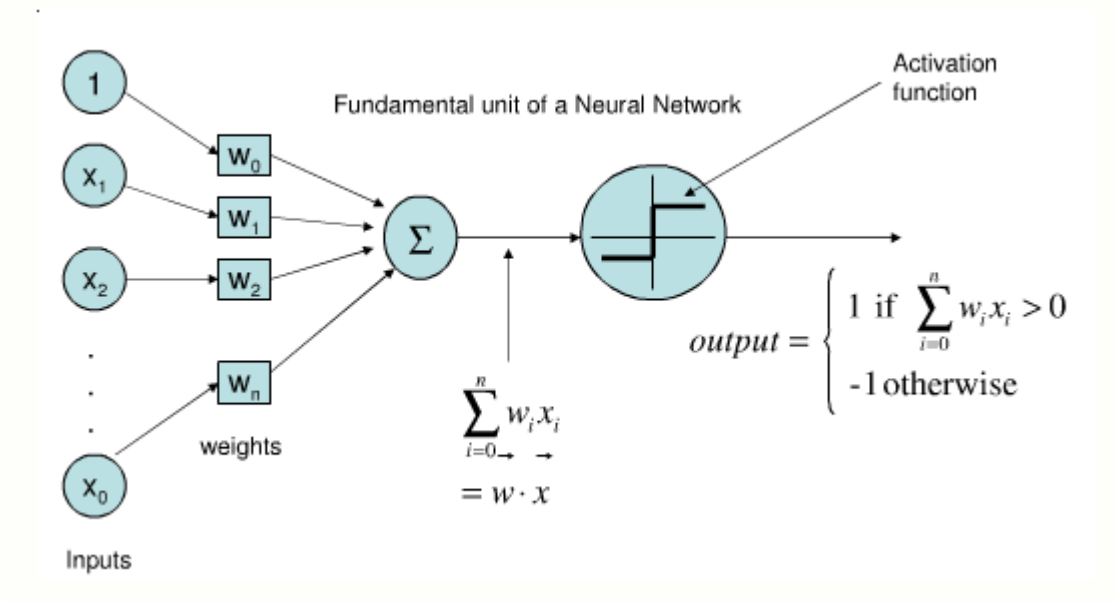
출처 : http://www.aistudy.com/neural/model_kim.htm

Artificial Neural Network – Perceptron

- 가중치(weight) : 입력신호의 강도를 표현($W_1, W_2, \cdots, W_n$)
- 입력신호의 총합(summation) : 각 입력신호에 가중치를 곱하여 합한 값

$$W_1 \cdot x_1 + W_2 \cdot x_2 + \cdots + W_n \cdot x_n = \sum W_i \cdot x_i$$

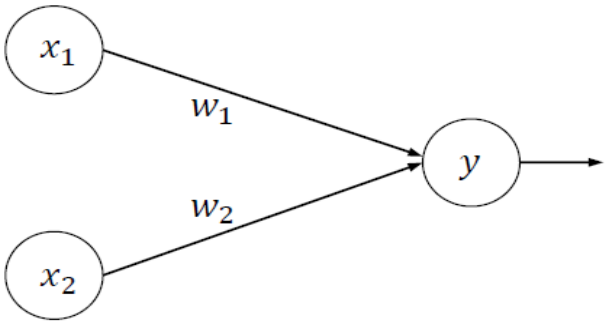
- 활성화 함수(activation function) : 신호의 총합을 출력신호로 변환



출처 : https://tex.stackexchange.com/questions/104334/tikz-diagram-of-a-perceptron

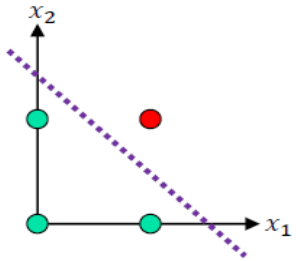
Artificial Neural Network – Perceptron

Minsky와 Papert가 그들의 저서 "Perceptrons" 에서 퍼셉트론이 비선형 분리 문제를 풀 수 없음을 증명(1st AI winter, 1969년)



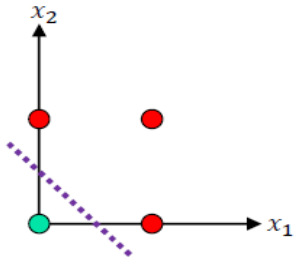
$$y = \begin{cases} 0 & (w_1 \cdot x_1 + w_2 \cdot x_2 \leq \theta) \\ 1 & (w_1 \cdot x_1 + w_2 \cdot x_2 > \theta) \end{cases}$$

AND



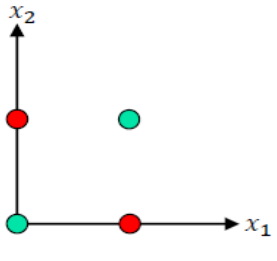
$w_1 = 1.0$
$w_2 = 1.0$
$\theta = 1.5$

OR



$w_1 = 1.0$
$w_2 = 1.0$
$\theta = 0.5$

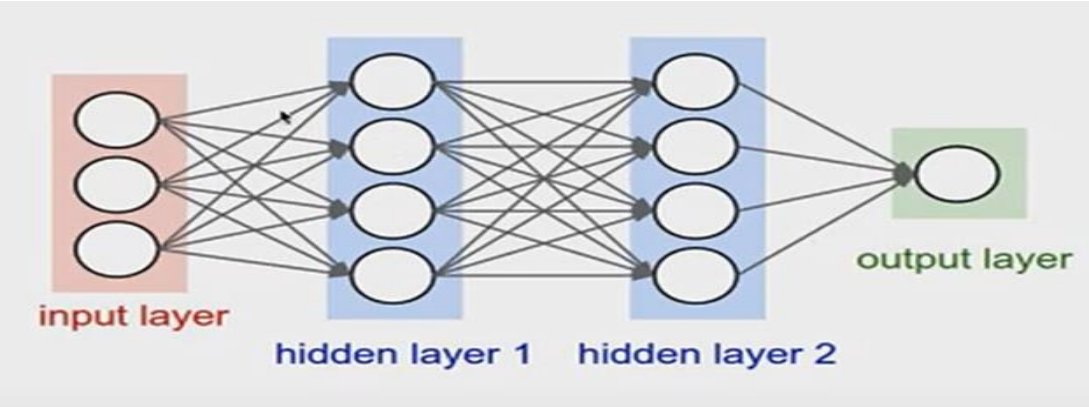
XOR



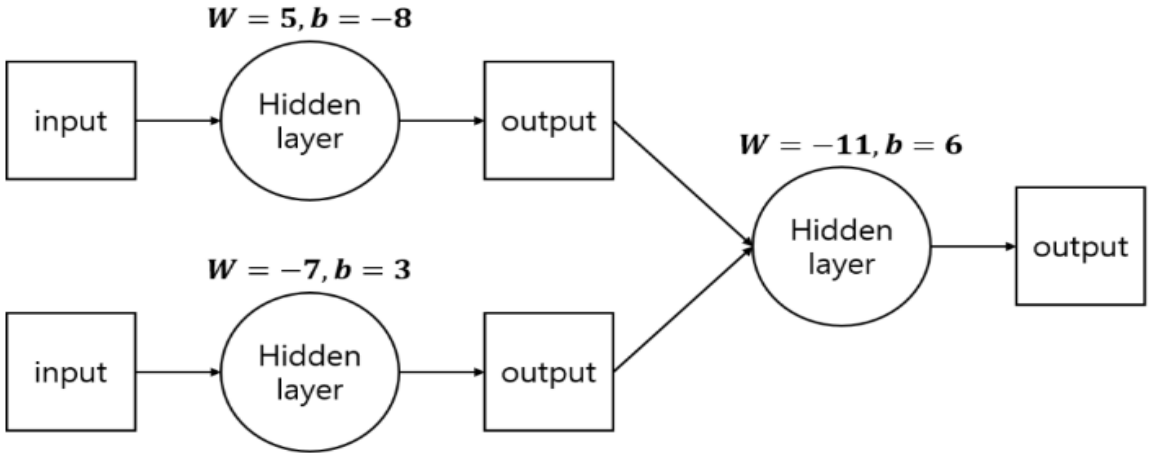
$w_1 = ?$
$w_2 = ?$
$\theta = ?$

Artificial Neural Network – MLP(Multi Layer Perceptron)

인간의 뉴런을 모방한 퍼셉트론을 다수의 계층으로 네트워크를 구성

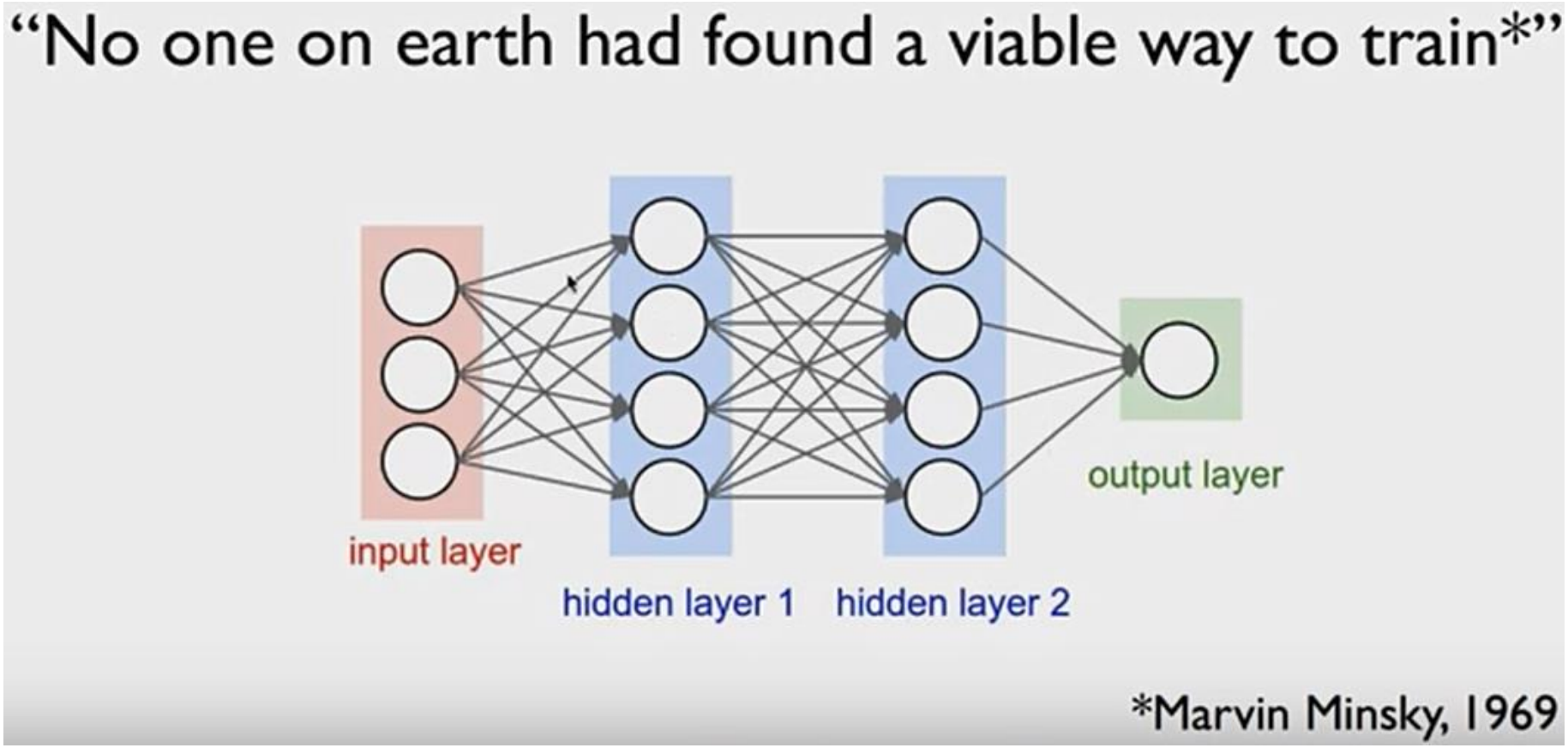


출처 : http://cs231n.github.io/convolutional-networks/



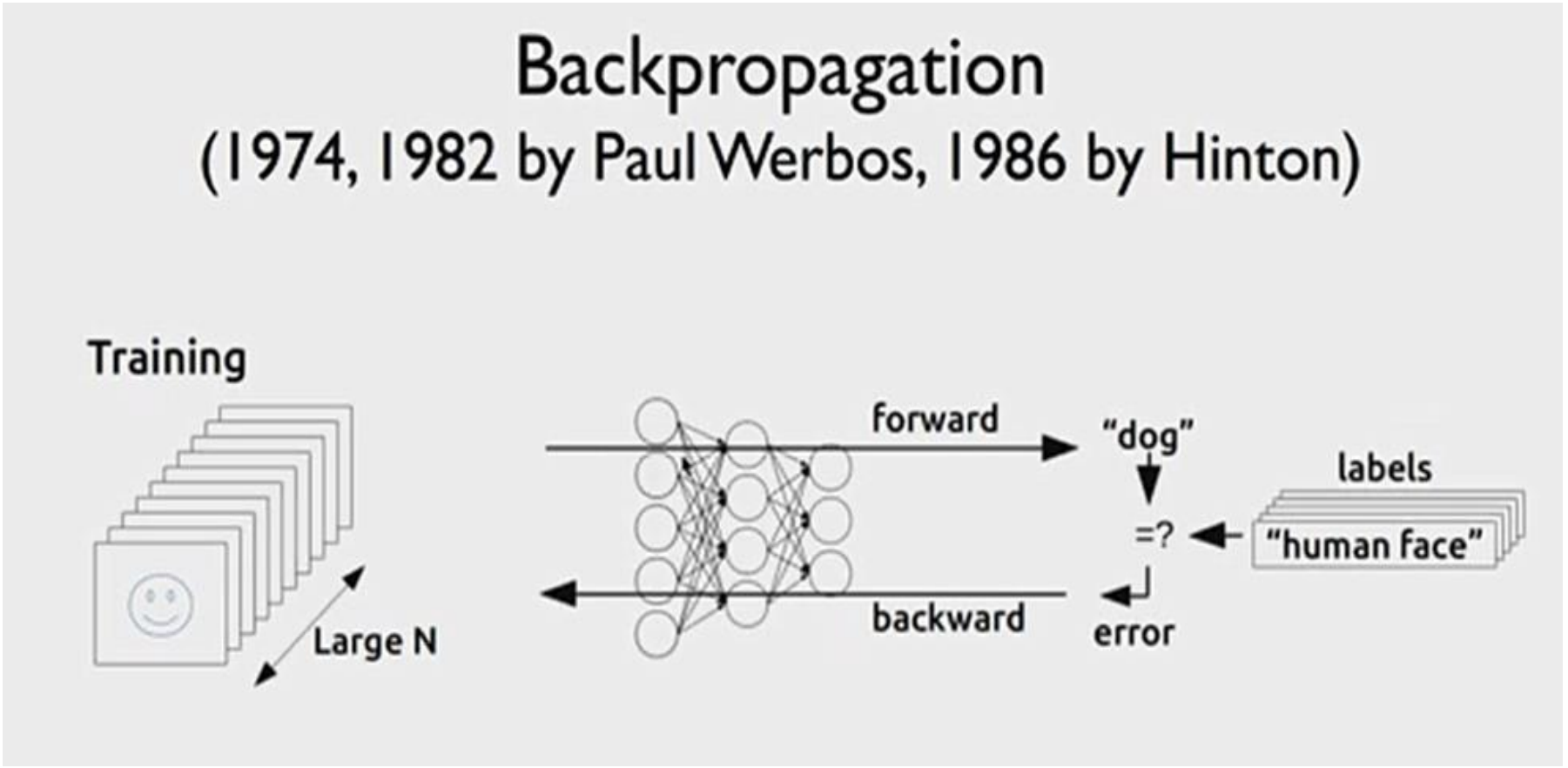
출처 : http://www.birc.co.kr/2018/01/22/xor-%EB%AC%B8%EC%A0%9C%EC%99%80-neural-network/

Artificial Neural Network – Learing Network Problem



출처 : http://cs231n.github.io/convolutional-networks/

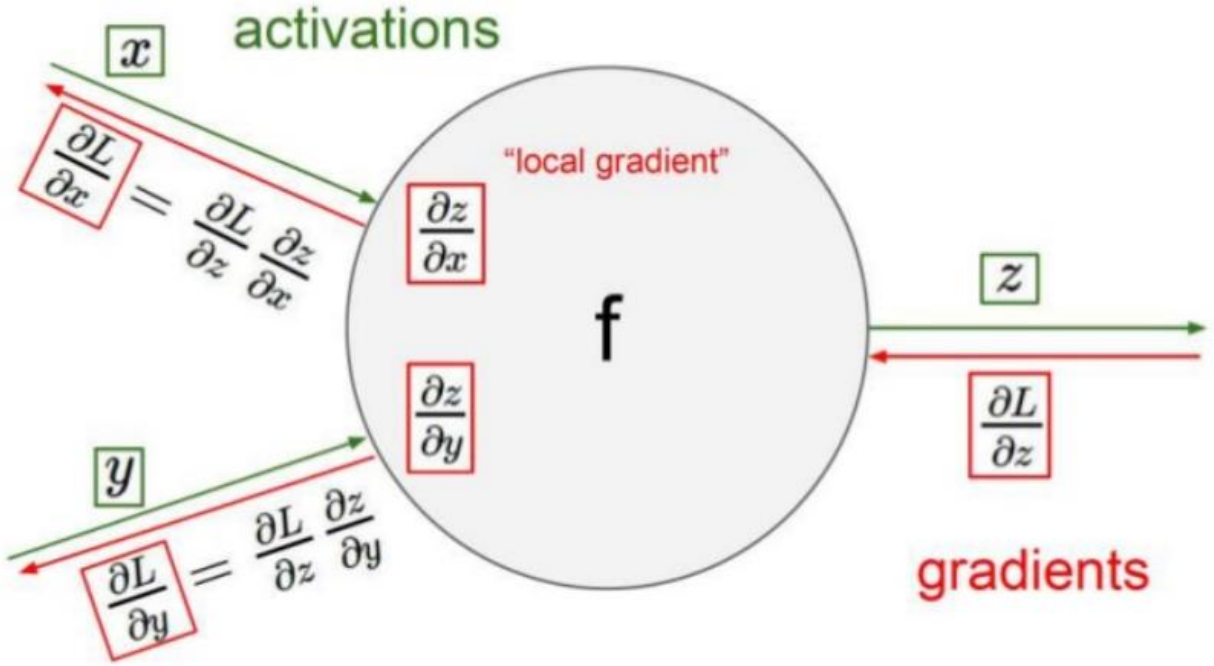
Artificial Neural Network – Back Propagation



출처 : https://devblogs.nvidia.com/parallelforall/inference-next-step-gpu-accelerated-deep-learning/

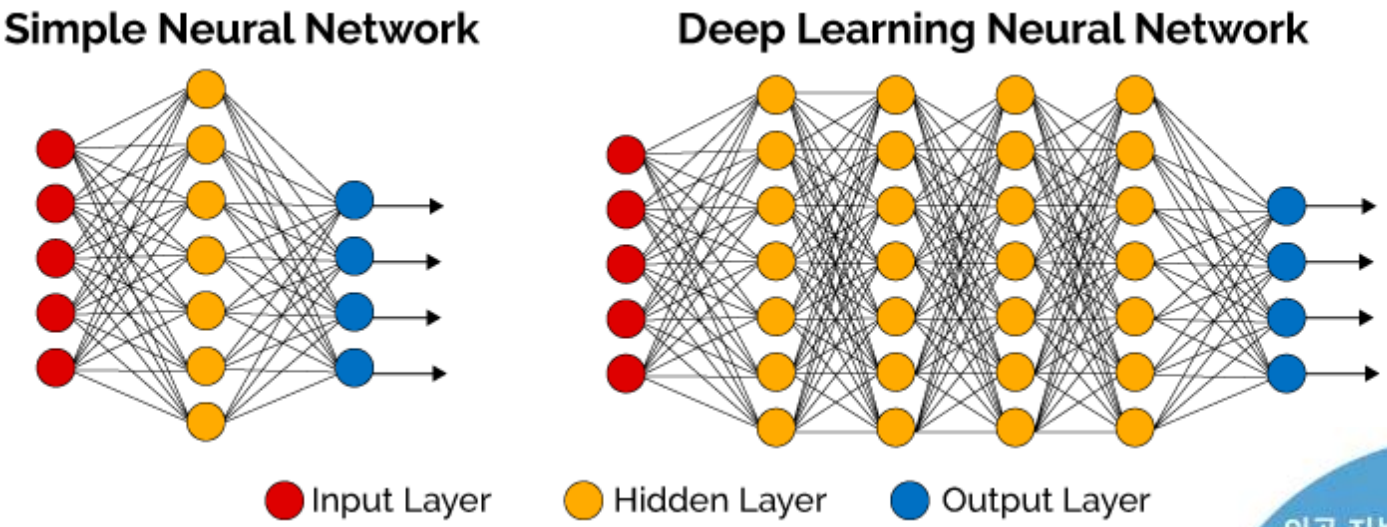
Artificial Neural Network – Back Propagation

Back Propagation

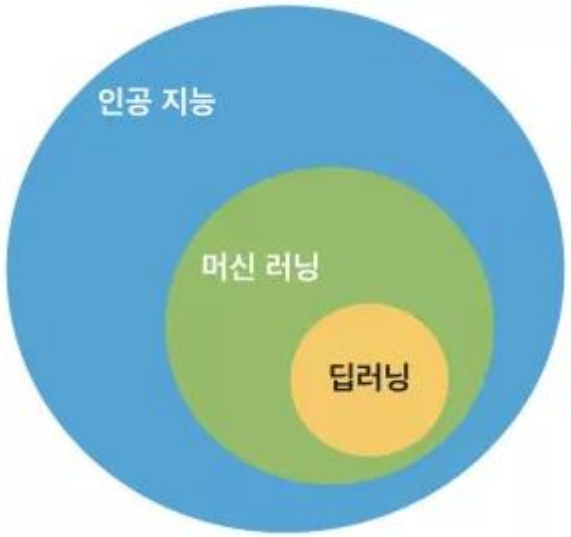


출처 : https://becominghuman.ai/back-propagation-in-convolutional-neural-networks-intuition-and-code

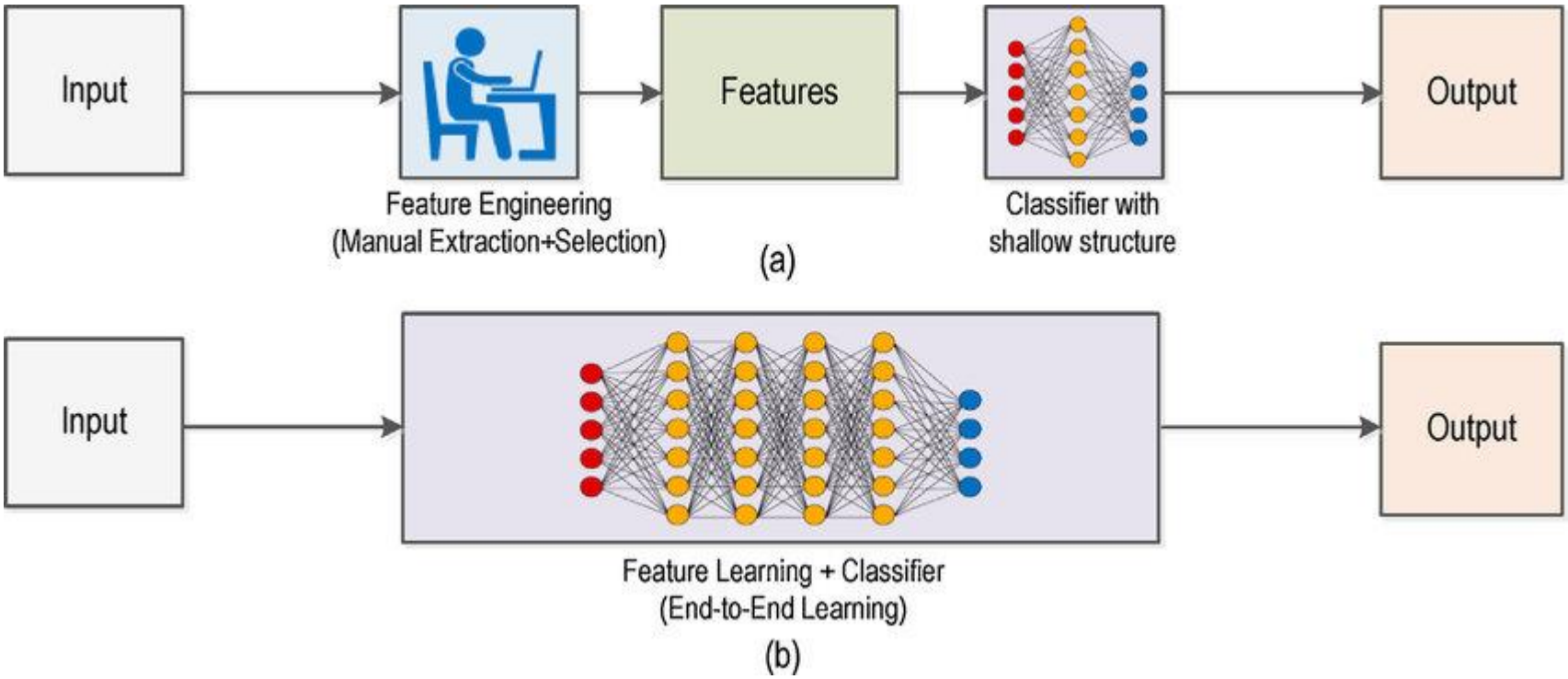
Deep Learning Neural Network



출처 : https://m.blog.naver.com/dibrary1004/221106360079

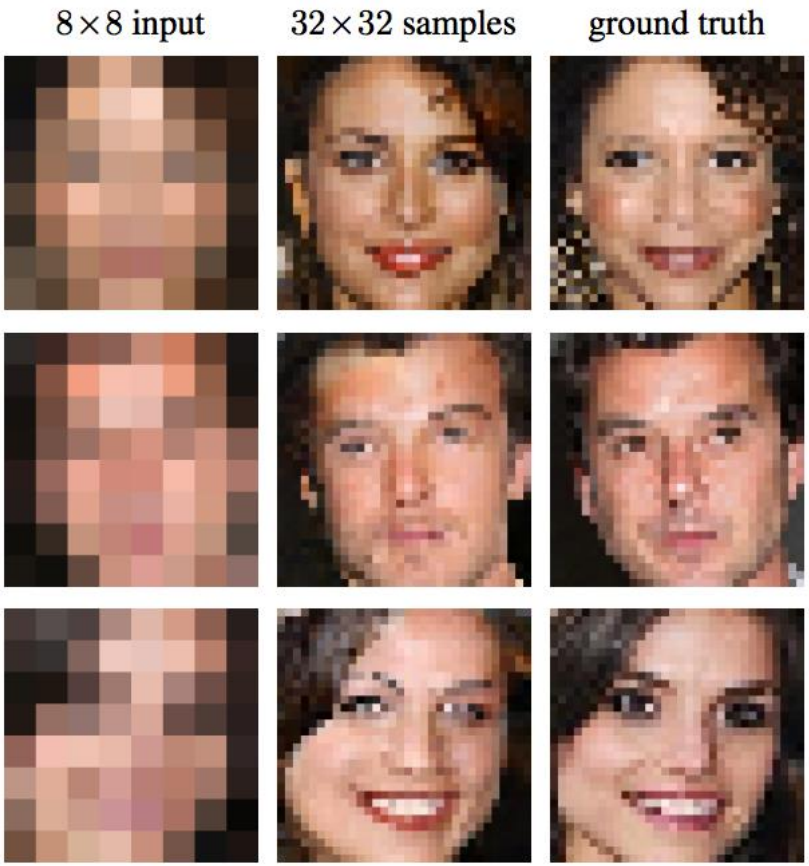


Deep Learning Neural Network



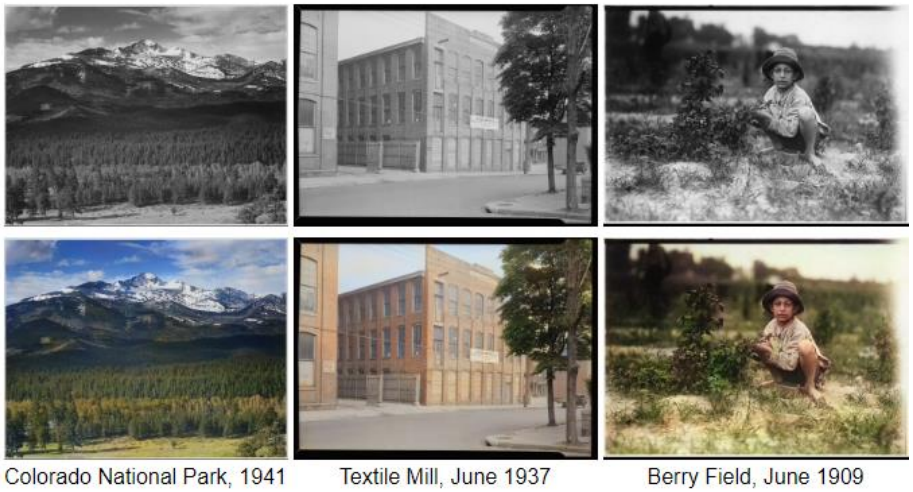
Deep Learning Case Study – Computer Vision

픽셀 복원



출처 : https://arxiv.org/pdf/1702.00783.pdf?xtor=AL-32280680

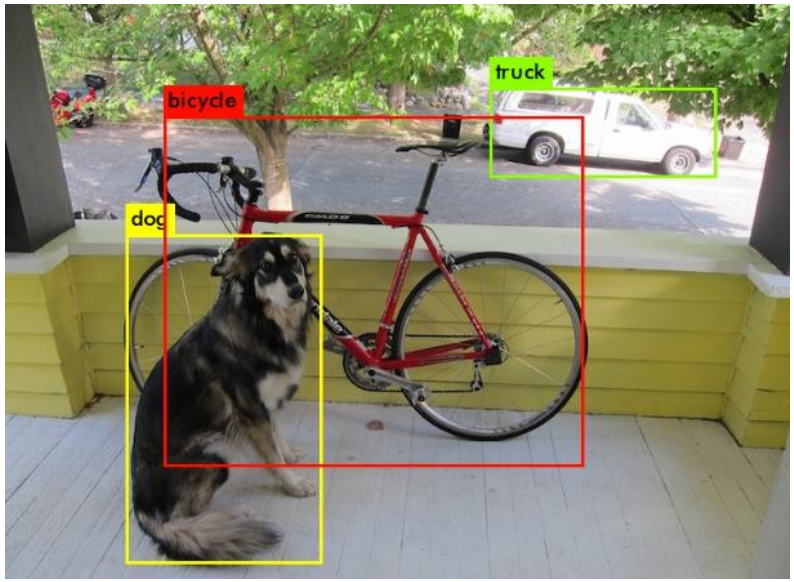
색상 복원



출처http://iizuka.cs.tsukuba.ac.jp/projects/colorization/en/

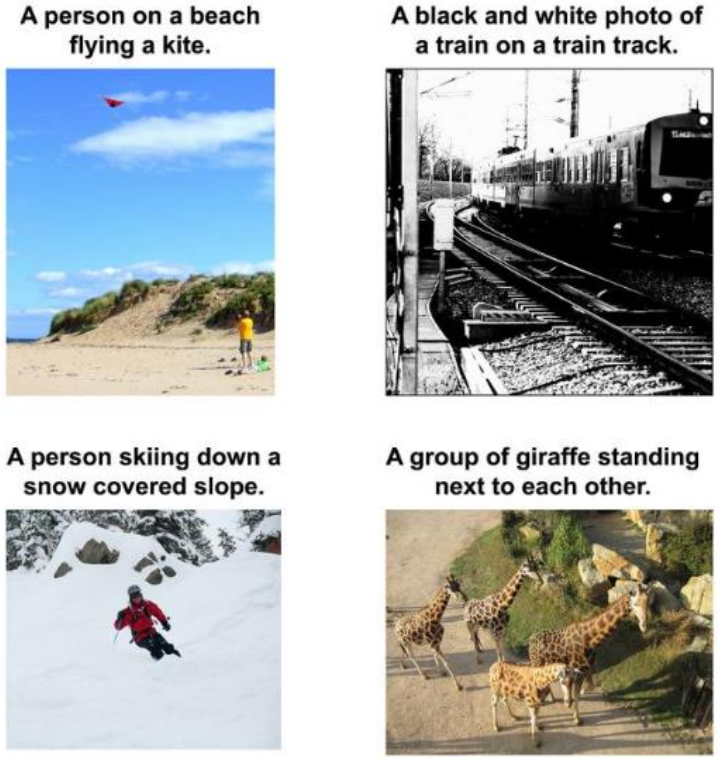
Deep Learning Case Study – Computer Vision

Object Detection



출처 : https://pjreddie.com/darknet/yolo/

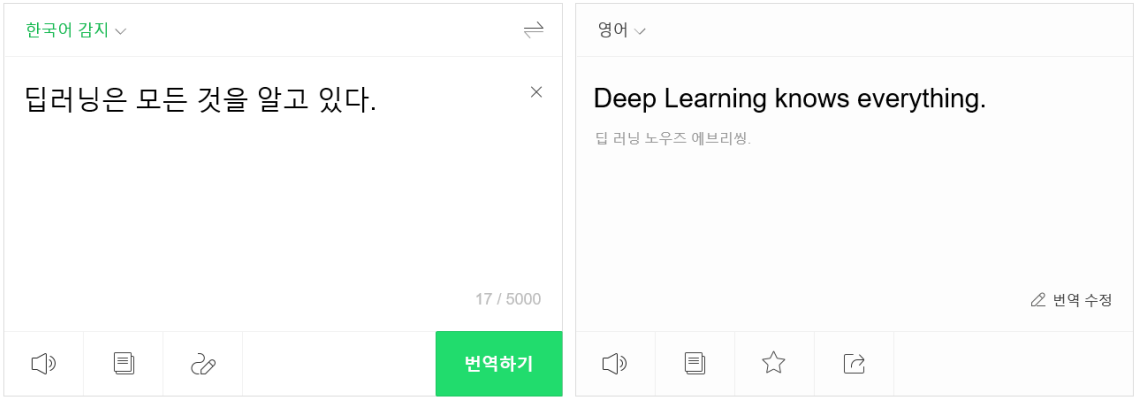
Image Tagging



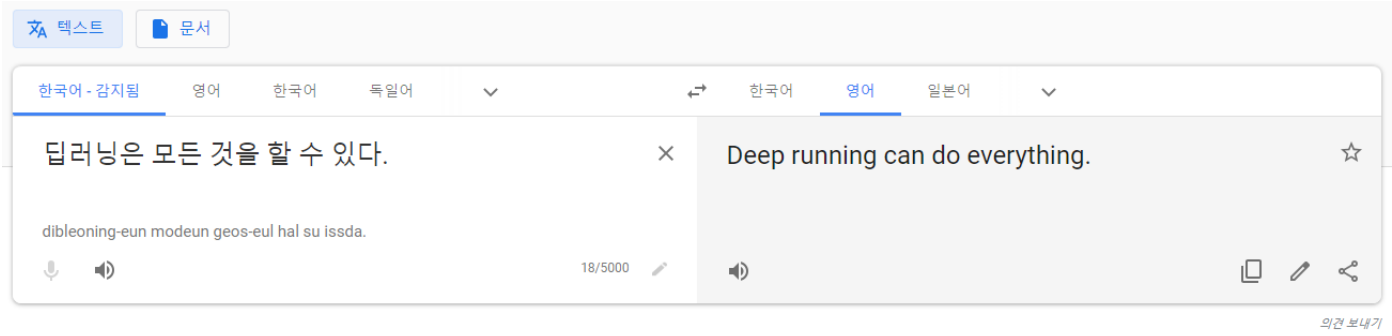
출처 : http://it.donga.com/25108/

Deep Learning Case Study – Translation

네이버 파파고



구글 번역기



Deep Learning Case Study – Medical Vision

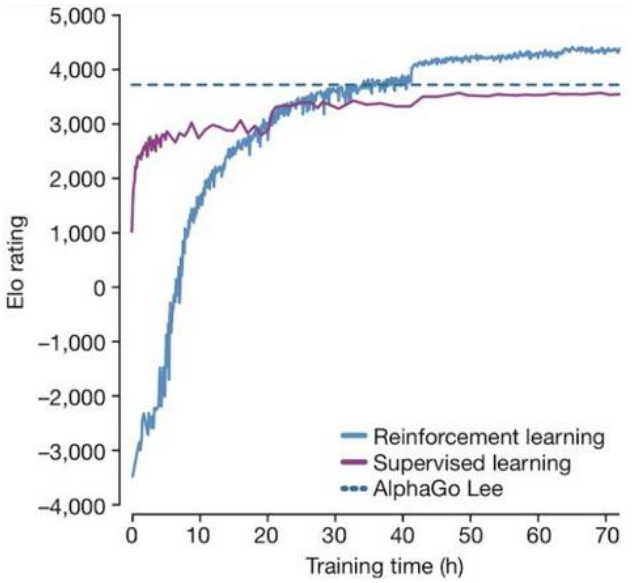
- 의료영상 질병 진단

출처 : https://lunit.io/company/

Deep Learning Case Study – Game

- AlphaGo

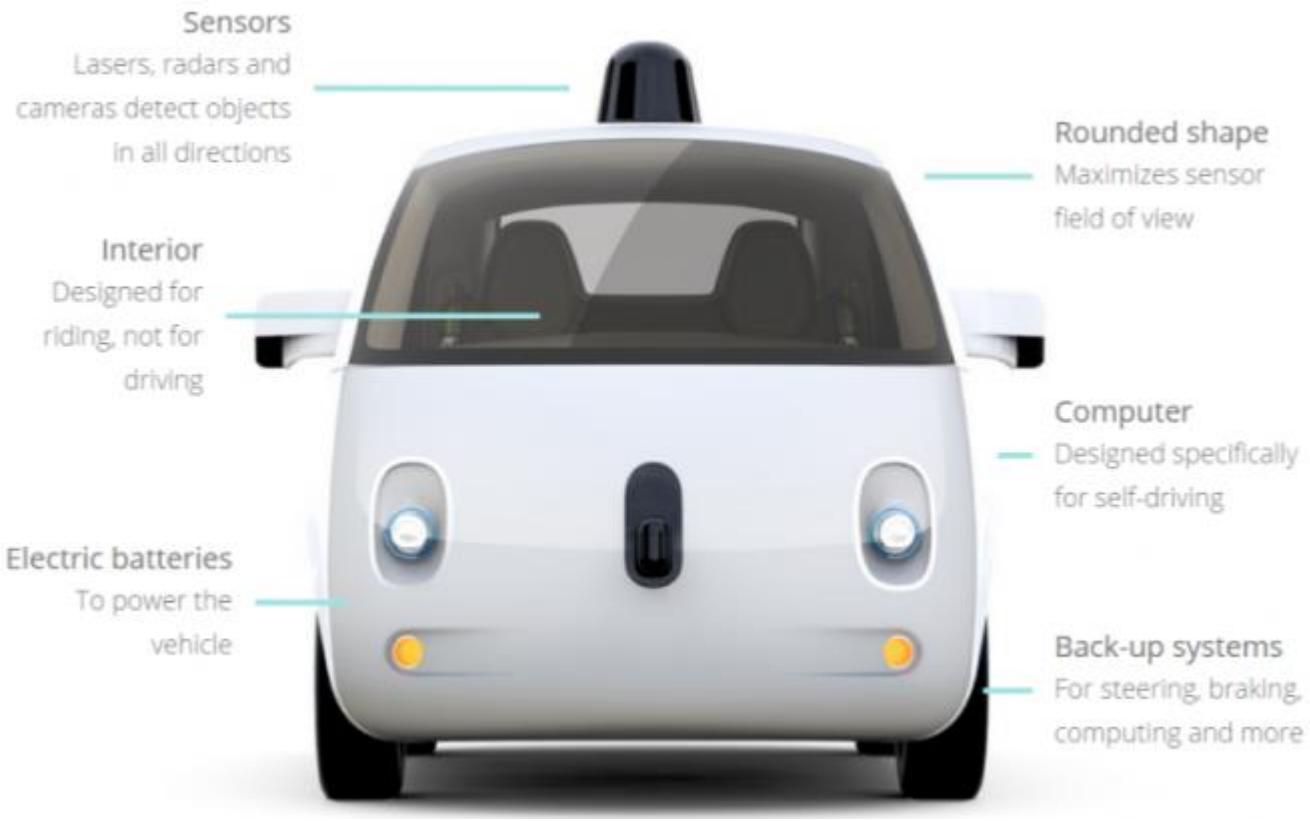
출처 : http://www.hani.co.kr/arti/sports/baduk/796462.html



출처 : 네이처

Deep Learning Case Study – Self Driving

- 구글 자율 주행차



출처 : http://www.bloter.net/archives/245493

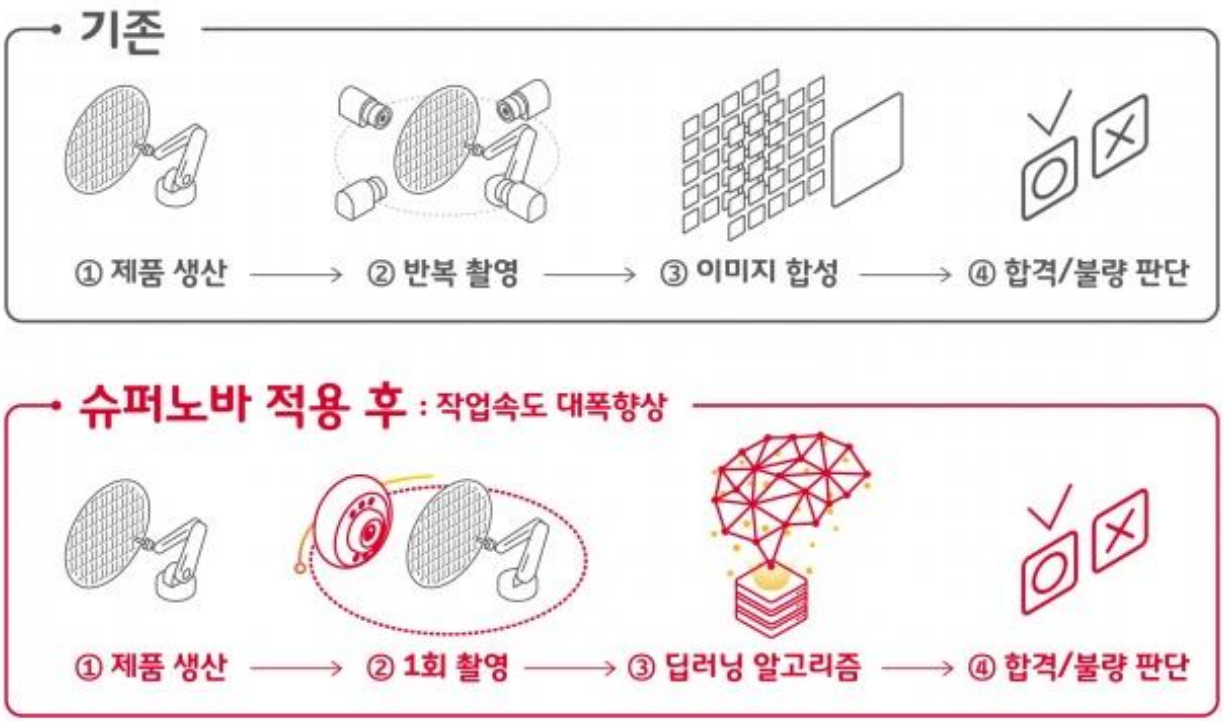
Deep Learning Case Study – Fraud Detection System

- 이상거래탐지시스템(FDS)

출처 : http://www.wiseenews.com/news/articleView.html?idxno=30321

Deep Learning Case Study – Manufacture

- SKT 반도체 제조공정 품질 개선



출처 : http://www.koit.co.kr/news/articleView.html?idxno=74758