Quick Introduction

Neural Networks Theory

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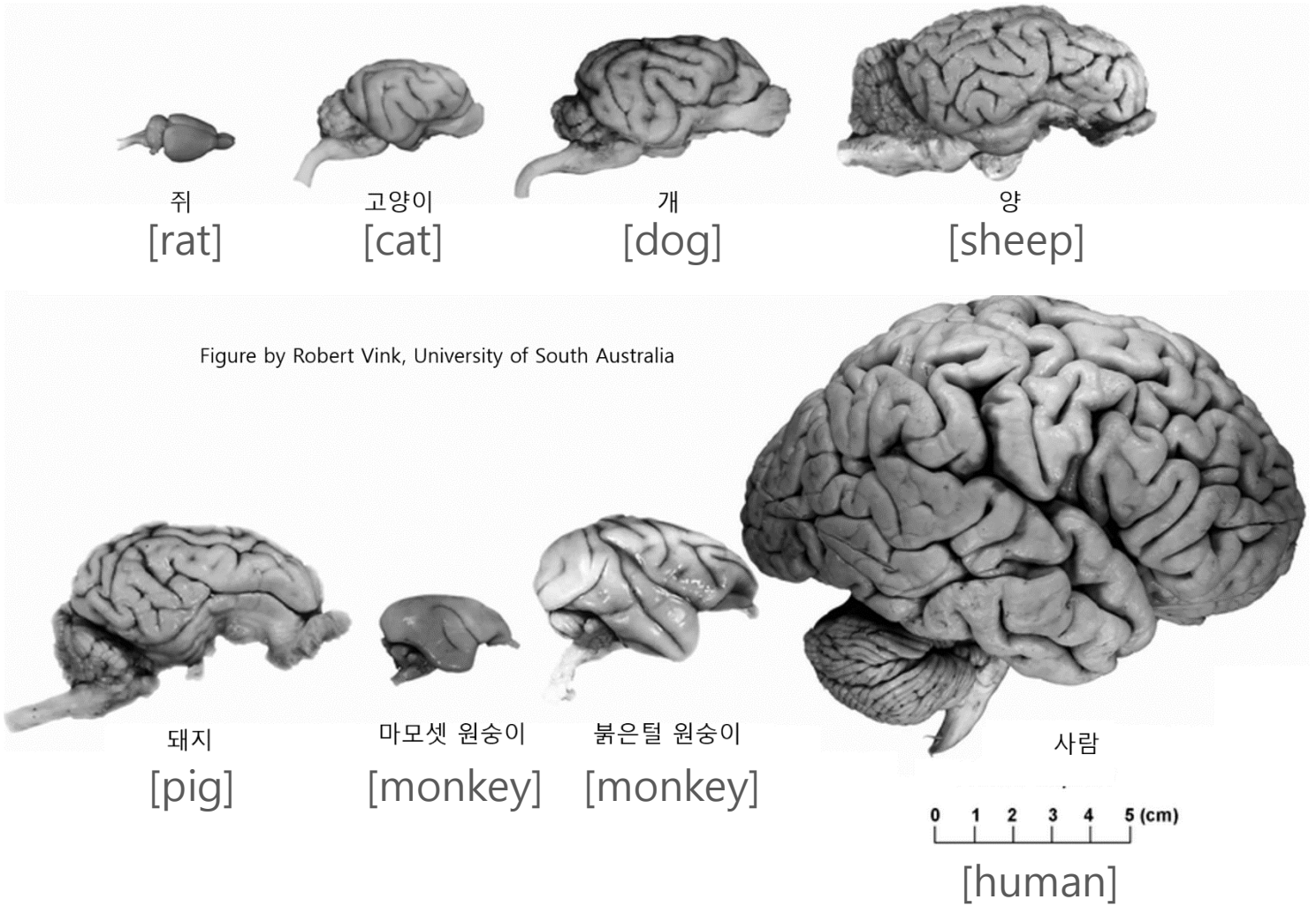
github.com/yungbyun/**neuralnetworks**

Neural Networks?


1
2
3
4
5
6
7


쥐
[rat]
고양이
[cat]
개
[dog]
양
[sheep]
Figure by Robert Vink, University of South Australia
돼지
[pig]
마모셋 원숭이
[monkey]
붉은털 원숭이
[monkey]
사람
0 1 2 3 4 5 (cm)
[human]

So, neural networks is …

뇌에 있는 신경세포의 연결

Artificial Neural Networks

made by people, 사람이 만든

> "...a computing system made up of a number of simple, highly interconnected processing elements, which process information by their dynamic state response to external inputs."

Frank Rosenblatt, Cornell Aeronautical Lab
(1957)

Why? What for?

Intelligence

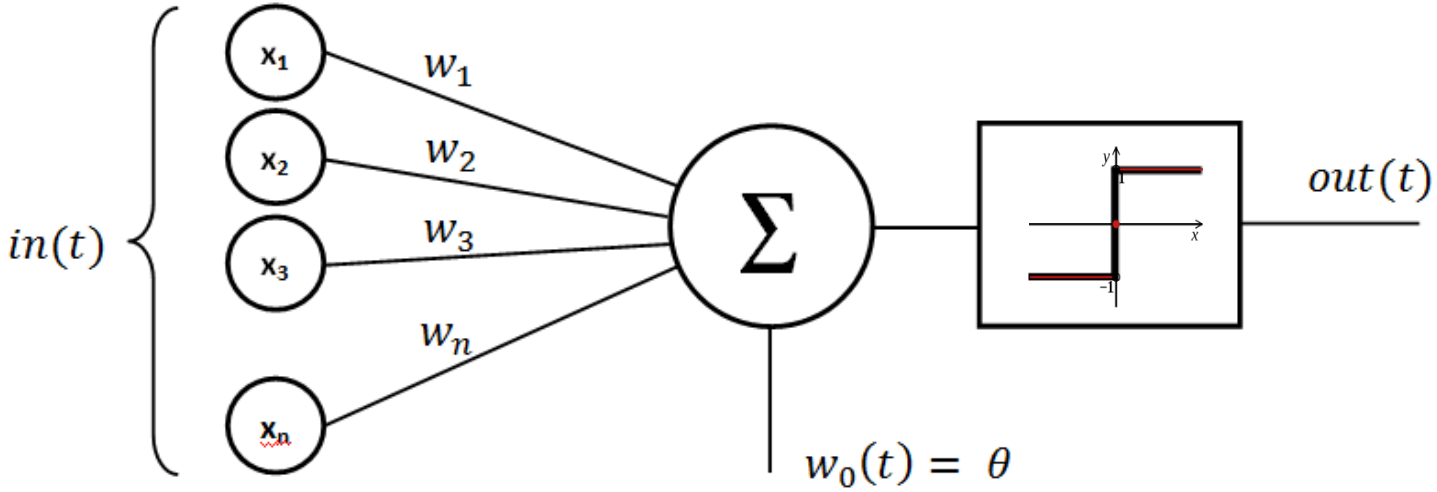
The ability to perceive or infer information, and to retain it as knowledge to be applied towards adaptive behaviors within an environment or context.

Artificial Intelligence

사람이 만든 지능

Rosenblatt, F. (1958). The perceptron: A probabilistic model for information storage and organization in the brain. *Psychological Review, 65*(6), 386–408. https://doi.org/10.1037/h0042519

Perceptron



ANN and rosy prospects in 1950s

ANN에 대한 장미빛 전망

NEW NAVY DEVICE LEARNS BY DOING; Psychologist Shows Embryo of Computer Designed to Read and Grow Wiser

July 8, 1958

The New York Times Archives

1st Period of Depression in 1960s

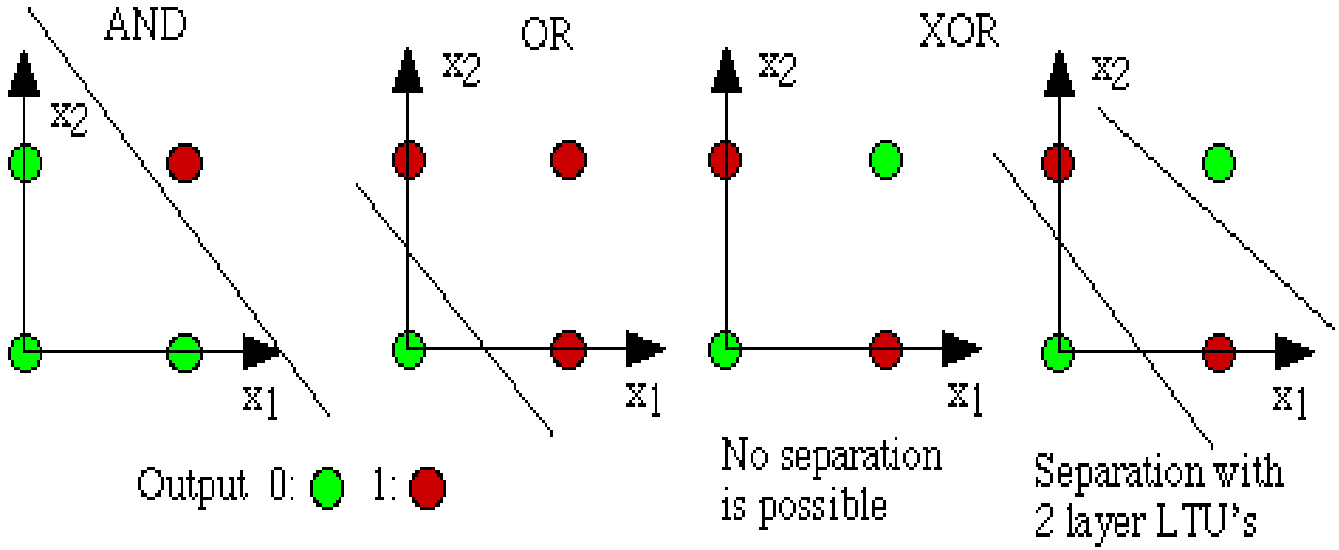
1차 침체기

Marvin Minsky, MIT AI Lab.

1969

with Perceptron

No solution for XOR problem



Muti-Layer Perceptron

by Rumelhart, Hinton, Williams
in 1986

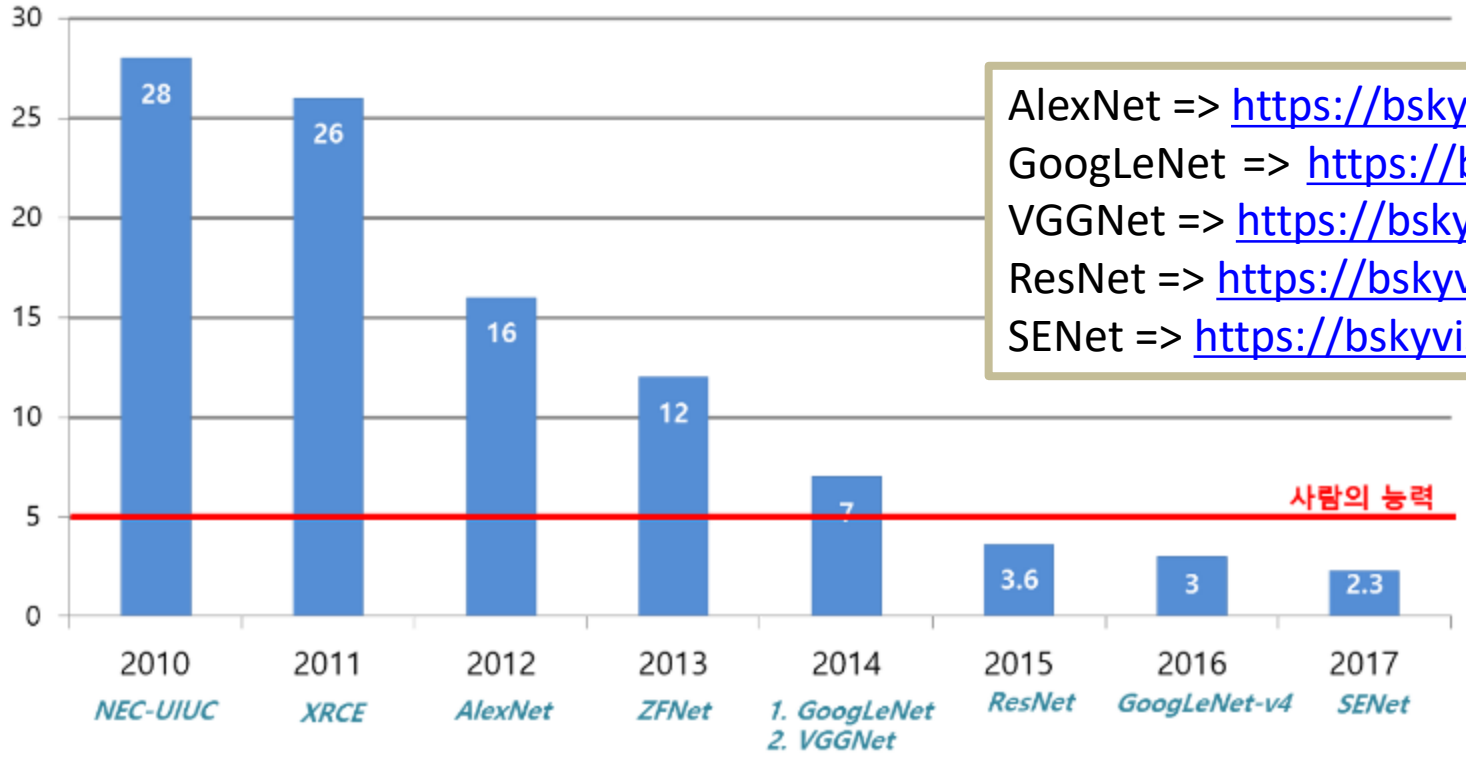


2st Period of Depression in 1990s

2차 침체기

- Difficulties in training MLP
- Not enough data
- Long Learning Time
- Overfitting

Deep Learning
in 2000s



AlexNet => https://bskyvision.com/421
GoogLeNet => https://bskyvision.com/539
VGGNet => https://bskyvision.com/504
ResNet => https://bskyvision.com/644
SENet => https://bskyvision.com/640

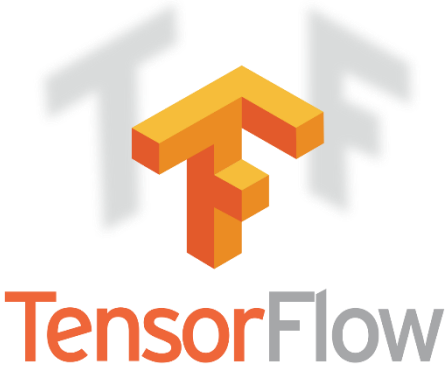
Reinforcement Learning

Many applications

using ANN

Agenda of this class

- Human Brain
- Machine Learning
- Linear Regression
- Minimizing Cost
- Logistic Classification
- Softmax Regression
- MLP, Deep Learning
- CNN


TensorFlow


K
Keras


PyTorch


Caffe

python™

jupyter


kaggle


Google
colab


GitHub

Schedule

Week	Subject
1	
2	Introduction (Y. Byun)
3	Brain and Artificial Neural Networks
4	Linear Regression
5	Minimizing Cost
6	Logistic Classification and Softmax
7	Multilayer NN
8	(Exam)

Schedule

Week	Subject
9	Deep Learning
10	Convolutional Neural Network
11	Presentation#1
12	Presentation#2
13	Presentation#3
14	Presentation#4
15	Presentation#5