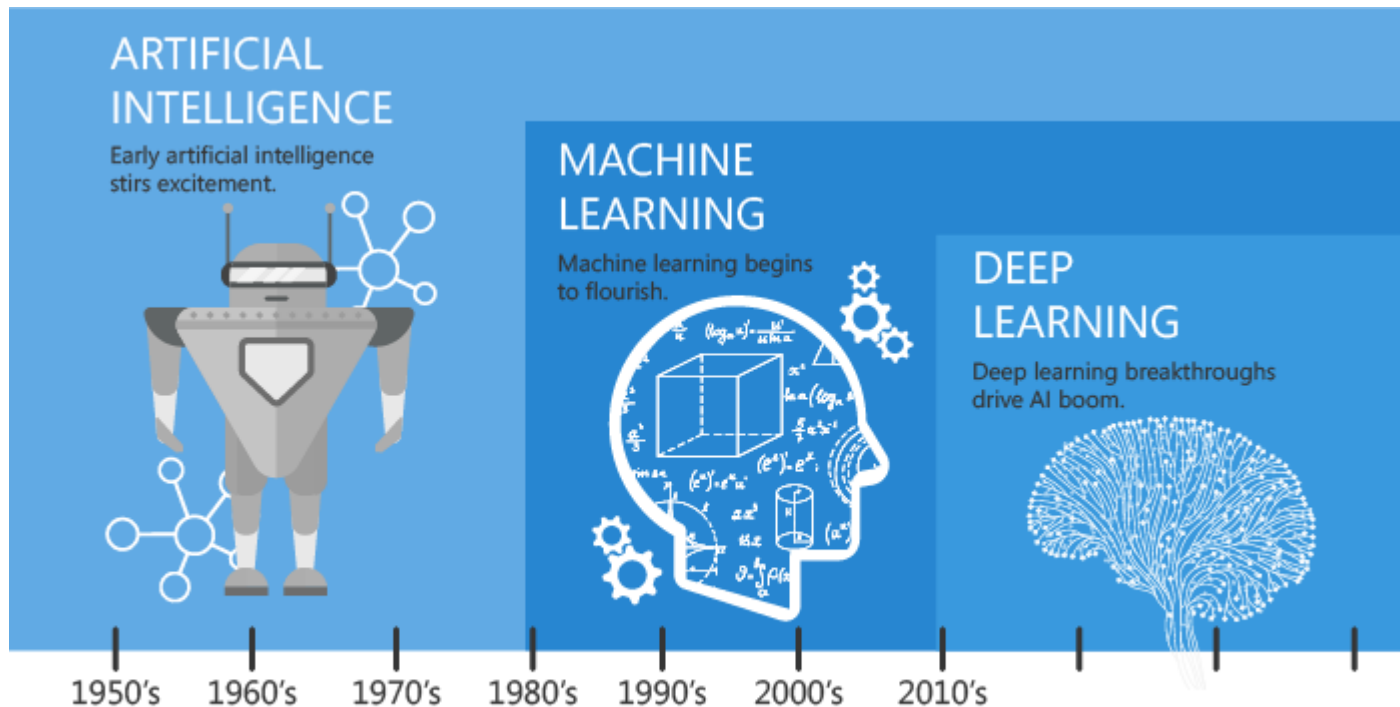


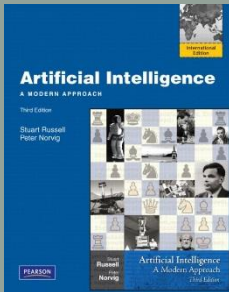
인공지능/기계학습/딥러닝

인공지능/기계학습/딥러닝



Since an early flush of optimism in the 1950's, smaller subsets of artificial intelligence - first machine learning, then deep learning, a subset of machine learning - have created ever larger disruptions.

AI에 관한 4 개의 관점



Humanly

Rationally

Thinking

Thinking Humanly

Thinking Rationally

Acting

Acting Humanly

Acting Rationally

Acting Humanly...

- **사람처럼 일하는/행동하는 기계**
 - **인공지능은 사람에 의해서 수행될 때 지능이 필요한 일을 수행하는 기계를 만드는 기술이다.** (The art of creating machines that perform functions that require intelligence when performed by people. Kurzweil, 1990)
 - **인공지능은 컴퓨터가 (현재는) 사람이 잘하는 일을 할 수 있도록 하는 방법을 연구하는 학문이다.** (The study of how to make computers do things, at which, at the moment, people are better. Rich and Knight, 1991)

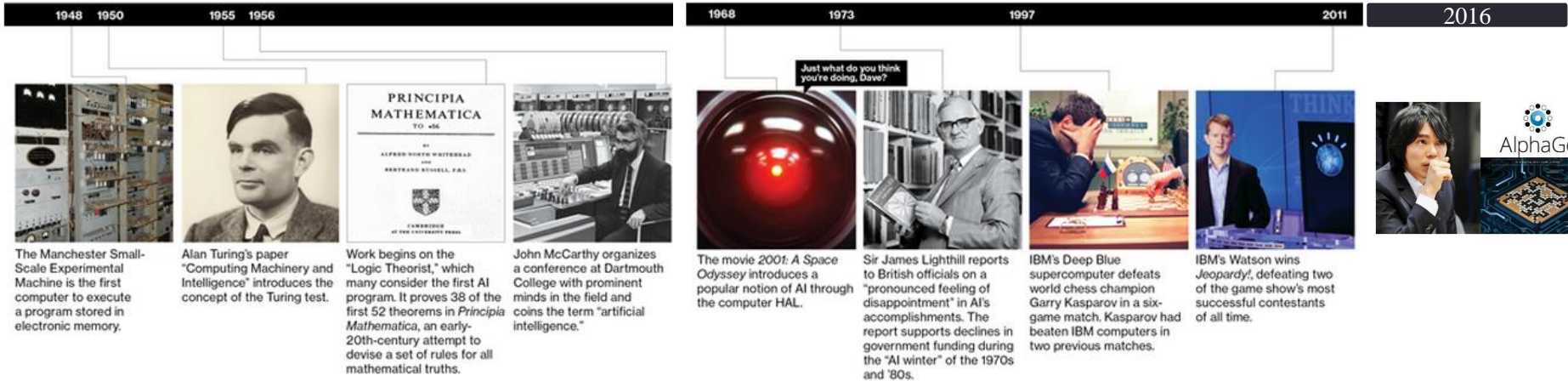
Artificial Flavor?



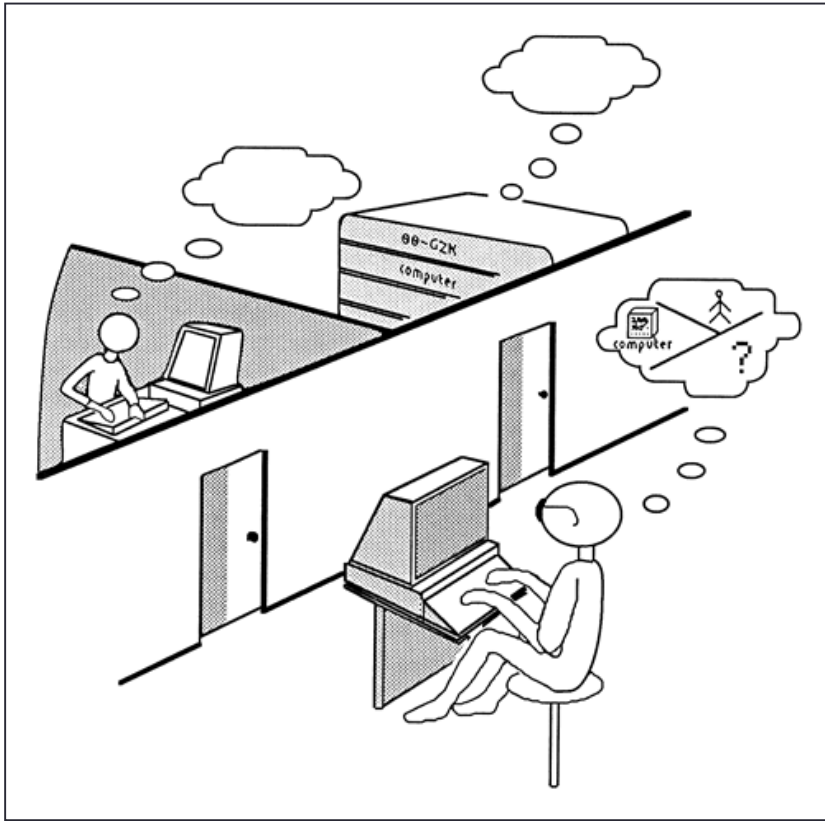
AI 역사



AI's Evolution



튜링테스트



B.J. Copeland 2000

- 튜링이 1950년 에 제안
- 질문자(interrogator)가, 질문에 대한 대답을 바탕으로 사람과 기계(로봇)을 구별할 수 없다면 기계가 지능을 가지고 있다고 하자.



Alan Turing

AI 역사

MIT
Technology
Review

AI's Evolution

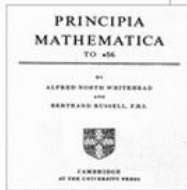
1948 1950 1955 1956



The Manchester Small-Scale Experimental Machine is the first computer to execute a program stored in electronic memory.



Alan Turing's paper "Computing Machinery and Intelligence" introduces the concept of the Turing test.



Work begins on the "Logic Theorist," which many consider the first AI program. It proves 38 of the first 52 theorems in *Principia Mathematica*, an early-20th-century attempt to devise a set of rules for all mathematical truths.



John McCarthy organizes a conference at Dartmouth College with prominent minds in the field and coins the term "artificial intelligence."

1968 1973



The movie *2001: A Space Odyssey* introduces a popular notion of AI through the computer HAL.



Sir James Lighthill reports to British officials on a "pronounced feeling of disappointment" in AI's accomplishments. The report supports declines in government funding during the "AI winter" of the 1970s and '80s.



IBM's Deep Blue supercomputer defeats world chess champion Garry Kasparov in a six-game match. Kasparov had beaten IBM computers in two previous matches.



IBM's Watson wins *Jeopardy!*, defeating two of the game show's most successful contestants of all time.



2016

딥블루

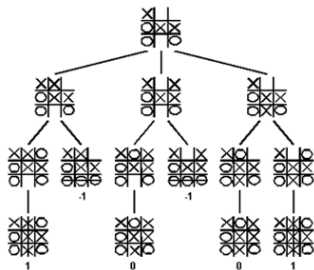
- 딥블루 vs 게리 카스파로프, 1997

- Deep Blue vs Kasparov

- $3\frac{1}{2}$ vs $2\frac{1}{2}$

- Brute-force search power

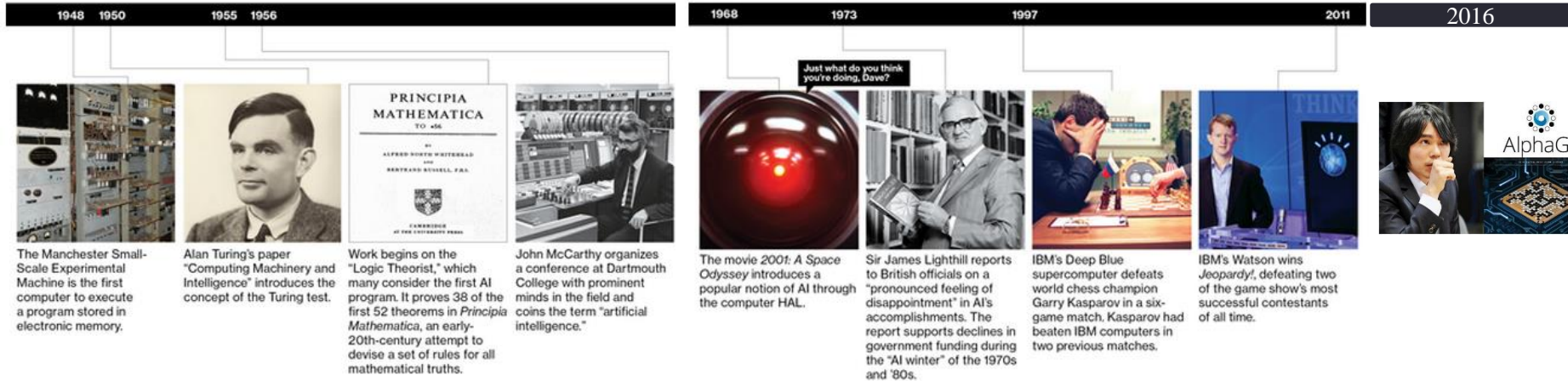
- 6~8 수를 내다봄



AI 역사



AI's Evolution



IBM Watson 슈퍼컴퓨터

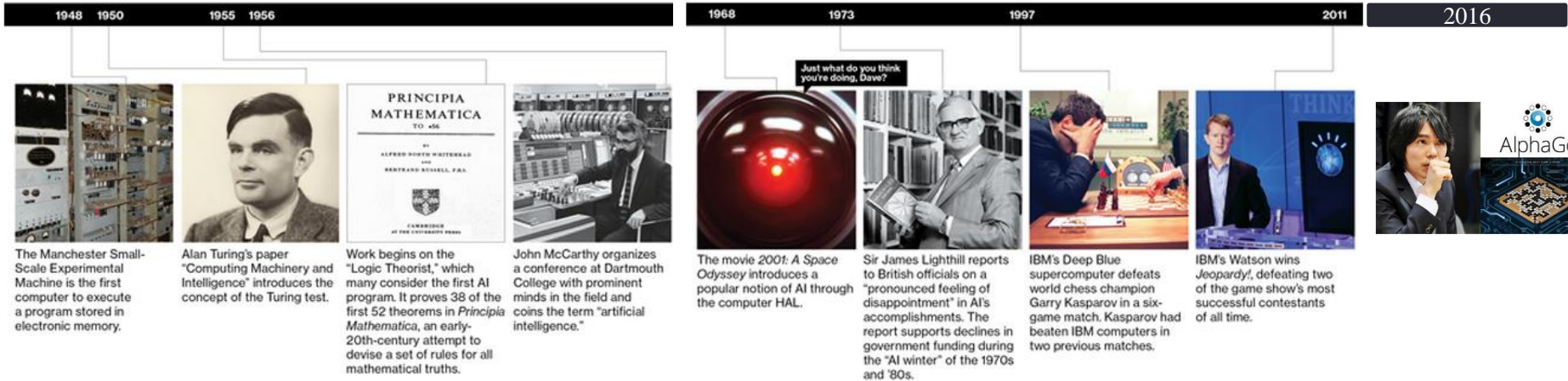
- **질문예시)**
 - **Kathleen Kenyon's excavation of this city mentioned in Joshua showed the wall had been repaired 17 times**
 - WHAT is "Jericho"
 - **This child star got his first on-screen kiss in "MY GIRL"**
 - WHO is "Macaulay Culkin"



AI 역사



AI's Evolution



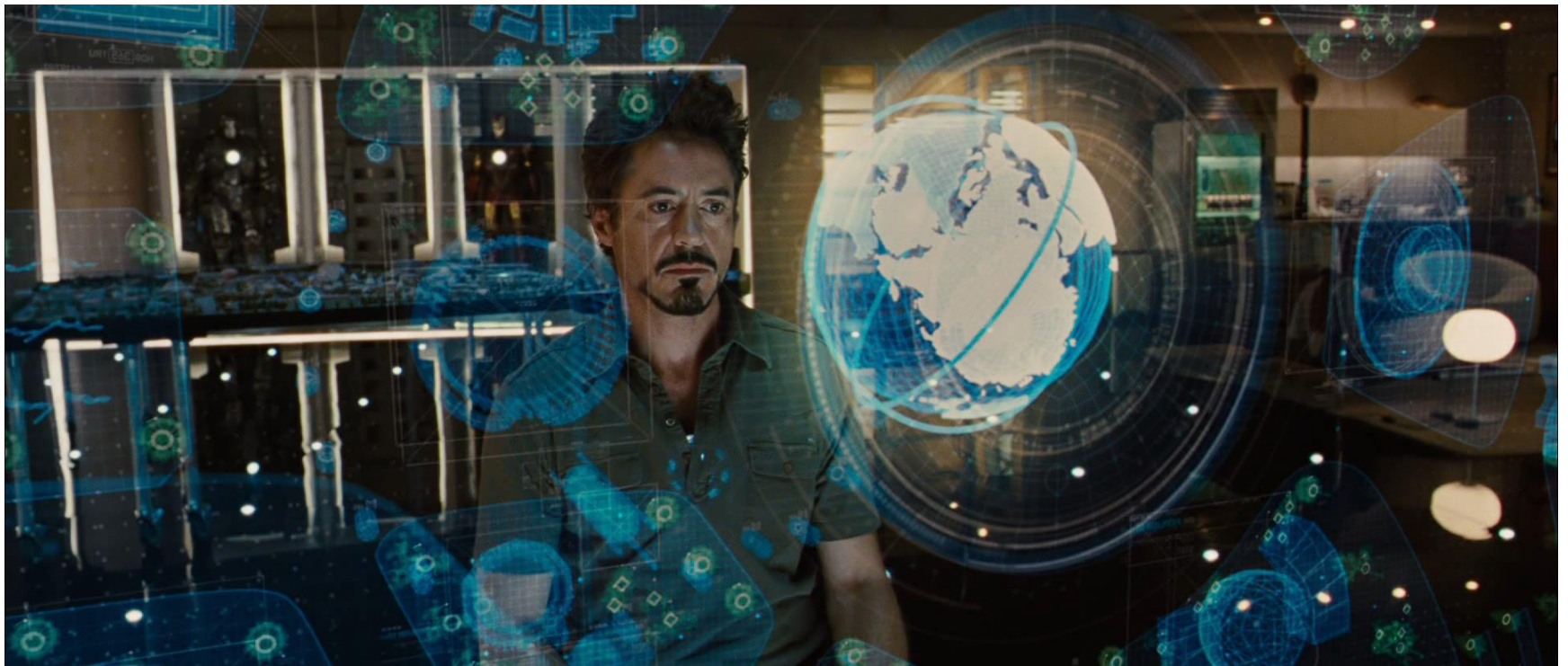
알파고



머신러닝

인공신경망을 중심으로...

인공지능 제스처 인식 시스템을 만들자!



손동작 인식



“Gesture A”

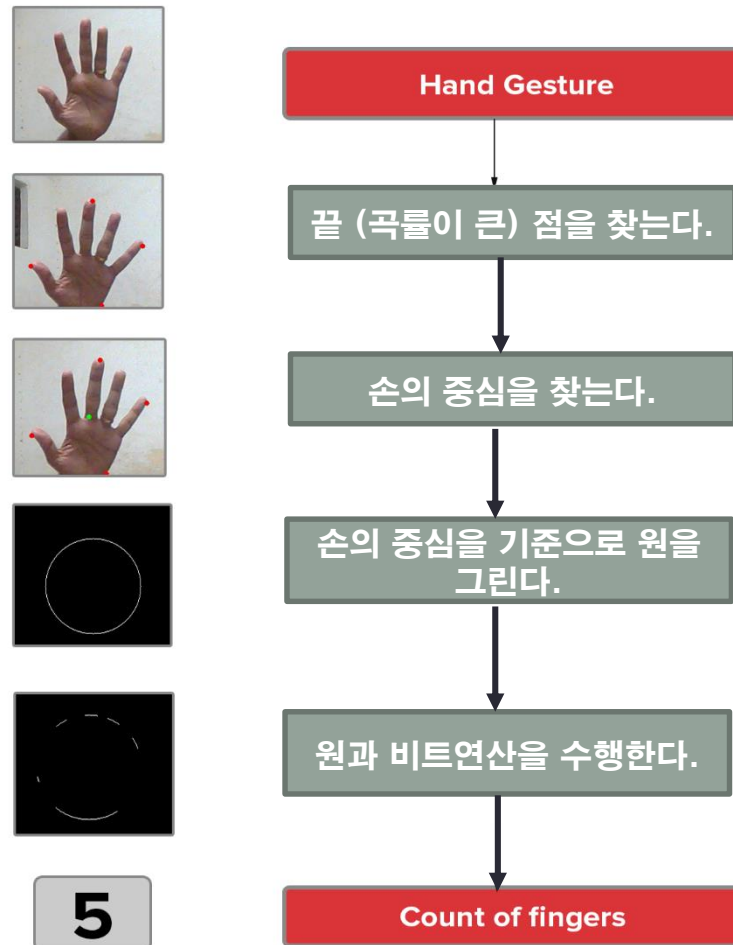


“Gesture B”

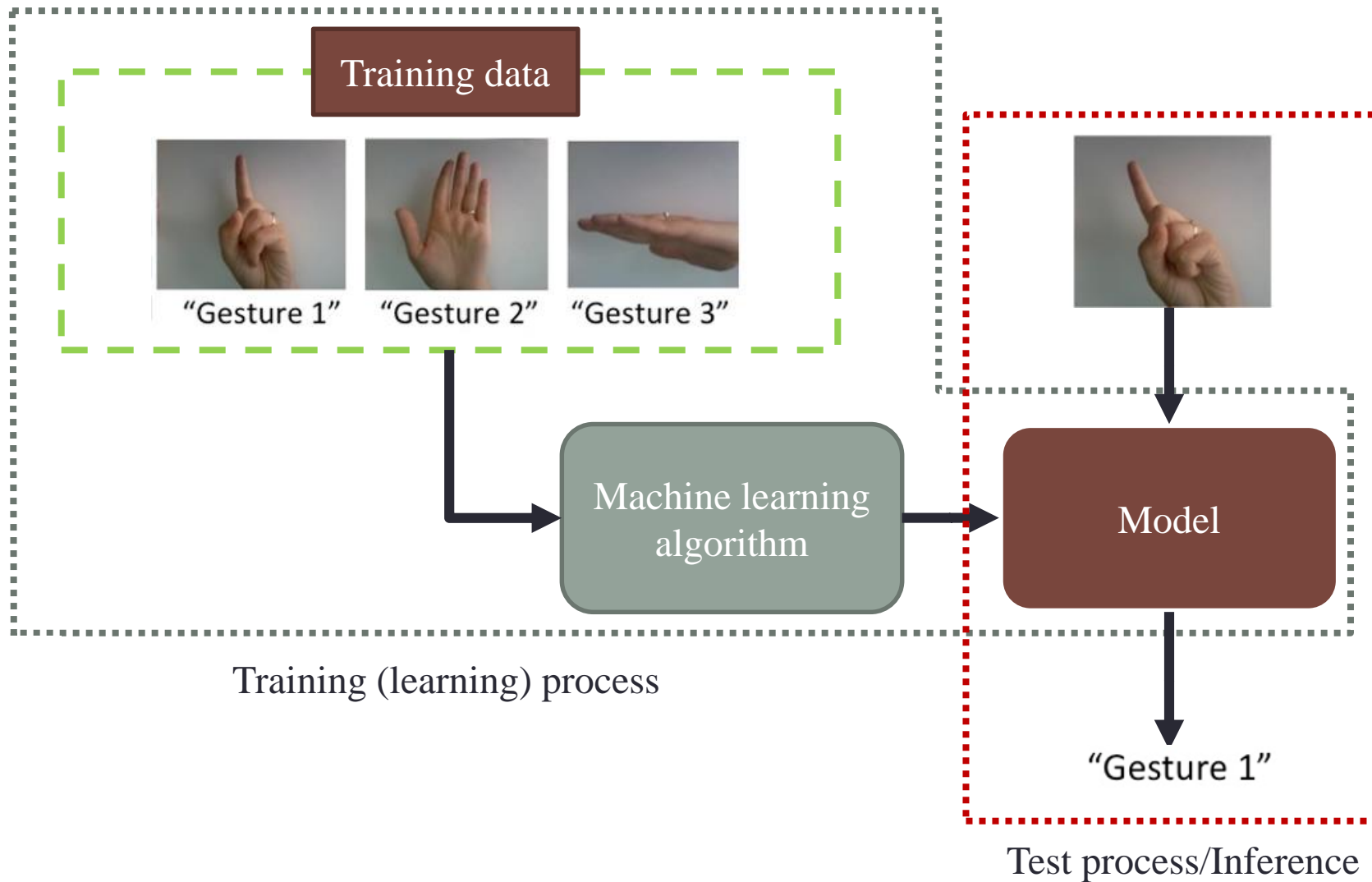


“Gesture C”

접근법 1: 내 경험/직관을 바탕으로 로직을 설계하자



접근법 2: 기계학습



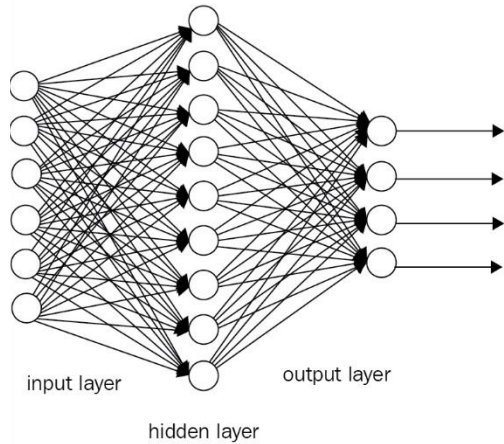
Black-box approach



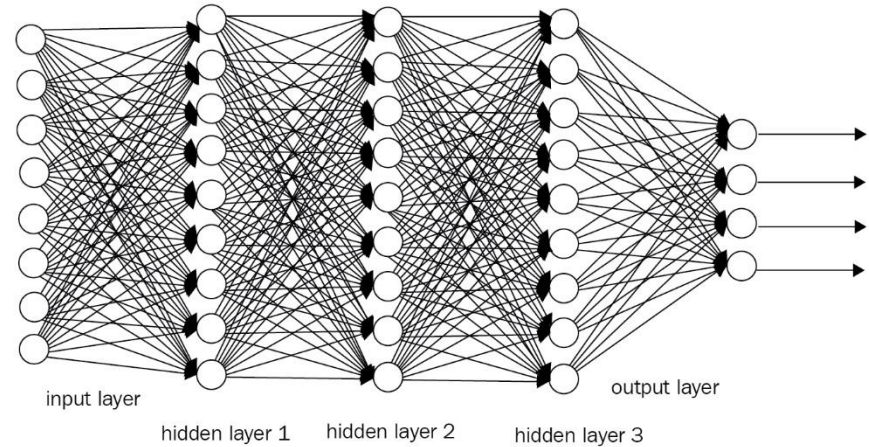
- 영상, 비디오, 음성 모두 벡터(숫자들의 어레이)로 표현할 수 있음
- 출력도 벡터로 표현할 수 있음. (고양이:[1,0,0], 개:[0,1,0], ...)
- 관찰된 숫자들이 들어가서 원하는 숫자들이 나오도록 하는 검은 상자
 - 검은 상자는 다양한 방식으로 구현될 수 있지만 현재는 **신경망**이 선호됨
 - 관계식에 필요한 파라미터는 예시로 부터 결정됨 (training 과정)

딥러닝

신경망 vs 깊은 신경망



신경망



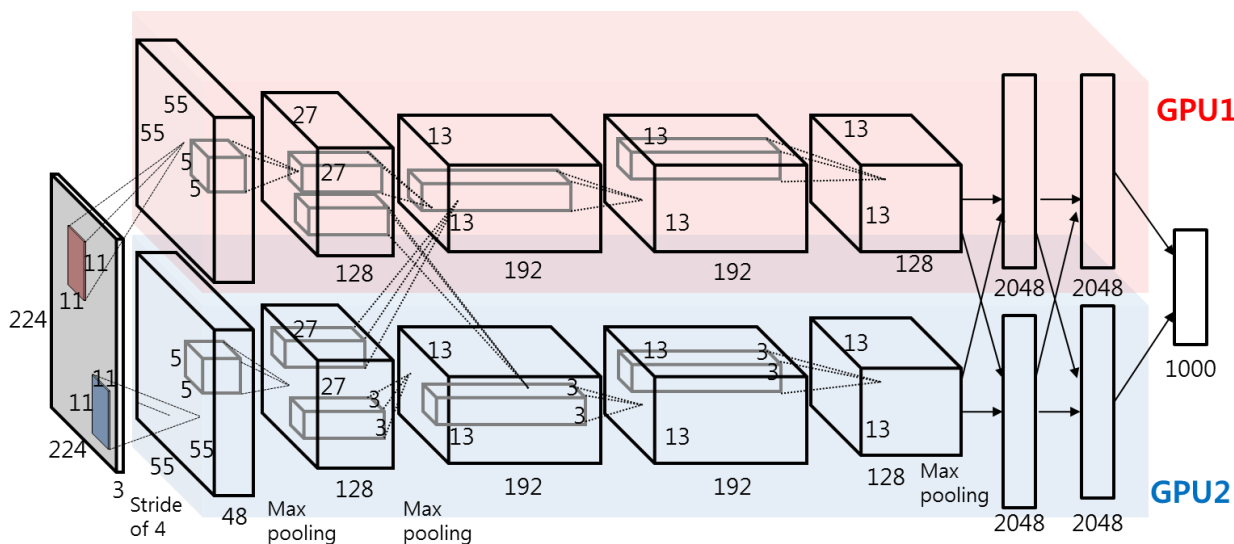
**깊은 신경망
(Deep Neural Networks)**

Large-scale recognition 1,000,000 images and 1,000 categories



AlexNet

- AlexNet won the 2012 ImageNet competition
 - 5 convolutional layers, 2 fully connected layers
 - The input is a color 224x224 image
 - 2 GPU architectures

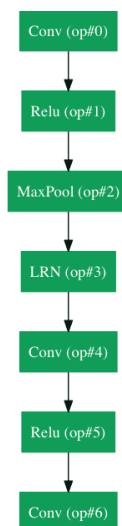


AlexNet results (2012)

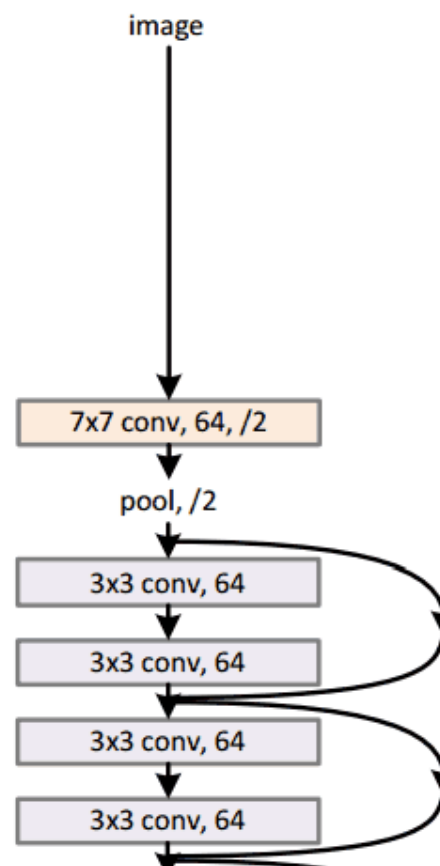
- [AlexNet TensorFlow codes and some results](#)



GoogLeNet (2013), ResNet-34 (2014)



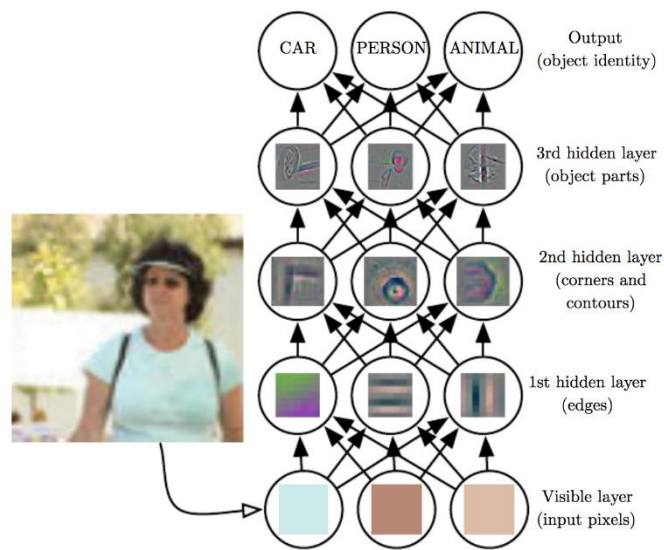
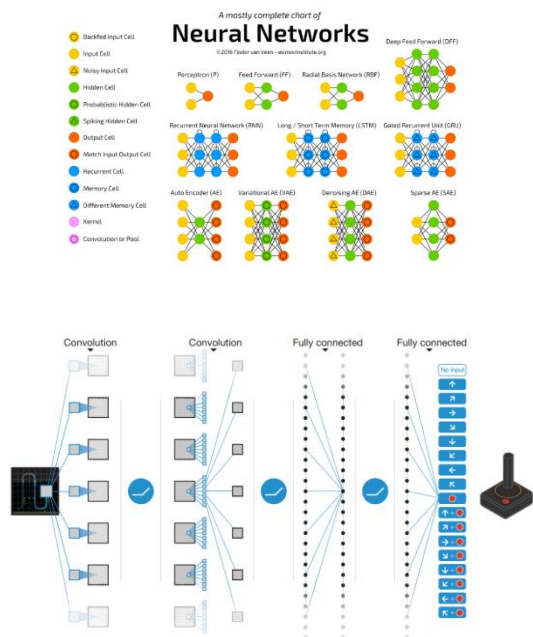
34-layer residual



딥러닝의 특징

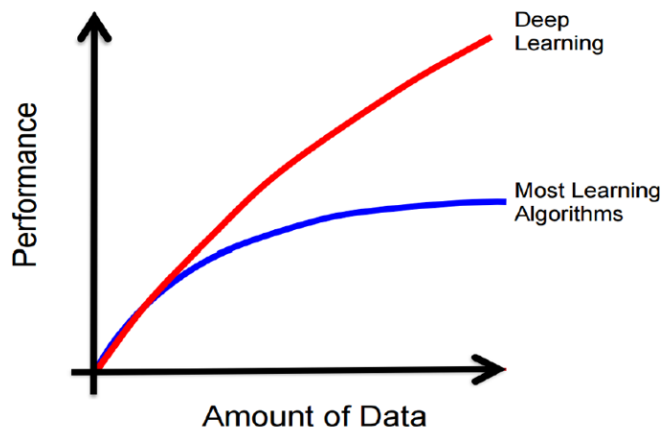
- 높은 유연성
 - 다양한 문제에 적용 가능
 - 다양한 구조 가능

- 표현법 학습
 - 계층적 특징 학습
 - 분산 표현



딥러닝의 특징

- 데이터 양에 비례하여 성능향상



- 병렬 처리에 적합
 - GPU, TPU, ...

