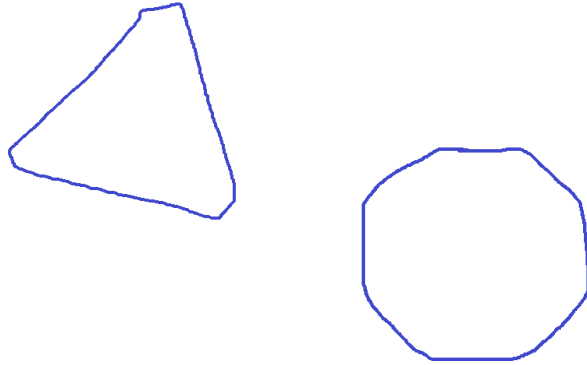# What is AI?

Understand Core Concept of
AI, ML, DL, CBR, LLM
Applications
Opportunities
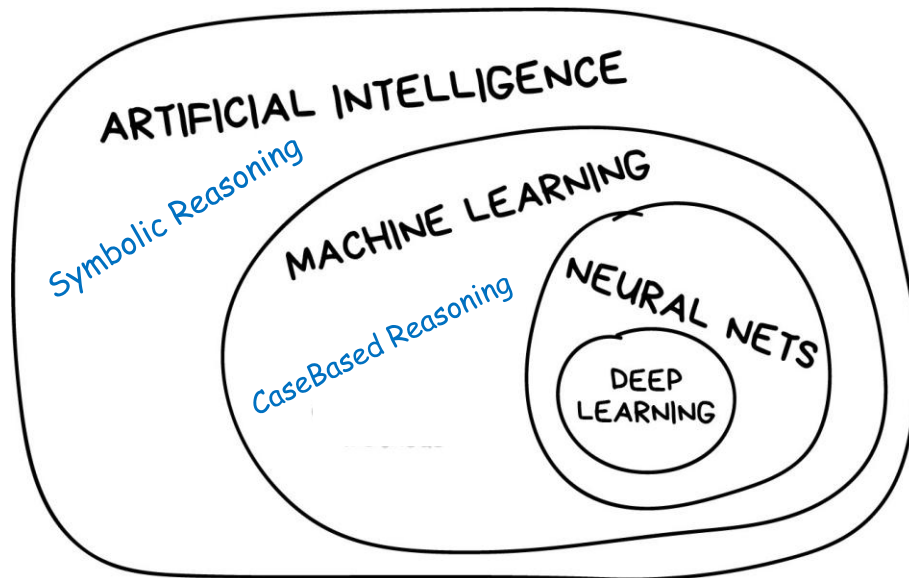
haesung kim
knowhow+
haesung.github.io

- What is being Intelligent?
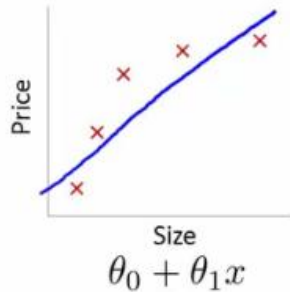 – Marvin Minsky 1970
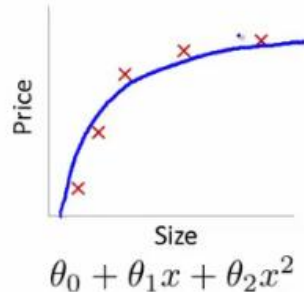
  NOT EASY !
  – Cannot Code
  – Learn from Data

ARTIFICIAL INTELLIGENCE

Symbolic Reasoning

MACHINE LEARNING

CaseBased Reasoning

NEURAL NETS

DEEP LEARNING

- Hard Areas
  – Reasoning 추론
  – Prediction 예측
  – Classification 분류
  – Creation 생성 (LLM)

Machine Learning Core Concept

House Price Prediction
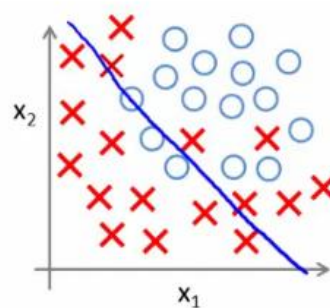
High bias (underfit) — $\theta_0 + \theta_1 x$

"Just right" — $\theta_0 + \theta_1 x + \theta_2 x^2$
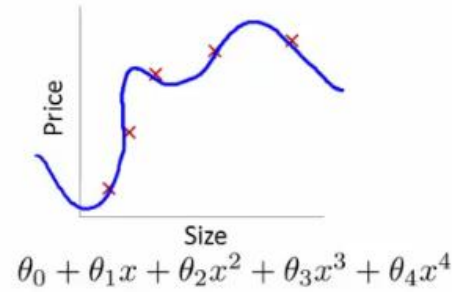
High variance (overfit) — $\theta_0 + \theta_1 x + \theta_2 x^2 + \theta_3 x^3 + \theta_4 x^4$
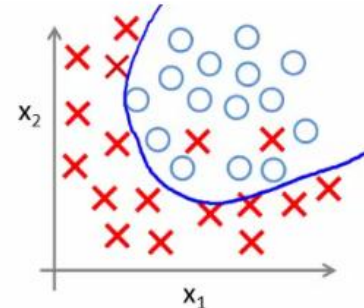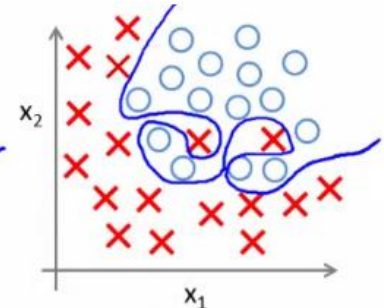
Hypertension Classification

$h_\theta(x) = g(\theta_0 + \theta_1 x_1 + \theta_2 x_2)$
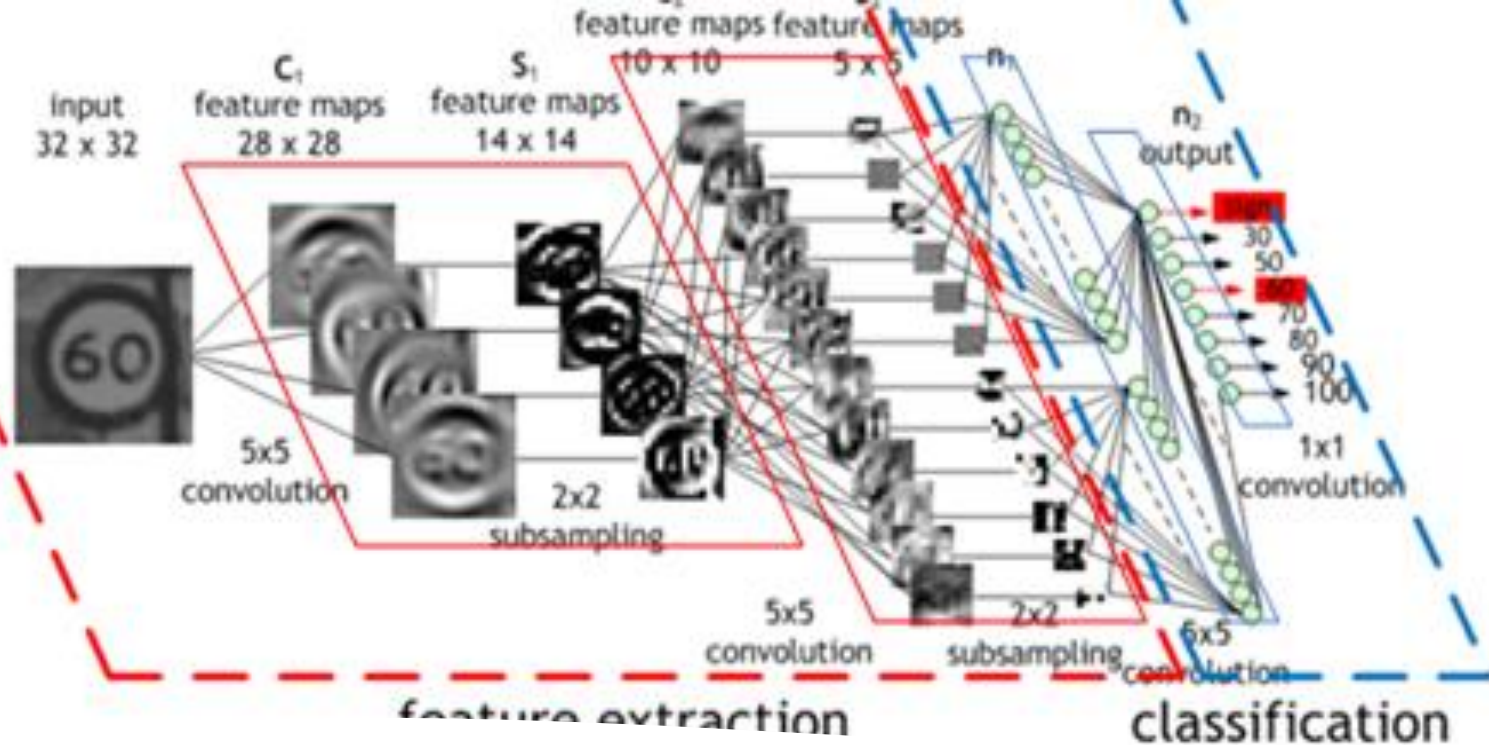(g = sigmoid function)

UNDERFITTING (high bias)

$g(\theta_0 + \theta_1 x_1 + \theta_2 x_2 + \theta_3 x_1^2 + \theta_4 x_2^2 + \theta_5 x_1 x_2)$

$g(\theta_0 + \theta_1 x_1 + \theta_2 x_1^2 + \theta_3 x_1^2 x_2 + \theta_4 x_1^2 x_2^2 + \theta_5 x_1^2 x_2^3 + \theta_6 x_1^3 x_2 + \ldots)$

OVERFITTING (high variance)

(Source: Coursera, Andrew Ng)

Why Deep Learning is Popular

- New fancy word of Neural Net
  - Fast = cheap graphic cards (Nvidia)
  - Data = huge tagged data
  - Easy = CNN (auto feature extraction)

- Vision
  - 97% accuracy better than human expert 95%
  - http://cs231n.stanford.edu/

CBR (Case-Based Reasoning, 사례기반추론)

사람이 문제를 해결하기 위하여 추론하는 프로세스를 모델링 한 방법 (Bergmann)

과거의 경험과 노하우

CBR시스템에 사례로 저장

문제발생

저장된 과거 사례들 중에서 유사도 검색을 통해 문제 상황과 가장 비슷한 사례(해결책) 제시

지혜 (Wisdom)

지식 (Knowledge)
Solution Story - Case

정보 (Information)
Structured Data - Table

데이터 (Data)

암묵지 (Tacit)

형식지 (Explicit)

CBR (맞춤형 비만관리 시스템)

DL vs CBR

요키 사진

개 고양이
사진+태그

Training

Model
coefficients

개 확률 95%,
고양이 확률 5%

분류 / 예측
- Fit Functions
- Black Box
- 이미지 분류 / 확률

환자 상태

CBR Model
사례구조
유사도함수
가중치

Casebase

성공사례
(치료사례)

유사도 1등 치료사례
유사도 2등 치료사례

추론
- Nearest Neighbor Classifier
- Best Case 추천
- 경험/노하우 재사용

Quiz DL/CBR/Rules?

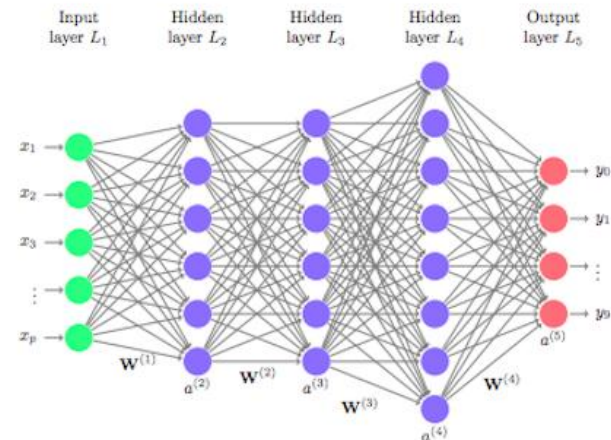1. Health Status Prediction
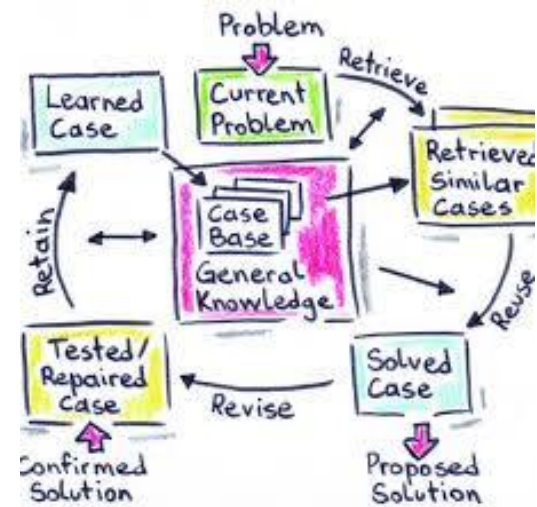   6개월후 건강상태예측

2. My Home Finder
   스마트직방

3. Cancer Detection & Treatment
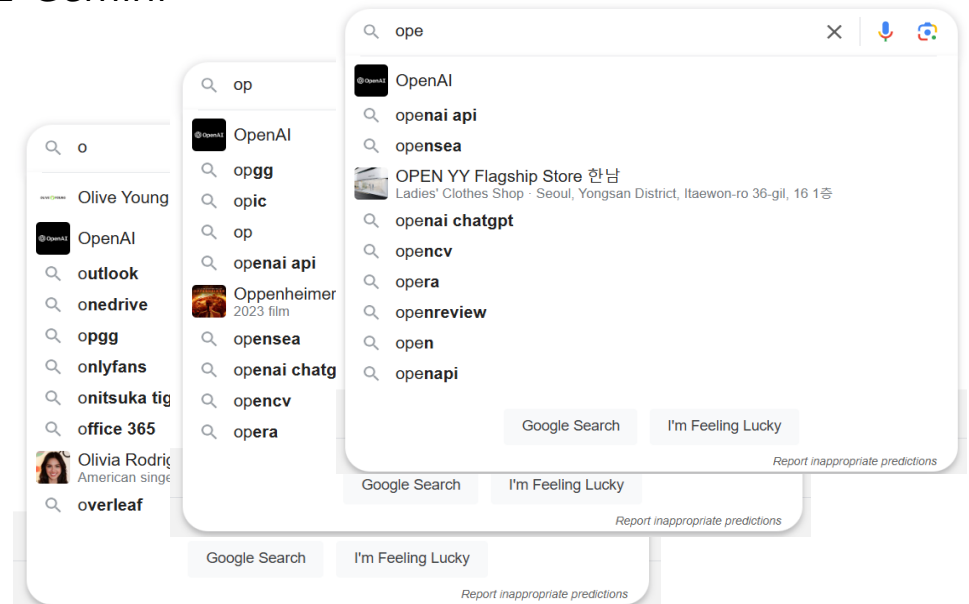   암 조기발견 및 치료

4. Metabolic Syndrome Detection
   대사증후군판정

LLM (Large Language Model)
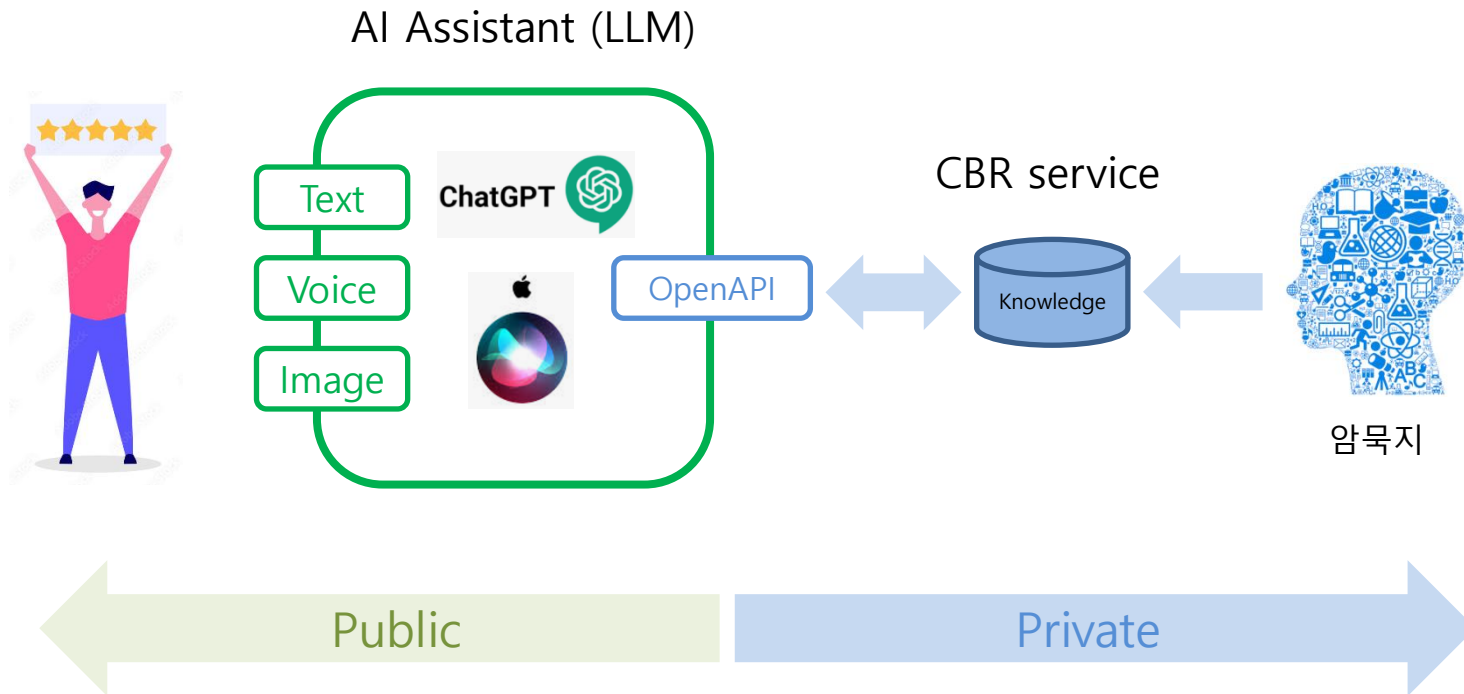
- ## Why is so Shocking?
  - 2022.11 OpenAI   ChatGPT
    - GPT → Transformer/Pre-Trained/Generative
    - Chat → Reinforcement Learning
    - Huge Parameters & Training Data & Human Feedback
  - 2023.03 Google Bard → 2023.12 Gemini
  - [ChatGPT vs Gemini](#)
  - [Open Source LLMs](#) – Meta Llama

- ## Threat or Opportunity?

Opportunities

CBR Solution

CBRagent

CBRproto

API

- 모델생성
- CBR추론
- 사례추가
- 사례제거

유사도함수
모듈

CBR Model

- 사례구조
- 유사도함수타입
- 속성가중치

Casebase

CBR apps

TCP/IP