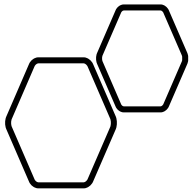
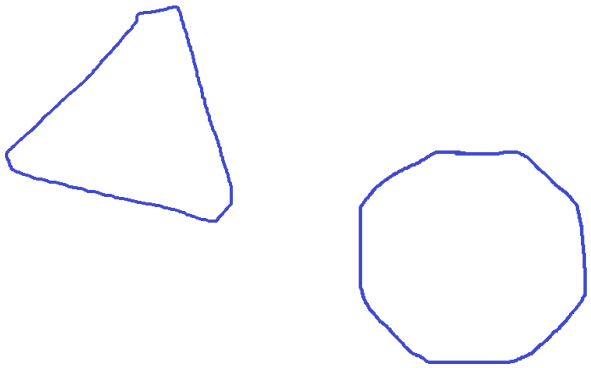


What is AI?

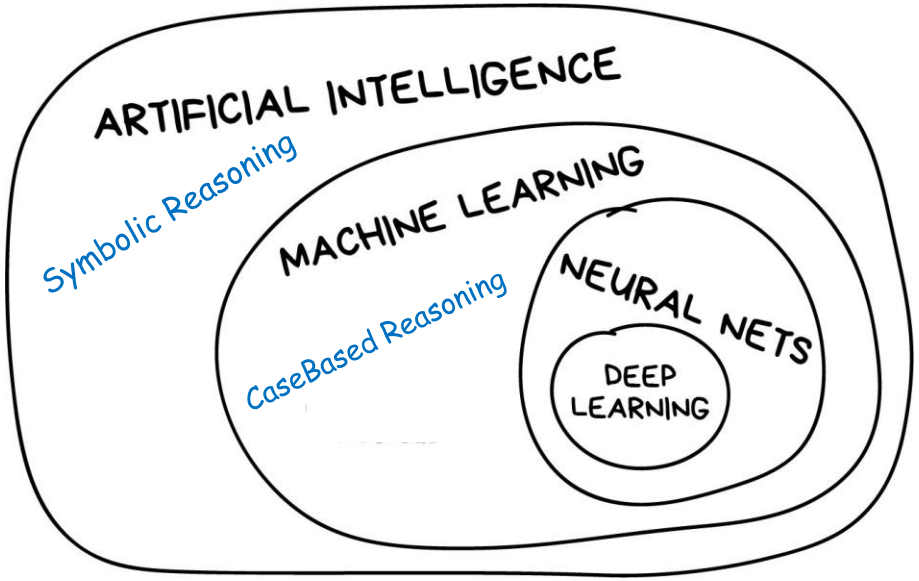
Understand Core Concept of
AI, ML, DL, CBR, LLM
Applications
Opportunities

haesung kim
knowhow+
haesung.github.io



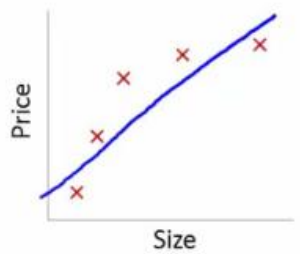
- What is being Intelligent?
  - Marvin Minsky 1970

NOT EASY !
- Cannot Code
- Learn from Data



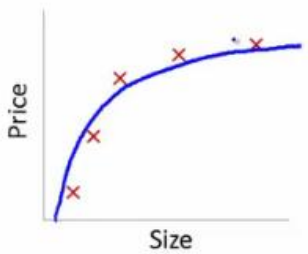
- Hard Areas
  - Reasoning 추론
  - Prediction 예측
  - Classification 분류
  - Creation 생성 (LLM)

Machine Learning Core Concept



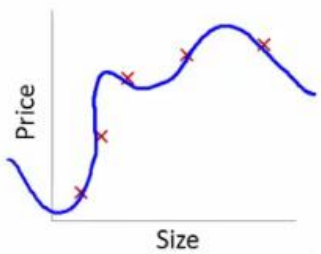
$\theta_0 + \theta_1 x$

High bias
(underfit)



$\theta_0 + \theta_1 x + \theta_2 x^2$

"Just right"

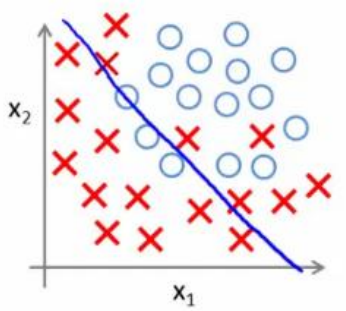


$\theta_0 + \theta_1 x + \theta_2 x^2 + \theta_3 x^3 + \theta_4 x^4$

High variance
(overfit)

House Price Prediction

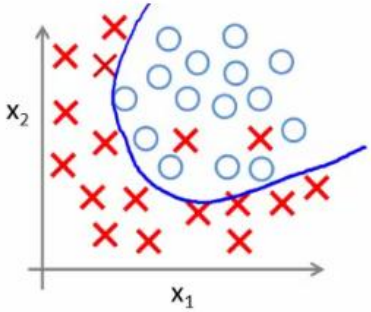
Hypertension Classification



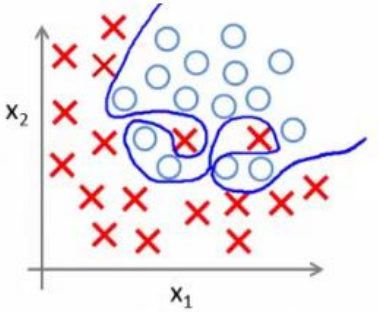
$h_\theta(x) = g(\theta_0 + \theta_1 x_1 + \theta_2 x_2)$

(g = sigmoid function)

UNDERFITTING
(high bias)



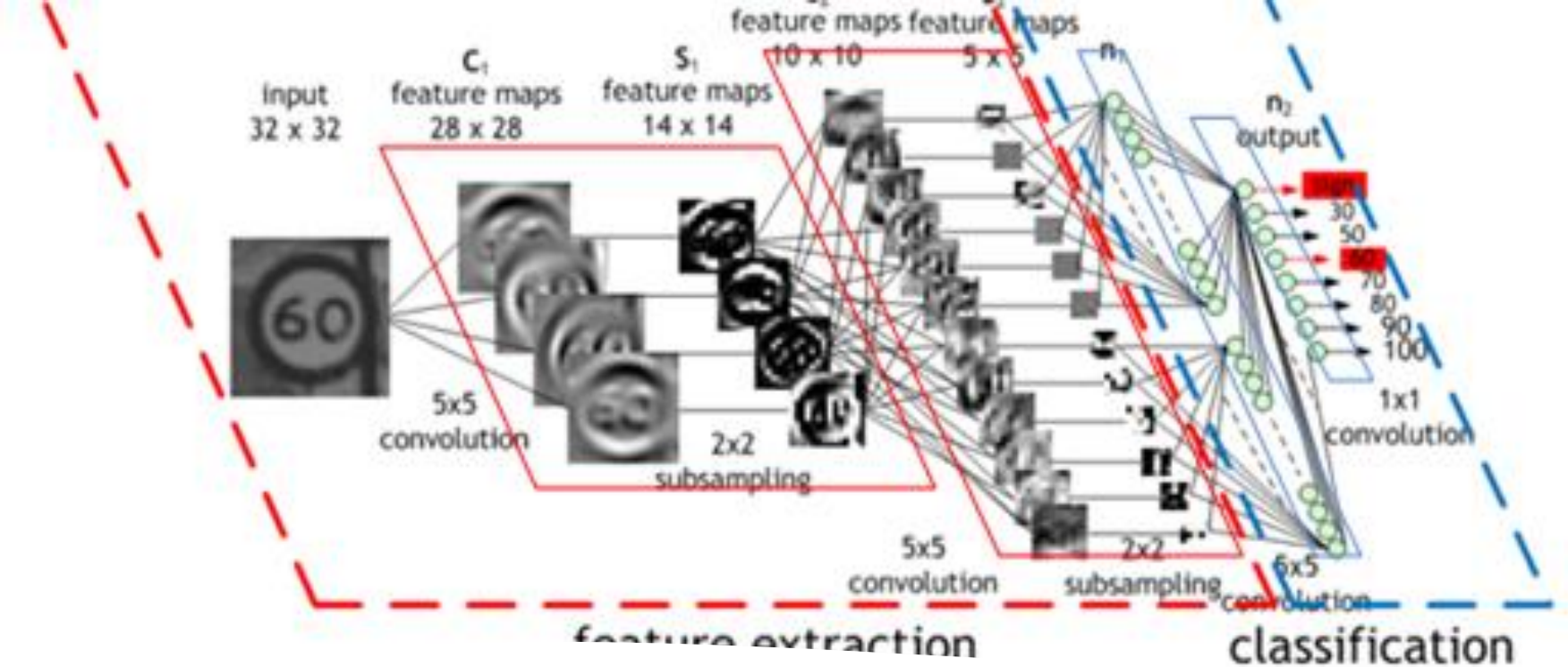
$g(\theta_0 + \theta_1 x_1 + \theta_2 x_2 + \theta_3 x_1^2 + \theta_4 x_2^2 + \theta_5 x_1 x_2)$



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

OVERFITTING
(high variance)

(Source: Coursera, Andrew Ng)



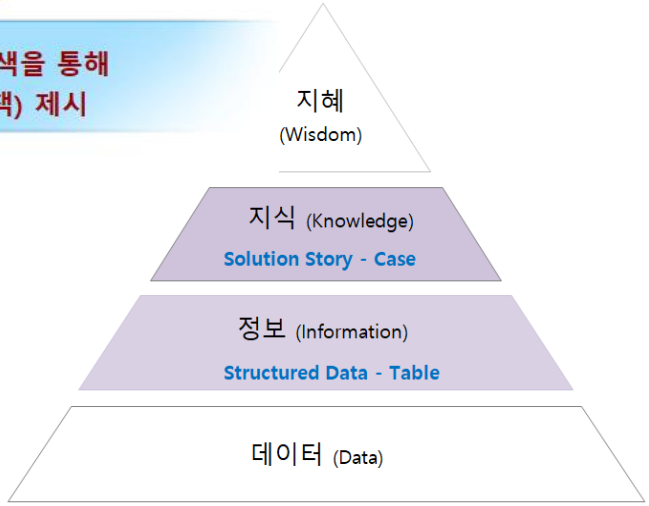
Why Deep Learning is Popular

- 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)

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



CBR (맞춤형 비만관리 시스템)

비만 여부	시술 부위	연령	대사 질환
[Y] N	팔 다리 [복부] 없음	<=29 [30-49] 50-69 >=70	고혈압 당뇨 이상지질 [없음]

CBR Query

CBR Model

유사도검색

Casebase

치료사례

유사도가 가장 높은 1, 2등
치료사례 2건

CASE-12
유사도 95%

비만 여부	시술 부위	연령	대사 질환	
[Y] N	팔 다리 [복부] 없음	<=29 [30-49] 50-69 >=70	**[고혈압]** 당뇨 이상지질 없음	• 42세 여성환자 • 4주 시술 및 약물처방 • 개선 추이

CASE-85
유사도 90%

비만 여부	시술 부위	연령	대사 질환	
[Y] N	팔 다리 [복부] 없음	<=29 30-49 **[50-69]** >=70	고혈압 당뇨 이상지질 [없음]	• 55세 남성환자 • 4주 시술 및 약물처방 • 개선 추이

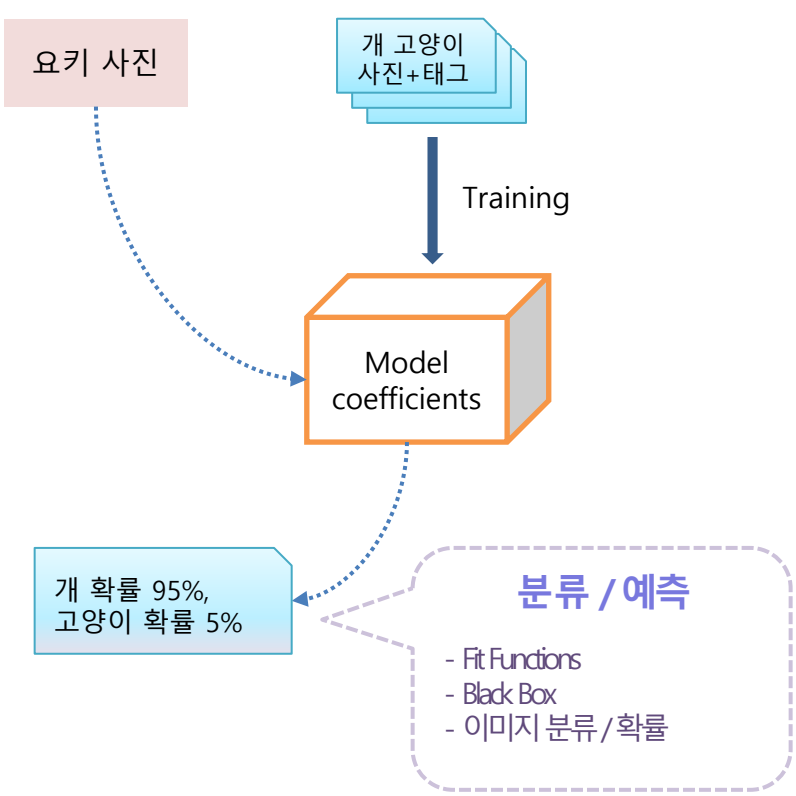
CBR 추론속성 | **해결책 / know-how**

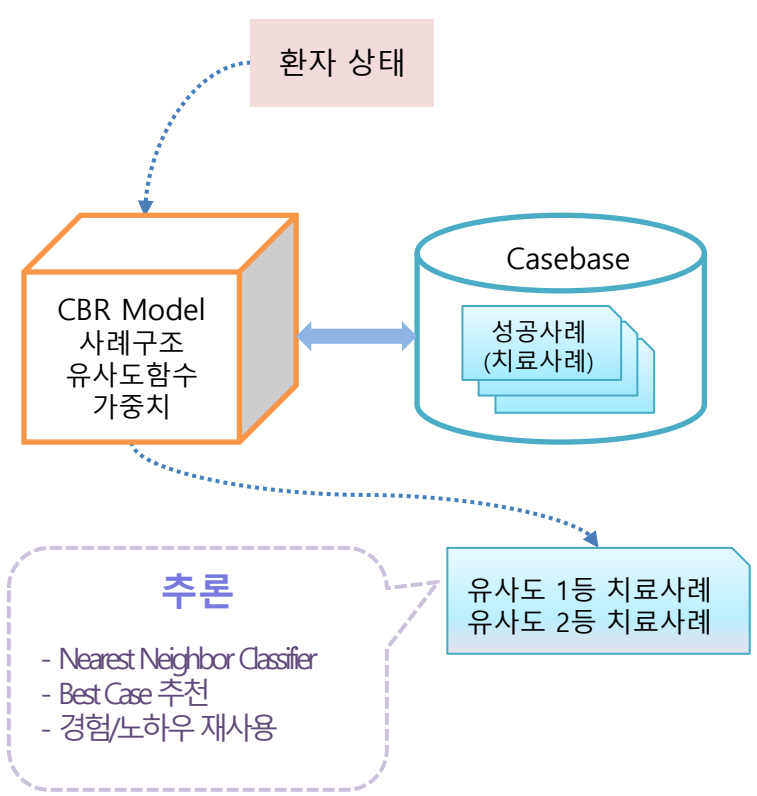
최종비만치료사례(CASE-12 및 CASE-320 리뷰 및 개선 결과)

비만 여부	시술 부위	연령	대사 질환	
[Y] N	팔 다리 [복부] 없음	<=29 [30-49] 50-69 >=70	고혈압 당뇨 이상지질 [없음]	• 47세 여성환자 • 4주 시술 및 약물처방 • 개선 추이

비만 치료 결과 효과적인
시술 및 약물처방으로 판명되면
Casebase에 치료사례로 등록

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

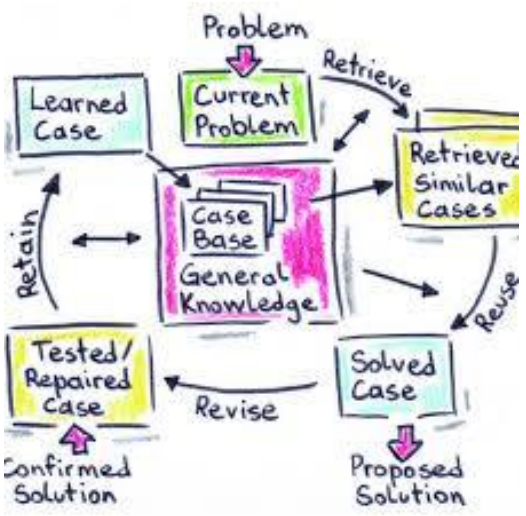

환자 상태
CBR Model
사례구조
유사도함수
가중치
Casebase
성공사례
(치료사례)
추론
- Nearest Neighbor Classifier
- Best Case 추천
- 경험/노하우 재사용
유사도 1등 치료사례
유사도 2등 치료사례

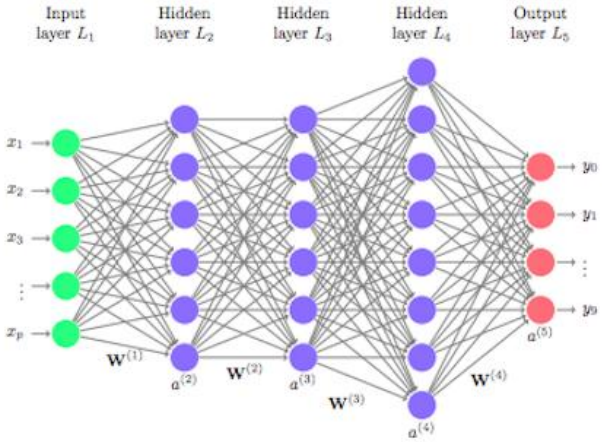
Quiz DL/CBR/Rule?

1. Metabolic Syndrome Detection
   대사증후군판정

2. Cancer Detection &
   Personalized Treatment
   암 조기발견 및 개인맞춤형치료

3. My Home Finder
   스마트직방

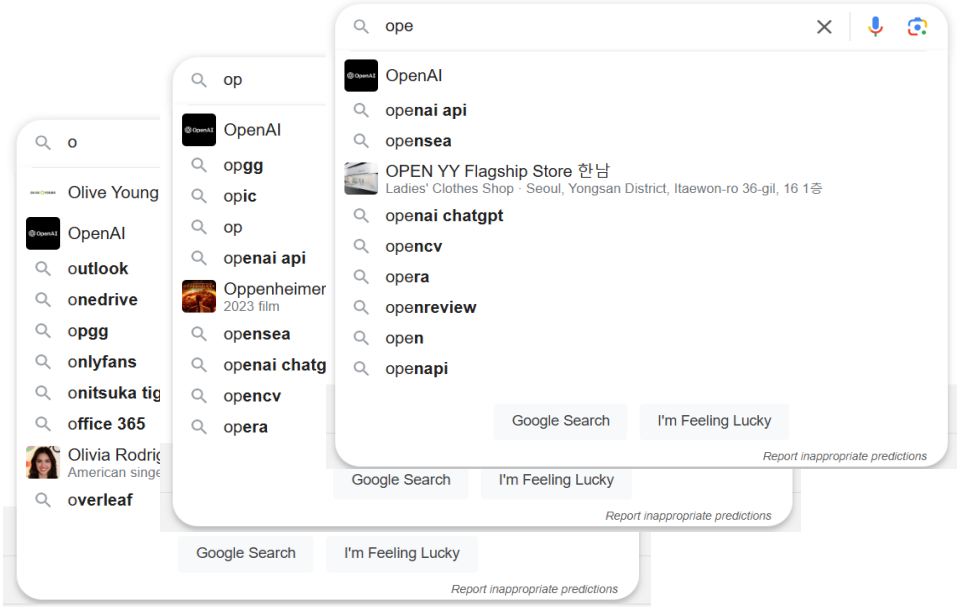




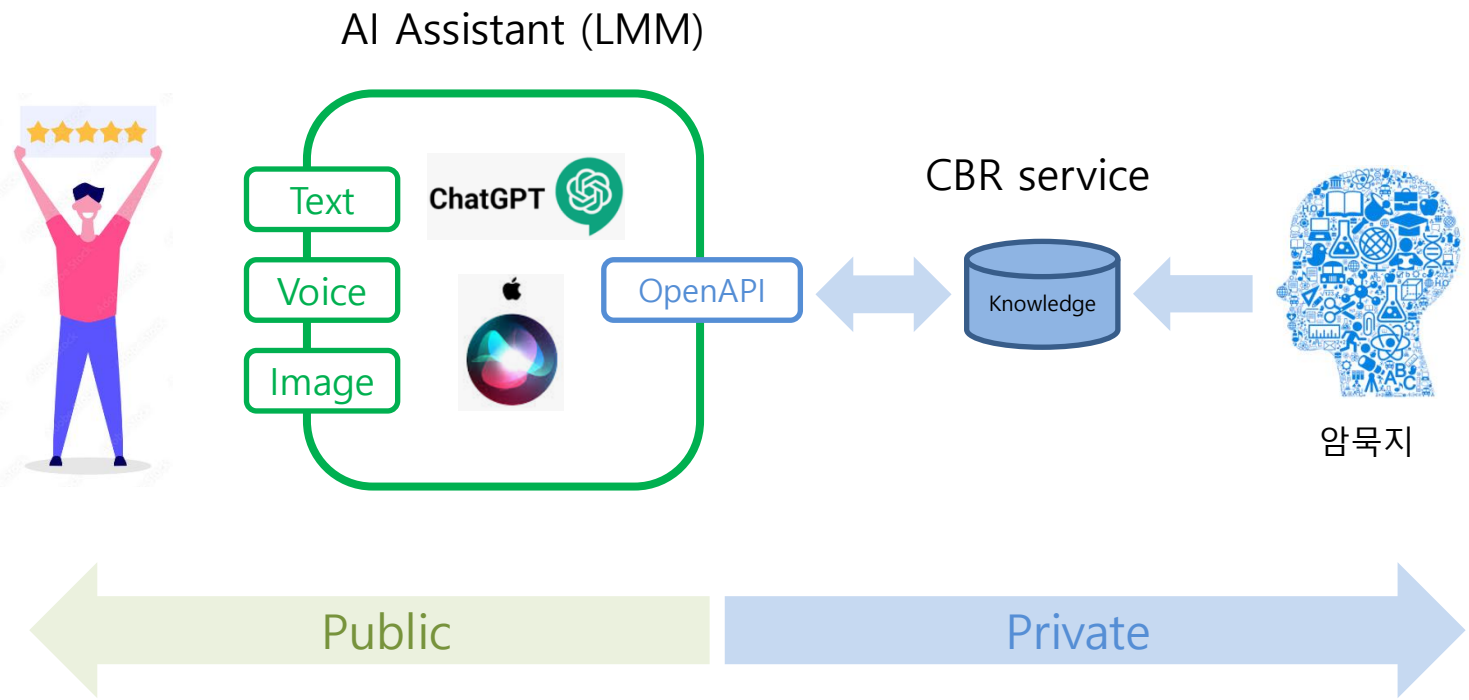
LLM (Large Language Model)

- 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