



What is AI?

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

haesung kim
knowhow+
haesung.github.io

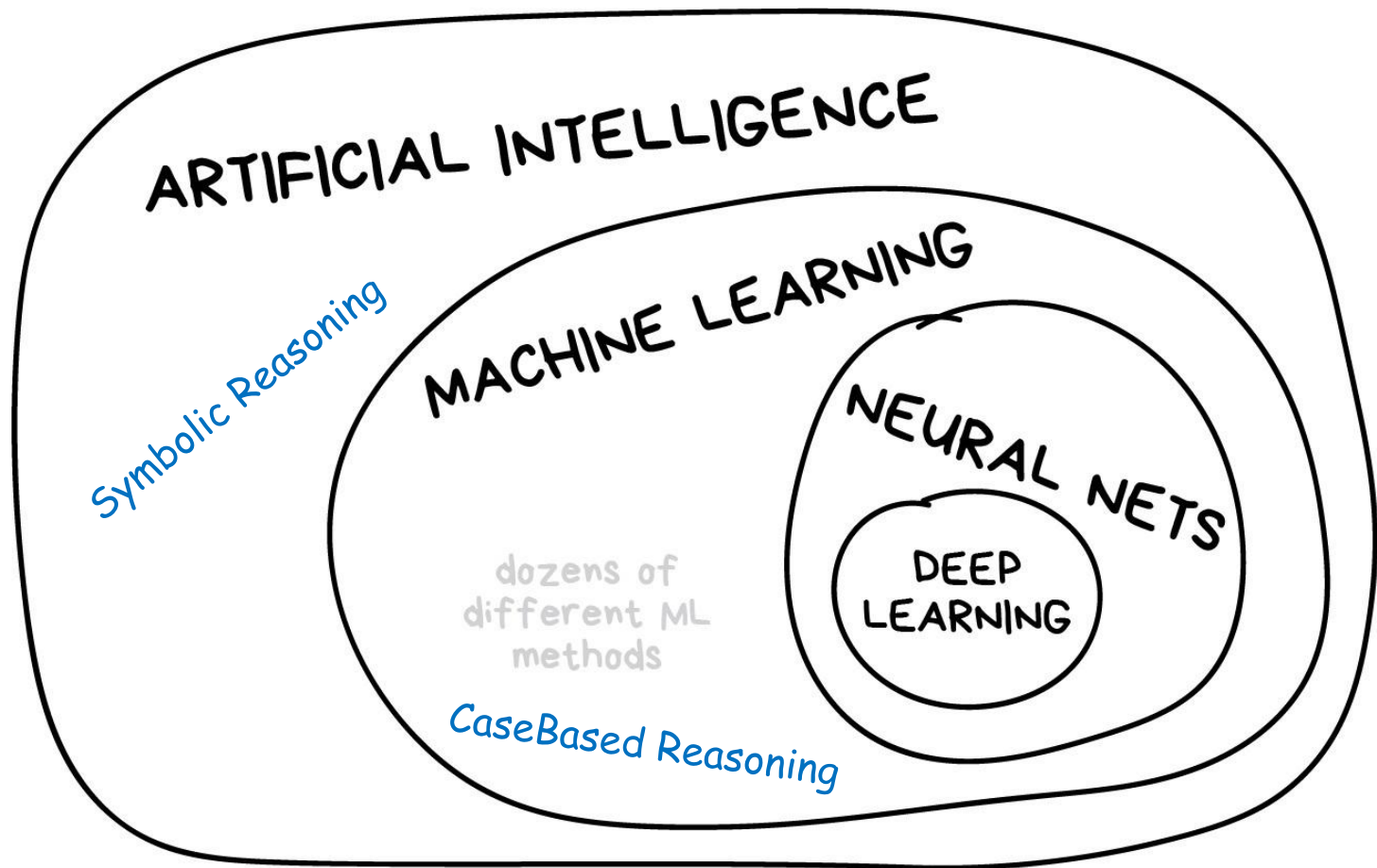
AI ?

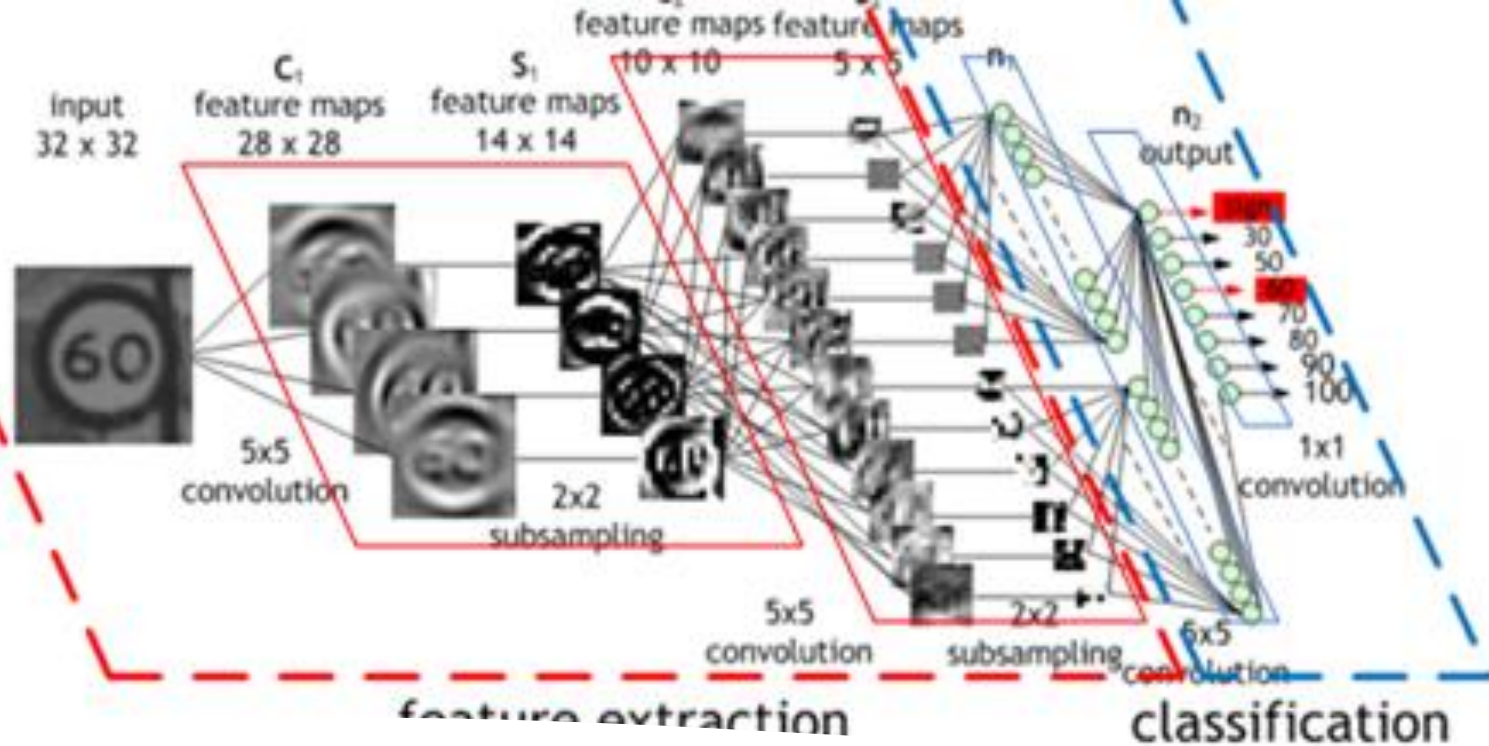
- What is Intelligent or Smart?
 - Dog or Cat
 - Marvin Minsky 1970

NOT EASY !

- Classify, Discern, Discriminate
 - Get Smarter - Learn from Data
- Hard Areas
 - Classification
 - Prediction
 - Reasoning
 - Creation (Natural Language)

Big Picture - AI, ML, DL, CBR





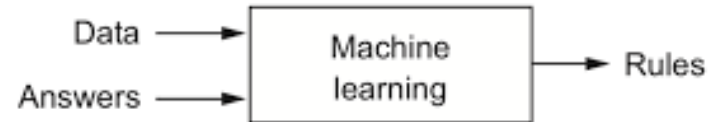
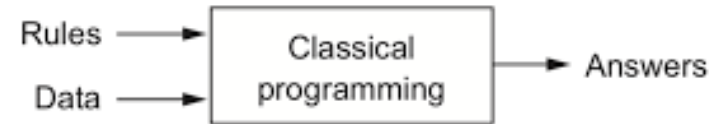
Why Deep Learning is Popular

- New fancy word of Neural Net
 - Fast = cheap graphic card
 - Data = huge tagged data
 - Easy = CNN (auto feature extraction)
- Vision
 - 97% accuracy better than human expert 95%
 - <http://cs231n.stanford.edu/>

Machine Learning

Data & Answers (Image & Tag)
Rules => Parameter / Weight Matrix

Machine Learning vs Programming

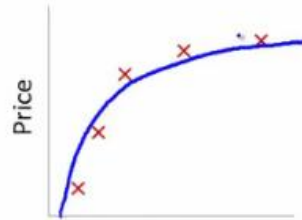


Machine Learning Core Concept



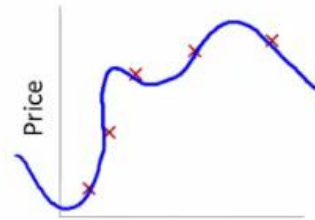
$$\theta_0 + \theta_1 x$$

High bias
(underfit)



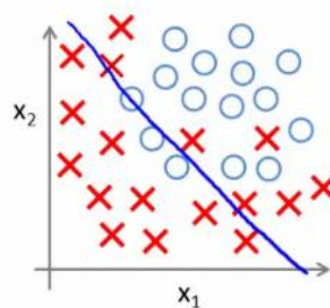
$$\theta_0 + \theta_1 x + \theta_2 x^2$$

"Just right"



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

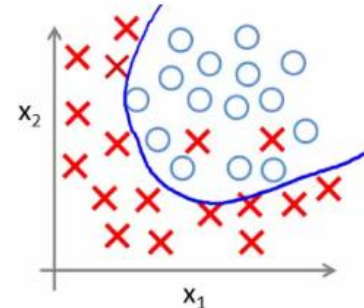
High variance
(overfit)



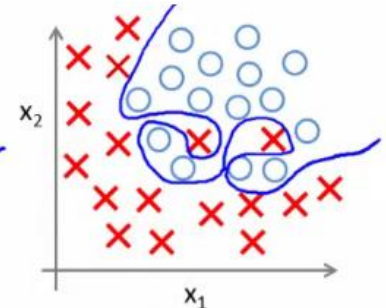
$$h_{\theta}(x) = g(\theta_0 + \theta_1 x_1 + \theta_2 x_2)$$

(g = sigmoid function)

UNDERFITTING
(high bias)



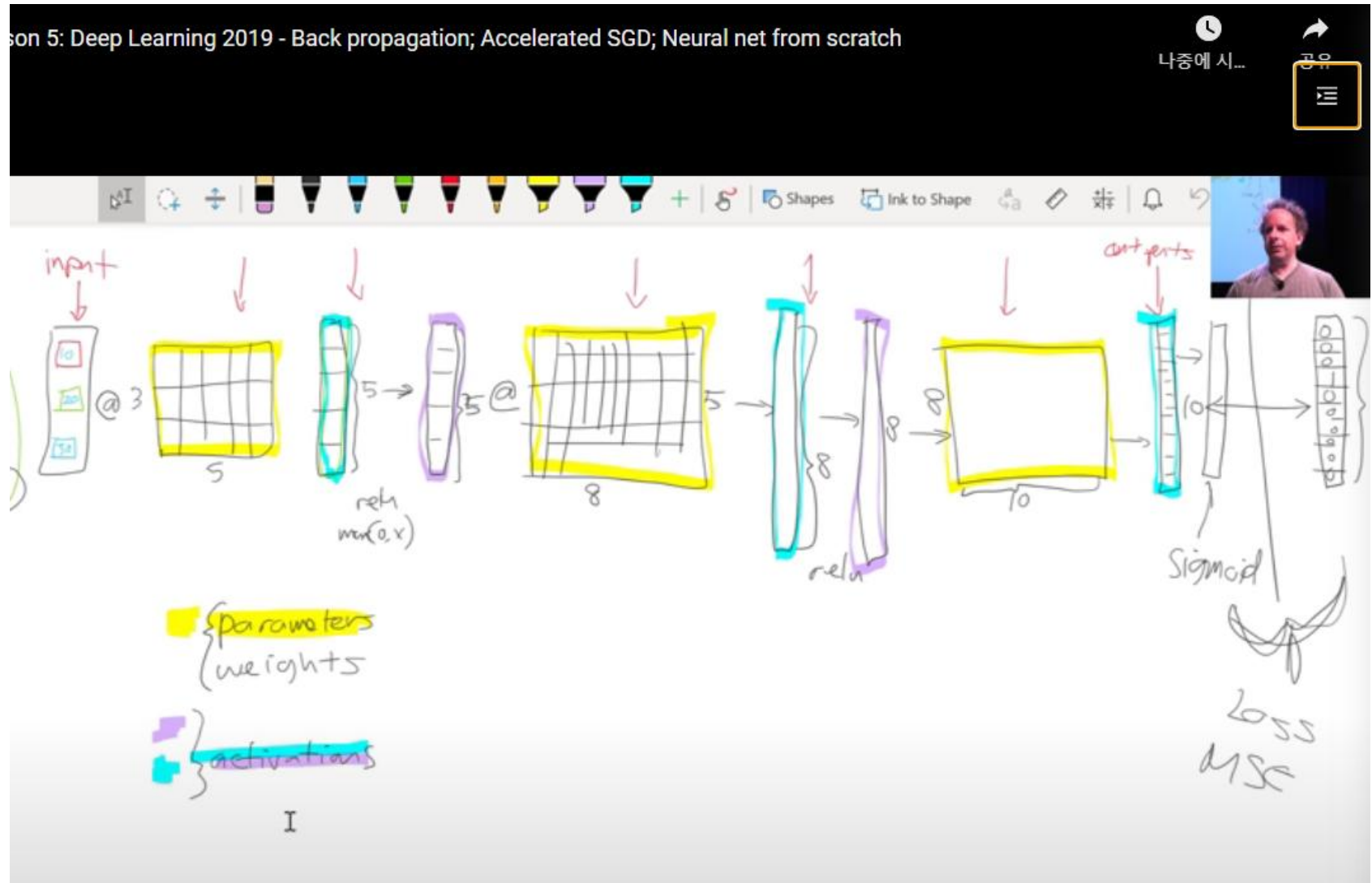
$$g(\theta_0 + \theta_1 x_1 + \theta_2 x_2 + \theta_3 x_1^2 + \theta_4 x_2^2 + \theta_5 x_1 x_2)$$



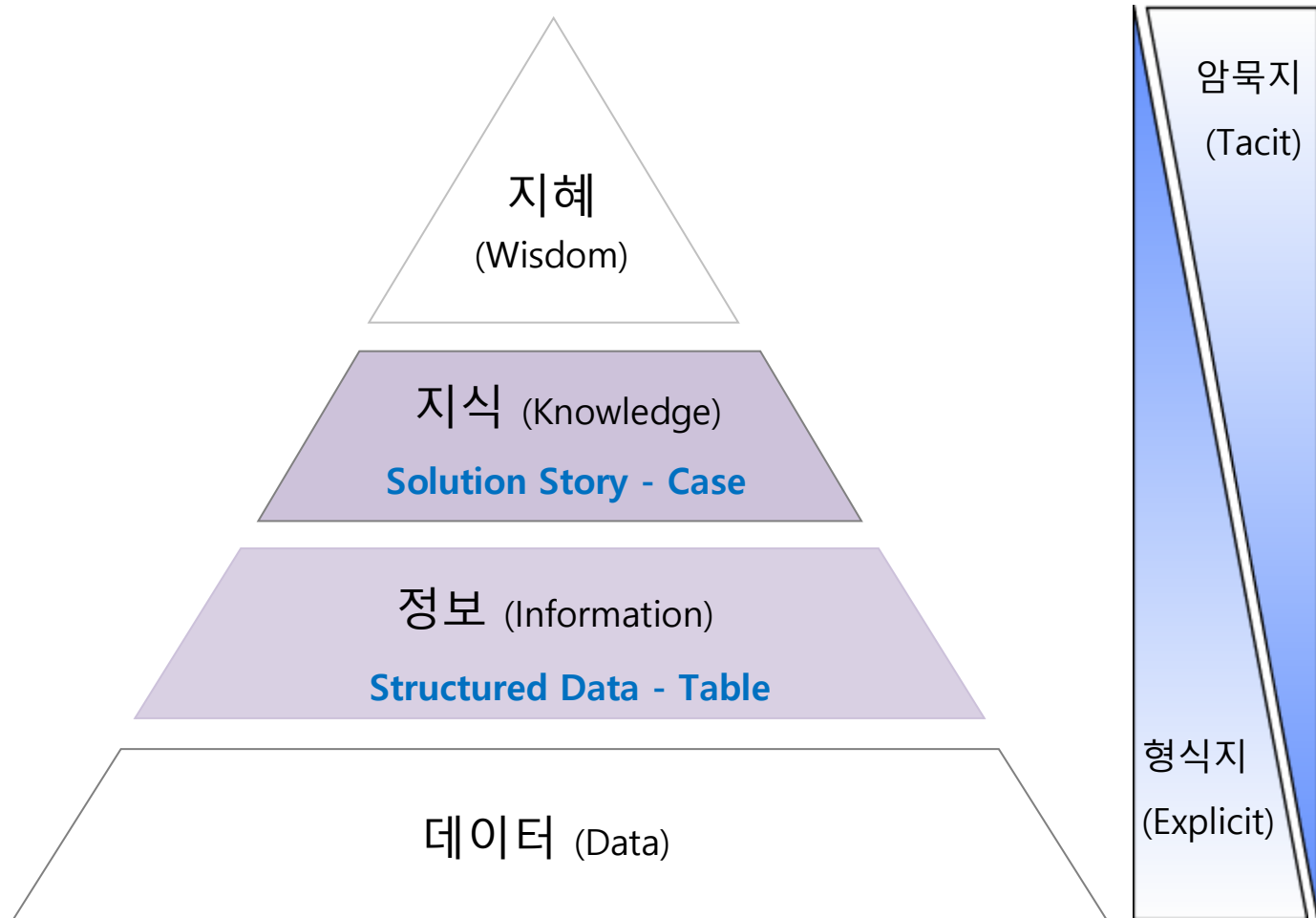
$$g(\theta_0 + \theta_1 x_1 + \theta_2 x_1^2 + \theta_3 x_1^2 x_2 + \theta_4 x_1^2 x_2^2 + \theta_5 x_1^2 x_2^3 + \theta_6 x_1^3 x_2 + \dots)$$

OVERFITTING
(high variance)

Deep Learning Core Concept

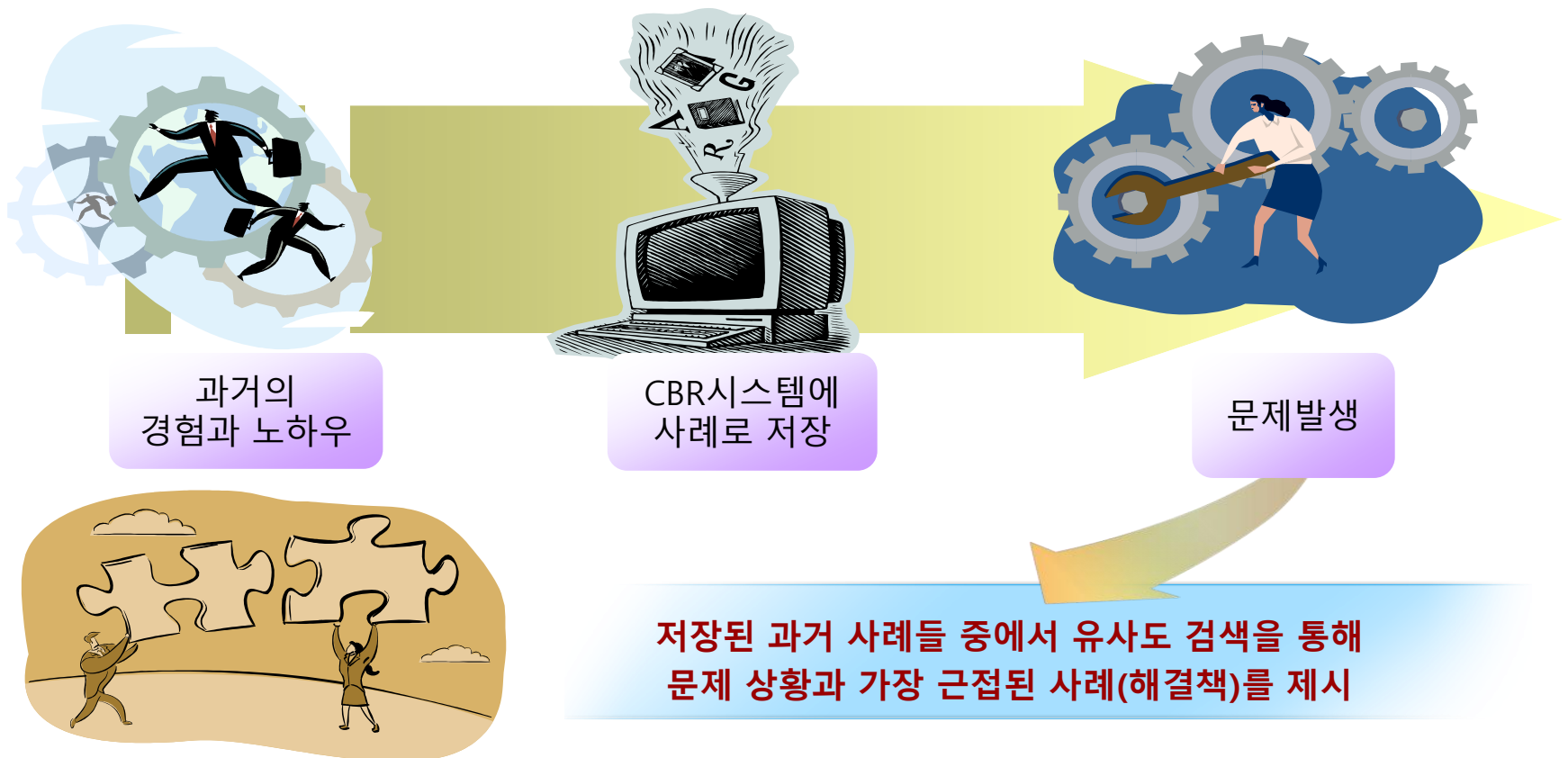


Knowledge vs Data



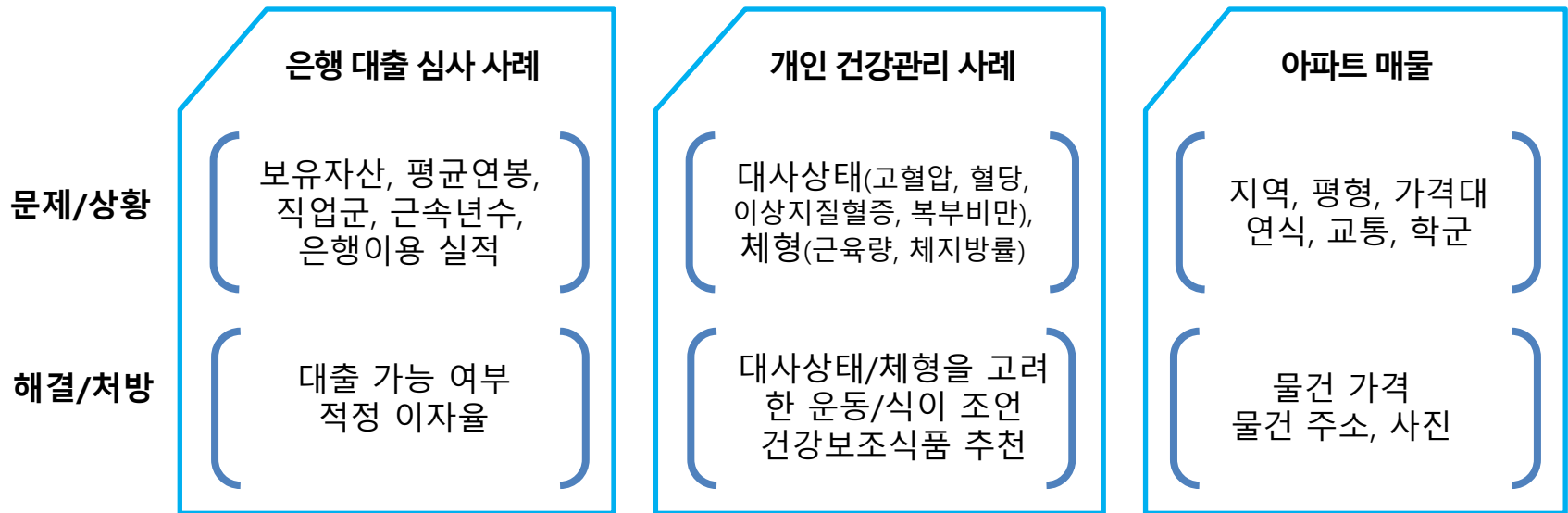
What is CBR (Case-Based Reasoning)

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

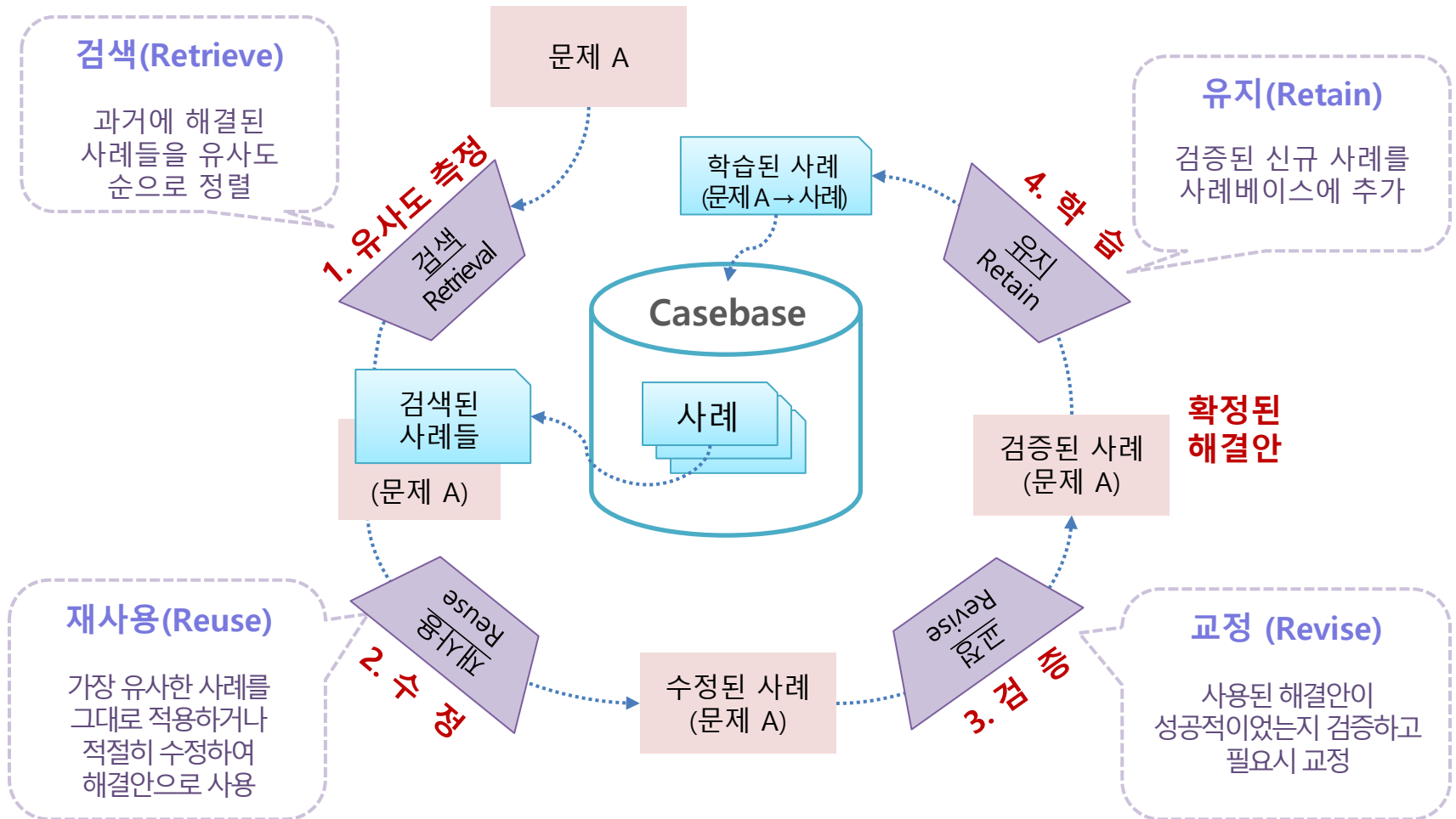


CBR Case Structure (사례구조)

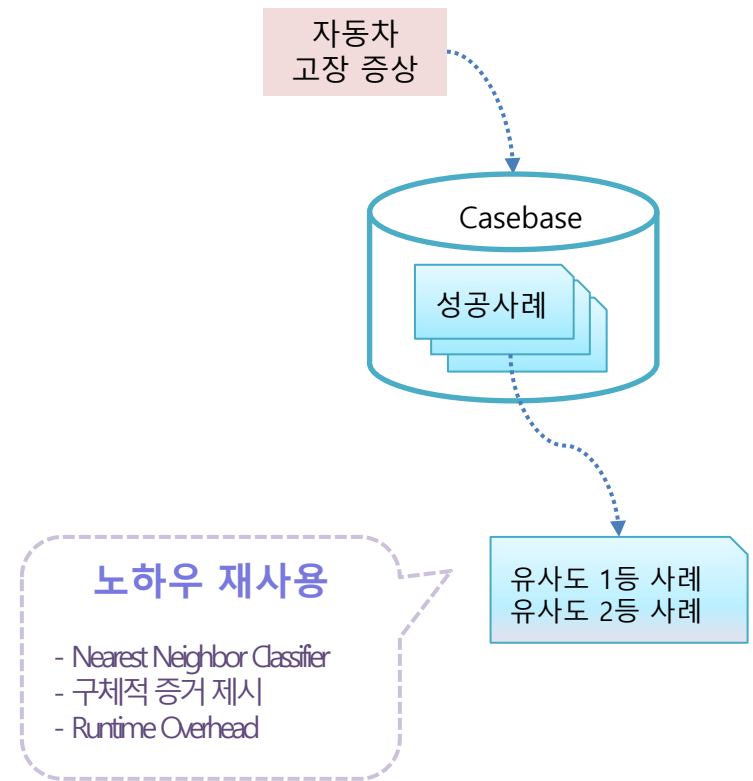
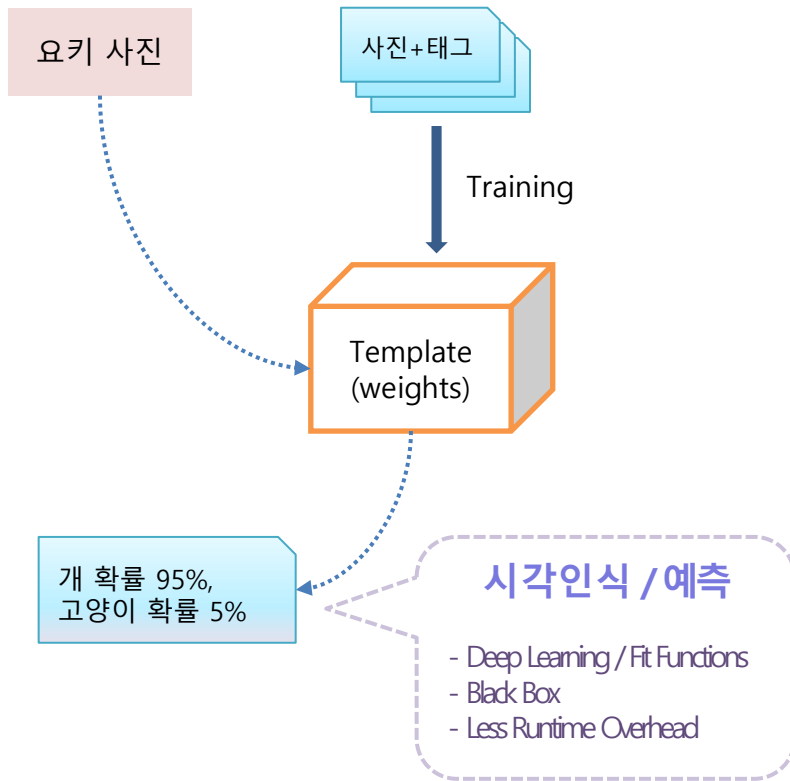
- **Case (사례) = Search Attributes (검색 속성) + Solution (해결방안, 원인)**
 - Search Attributes : 문제/상황을 표현하는 **Key/Value** - 유사도검색에 사용
 - Solution : 실제 해결방안, 처방, 구체적 정보 등 (텍스트, 이미지, 동영상 등 멀티미디어)



CBR 4R Process

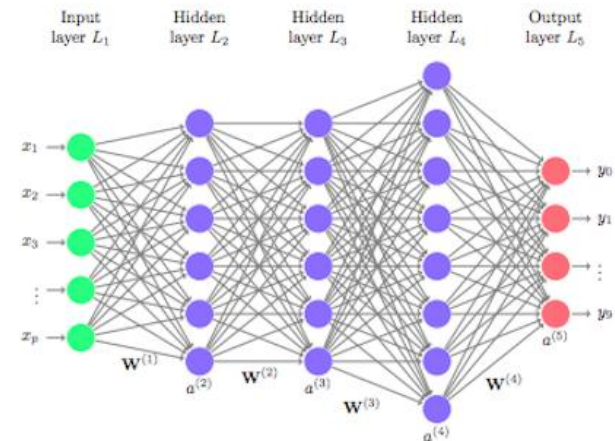
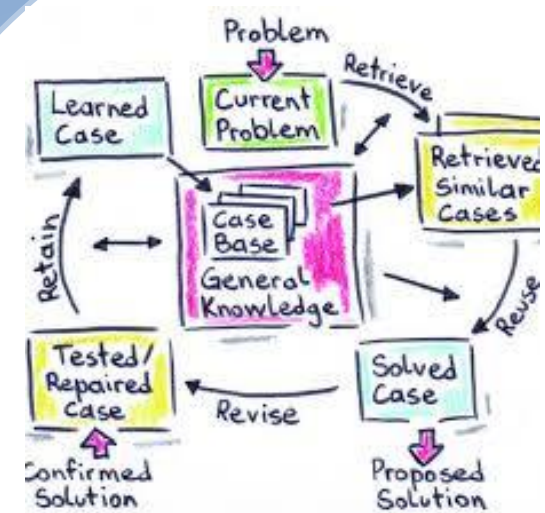


DL vs CBR



DL or CBR or Rules

1. Car Repair Support System
2. Health Status Prediction
3. My Home Finder
4. Cancer Detection & Treatment
5. Metabolic Syndrome Detection



One More Thing

ChatGPT
Opportunities?

LLM (Large Language Model)

- Why is so Shocking?
 - OpenAI ChatGPT 2022.11
 - Google Bard 2023.3 → Gemini 2023.12
 - Transformer/Pre-Trained/Generative/RL → Huge Parameters & Data
 - Open Source → Meta Llama 2, Google Gemma
- ChatGPT vs Gemini
 - Pros & Cons
 - Performance (Accuracy, Style, Multi-modal, Speed)
 - Ecosystem (GPTs, Extension)
 - Price
 - <https://zapier.com/blog/chatgpt-vs-bard/>
 - Just Use & Select
- Consciousness

Opportunities

- Done!
 - Image data → CNN → Classification 분류
 - Tabular data → embedding → Prediction 예측
 - Know-how → CBR → Reasoning 사례기반추론
 - Language → LLM → Creation 이해/생성
- AI Assistant
 - Apple Siri
 - LLM + Custom Prompts + External Services → Automation
 - <https://openai.com/blog/introducing-gpts>
- Prepare!
 - Individual → Directive & Creative, Prompt Engineering
 - Company → 개인 암묵지 → 전사적 공유 및 재사용 가능한 형식지(사례)

Opportunities

AI Assistant (LLM)

