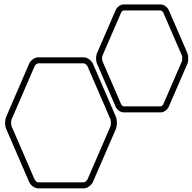
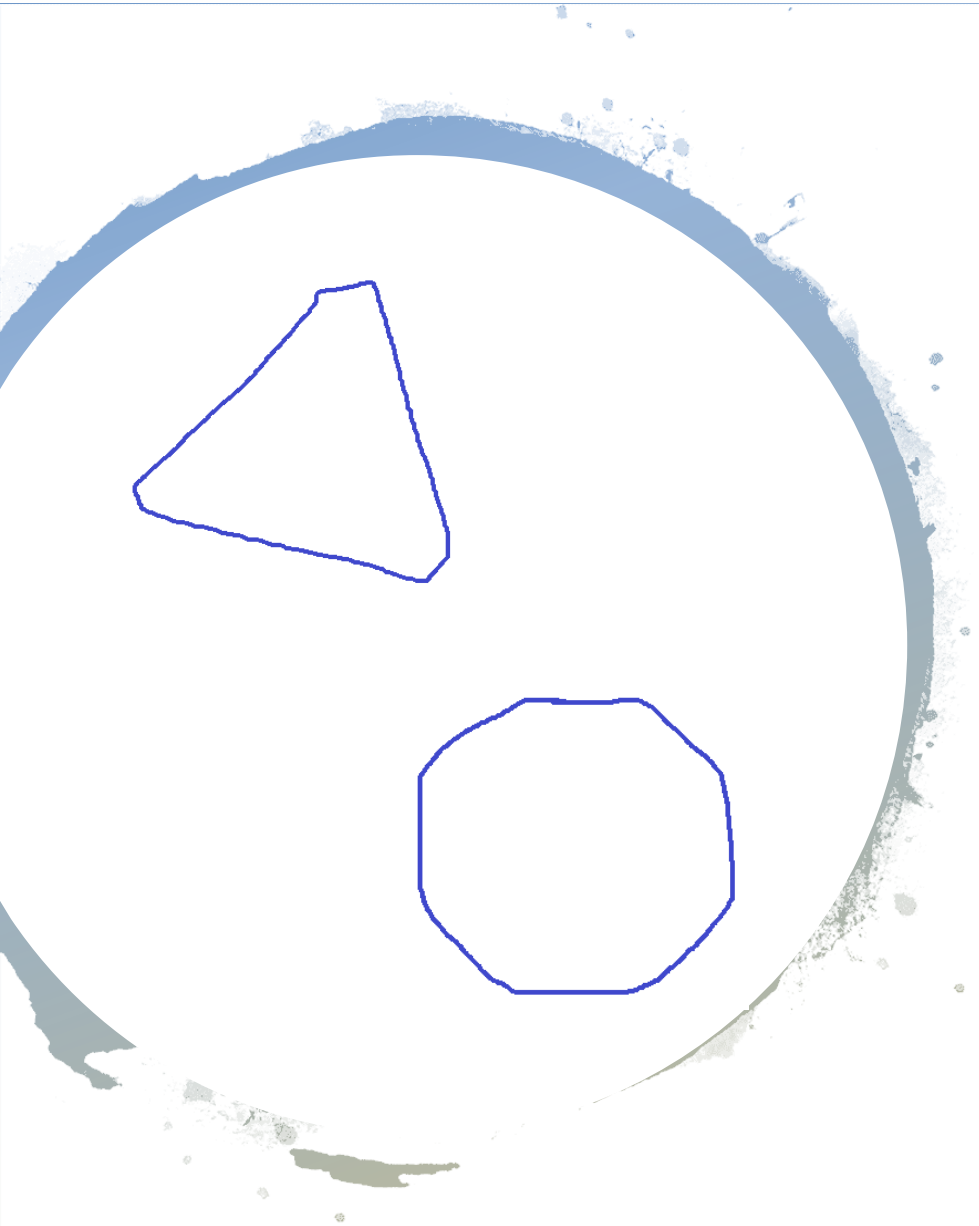


What is AI?

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

haesung kim
knowhow+
haesung.github.io



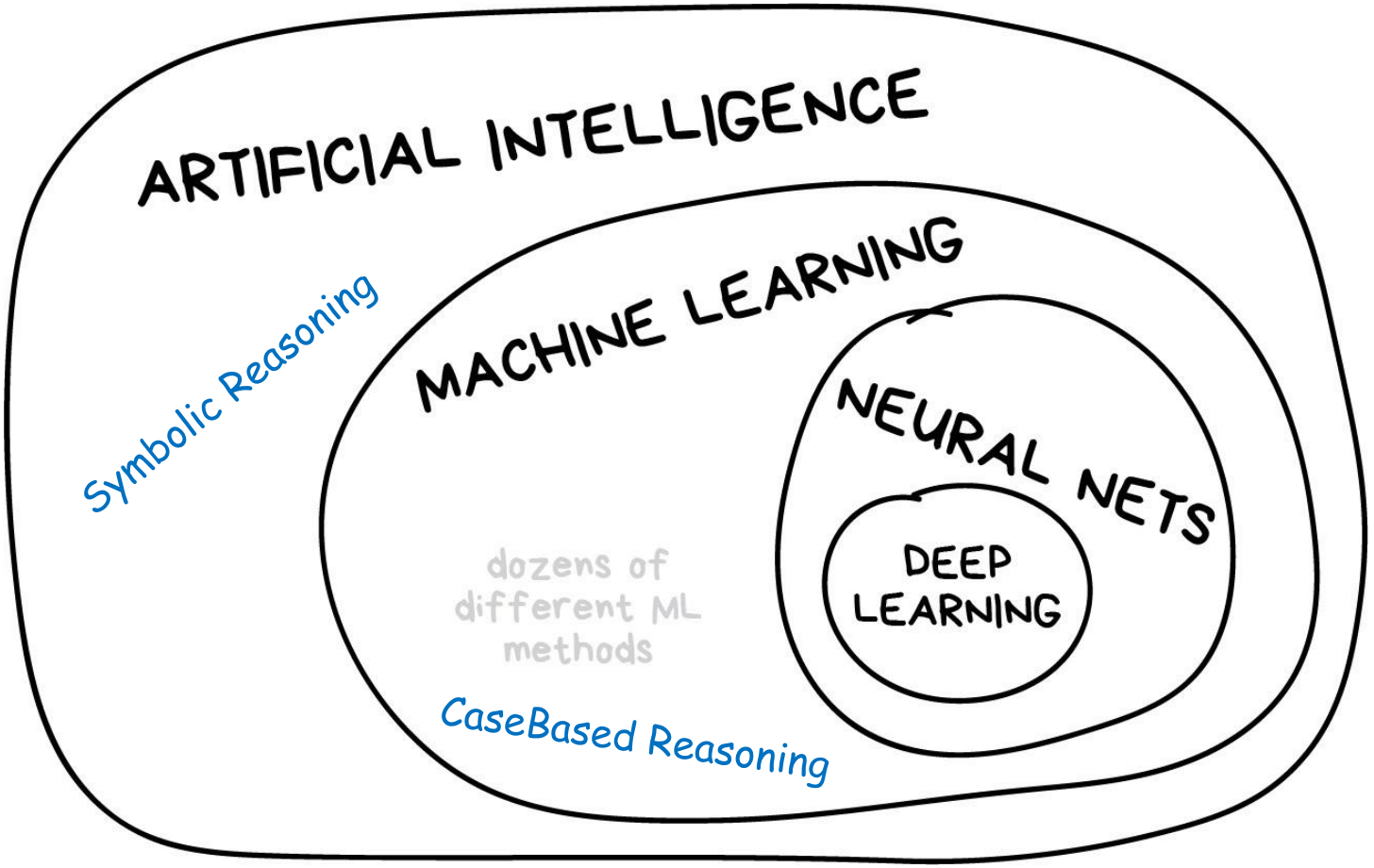
AI ?

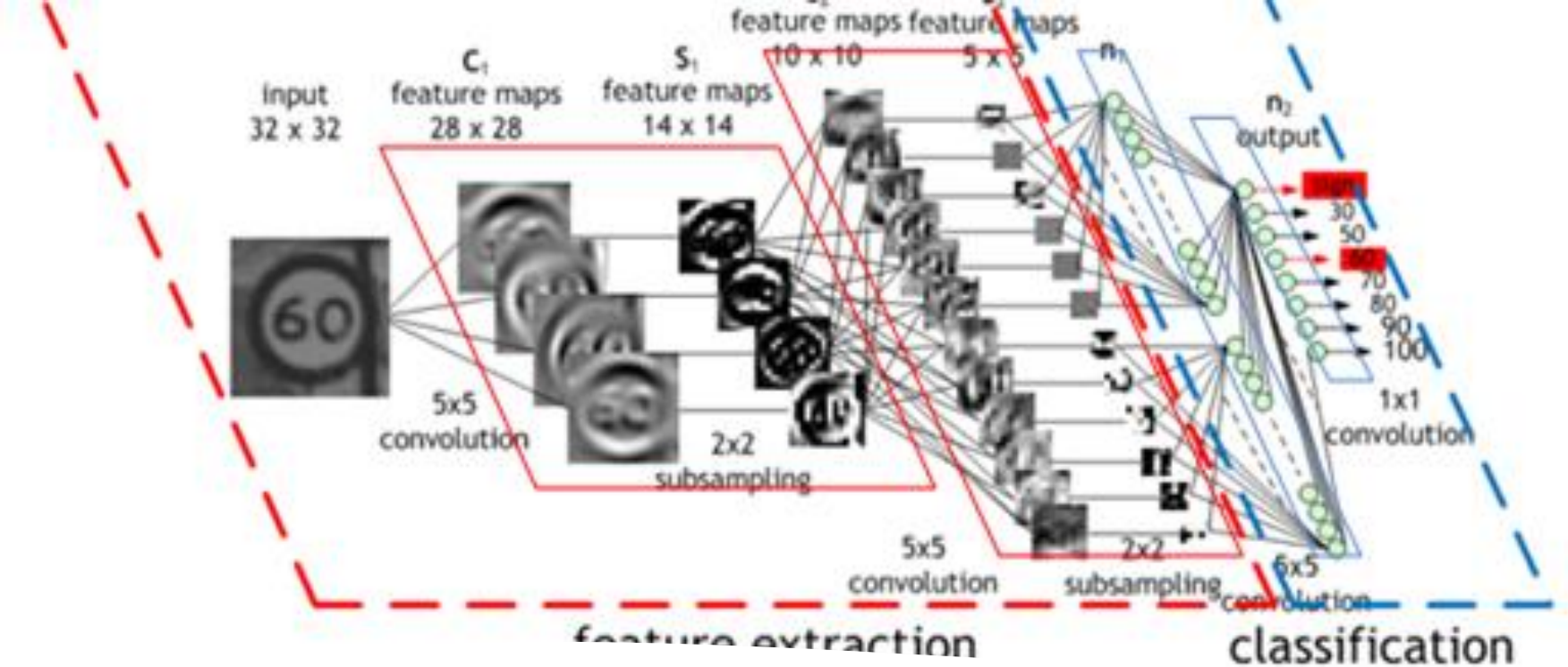
- What is Intelligent or Smart?
  - Dog or Cat
  - Marvin Minsky 1970

  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

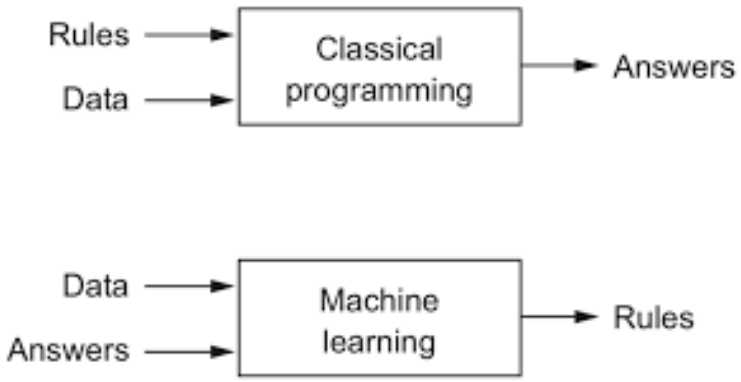
- New fancy word of Neural Net
  - Fast = cheap graphic card
  - Data = huge tagged data
  - Easy = CNN (auto feature extraction)
- Vision
  - 97% accuracy better than human expert 95%
  - http://cs231n.stanford.edu/

Machine Learning

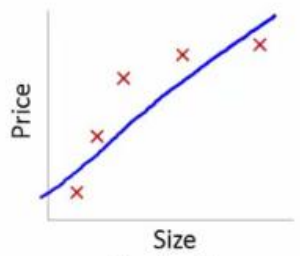
Data & Answers (Image & Tag)

Rules => Parameter / Weight Matrix

Machine Learning vs Programming

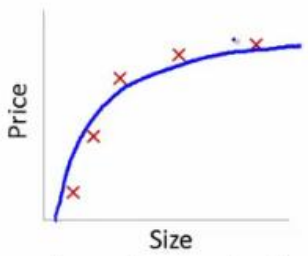


Machine Learning Core Concept



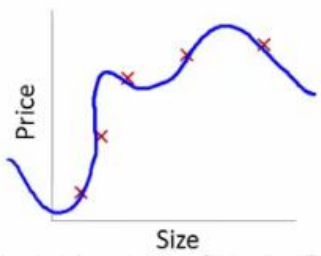
$\theta_0 + \theta_1 x$

High bias
(underfit)



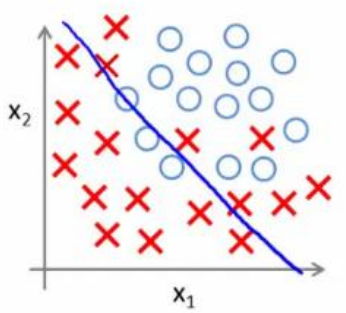
$\theta_0 + \theta_1 x + \theta_2 x^2$

"Just right"



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

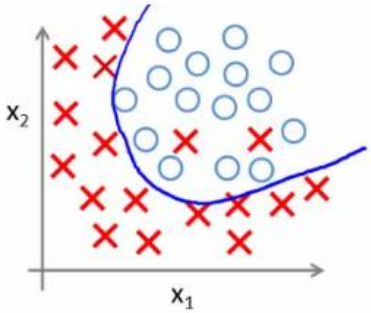
High variance
(overfit)



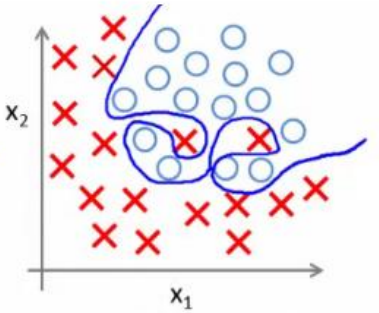
$h_\theta(x) = g(\theta_0 + \theta_1 x_1 + \theta_2 x_2)$

(g = sigmoid function)

UNDERFITTING
(high bias)



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

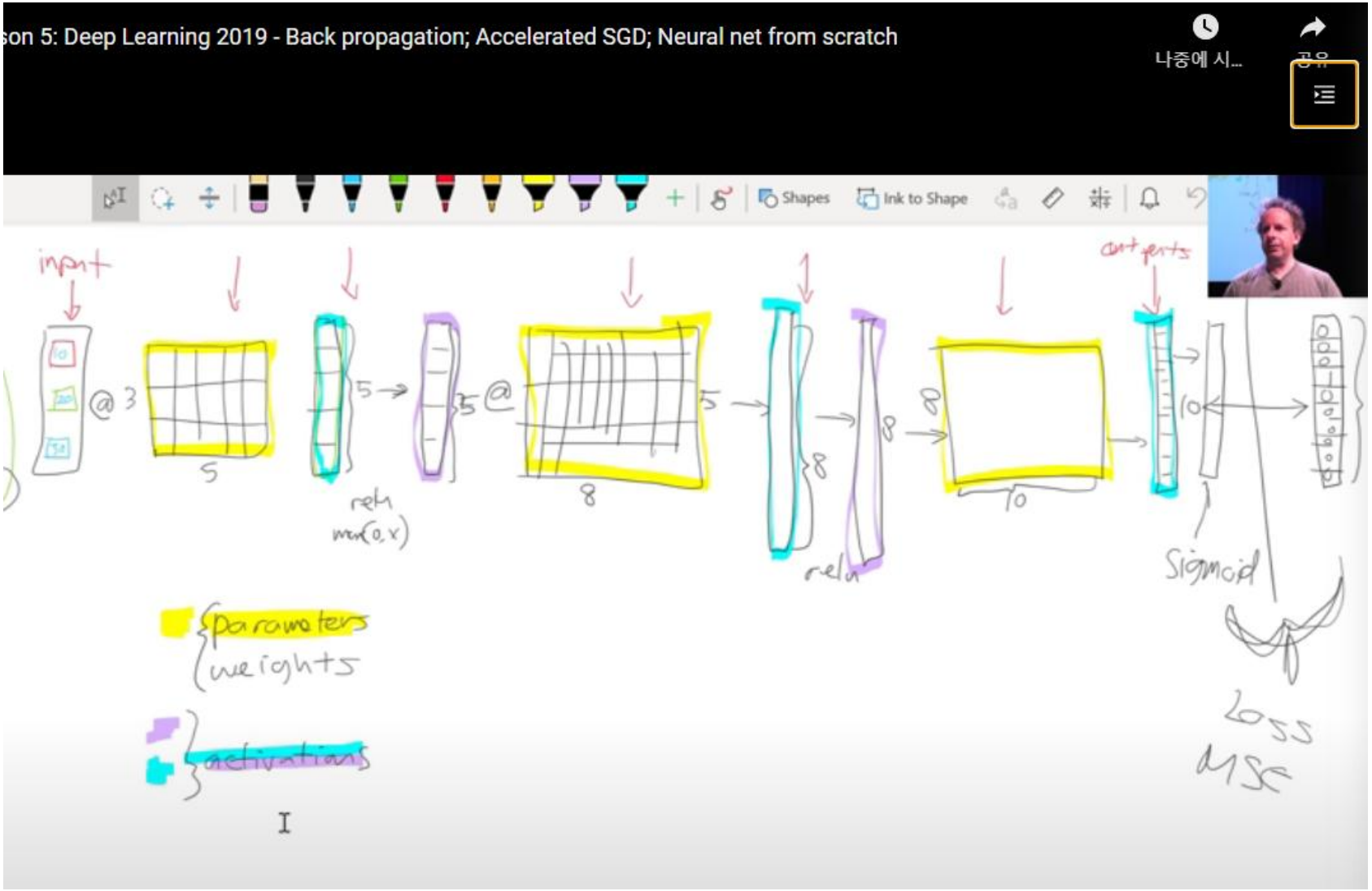


$g(\theta_0 + \theta_1 x_1 + \theta_2 x_1^2 + \theta_3 x_1^2 x_2 + \theta_4 x_1^2 x_2^2 + \theta_5 x_1^2 x_2^3 + \theta_6 x_1^3 x_2 + \ldots$

OVERFITTING
(high variance)

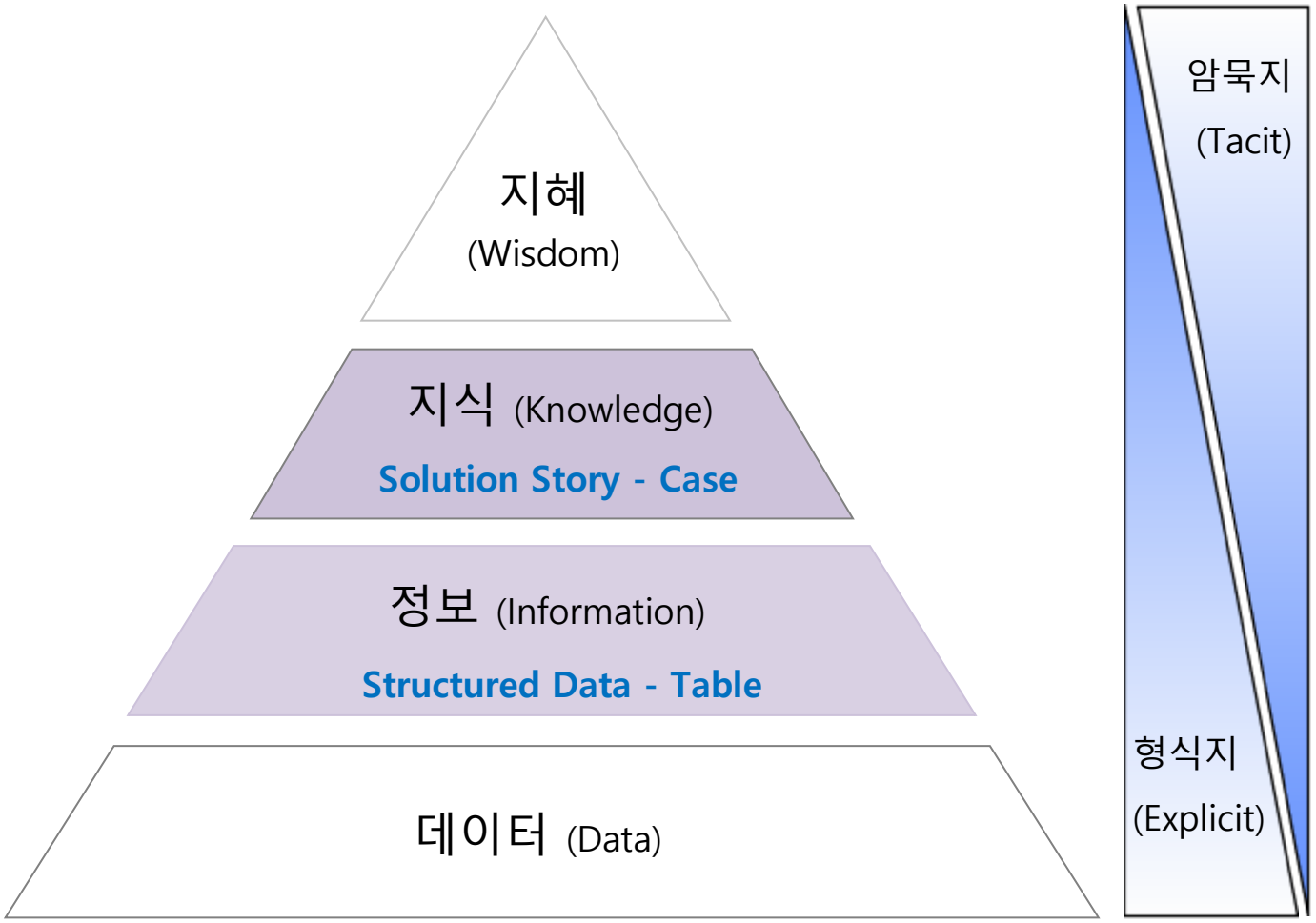
(Source: Coursera, Andrew Ng)

Deep Learning Core Concept



(Source: Fast.ai, Jeremi Howard)

Knowledge vs Data

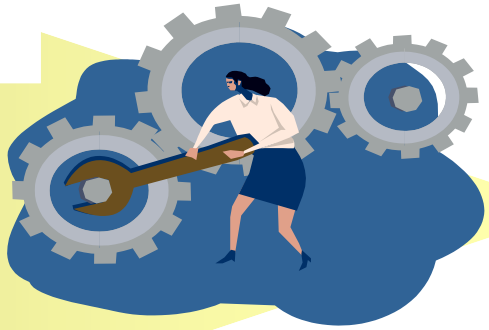


What is CBR (Case-Based Reasoning)

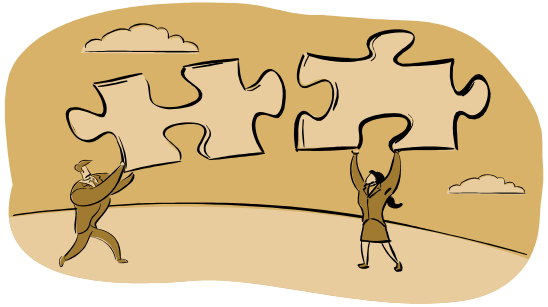
사람이 문제를 해결하기 위하여 추론하는 프로세스를 모델링 한 방법 (Bergmann)

과거의
경험과 노하우

CBR시스템에
사례로 저장



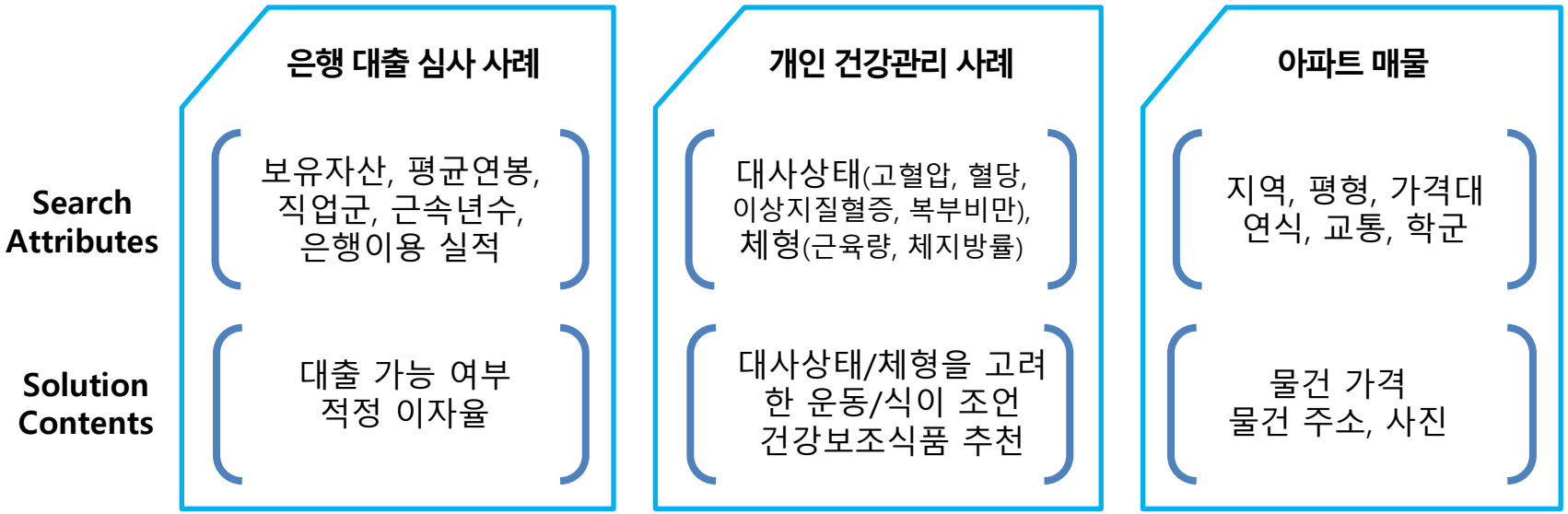
문제발생



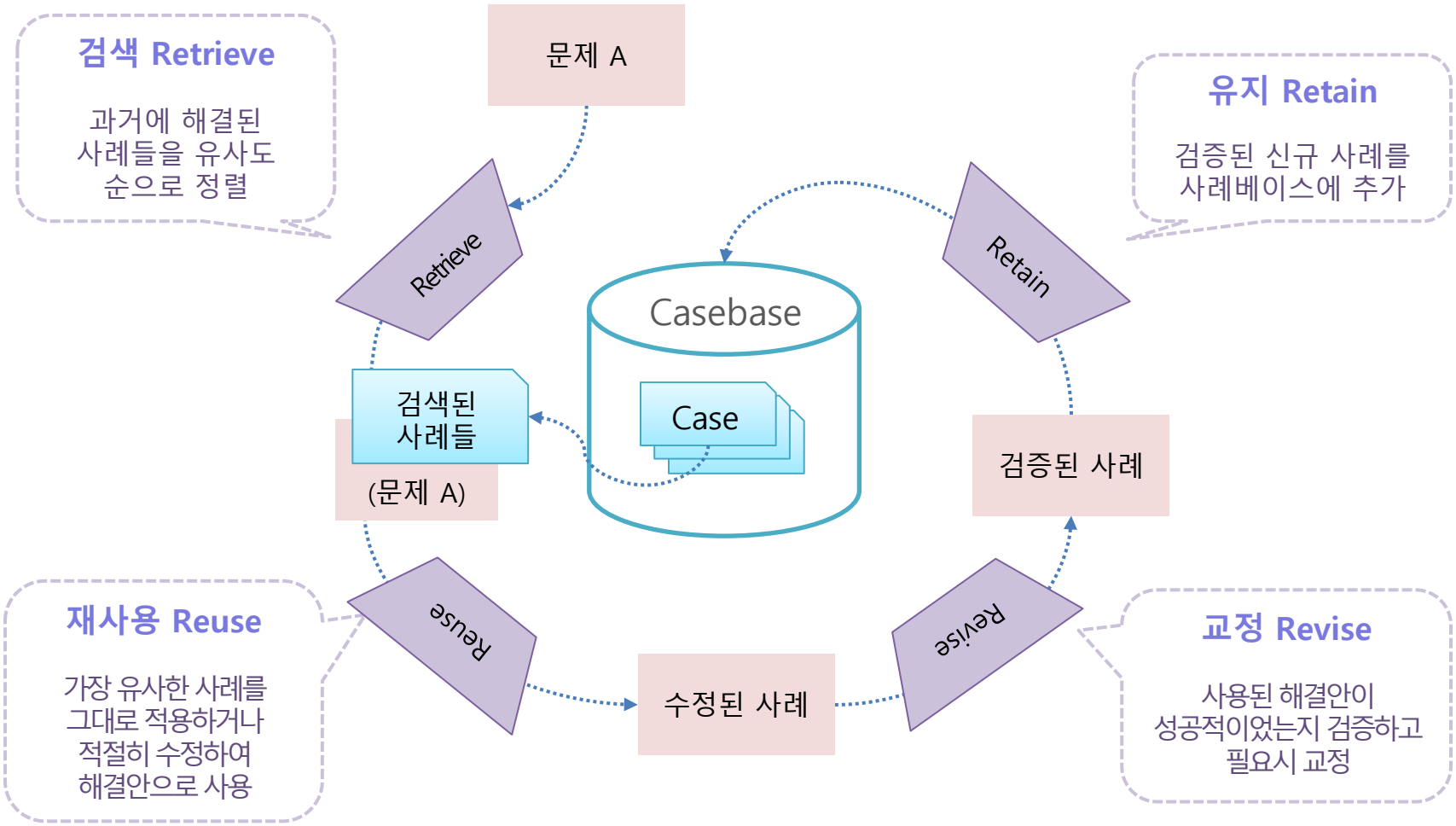
저장된 과거 사례들 중에서 유사도 검색을 통해
문제 상황과 가장 비슷한 사례(해결책) 제시

CBR Case Structure (사례구조)

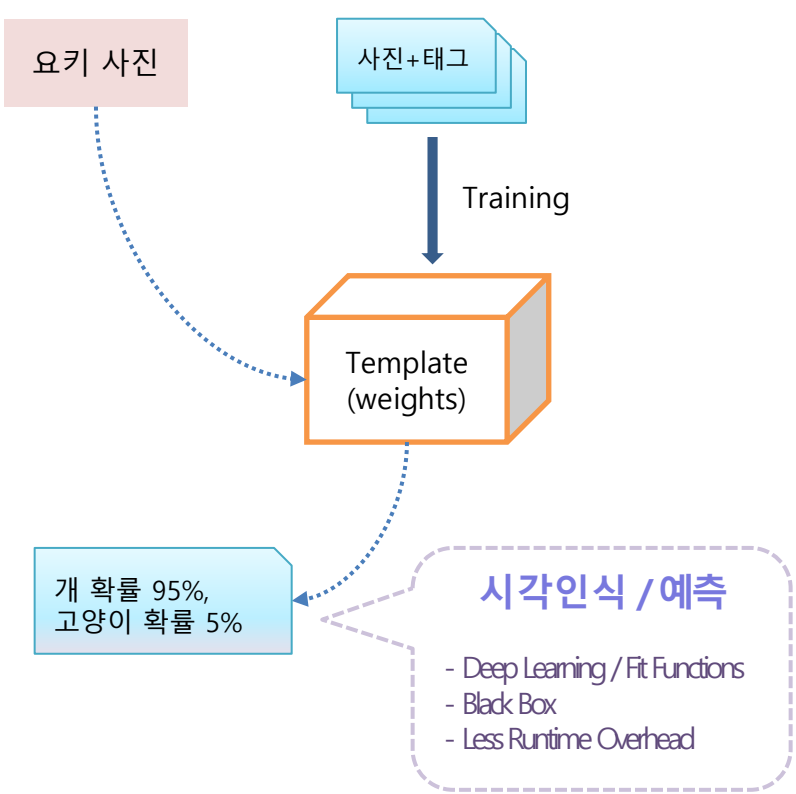
- **Case** (사례) = **Search Attributes** (검색속성) + **Solution Contents** (해결방안)
  - Search Attributes : 문제/상황을 표현하는 **Key/Value - 유사도검색**에 사용
  - Solution Contents : 실제 해결방안, 처방, 구체적 정보 등 (텍스트, 이미지, 동영상)

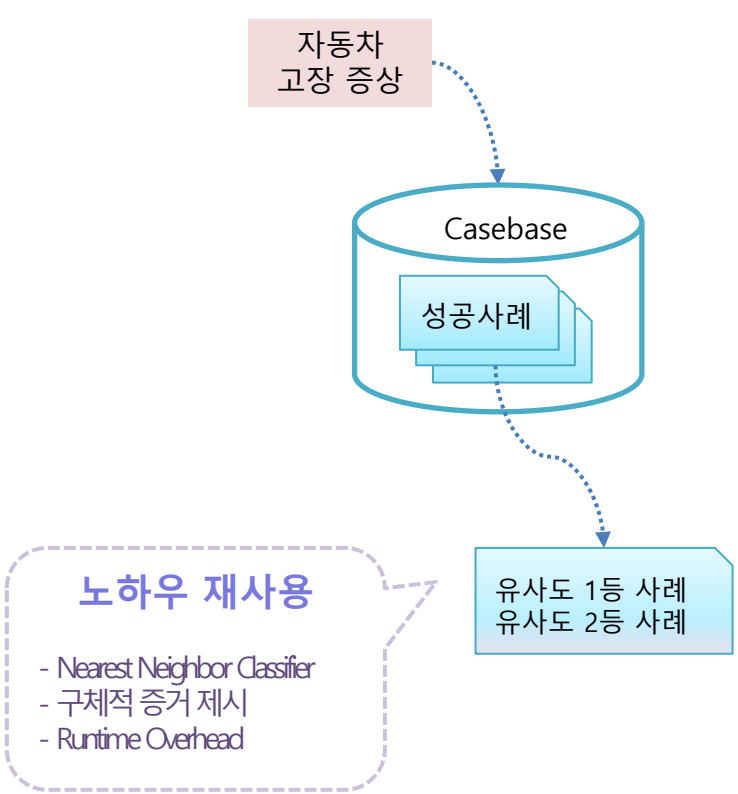


CBR 4R Process



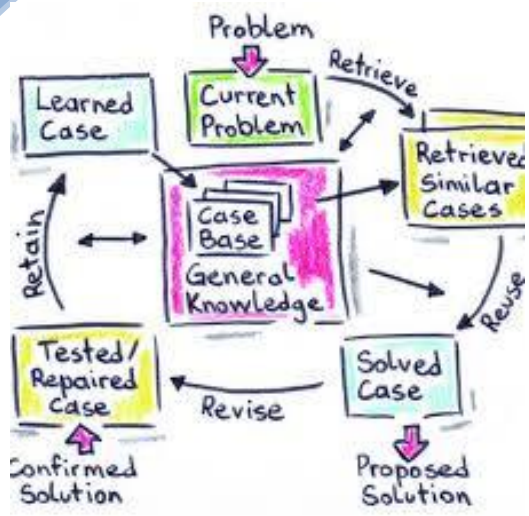
DL vs CBR

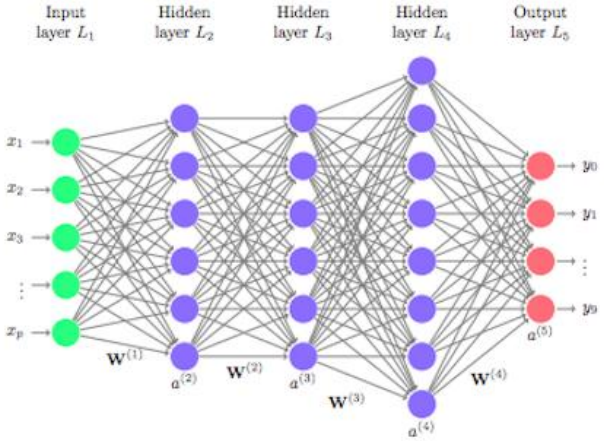

요키 사진
사진+태그
Training
Template
(weights)
개 확률 95%,
고양이 확률 5%
시각인식 / 예측
- Deep Learning / Fit Functions
- Black Box
- Less Runtime Overhead


자동차
고장 증상
Casebase
성공사례
유사도 1등 사례
유사도 2등 사례
노하우 재사용
- Nearest Neighbor Classifier
- 구체적 증거 제시
- Runtime Overhead

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