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Hands on Tips on Machine Learning App Development

AI, Machine Learning, Deep Learning

CBR (Case-Based Reasoning) is ML (Machine Learning)

Machine Learning vs Classical Programming

Machine Learning & Deep Learning Core Concepts

Why Deep Learning is Popular

Tensorflow.js – JavaScript Machine Learning Platform

Best Choice between Deep Learning, CBR, and Rules

[Quiz](#)

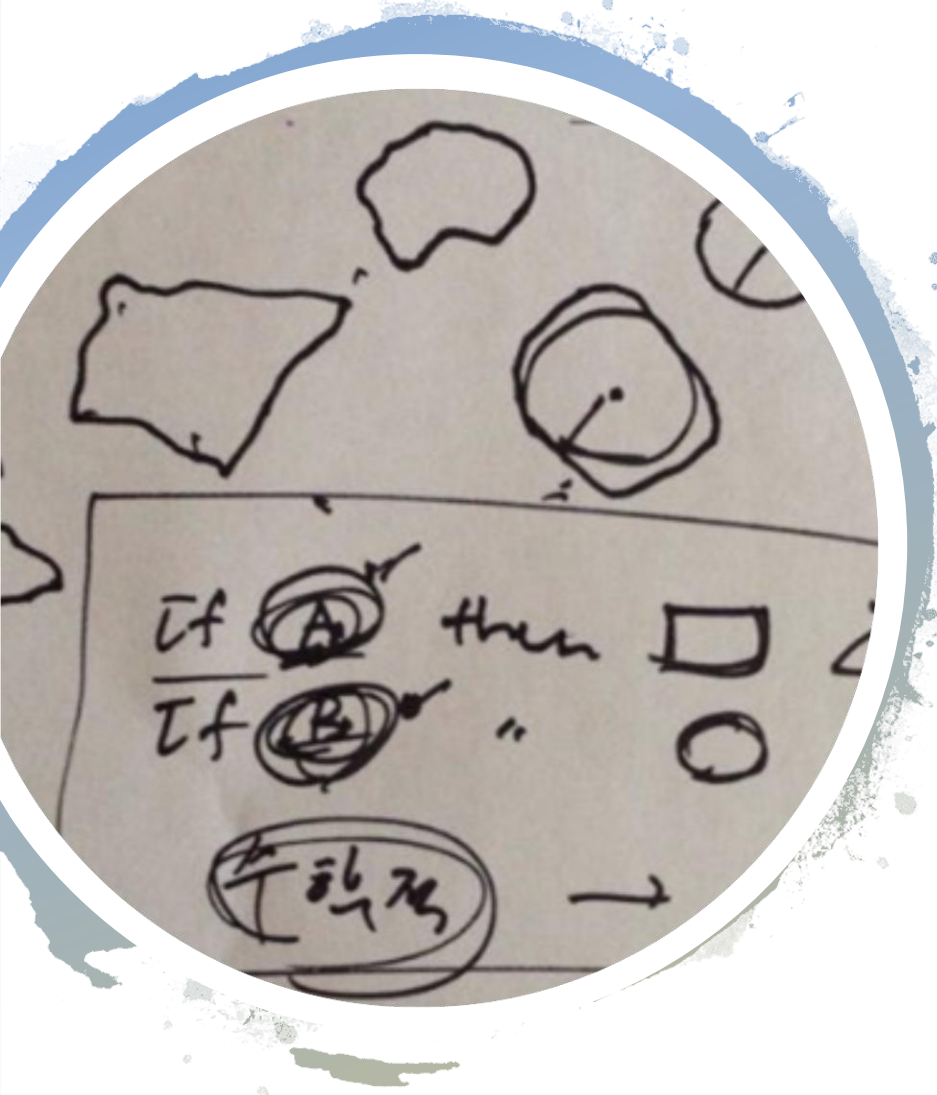
[Demo](#)

AI ?

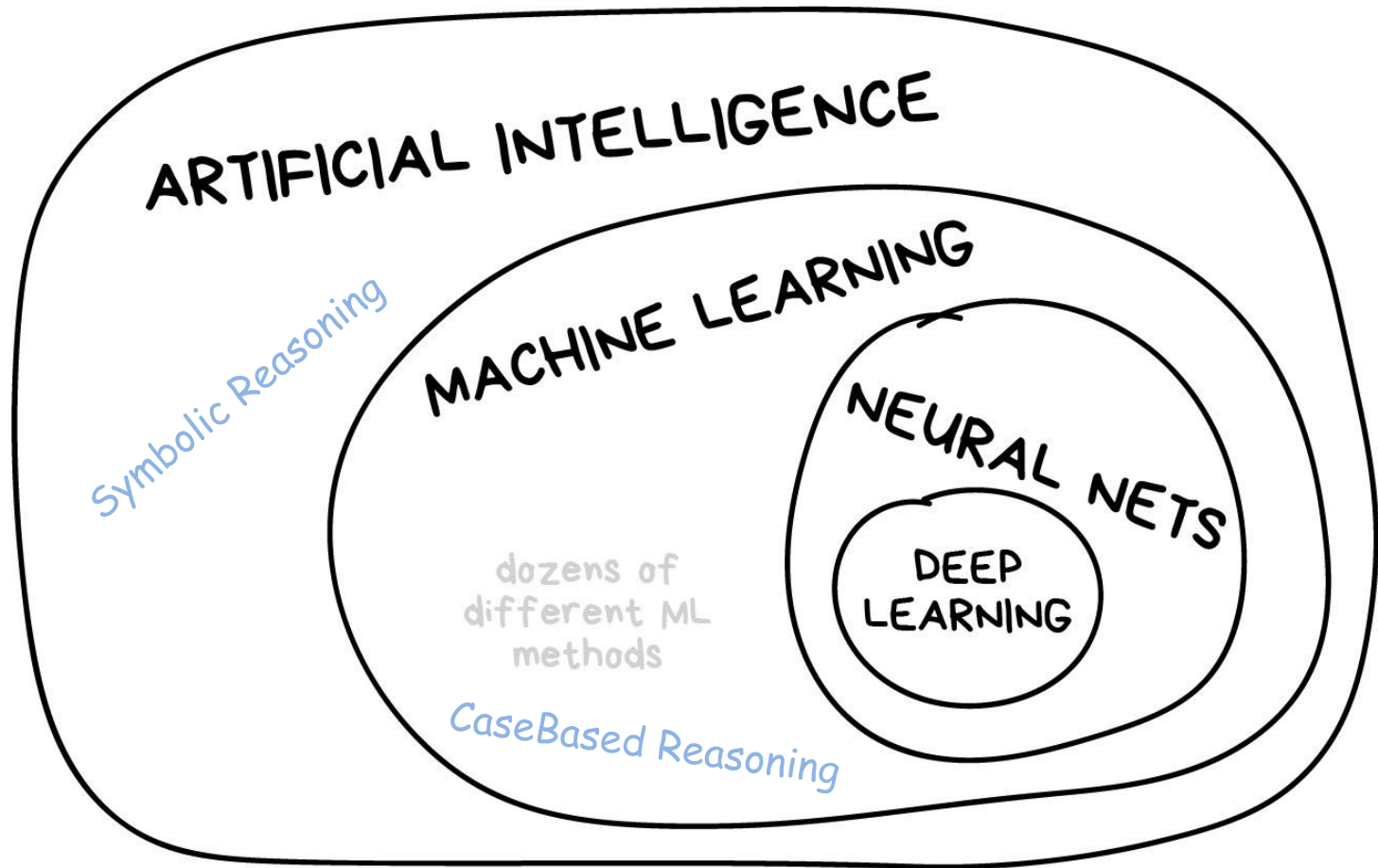
- What is Intelligent or Smart?
 - Classify, Discern, Discriminate
 - Dog or Cat
 - Circle, Triangle, Rectangle

NOT EASY !

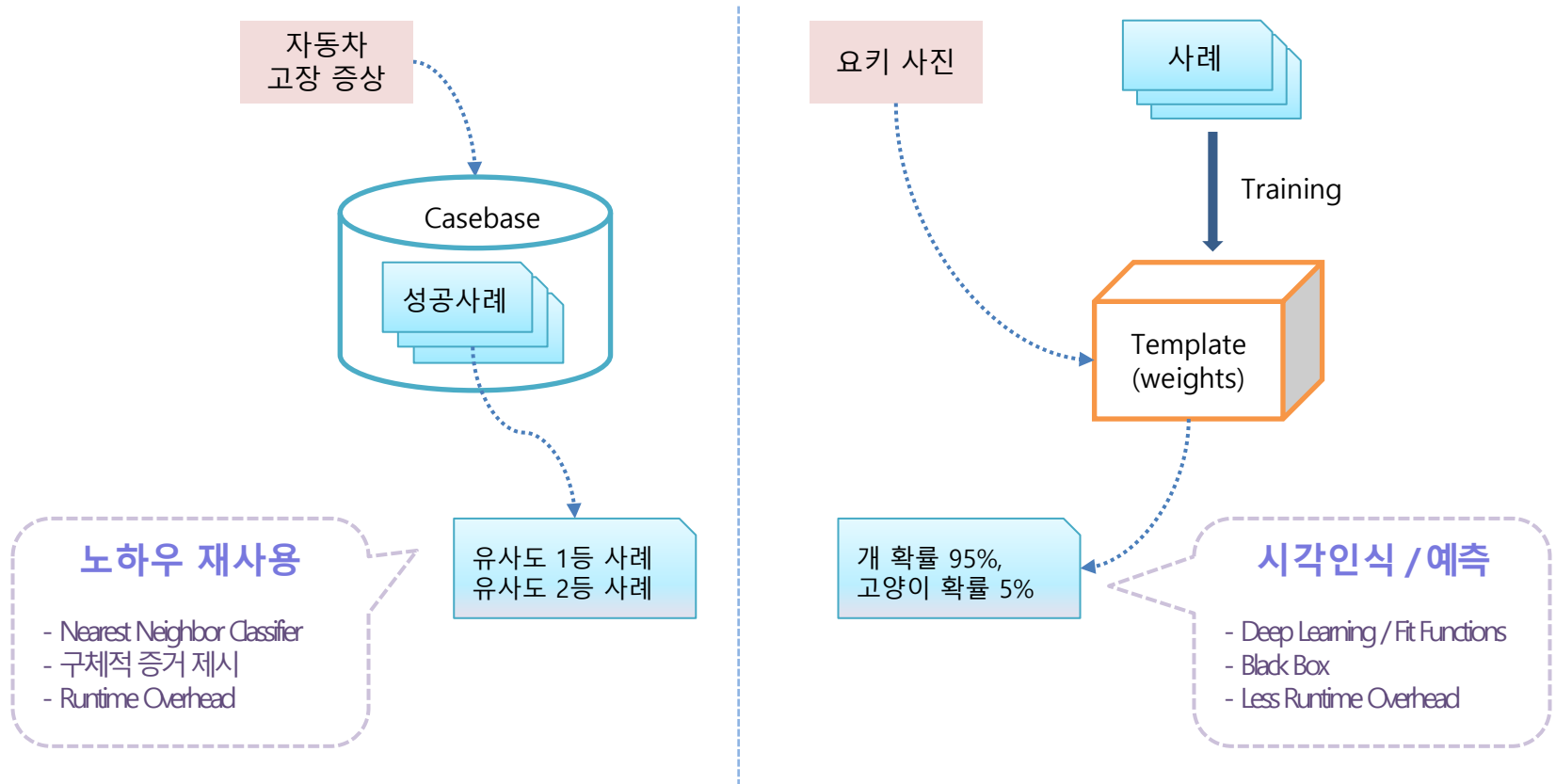
- Learn – Get Smarter
- What is Artificial?



AI, ML, DL



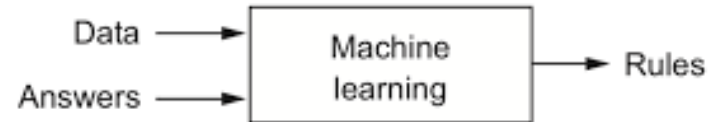
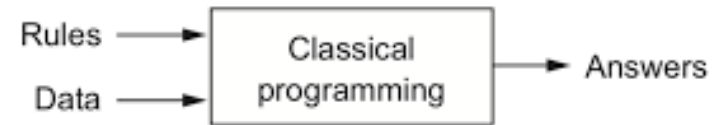
CBR (Case-Based Reasoning) is ML



Machine Learning

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

Machine Learning VS Classical Programming

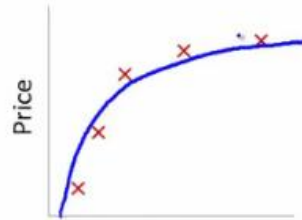


Machine Learning Core Concept



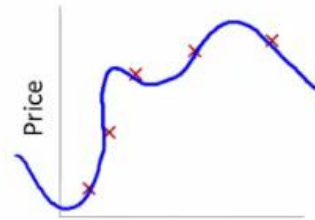
$$\theta_0 + \theta_1 x$$

High bias
(underfit)



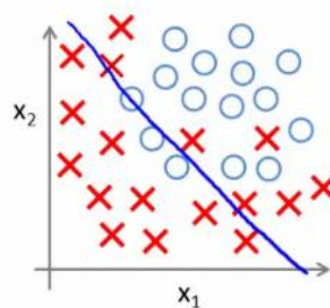
$$\theta_0 + \theta_1 x + \theta_2 x^2$$

"Just right"



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

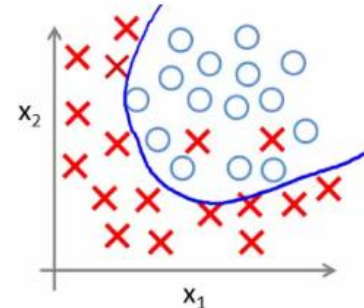
High variance
(overfit)



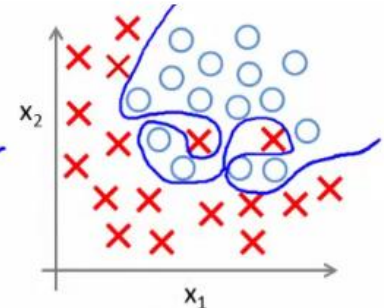
$$h_{\theta}(x) = g(\theta_0 + \theta_1 x_1 + \theta_2 x_2)$$

(g = sigmoid function)

UNDERFITTING
(high bias)



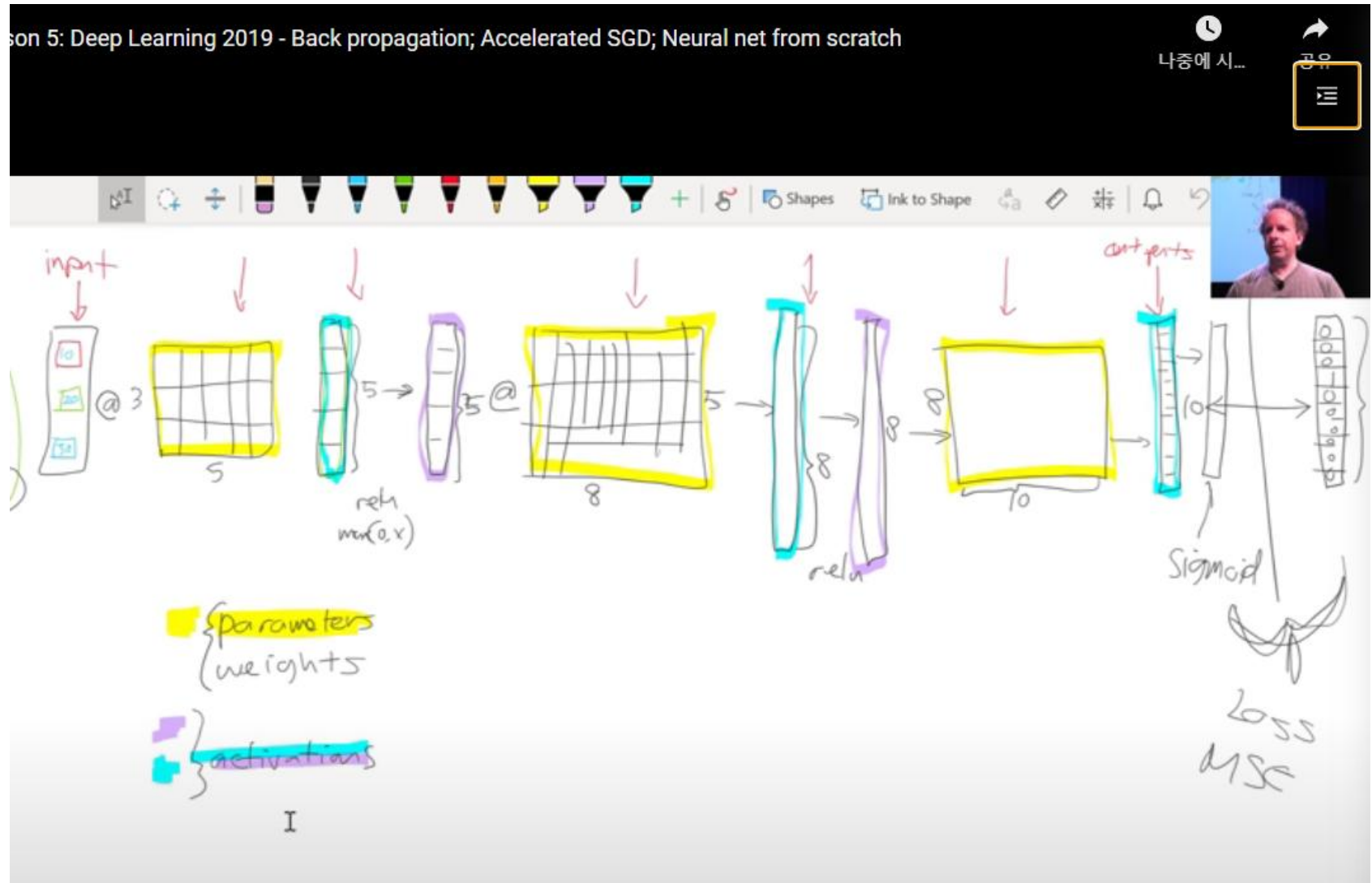
$$g(\theta_0 + \theta_1 x_1 + \theta_2 x_2 + \theta_3 x_1^2 + \theta_4 x_2^2 + \theta_5 x_1 x_2)$$

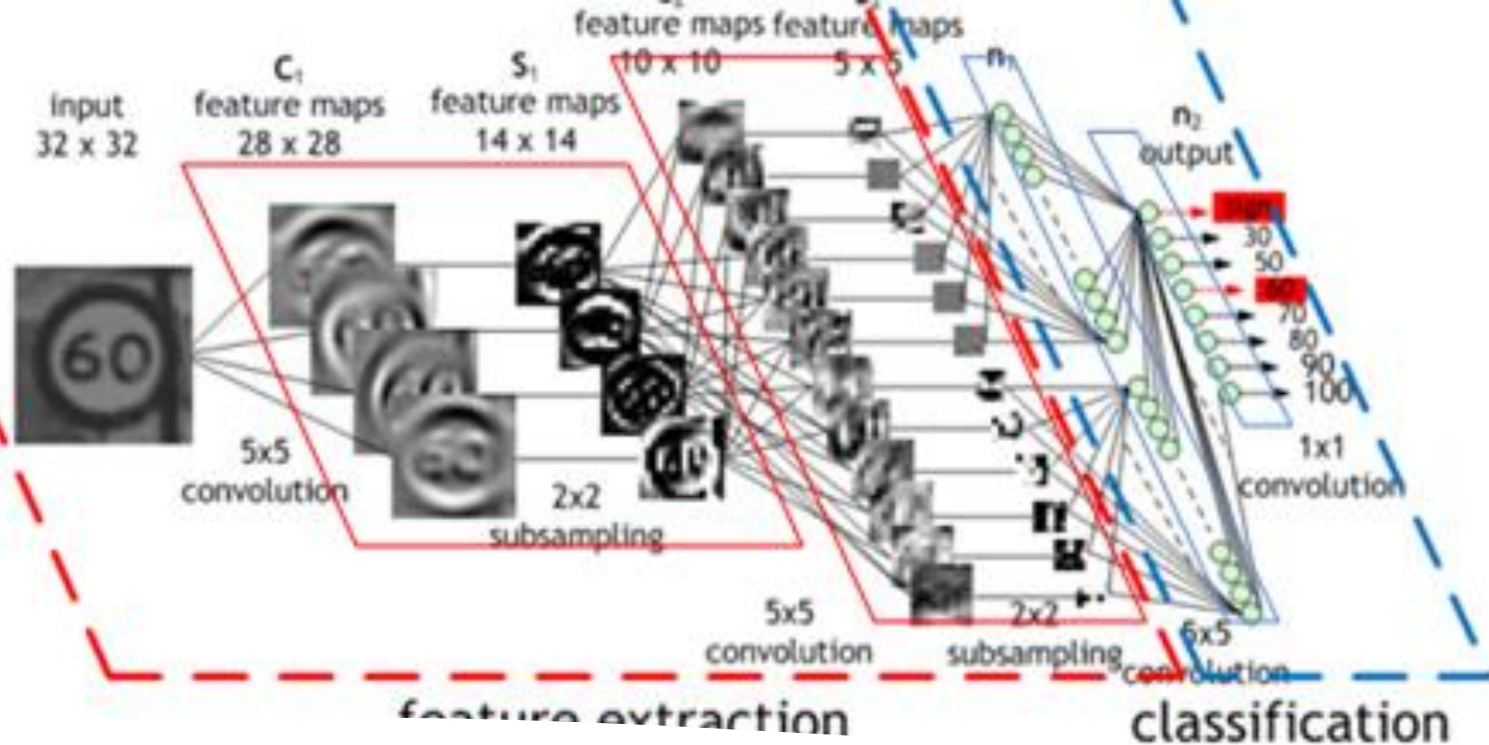


$$g(\theta_0 + \theta_1 x_1 + \theta_2 x_1^2 + \theta_3 x_1^2 x_2 + \theta_4 x_1^2 x_2^2 + \theta_5 x_1^2 x_2^3 + \theta_6 x_1^3 x_2 + \dots)$$

OVERFITTING
(high variance)

Deep Learning Core Concept





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/>

Tensorflow.js – JavaScript Machine Learning Platform

- Why Tensorflow.js
 - ✓ Easy – chromium browser debugger
 - ✓ Fast - webGL, wasm backend
 - ✓ Secure – embedded model in app
- JavaScript
 - ✓ Full stack developer language (web, server, ai)
 - ✓ Simple, functional, modular
 - ✓ The good parts - Douglas Crockford
- Best courses
 - ✓ Andrew Ng, <https://www.coursera.org/learn/machine-learning>
 - ✓ Jeremi Howard, <https://course.fast.ai/>
 - ✓ Stanford CNN Course, <http://cs231n.stanford.edu/>

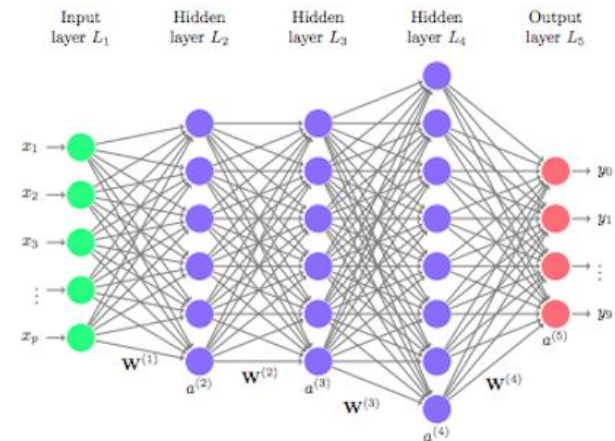
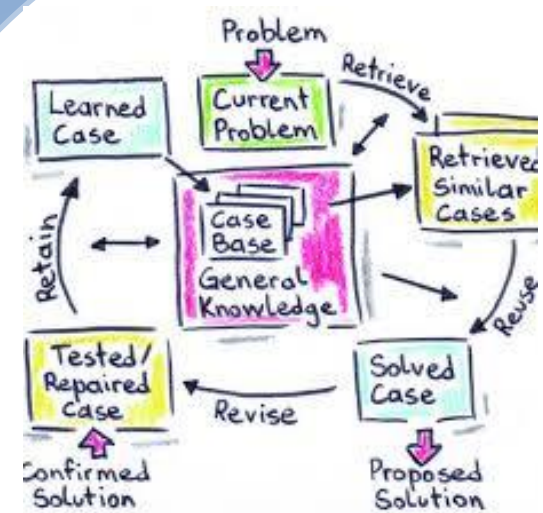
DL or CBR or Rules?

if *Expert & Know-How* available

if *Simple & Stable & Exact match*
Classical Coding (Rules)

else *Diverse & Changing & Similar match*
CBR

else
Deep Learning



Quiz

1. Personalized Vitamin Recommendation
2. Amazon Recommendation
3. My Apartment Finder
4. Health Improvement Prediction
5. Cancer Detection & Treatment
6. Metabolic Syndrome Detection

