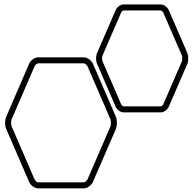
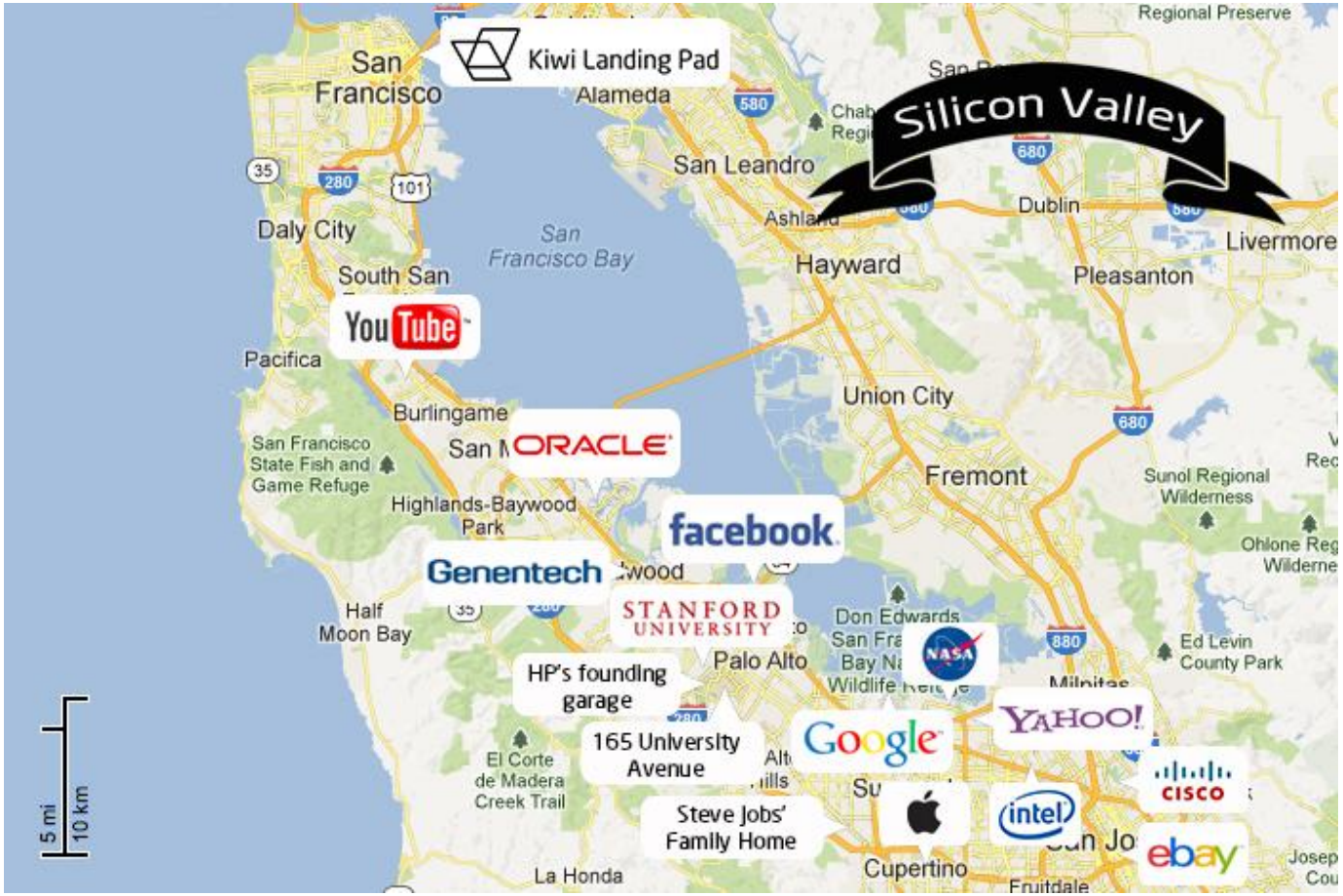


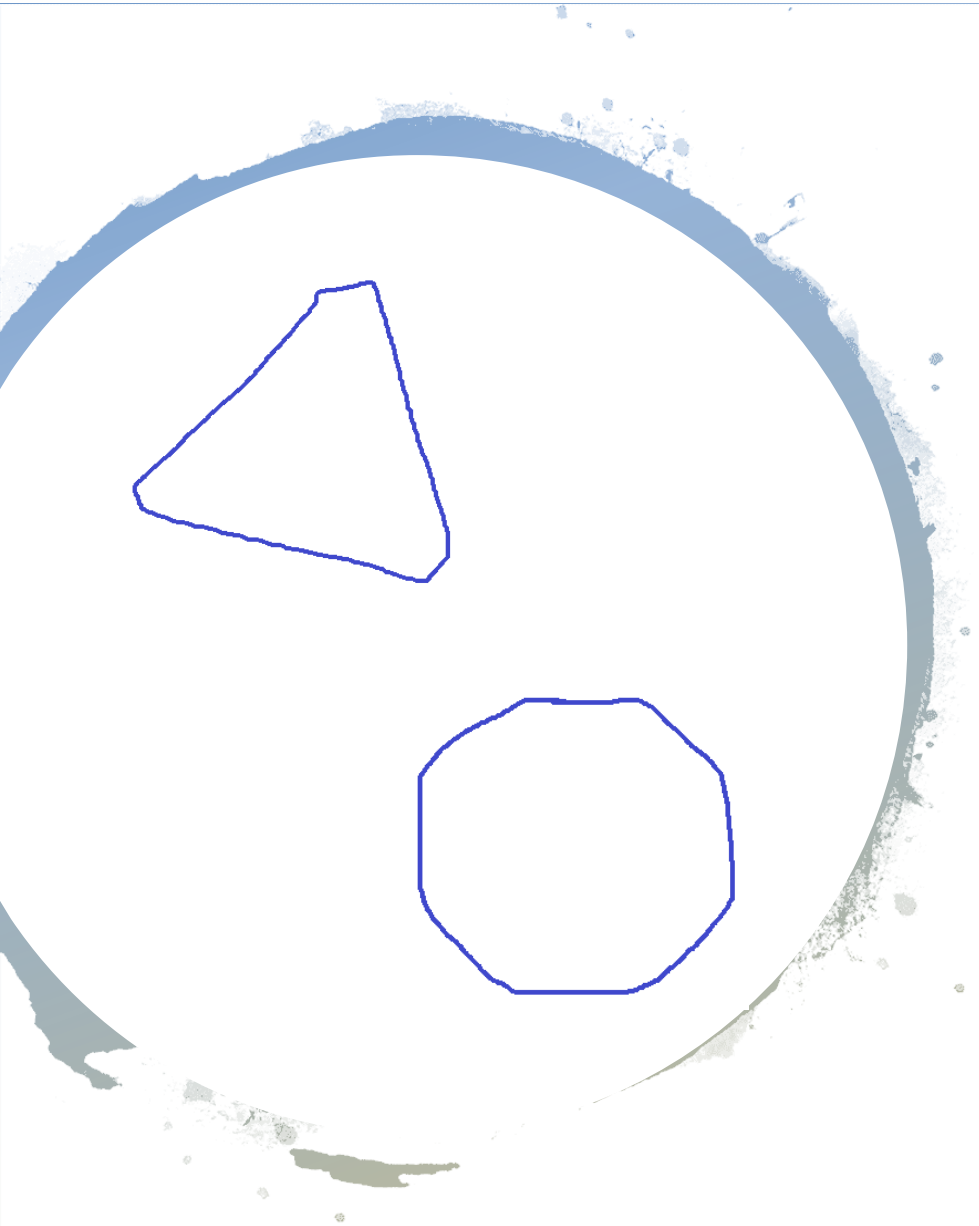
haesung kim
ai architect @nexton
haesung.github.io

Machine Learning Hands on Tips

AI, Machine Learning (ML), Deep Learning (DL)
Case-Based Reasoning (CBR)
Machine Learning vs Programming
Machine Learning, Deep Learning Core Concepts
Why Deep Learning is Popular
Tensorflow.js – JavaScript Deep Learning Platform
Deep Learning or CBR or Rules

Why Bay Area


Kiwi Landing Pad
Silicon Valley
San Francisco
Alameda
San Leandro
Daly City
San Francisco Bay
South San
Hayward
Pleasanton
Dublin
Livermore
Regional Preserve
YouTube
Pacifica
Burlingame
Union City
ORACLE
San Francisco State Fish and Game Refuge
Highlands-Baywood Park
Fremont
Sunol Regional Wilderness
facebook
Genentech
STANFORD UNIVERSITY
Half Moon Bay
Palo Alto
Don Edwards San Francisco Bay National Wildlife Refuge
Ed Levin County Park
HP's founding garage
YAHOO!
Google
165 University Avenue
El Corte de Madera Creek Trail
cisco
Steve Jobs' Family Home
intel
ebay
Cupertino
La Honda
5 mi
10 km



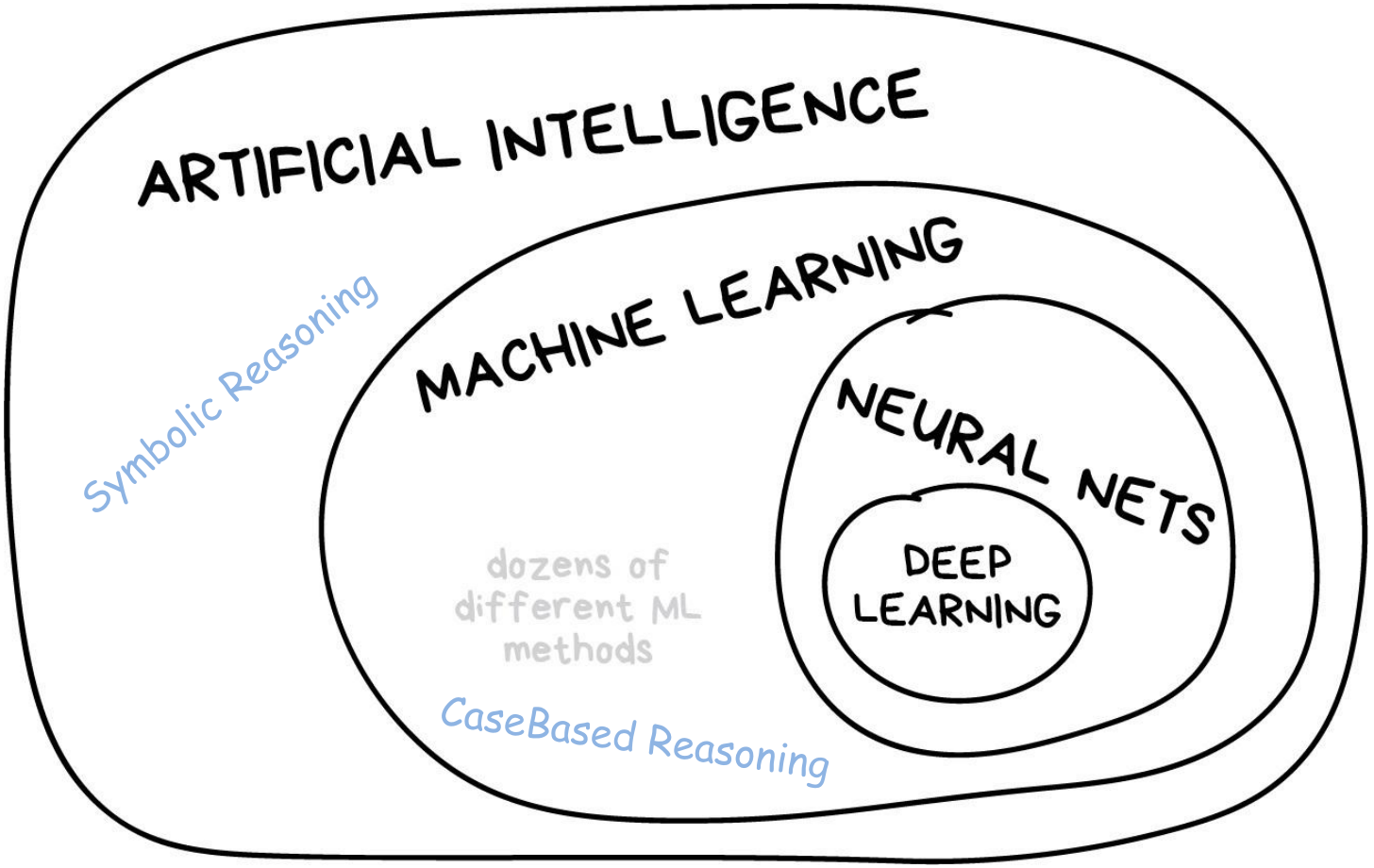
AI ?

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

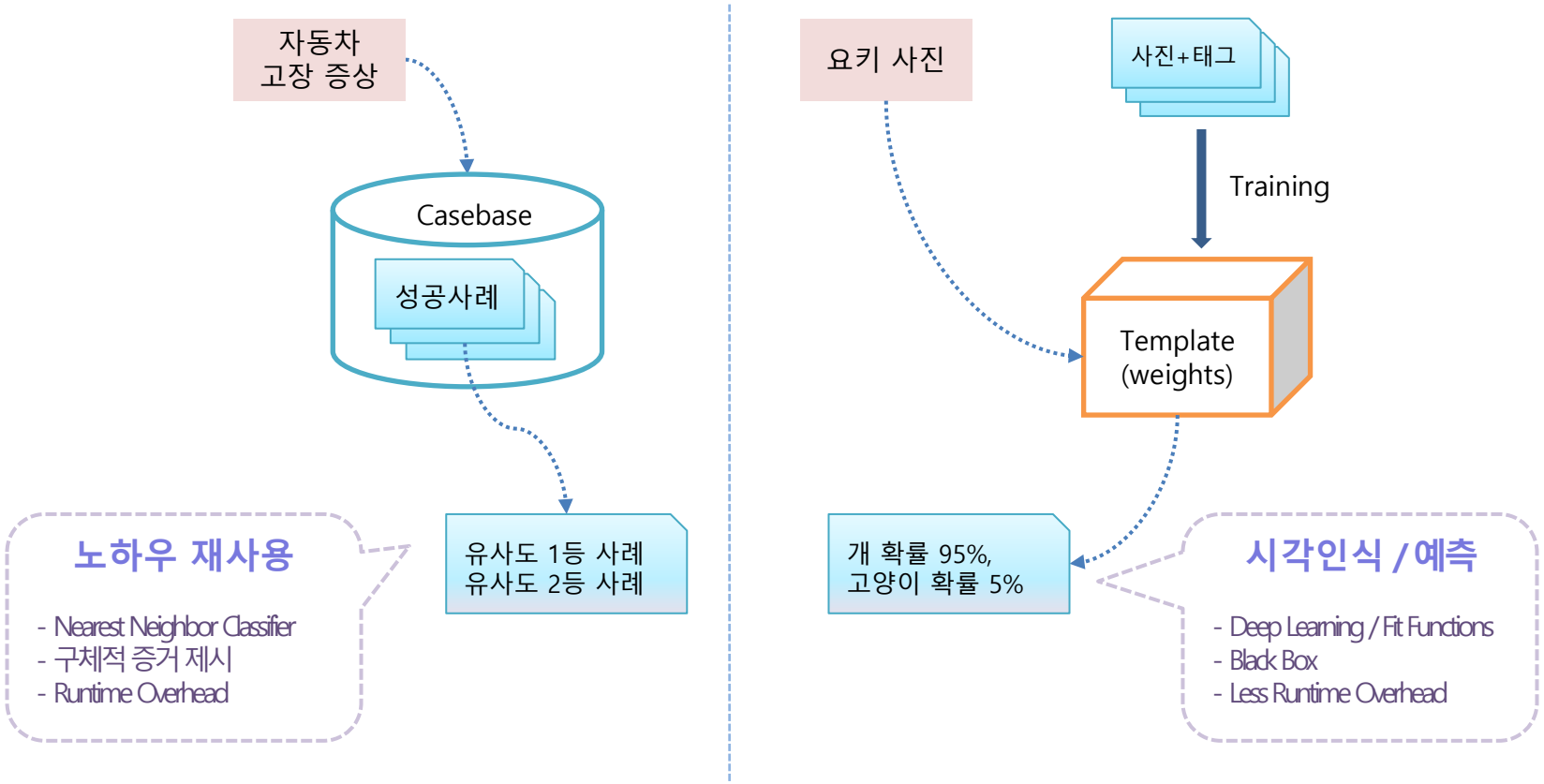
  NOT EASY !

  - Classify, Discern, Discriminate
  - Get Smarter - Learn from Data
- What is Artificial?
  - Program has intelligence

AI, ML, DL


ARTIFICIAL INTELLIGENCE
Symbolic Reasoning
MACHINE LEARNING
dozens of different ML methods
CaseBased Reasoning
NEURAL NETS
DEEP LEARNING

CBR (Case-Based Reasoning)

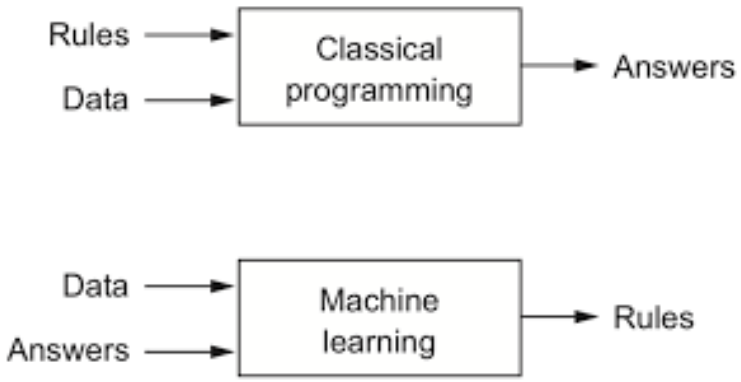


Machine Learning

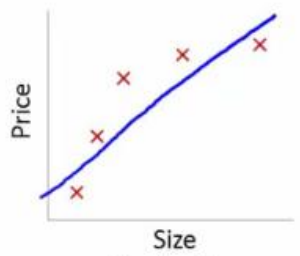
Data & Answers (Image & Tag)

Rules => Parameter / Weight Matrix

Machine Learning vs Programming

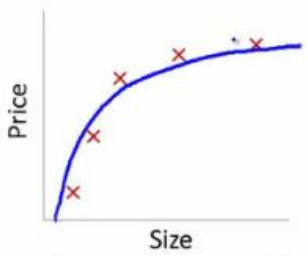


Machine Learning Core Concept



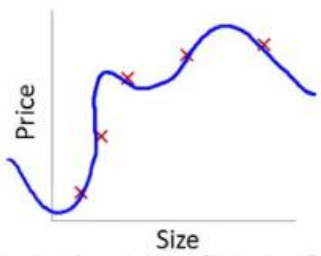
$\theta_0 + \theta_1 x$

High bias
(underfit)



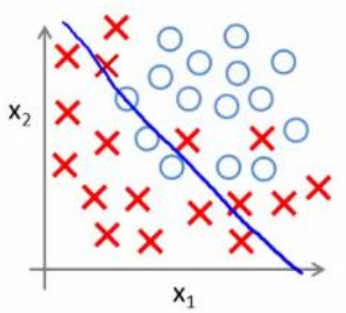
$\theta_0 + \theta_1 x + \theta_2 x^2$

"Just right"



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

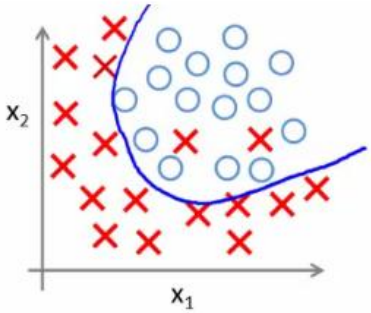
High variance
(overfit)



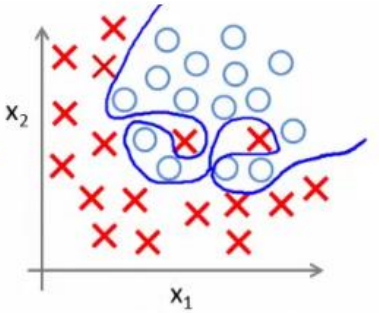
$h_\theta(x) = g(\theta_0 + \theta_1 x_1 + \theta_2 x_2)$

(g = sigmoid function)

UNDERFITTING
(high bias)



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

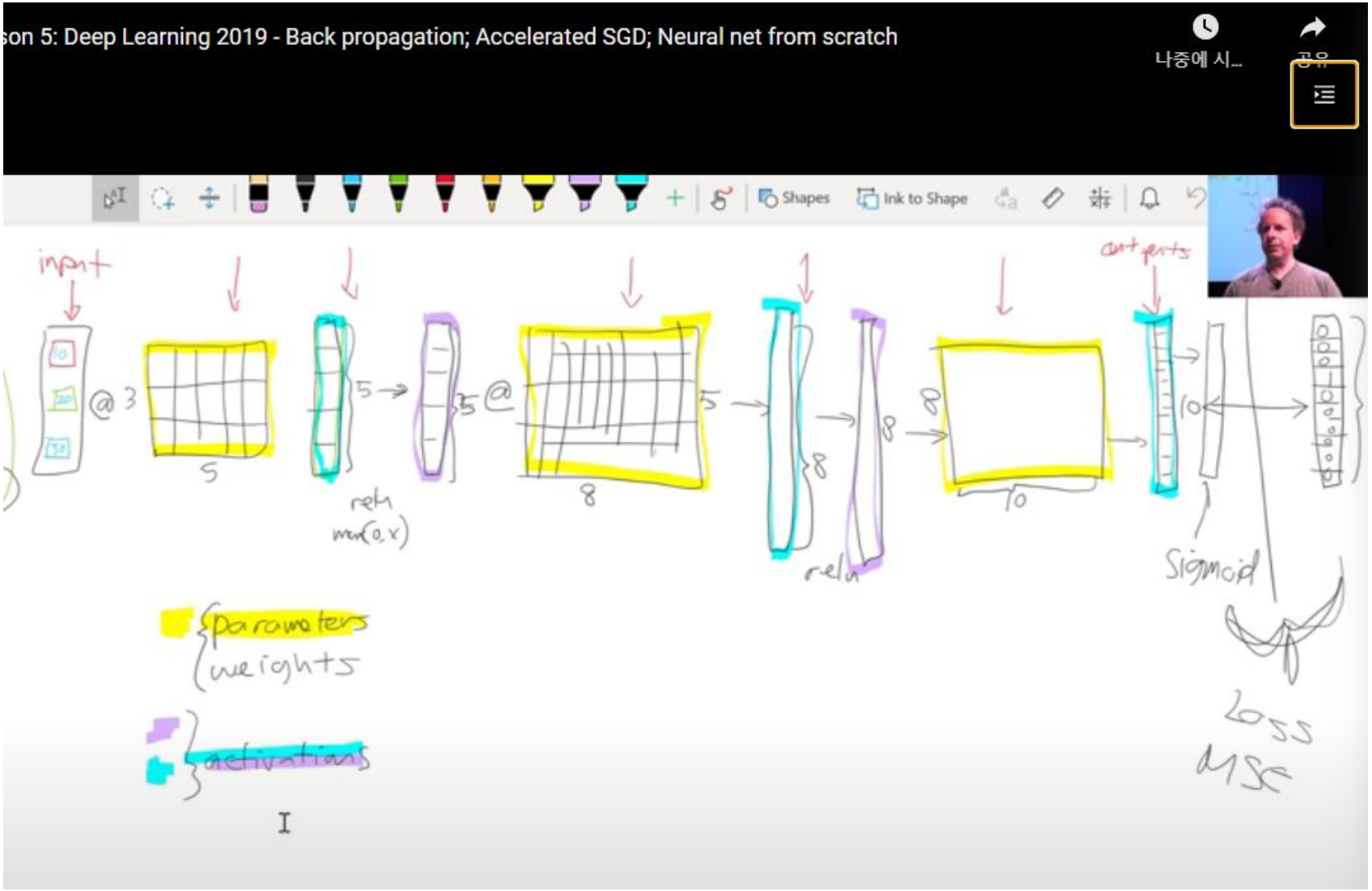


$g(\theta_0 + \theta_1 x_1 + \theta_2 x_1^2 + \theta_3 x_1^2 x_2 + \theta_4 x_1^2 x_2^2 + \theta_5 x_1^2 x_2^3 + \theta_6 x_1^3 x_2 + \ldots$

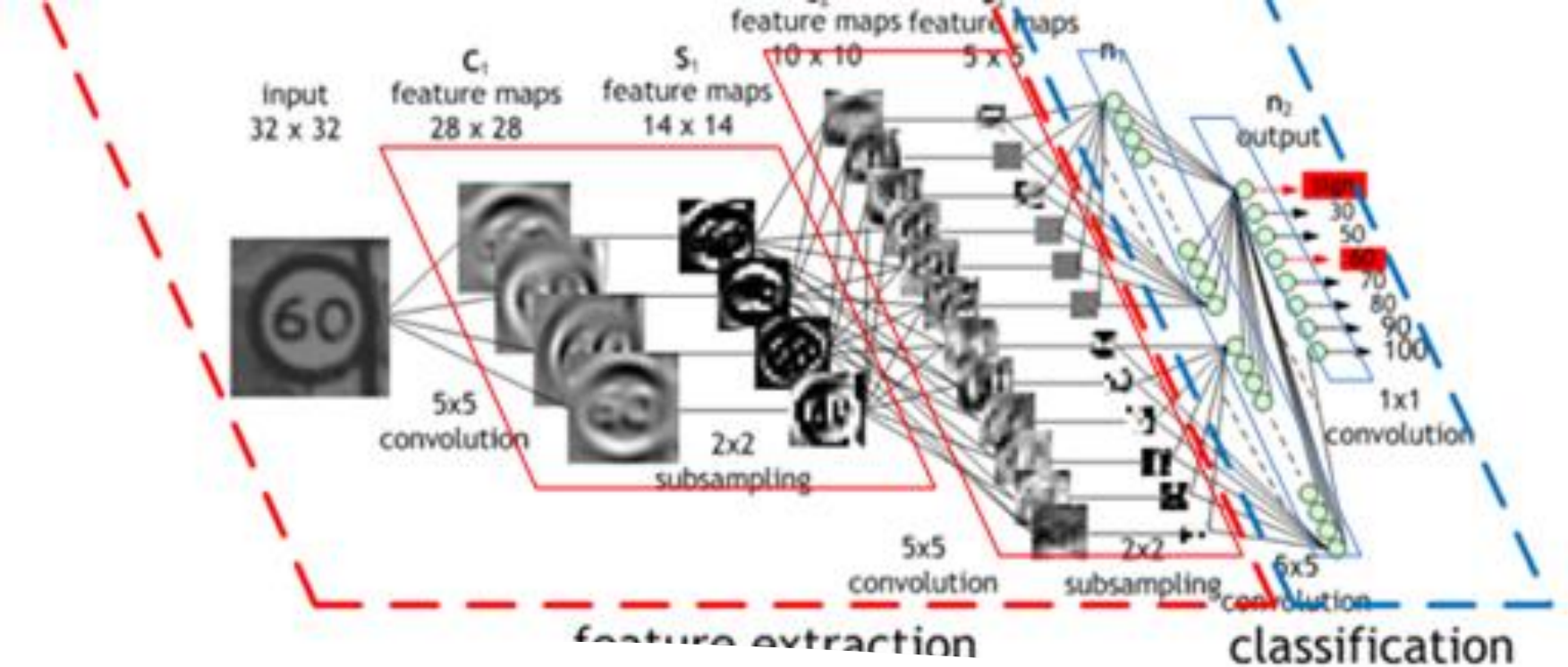
OVERFITTING
(high variance)

(Source: Coursera, Andrew Ng)

Deep Learning Core Concept



(Source: Fast.ai, Jeremi Howard)



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 Deep 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

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