

성균관대학교

*S I O R*

로봇학회

2022년 04월 21일

**AI**

n 주 차

# 목차

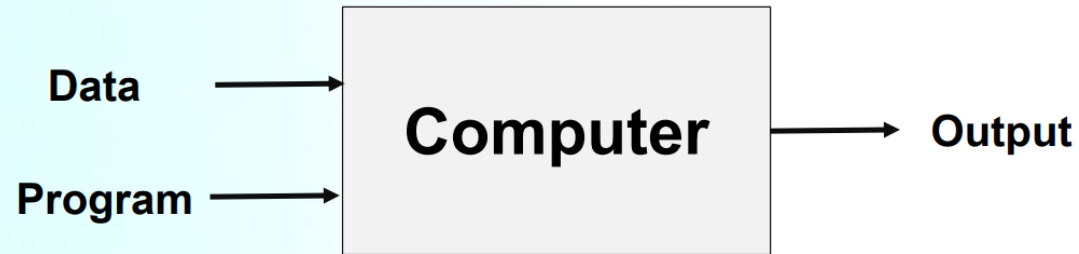
- Machine Learning
- Linear Regression
- Cost Minimization
- Multivariable ~
- Discussion
- Result

# Machine Learning

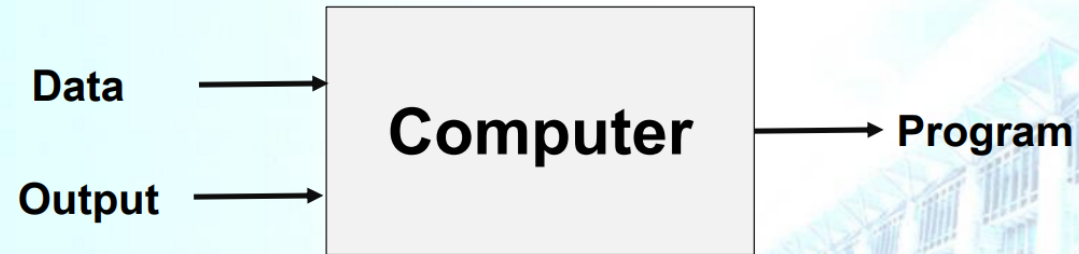
---

Machine Learning의 정의: Arthur Samuel (1959). Machine Learning: Field of study that gives computers the ability to learn **without being explicitly programmed**.

## ■ Traditional program



## ■ Machine learning



AI

# Machine Learning

---

Machine Learning의 분류:

1. Supervised Learning: 입력에 대한 정답이 있다.
2. Unsupervised Learning: 입력에 대한 정답이 없다.

# Simple Linear Regression

---

Linear Regression

## Summary

- Regression
- Linear Regression
- Hypothesis  $H(x) = Wx + b$
- Cost function  $cost(W, b) = \frac{1}{m} \sum_{i=1}^m (H(x_i) - y_i)^2$
- Goal: Minimize cost

# Cost Minimization

---

Gradient Descent

## **Gradient descent algorithm**

$$W := W - \alpha \frac{1}{m} \sum_{i=1}^m (W(x_i) - y_i) x_i$$

# Multivariable

---

$$\begin{pmatrix} x_{11} & x_{12} & x_{13} \\ x_{21} & x_{22} & x_{23} \\ x_{31} & x_{32} & x_{33} \\ x_{41} & x_{42} & x_{43} \\ x_{51} & x_{52} & x_{53} \end{pmatrix} \cdot \begin{pmatrix} w_{11} & w_{12} \\ w_{21} & w_{22} \\ w_{31} & w_{32} \end{pmatrix} = \begin{pmatrix} x_{11}w_{11} + x_{12}w_{21} + x_{13}w_{31} & x_{11}w_{12} + x_{12}w_{22} + x_{13}w_{32} \\ x_{21}w_{11} + x_{22}w_{21} + x_{23}w_{31} & x_{21}w_{12} + x_{22}w_{22} + x_{23}w_{32} \\ x_{31}w_{11} + x_{32}w_{21} + x_{33}w_{31} & x_{31}w_{12} + x_{32}w_{22} + x_{33}w_{32} \\ x_{41}w_{11} + x_{42}w_{21} + x_{43}w_{31} & x_{41}w_{12} + x_{42}w_{22} + x_{43}w_{32} \\ x_{51}w_{11} + x_{52}w_{21} + x_{53}w_{31} & x_{51}w_{12} + x_{52}w_{22} + x_{53}w_{32} \end{pmatrix}$$

[n, 3]

[3, 2]

[n, 2]

$$H(X) = XW$$

성균관대학교

***Thank You***

로봇동아리