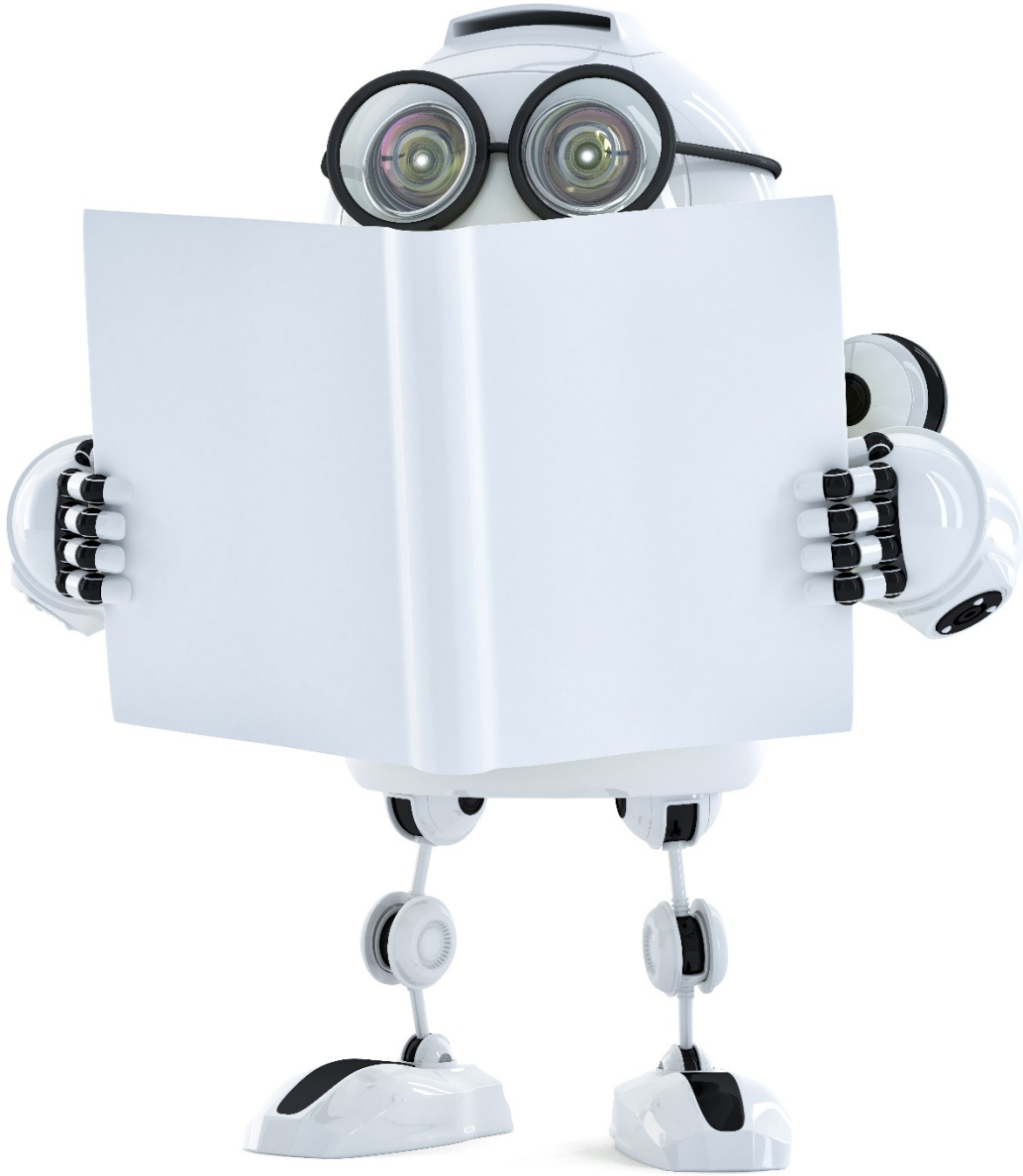
Overview

Linear Regression



Director of TEAMLAB
Sungchul Choi

머신러닝의 학습 방법들

- **Gradient descent based learning**
- **Probability theory based learning**
- **Information theory based learning**
- **Distance similarity based learning**

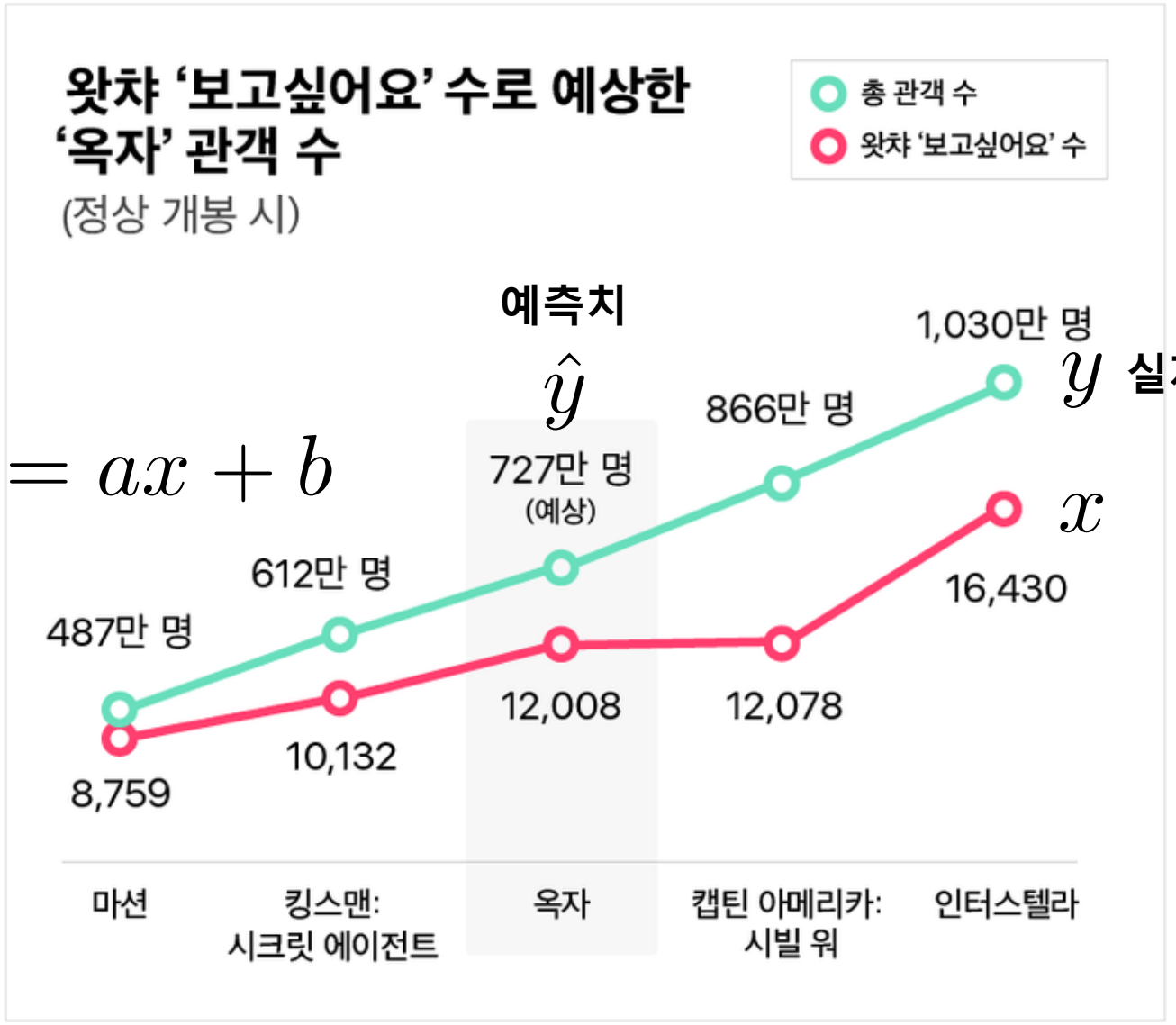
머신러닝의 학습 방법들

- Gradient descent based learning

실제 값과 학습된 모델 예측치의 오차를 최소화

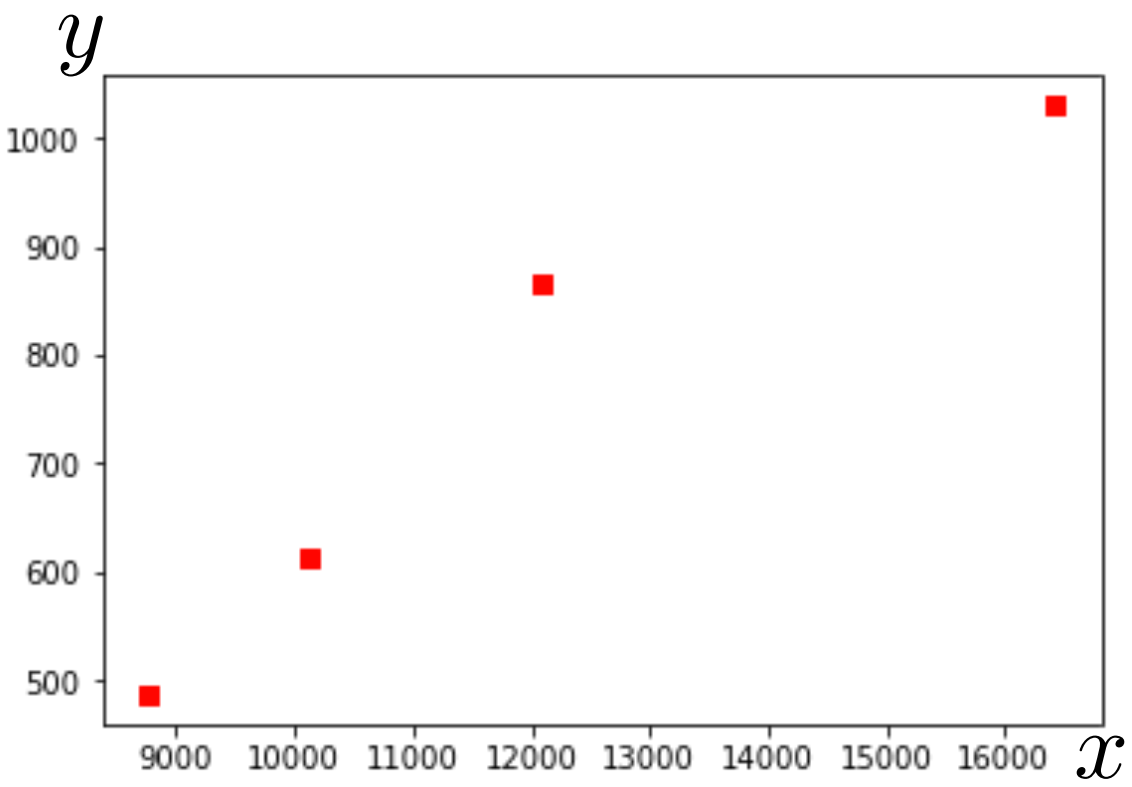
모델의 최적 parameter 찾기가 목적

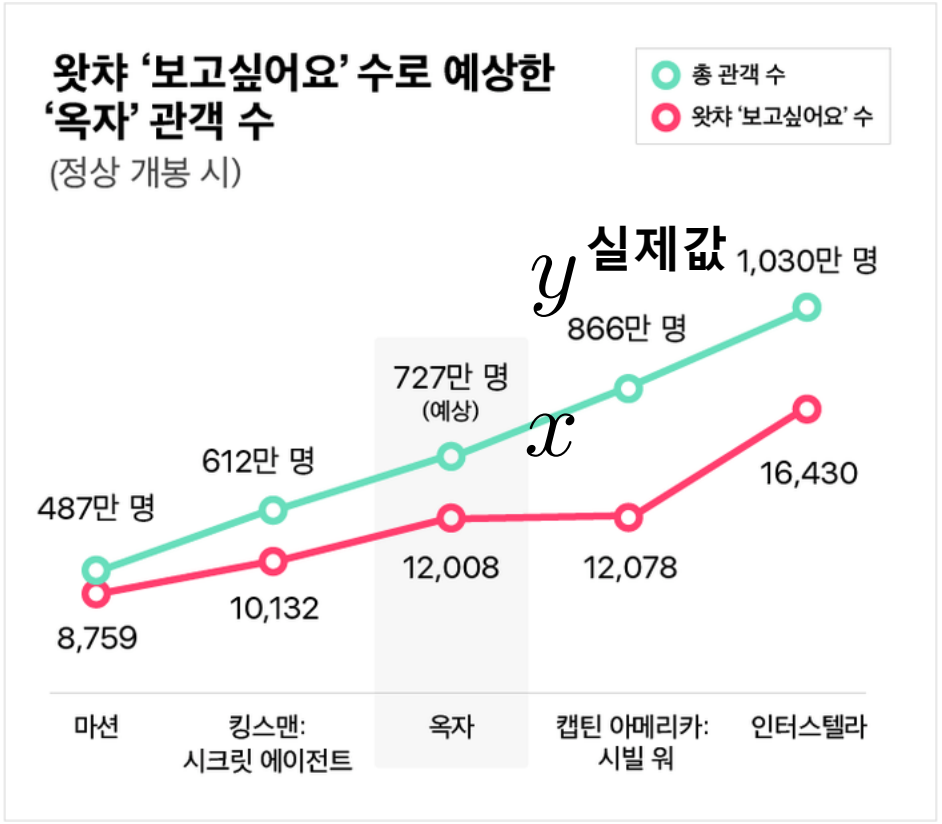
gradient descent 활용



$$\hat{y} = ax + b$$

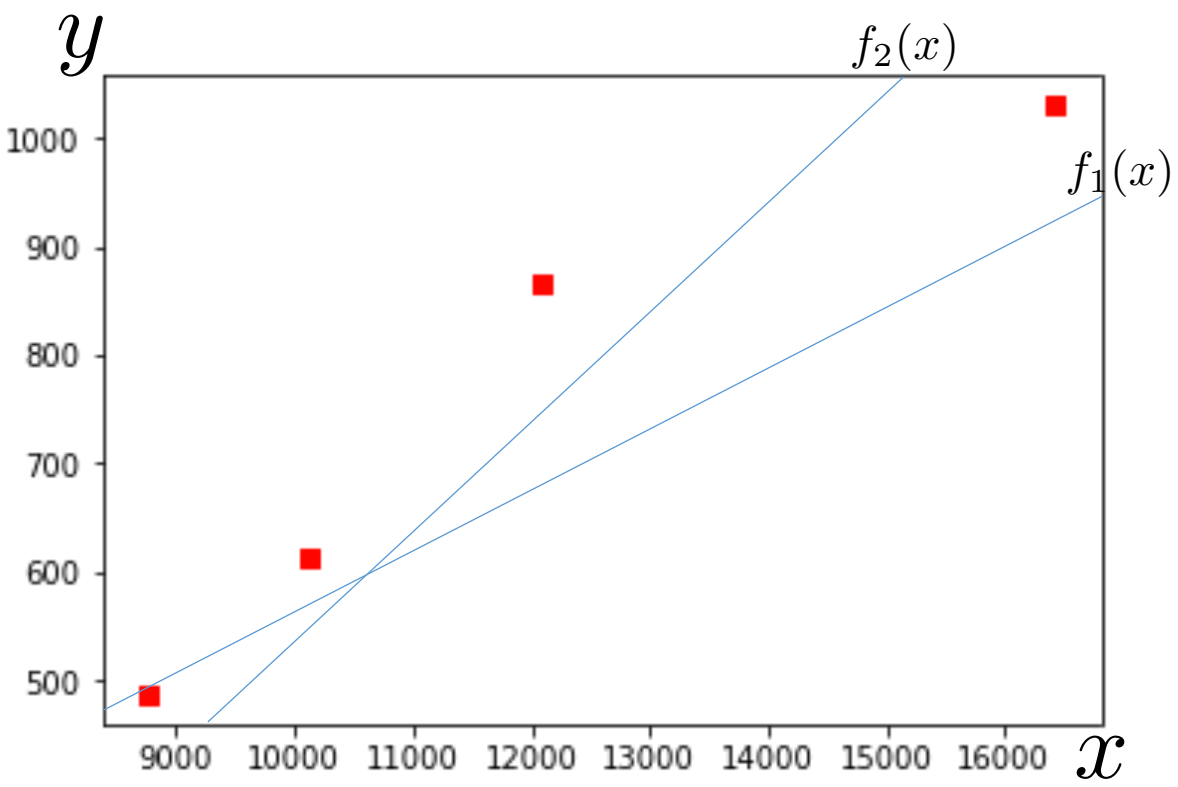
Source: http://platum.kr/archives/83757

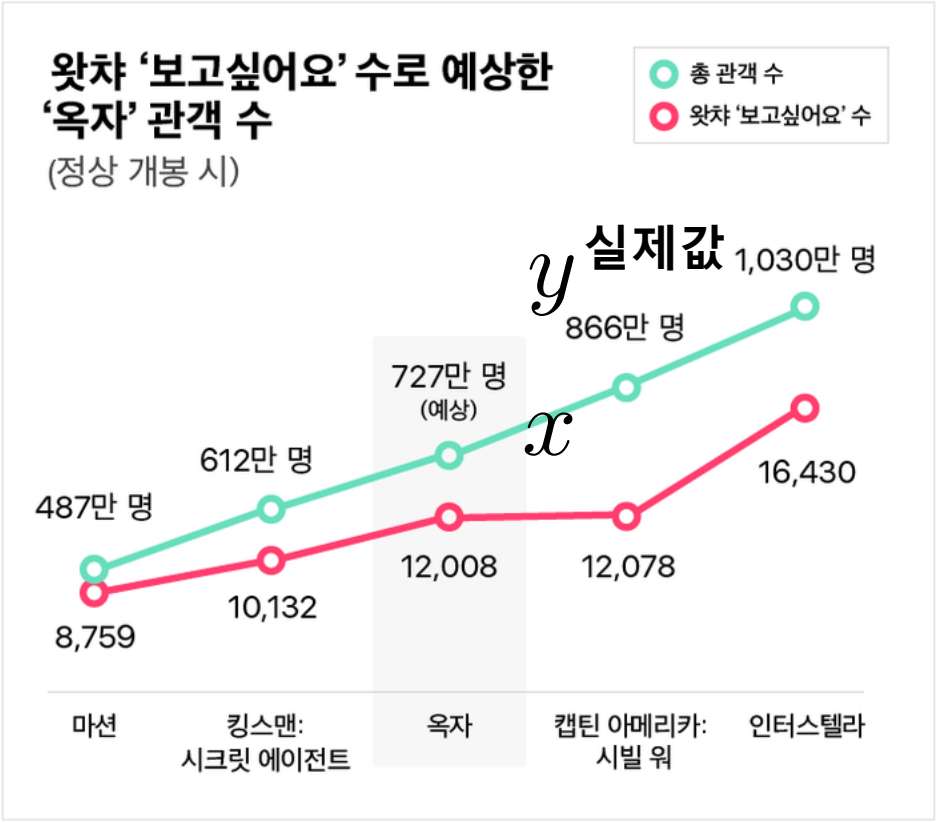




Source: http://platum.kr/archives/83757

$$f(x) = \hat{y} = ax + b$$





Source: http://platum.kr/archives/83757

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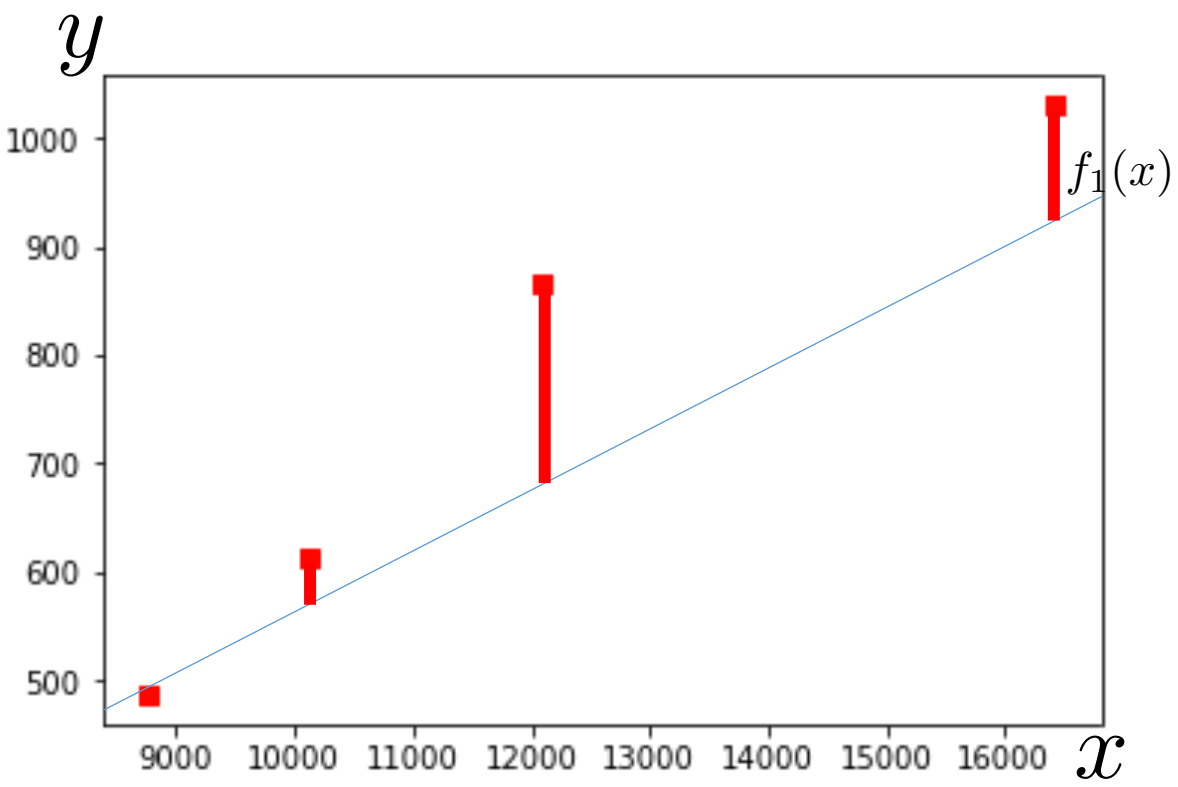

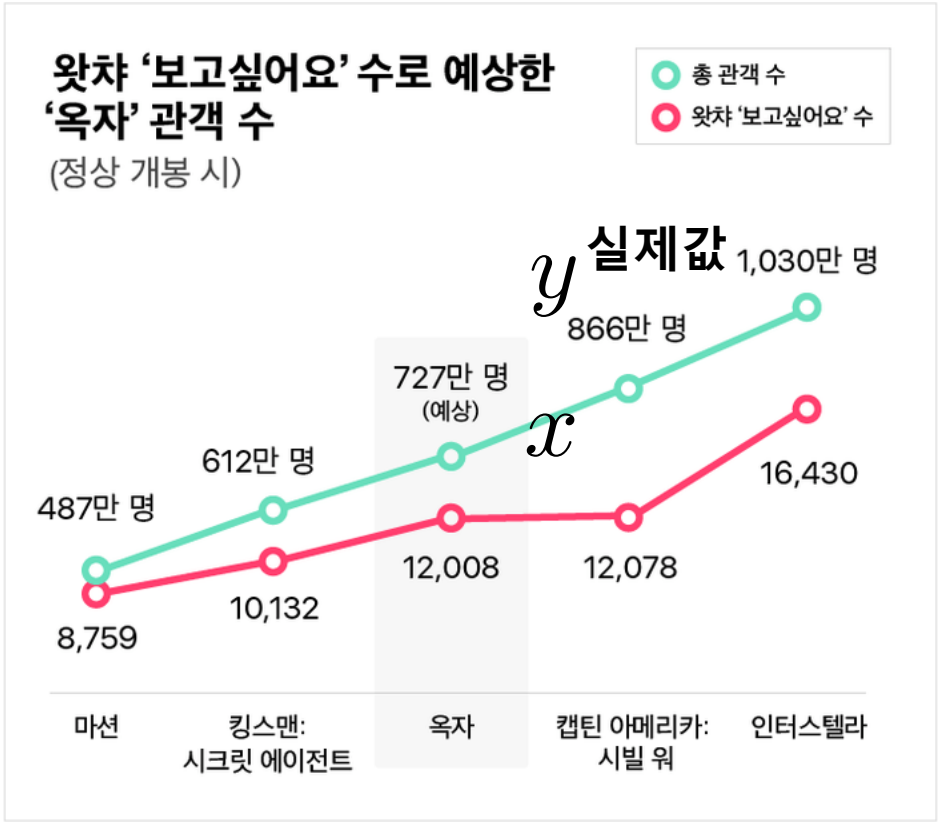

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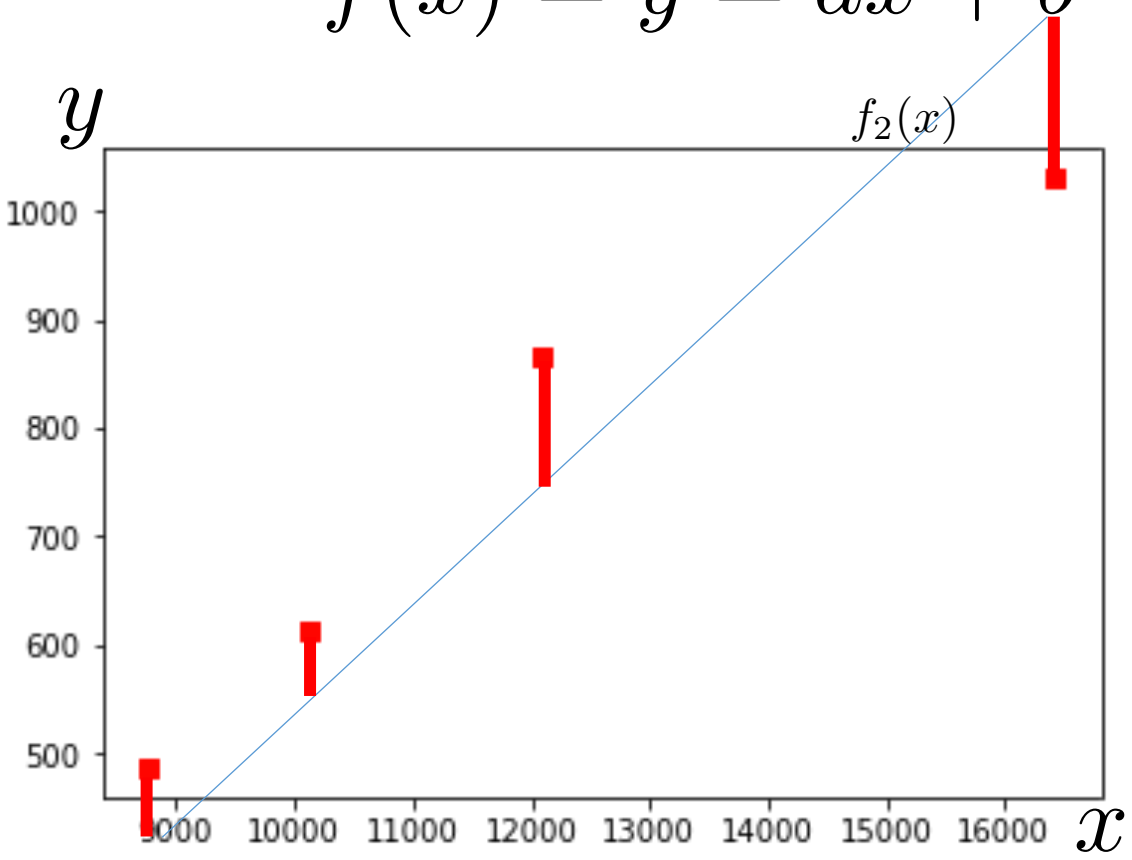
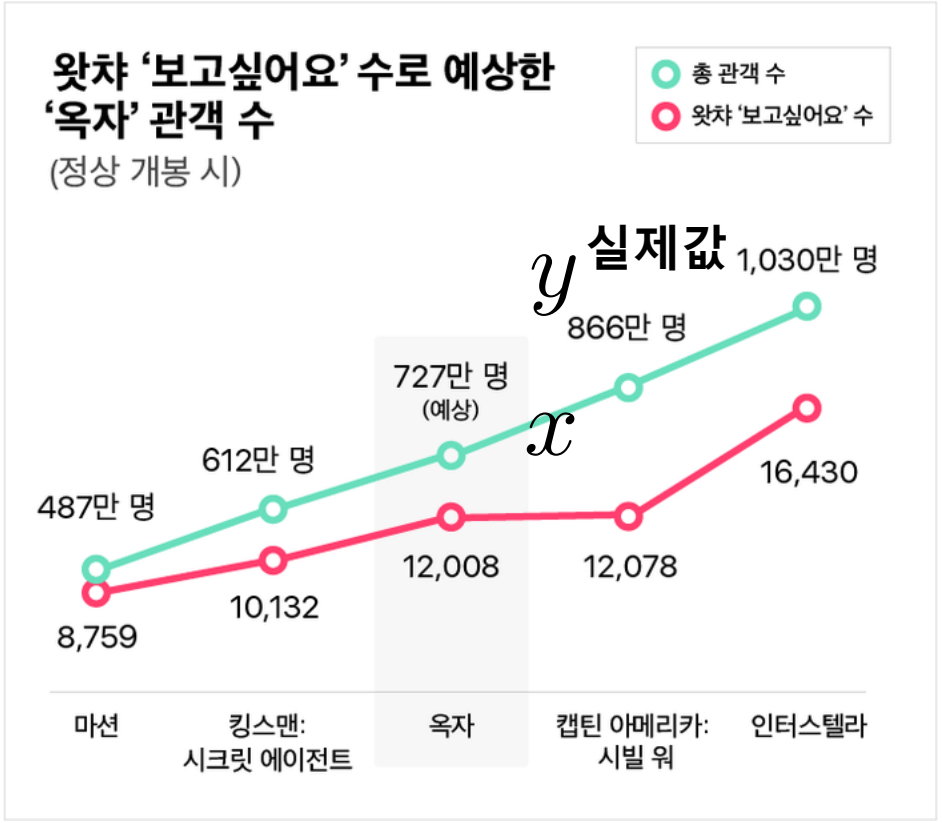


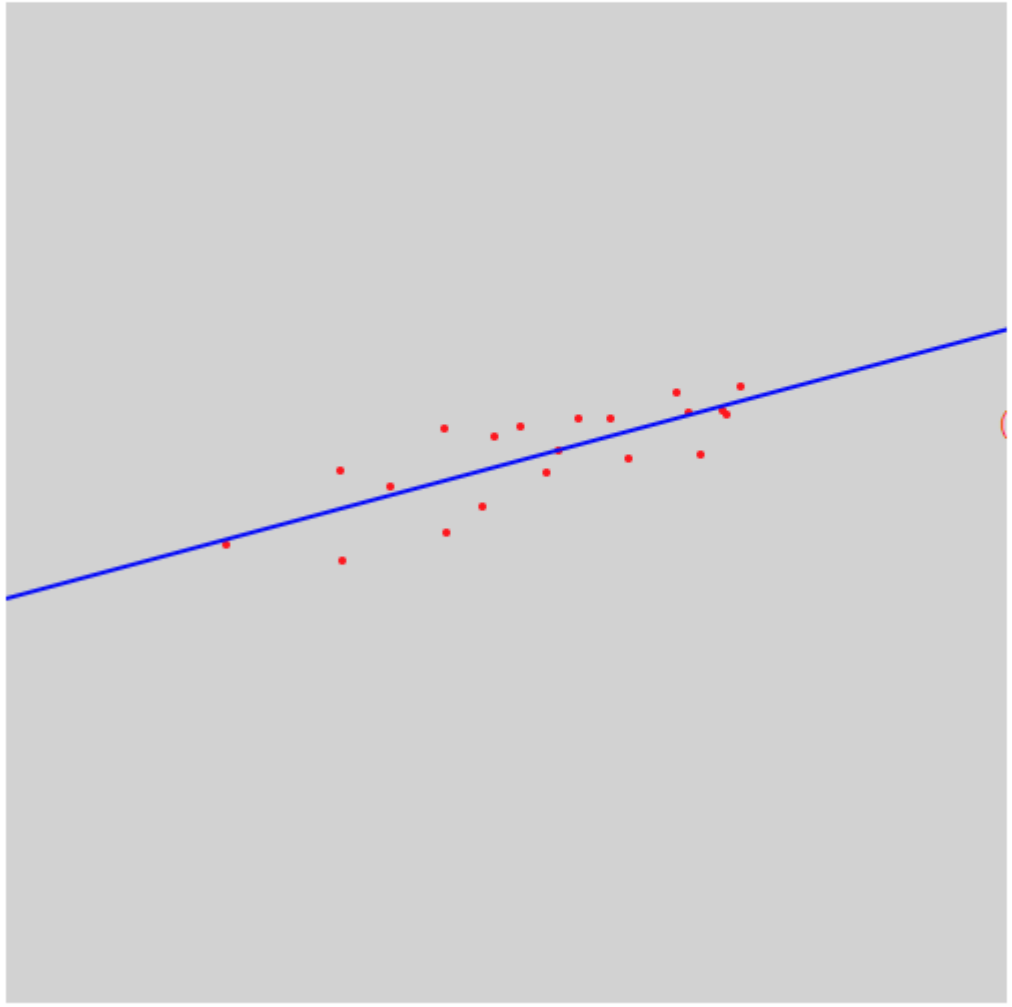


Source: http://platum.kr/archives/83757

- Home
- Linear Regression - Ordinary Least Squares Method

Linear Regression - Ordinary Least Squares Method

Y: -0.2689810286743359 3x+297.9945080961918



https://sujinleeme.github.io/javascript-machine-learning/linear-regression-ols
https://www.facebook.com/sujinlee.me

예측 함수와 실제 값의 오차를 줄여보자!

오차의 합

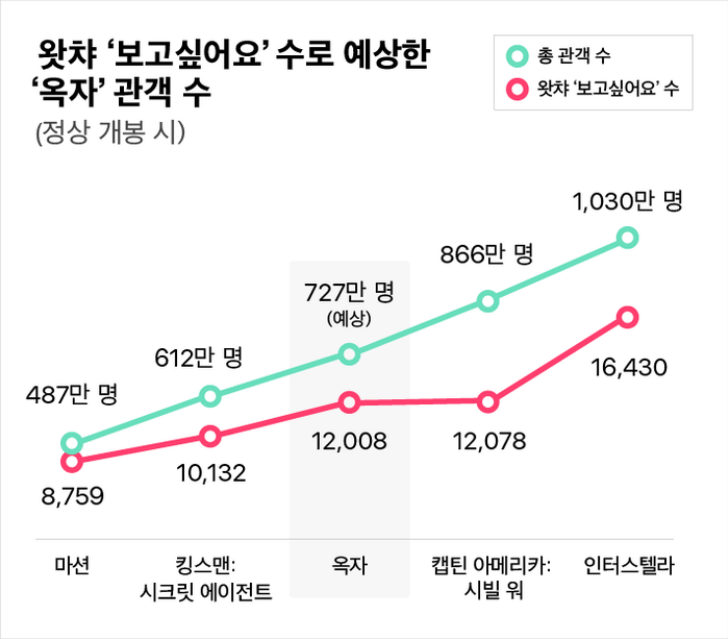
$$(\hat{y}^{(1)} - y^{(1)}) + (\hat{y}^{(2)} - y^{(2)}) + (\hat{y}^{(3)} - y^{(3)}) + (\hat{y}^{(4)} - y^{(4)})$$

오차는 양수 또는 음수 가능 ➔ 상쇄될 수 있음

$$(\hat{y}^{(1)} - y^{(1)})^2 + (\hat{y}^{(2)} - y^{(2)})^2 + (\hat{y}^{(3)} - y^{(3)})^2 + (\hat{y}^{(4)} - y^{(4)})^2$$

제곱의 합으로 변환

$$\sum_{i=1}^{n}(\hat{y}^{(i)} - y^{(i)})^2 \quad \hat{y} = \begin{bmatrix} w_1 \times 8759 + w_0 \\ w_1 \times 10132 + w_0 \\ w_1 \times 12078 + w_0 \\ w_1 \times 16430 + w_0 \end{bmatrix} \quad y = \begin{bmatrix} 487 \\ 612 \\ 866 \\ 1030 \end{bmatrix}$$



$$(\hat{y} - y)^2 = \begin{bmatrix} (w_1 \times 8759 + w_0 - 487)^2 \\ (w_1 \times 10132 + w_0 - 612)^2 \\ (w_1 \times 12078 + w_0 - 866)^2 \\ (w_1 \times 16430 + w_0 - 1030)^2 \end{bmatrix}$$

Squared Error

Squared Error를 최소화 할 수 있는 weight값의 발견

$$\sum_{i=1}^{n}(w_1 x^{(i)} + w_0 \times 1 - y^{(i)})^2$$

최소 또는 최대의 문제 → 미분으로 해결하기

찾고자 하는 값은? w_1, w_0

Human knowledge belongs to the world.