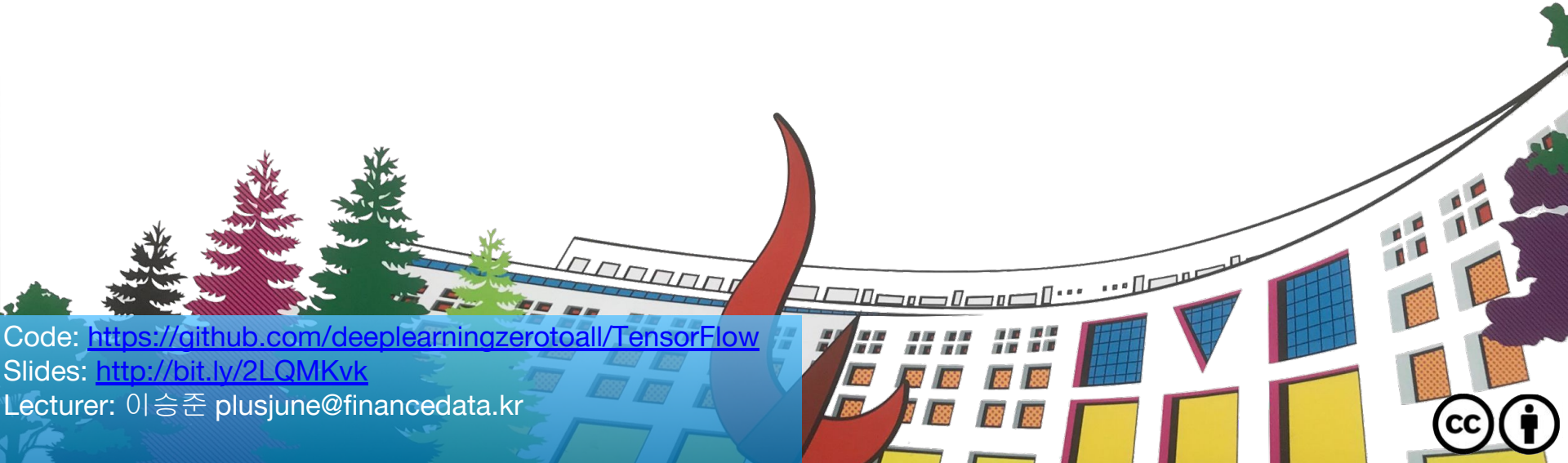
ML/DL for Everyone Season2

with TensorFlow

02 - Simple Linear Regression



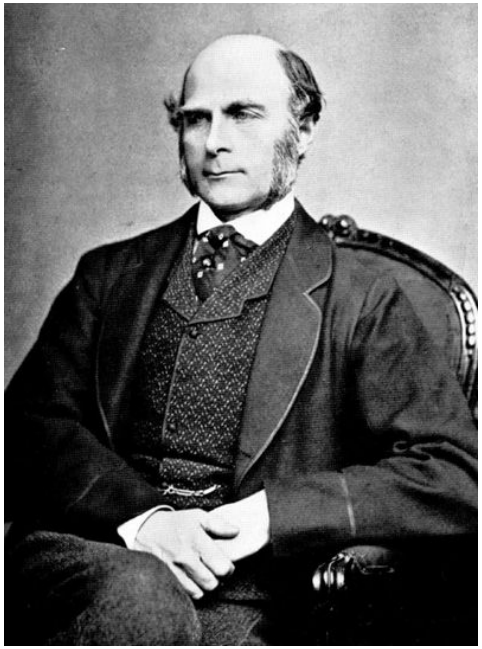
Code: https://github.com/deeplearningzerotoall/TensorFlow
Slides: http://bit.ly/2LQMKvk
Lecturer: 이승준 plusjune@financedata.kr

다루고자 하는 주제

- Regression
- Linear Regression
- Hypothesis
- Which hypothesis is better?
- Cost, Cost function
- Goal: Minimize cost

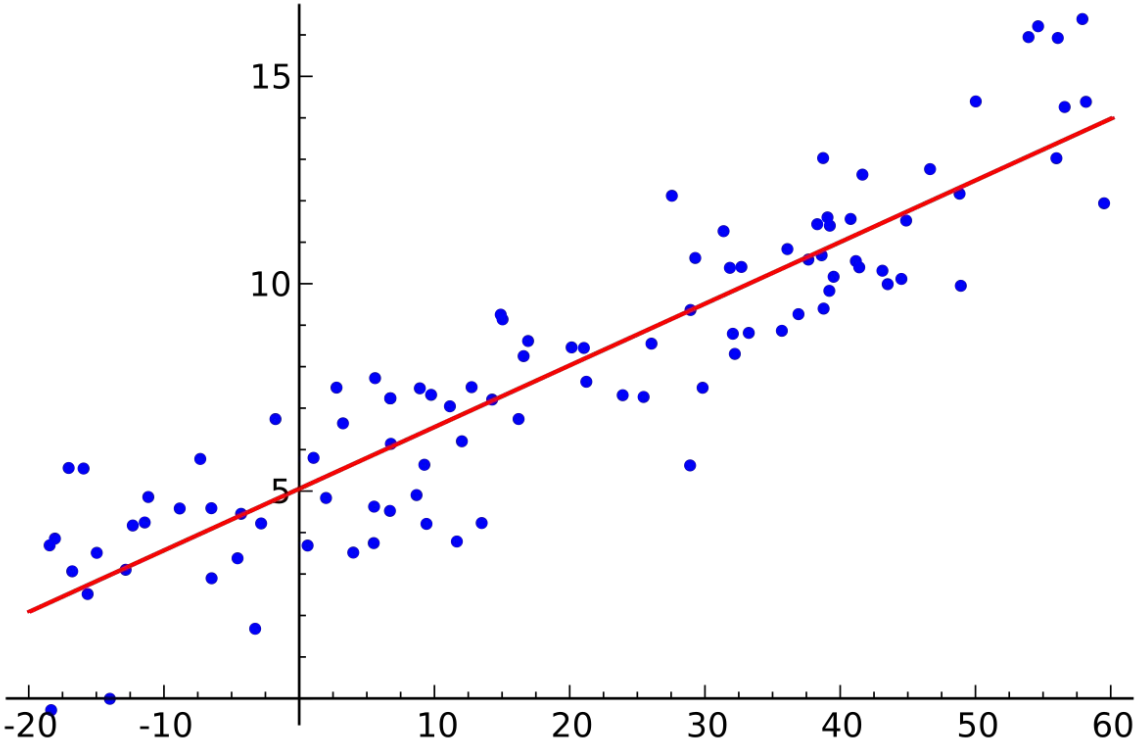
Regression

"Regression toward the mean"



Sir Francis Galton (1822 ~ 1911)

Linear Regression



$$y = ax + b$$

https://en.wikipedia.org/wiki/Linear_regression

Predicting exam score: regression

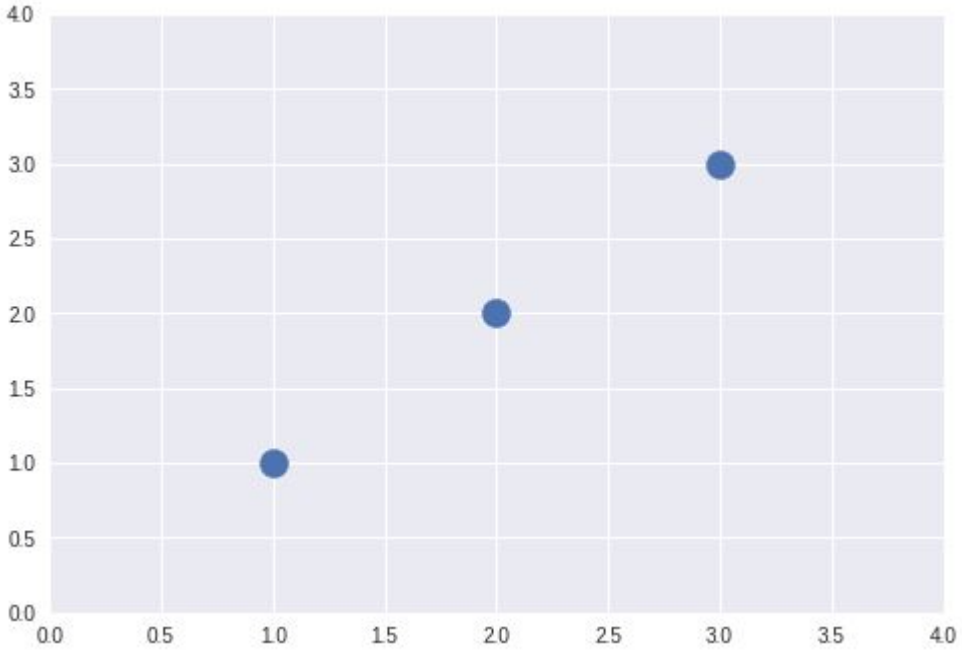
x (hours)	y (score)
10	90
9	80
3	50
4	30

Regression

x	y
1	1
2	2
3	3

Regression

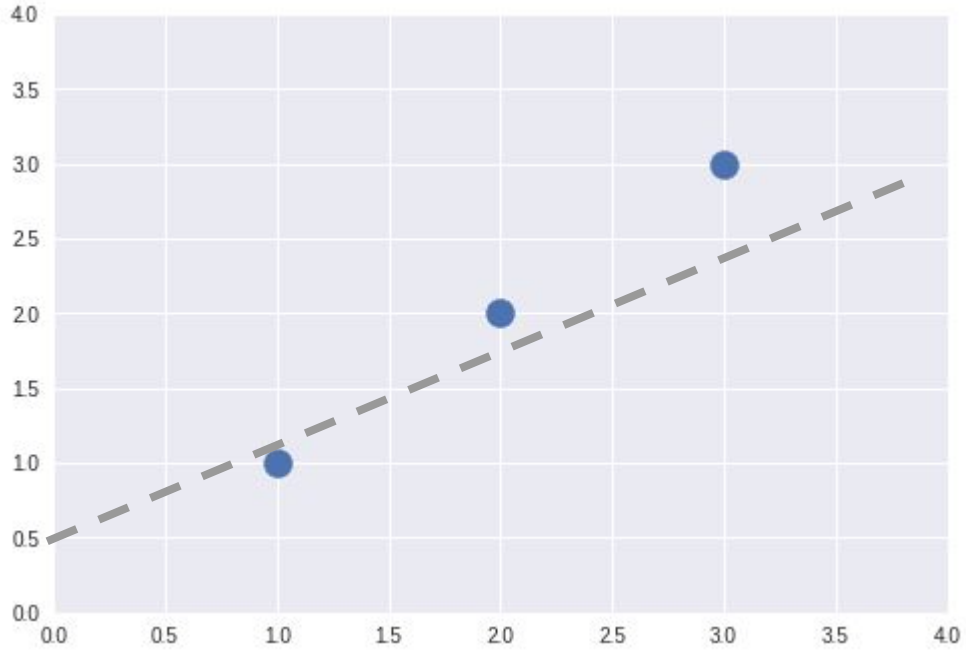
x	y
1	1
2	2
3	3



Hypothesis

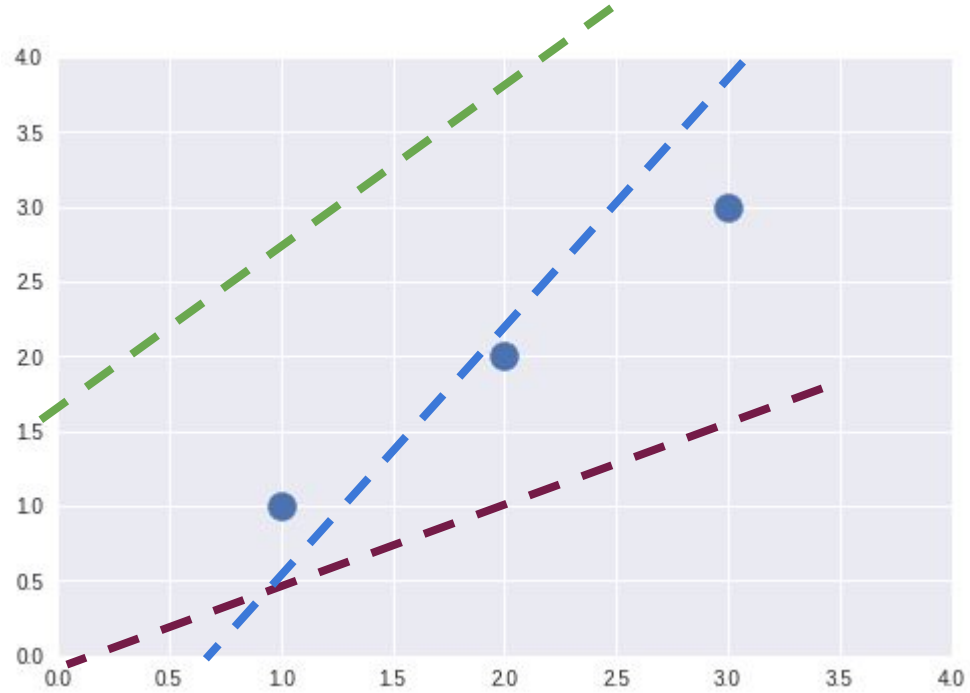
(Linear)

$$H(x) = Wx + b$$



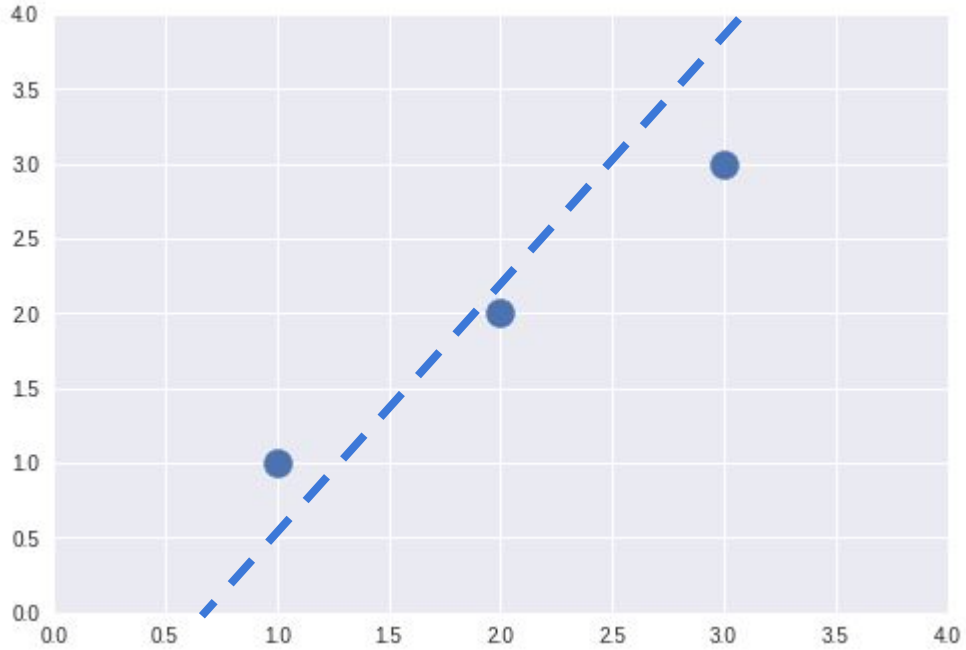
Which hypothesis is better?

$$H(x) = Wx + b$$



Which hypothesis is better?

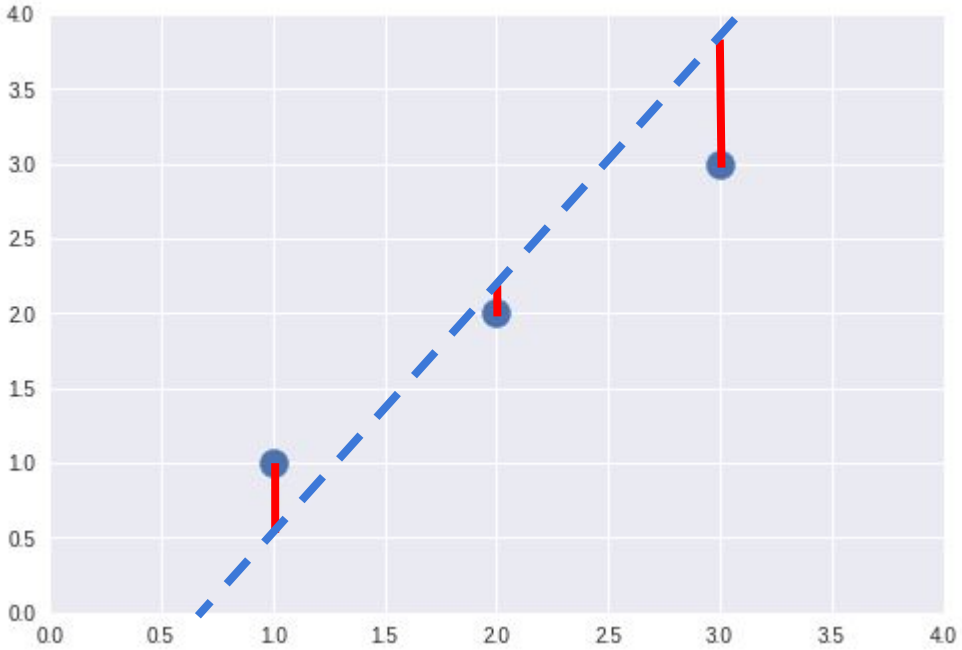
$$H(x) = Wx + b$$



Cost

$$H(x) = Wx + b$$

$$H(x) - y$$



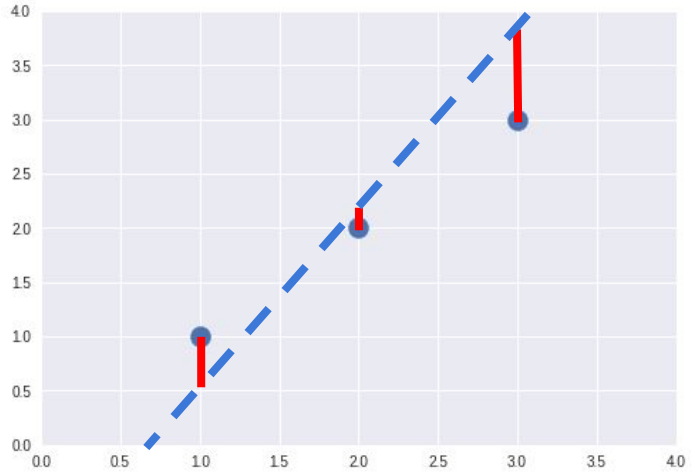
Cost

How **fit** the line to our (training) data

$$\frac{(H(x_1)-y_1)^2+(H(x_2)-y_2)^2+(H(x_3)-y_3)^2}{3}$$

$$cost(W) = \frac{1}{m}\sum_{i=1}^{m}(Wx_i - y_i)^2$$

$H(x) - y$



Cost function

$$cost(W) = \frac{1}{m} \sum_{i=1}^{m} (Wx_i - y_i)^2$$

$$H(x) = Wx + b$$

$$cost(W, b) = \frac{1}{m} \sum_{i=1}^{m} (H(x_i) - y_i)^2$$

Goal: Minimize cost

$$\underset{W,b}{minimize}\ cost(W, b)$$

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

What’s Next?

- How to minimize cost