

NeuralNet 101

2. Linear Regression

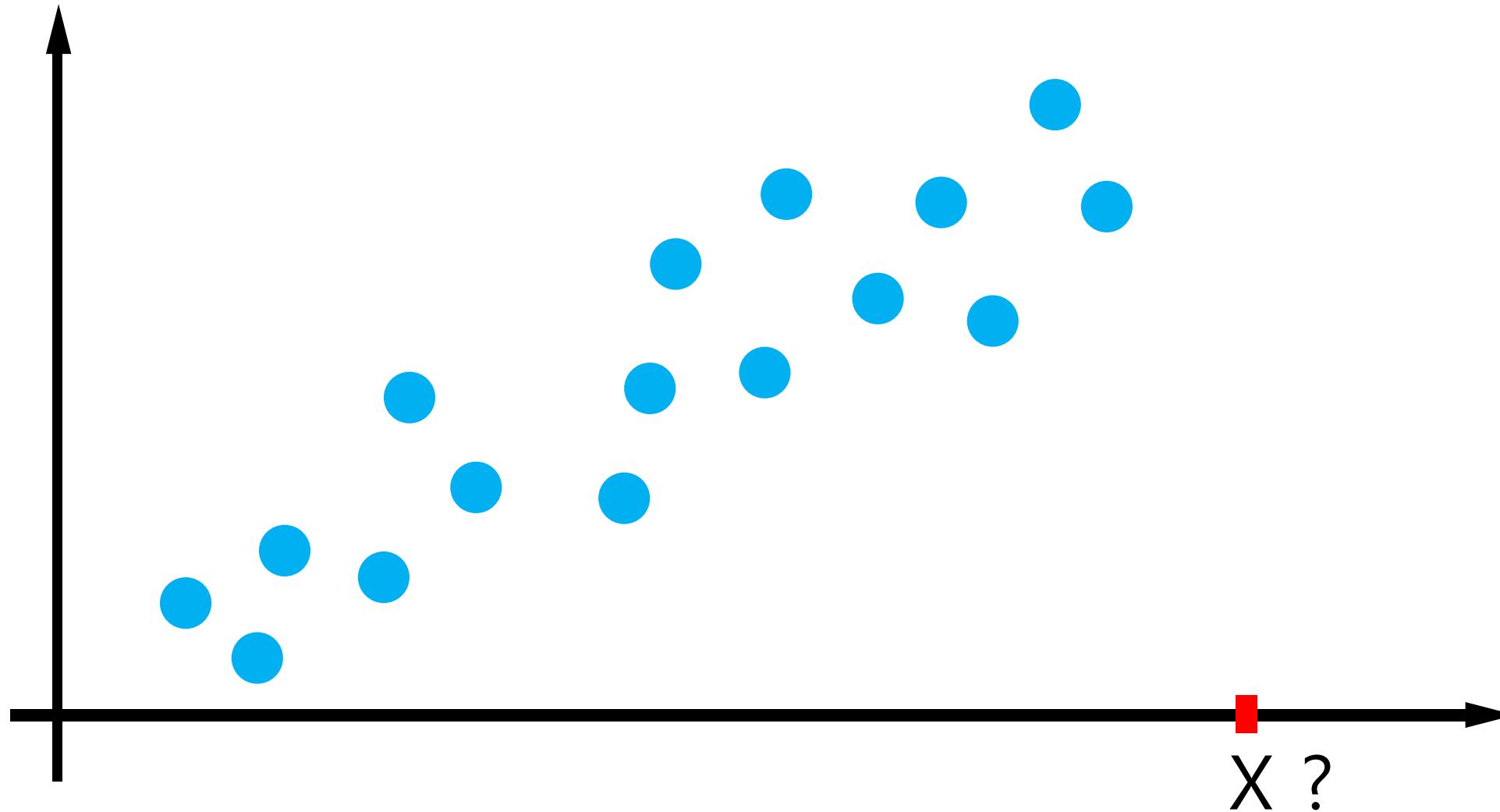
What is Linear Regression?

Estimating the mean in multi variable data
with Linear function

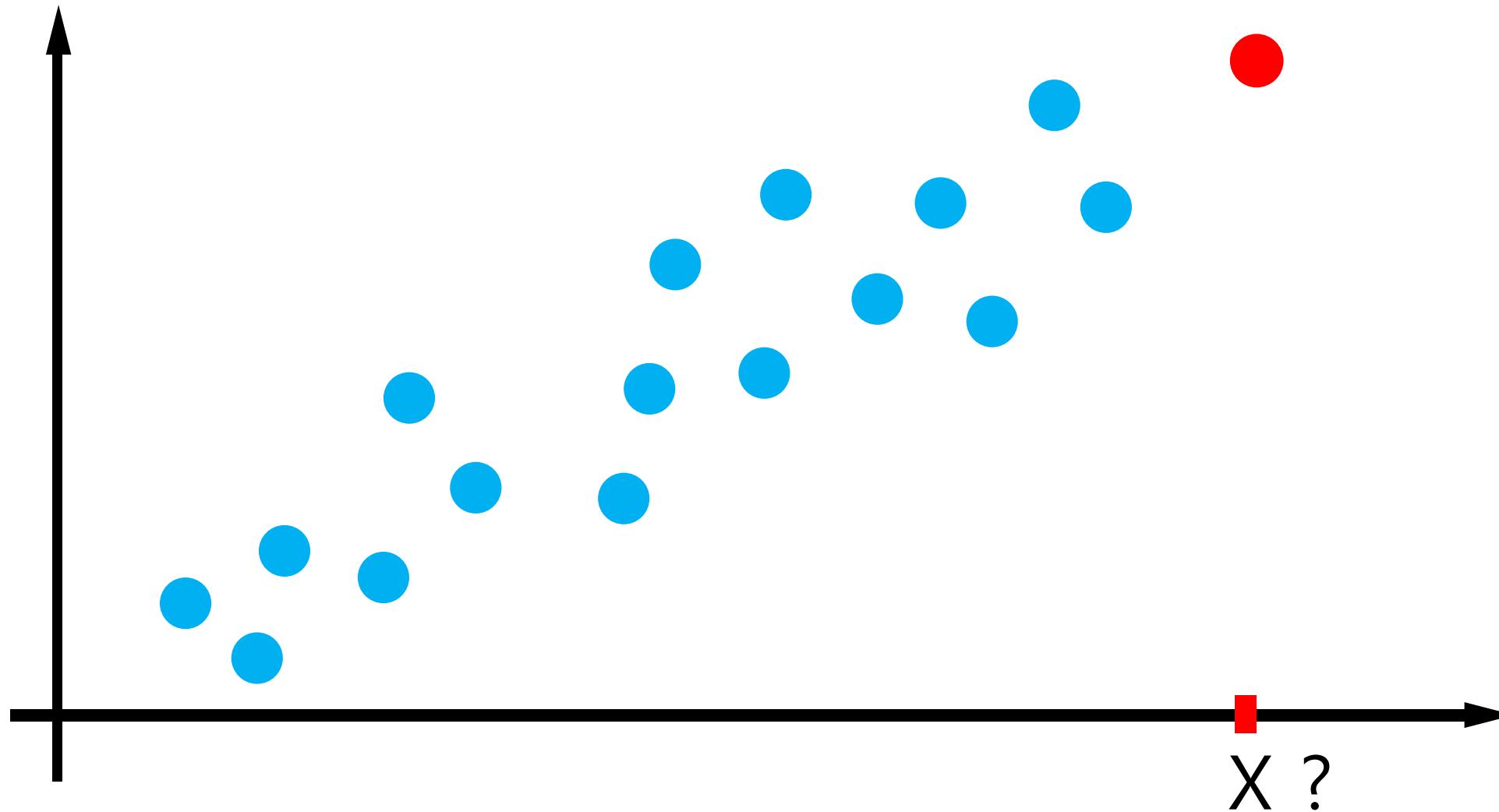
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When do we use Linear Regression?



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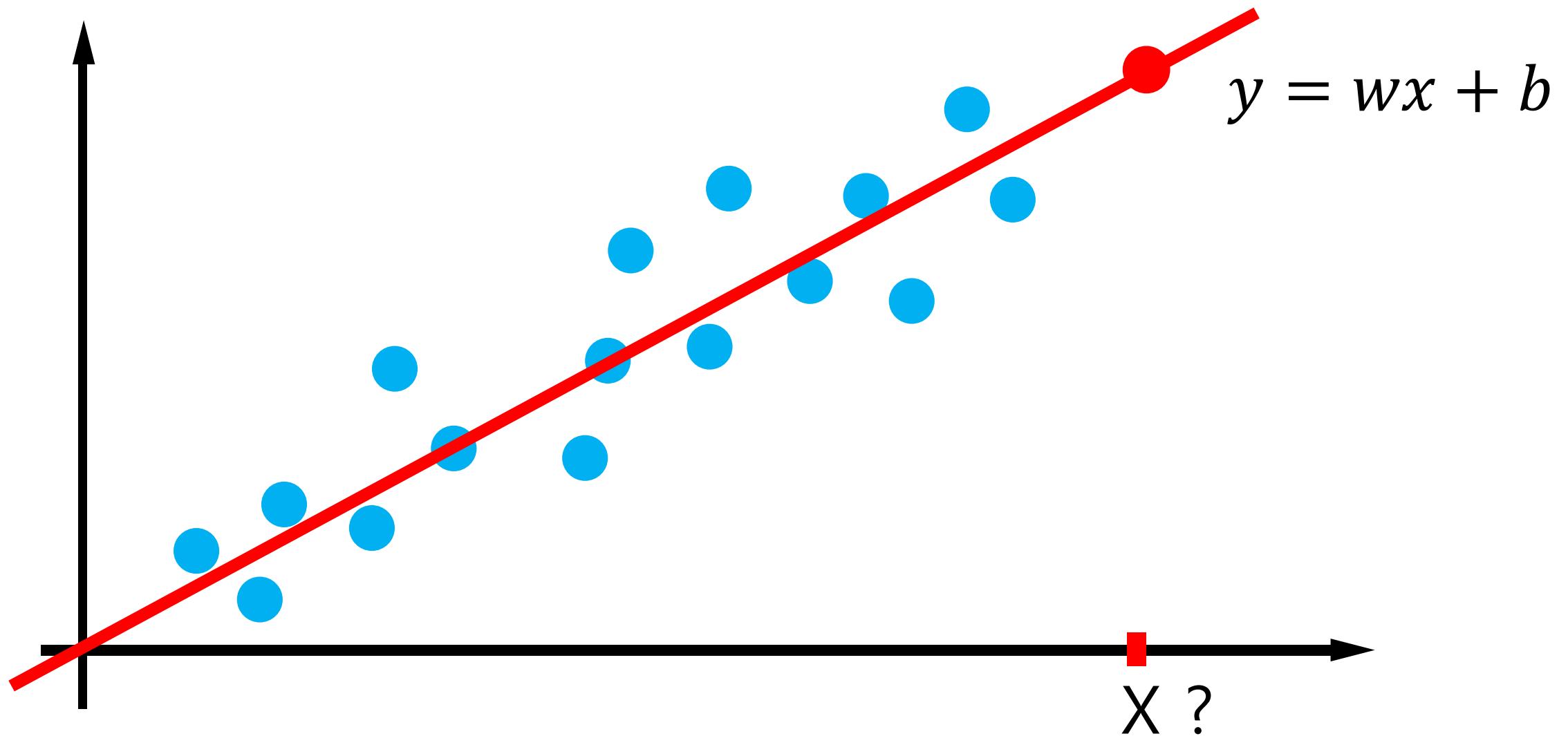


When do we use Linear Regression?

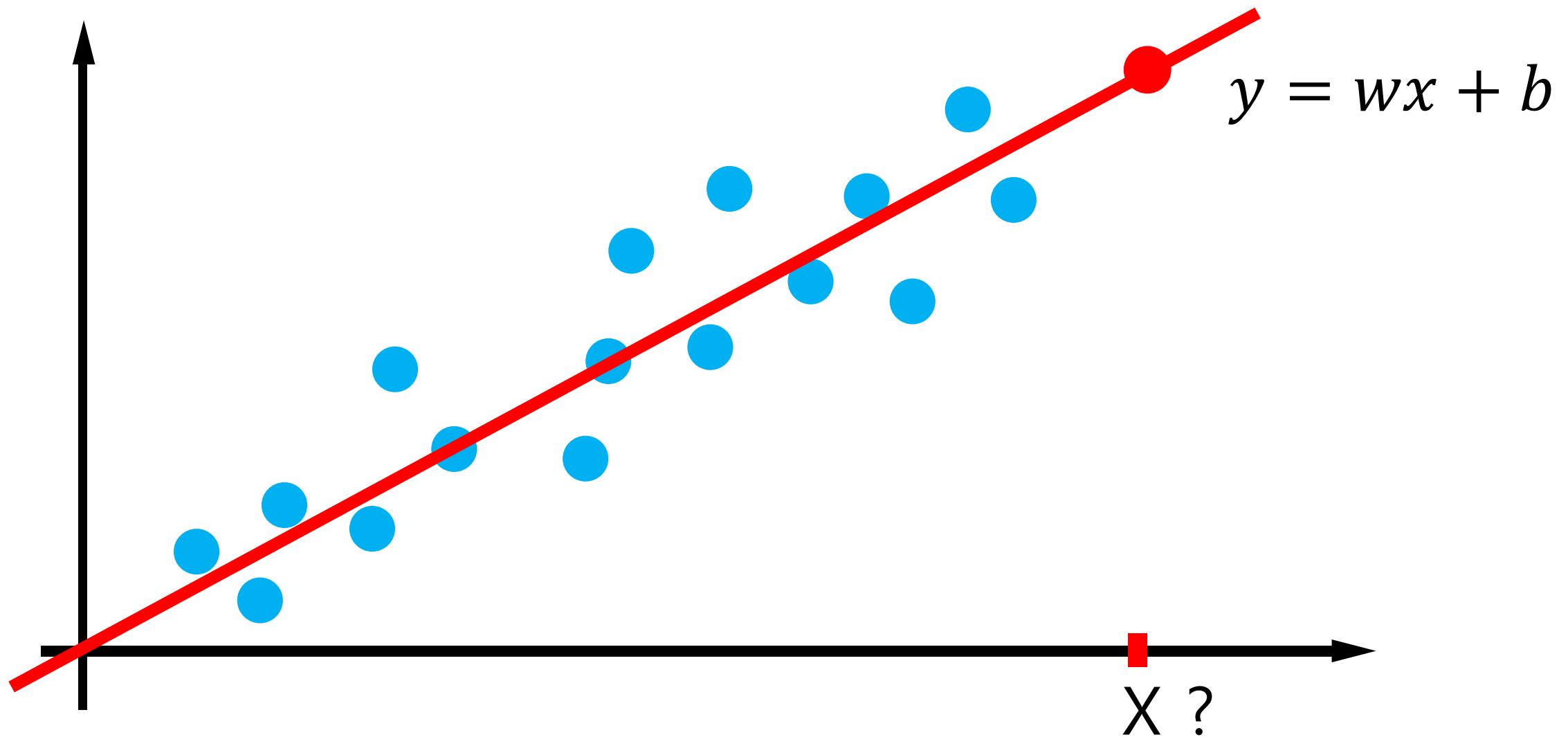


<https://youtu.be/0YpNPG46nlw>

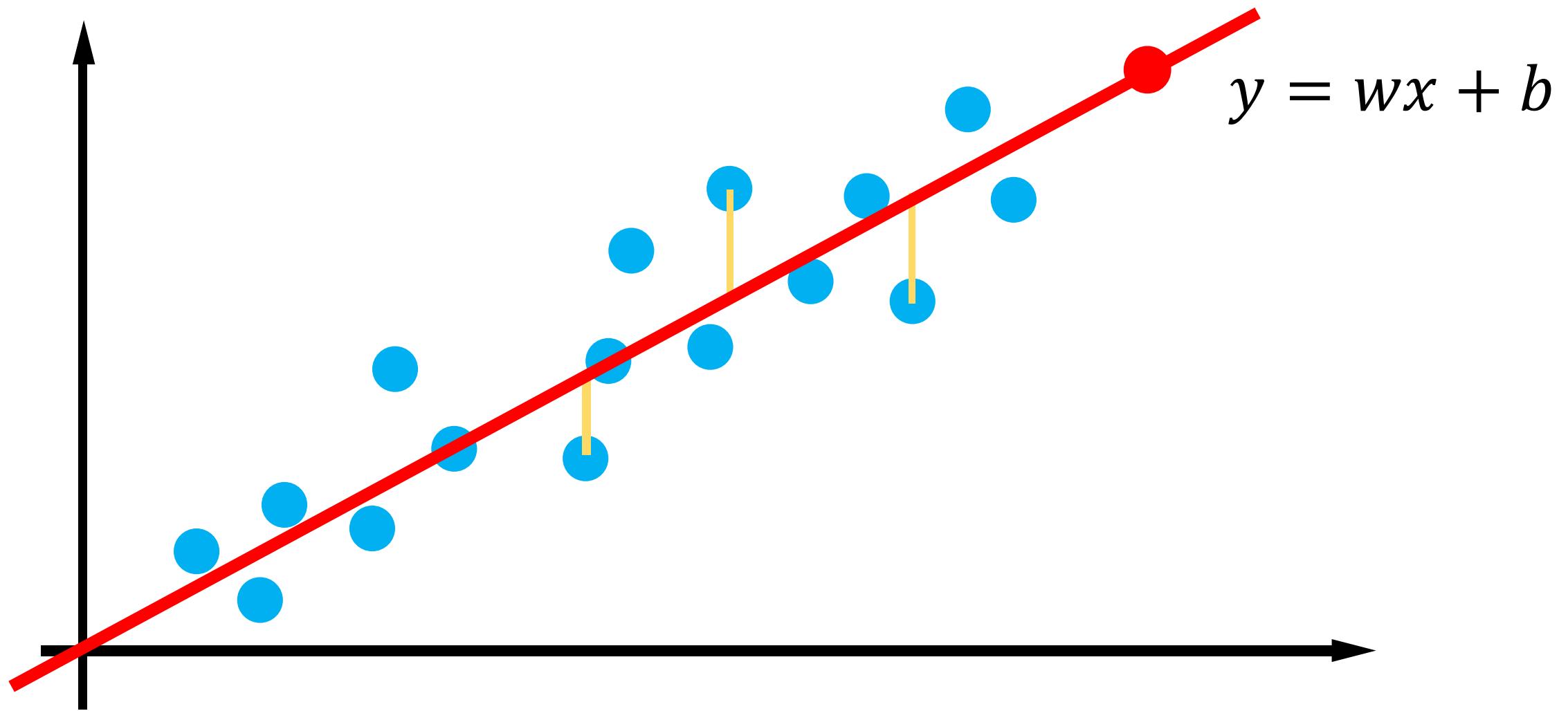
Linear Function



Find w, b



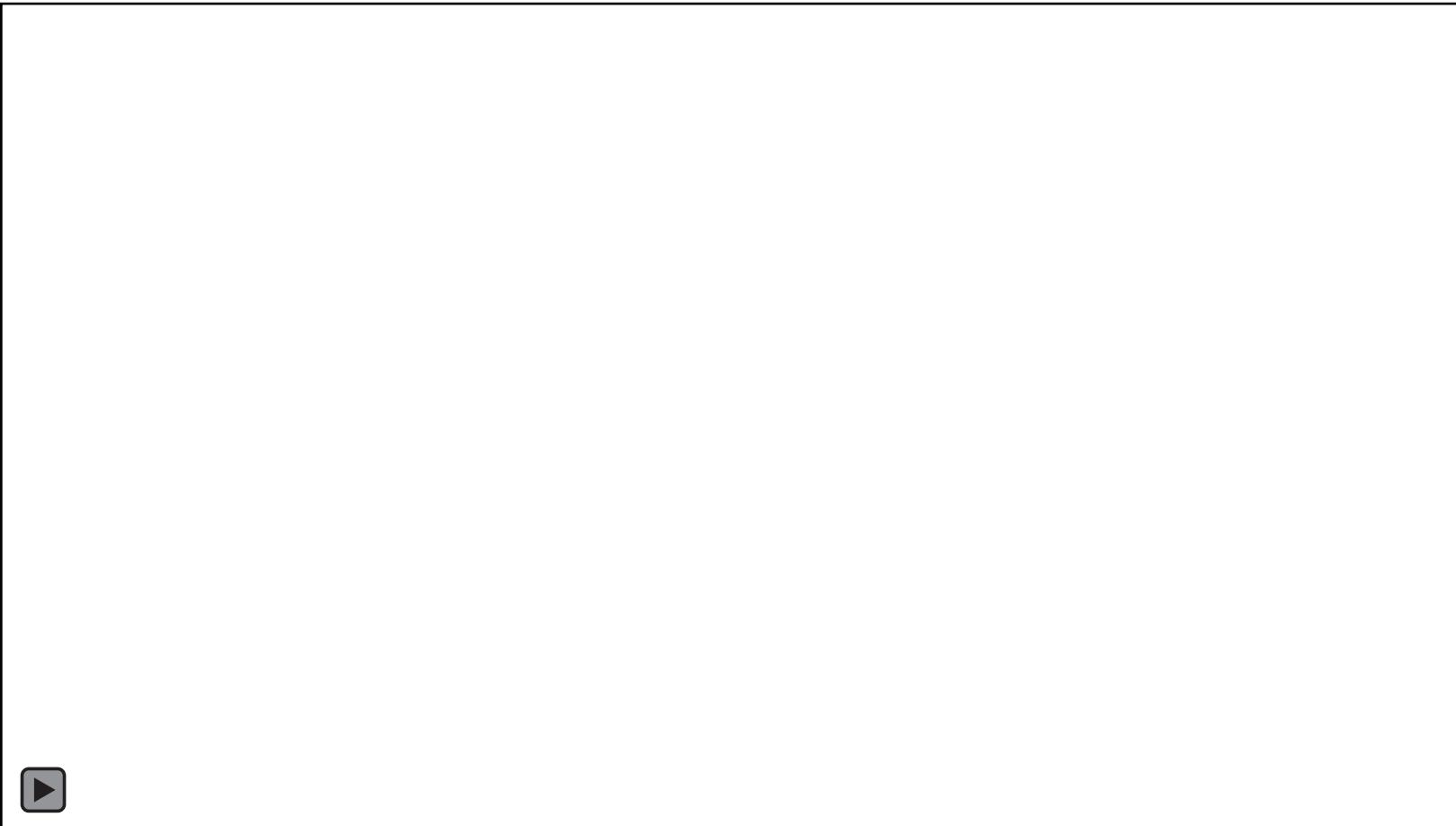
Error



Error Function

$$L(w, b) = \frac{1}{2m} \sum_{i=0}^m (f(x_i) - y_i)^2$$

Error Function



<https://youtu.be/QN2esfrzHHI>

Gradient Descent (Last Lecture)

$$x_{n+1} = x_n - \alpha f'(x_n)$$

Differential

$$\frac{\partial}{\partial w} L(w, b) = \frac{\partial}{\partial w} \frac{1}{2m} \sum_{i=0}^m (f(x_i) - y_i)^2$$

Differential

$$\frac{\partial}{\partial w} L(w, b) = \frac{1}{m} \sum_{i=0}^m (wx + b - y_i)x$$

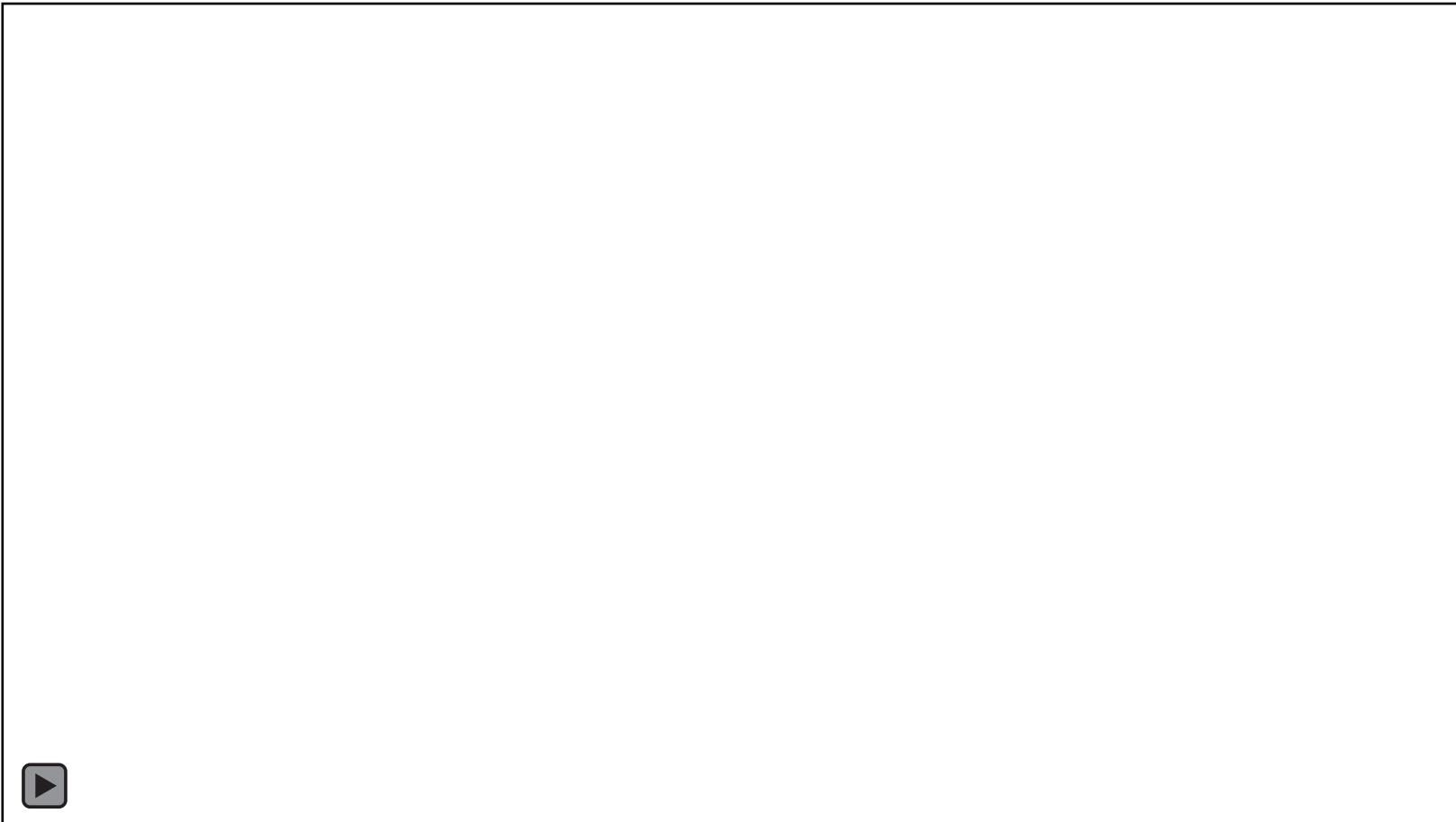
Gradient Descent (Last Lecture)

$$x_{n+1} = x_n - \alpha \frac{1}{m} \sum_{i=0}^m (wx_i + b - y_i)x_i$$

Gradient Descent (Last Lecture)

$$w_{n+1} = w_n - \alpha \frac{1}{m} \sum_{i=0}^m (wx_i + b - y_i)x_i$$

Loss Function



https://youtu.be/EcgLQsSP_WA

Multi variable

$$f = \vec{x} \cdot \vec{w} + b$$

Multi variable

$$f(x_1, x_2, x_3) = w_1x_1 + w_2x_2 + w_3x_3 + b$$

Linear regression



<https://youtu.be/sQYNuwvpNk8>

Lab Session

vlab-kaist/NN101_23S/lab/week2