Simple Linear Regression

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1 Linear model

The simple linear regression model is given by:

$$Y = b + m * X_i + \epsilon$$

2 Cost function

$$E = \frac{1}{n}\sum(y_i - (b + m.x_i))^2$$

3 Gradient descent

$$\frac{\delta E}{\delta m} = -\frac{2}{n}\sum(y_i - (b + m.x_i))).x_i = \frac{1}{n}\sum 2x_i(\hat{y} - y_i)$$

$$\frac{\delta E}{\delta b} = -\frac{2}{n}\sum(y_i - (b + m.x_i)) = \frac{1}{n}\sum 2(\hat{y} - y_i)$$

Update parameters:
a: learning rate

$$m = m - \alpha\frac{\delta E}{\delta m}$$

$$b = b - \alpha\frac{\delta E}{\delta b}$$