

Given some data  $X, Y$  you need to learn the parameters required to learn the relation between both variables. For example as shown in the equation below you need to learn  $\beta_0$  (Bias) and  $\beta_1$ .

$$\hat{y}(x) := \hat{\beta}_0 + \hat{\beta}_1 x$$

Given the above equation you can then calculate **vector of** Betas (  $\hat{\beta}$  ) using;

$$X^T X \hat{\beta} = X^T y$$

Last step to obtain Betas is to divide by (  $X^T X$  ) or basically multiplying by (  $X^T X$  ) inverse.

So in the end Beta can be calculated using;

$$\mathbf{Beta} = (X^T \cdot X)^{-1} \cdot (X^T \cdot Y)$$