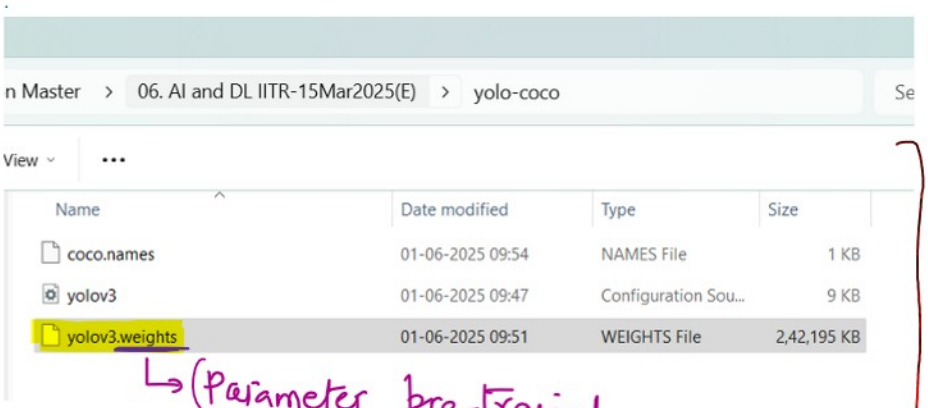
Module 2 | Introduction to Artificial Neural Networks

14 September 2025 11:19

Parameters in AI model?

→ Parameters are the internal variables of a model that are learned from the data during training



→ (Parameter pre-trained weights & biases)

YOLO

Type of ML models

1. Linear Regression.

Examples of Parameters

Coefficients ($\hat{\beta}_1, \hat{\beta}_2, \ldots$ etc), Intercept (β_0)

Weights ⊕ bias

→ Linear Regression Gradient Descent (GD)

→ [Linear Regression using gradient descent]

2. Decision Trees

criterion, max_depth

3. K-Means clustering

n_clusters, cluster centroids, max_it...

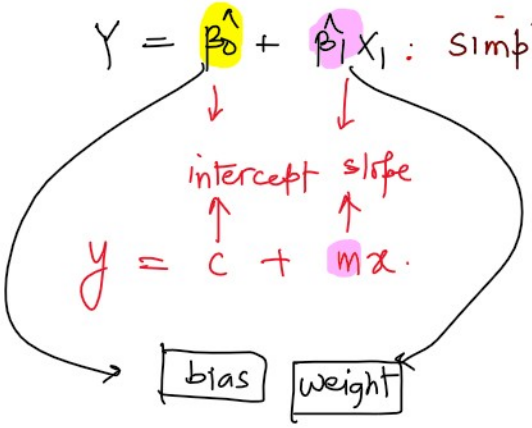
3. K-Means clustering — n_clusters, cluster_centroids, max_iter

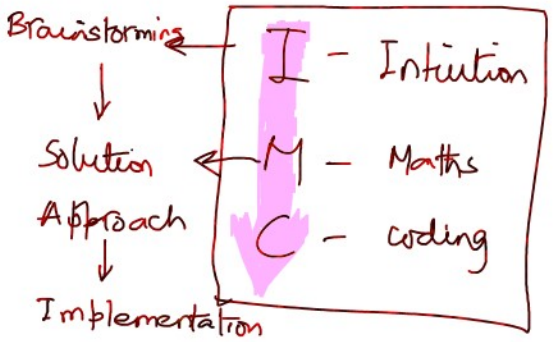
4. Neural Network — weights and biases

Linear Regression

$$Y = \hat{\beta_0} + \hat{\beta_1} X_1 + \hat{\beta_2} X_2 + \cdots + \hat{\beta_n} X_n$$: MLR: Multiple Linear Regression.

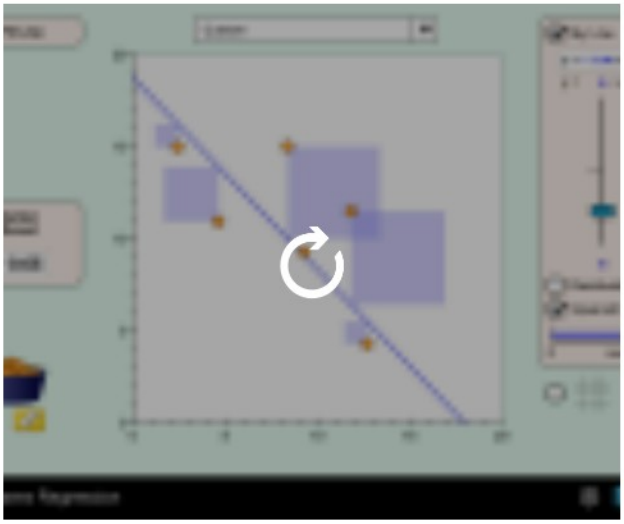
$$Y = \hat{\beta_0} + \hat{\beta_1} X_1$$: Simple Linear Regression.

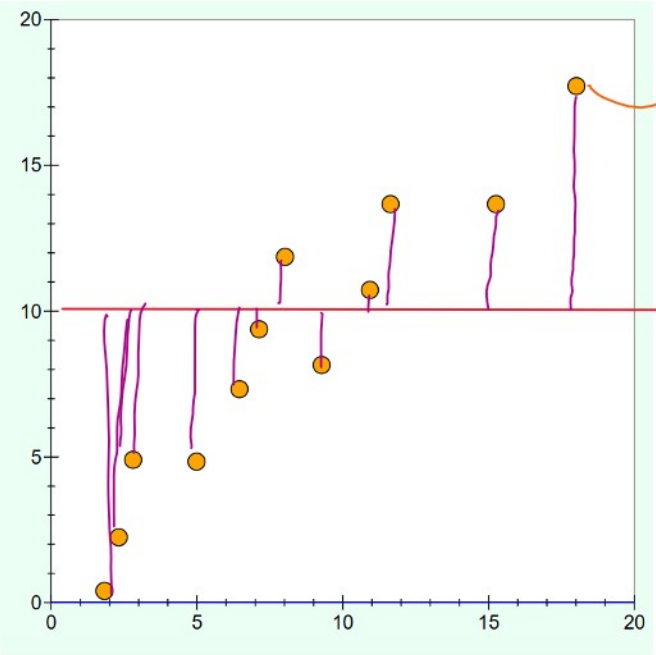




Intuition behind Linear Regression

Least-Squares Regression

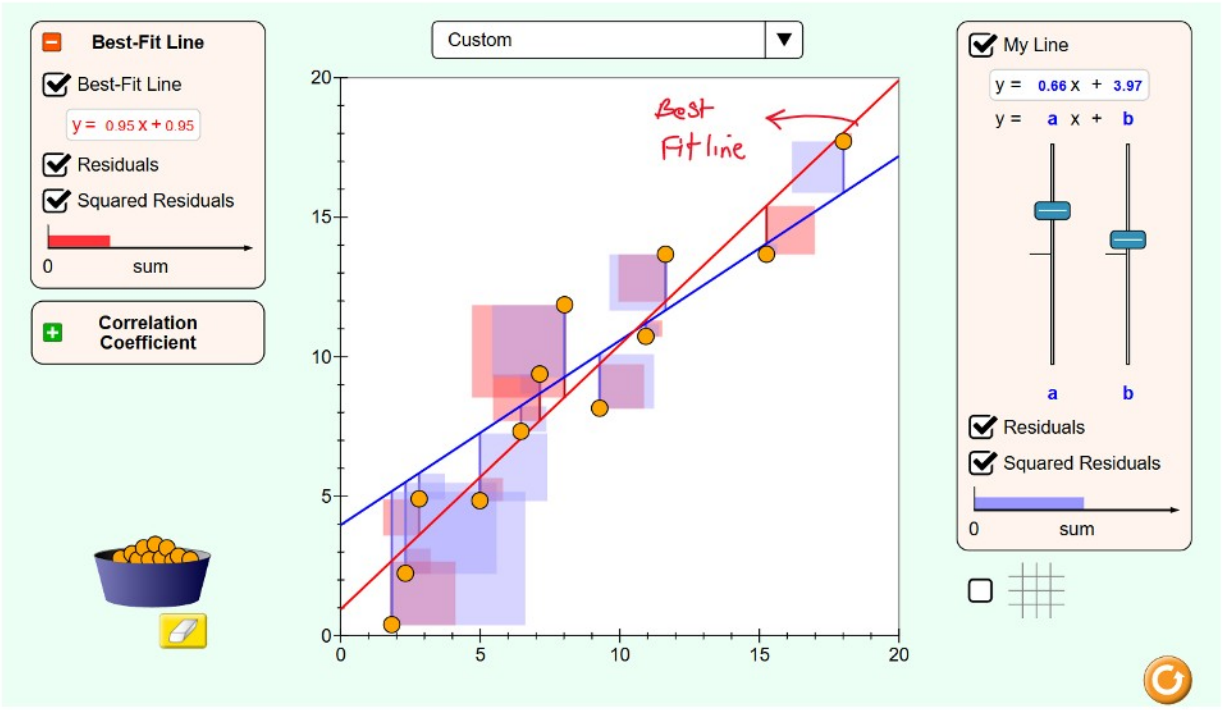




actual data points

linear regression line

$$MSE = \frac{\sum(error)^2}{N} = \frac{SSE}{N}$$



squared residual

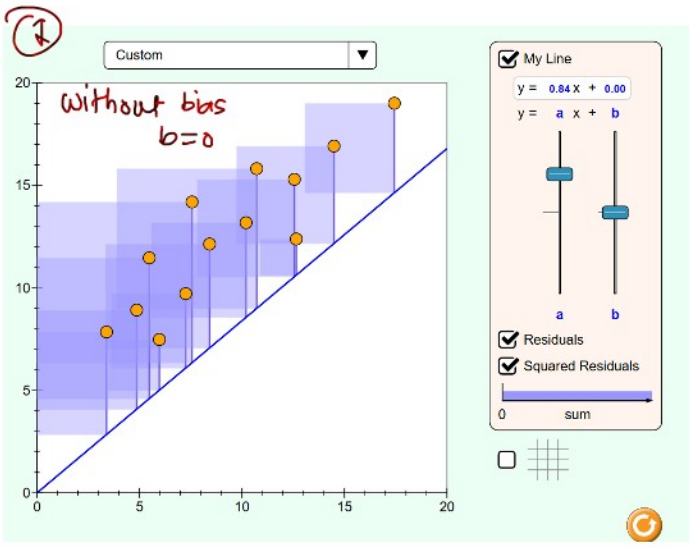
Best Fit line → lowest value of squared residuals → error is the least → (Best Fit line)

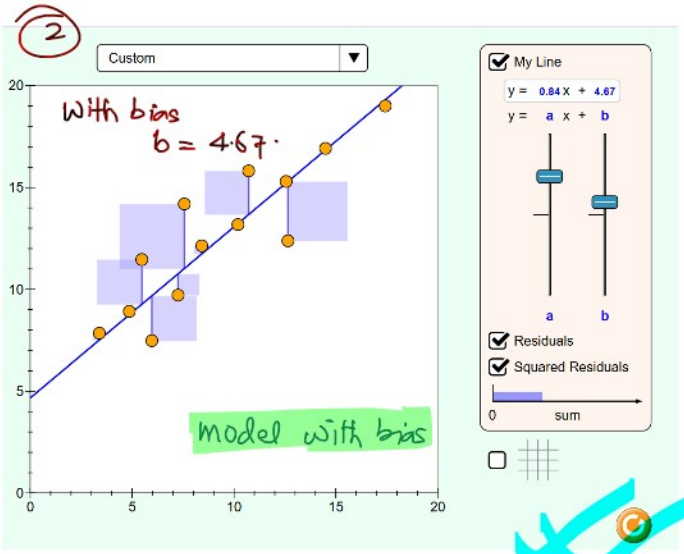
My line

$Y = 0.95X + 0.95$

weight bias

Why do we need bias ??





Comparing SSEs, it is clear that the model #② has better accuracy.

Kavita - What led to choose the linear regression out of so many available ML models ?

- What's the problem you are solving ?
  - Regression
  - classification
    - (continuous output) → linear relationships between Y and X_i's
    - → simple and stable model → 6 weeks → consistent performance across product categories
    - → Training time
    - → Business context → linear regression is highly interpretable → explain easily to stake holders → they believe in your model → (change management)


change management