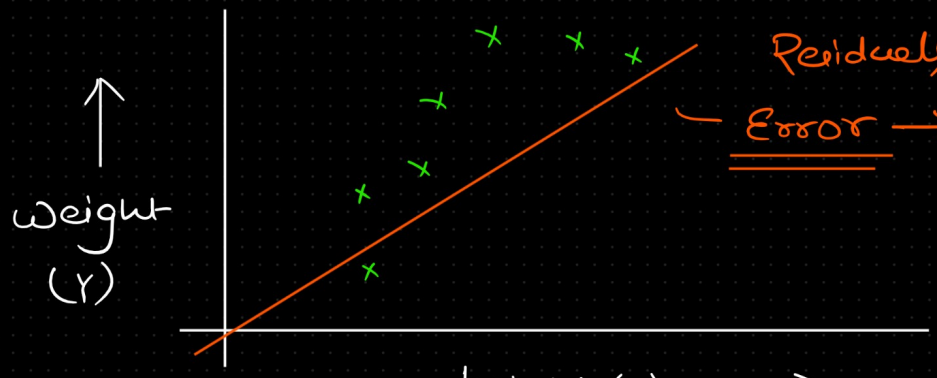
Bias & Variance

Error ⟶ Bias + Variance

↓

Training Error



Residuals/
Error ⟶ $(y - \hat{y})\downarrow\downarrow$

High Bias

$y = mx + c$ (underfitting)

↓

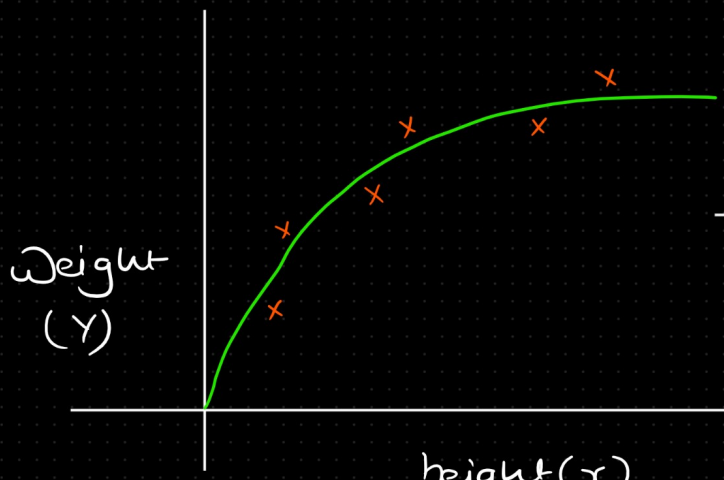
Not able to understand even the simpler data

↓

High Training Error

↳ Add more data points

Low Bias, Low Variance

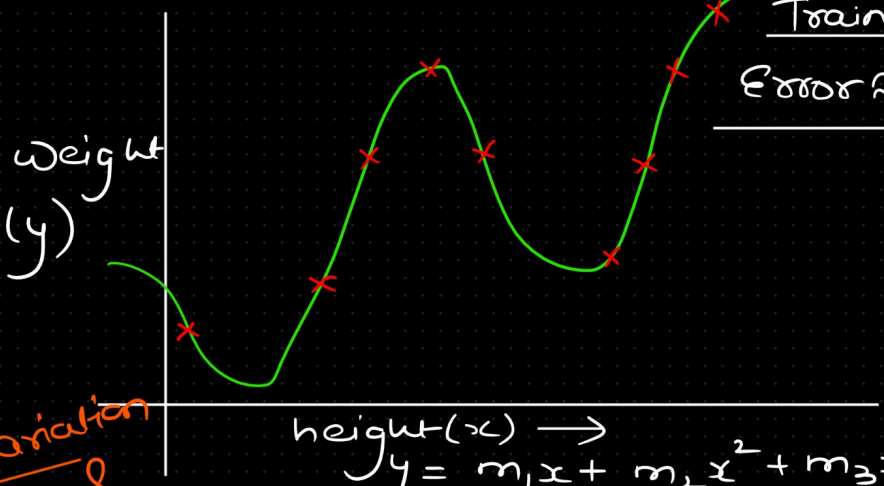


→ Ideal scenario

$y = m_1x + m_2x^2 + c$

Low Bias

Training Error ≈ 0 $(y - \hat{y})$



$y = m_1x + m_2x^2 + m_3x^3 + m_4x^4 + c$

Huge variation b/w training & testing error

High variance

Testing Error → very very high

↳ learns the noisy data points

Low Bias, High variance → Overfitting

↳ Regularization Techniques

Actual target ⇒ Training ↓↓ + Testing ↓↓