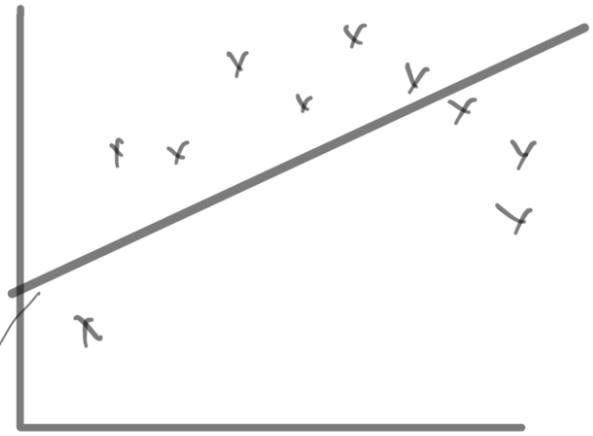
Stanford CS229 Lecture-7

Bias :- Introduced by approximating a complex problem

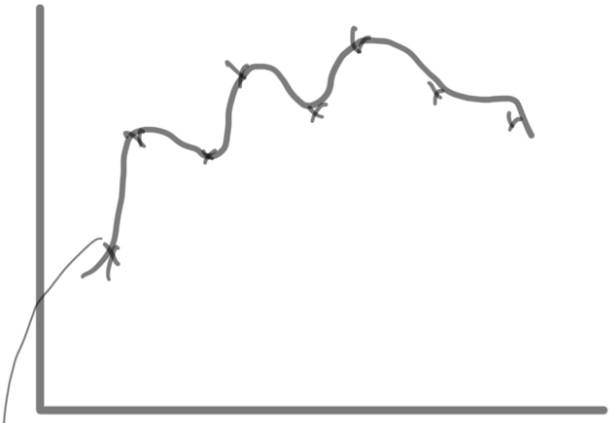
↳ reflects how far is our model from true values

Variance:- Reflects how predictions vary from dataset.



High bias (Underfitting)

$\theta_0 + \theta_1 x$ (Linear regression)



High Variance (Overfitting)

$\theta_0 + \theta_1 x + \theta_2 x^2 + \ldots$ (Polynomial regression)

High Bias

↳ Here the dataset was pre-conceived to fit a straight line. i.e Bias

High Variance

High variance from all the 3 samples as an average (overfitting)

Regularization :-

↳ Generalizing a model to prevent overfitting.

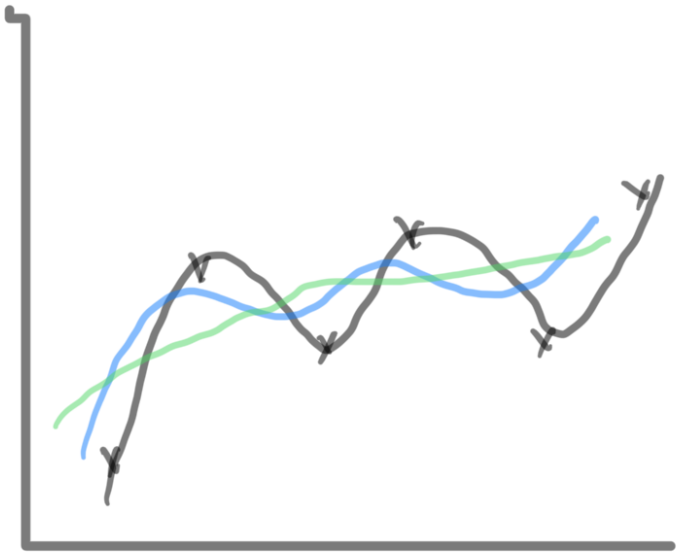
Ex :-

$$\min_{\theta} \frac{1}{2} \sum_{i=1}^{m} \| y^{(i)} - \theta^T x^{(i)} \|^2 + \pi \|\theta\|^2$$

↳ Linear Regression optimization objective

↳ Regularization term

Ex :-



$\pi = 0$
$\pi = 1$
$\pi = 2$

as you can see as we increase π (regularization), we decrease overfitting