Regularizam - 1   (Interview imp)

→ Bias variance tradeoff -

→ $\frac{c_{g}p^{o} \mid \{q, \mid \{q,}{x \qquad y}$

we want a fn st : $y = f(x)$
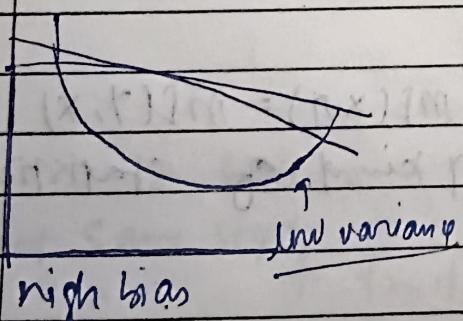
&, $y = f(x) + error$
            └ irreducable

we want $f(x)$ for population but we
only have sample so we get $f'(x)$
        $\hat{y} = f'(x)$

$y - \hat{y} = f(x) - f'(x)$: [reducable error]
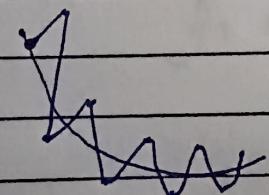
• Bias → inability of ML model to fit in training
                                        data

high bias → very less fit   (low variance)
Low bias

"Variance - how much ML
predict" changes when
training data is changed

low variance
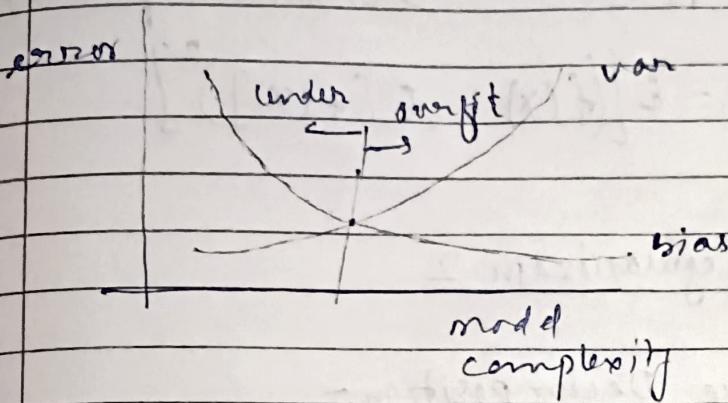
high bias

→ Low bias but high variance

- high bias then underfitting
  low bias then overfitting

we want low bias & low variance
But if we minimize bias then var. increases

- Expected values –
  is any outcome of a R.V over a large no.
  of trials or experiments

Discrete R.V ⇒ $E(x) = X_1 \cdot P(X_1) + X_2 P(X_2) + \cdots + X_n P(X_n)$

⇒ Expected value ⟶ means Popul^n mean
   Var $[x]$ ⟶ var of popul^n

$$var[x] = E[x^2] - (E[x])^2$$

$$E[(x - E[x])^2]$$

Bias –
   is a systematic error that a model introduces
   because it cannot capture true rel^n in data
   It is diff b/w expected predc^n of
   our model & correct value which we are
   trying to predict.

→ true f^{n} $f(x)$ we know $f'(x)$

<u>So</u>

$$Bias = E[f'(x)] - f(x)$$

if $E[f'(x)] = f(x)$

$\Rightarrow$ Bias $= 0$ $\Rightarrow$ Unbiased predictor

• $Var(f'(x)) = E\left[\left(f'(x) - E[f'(x)]\right)^{2}\right]$