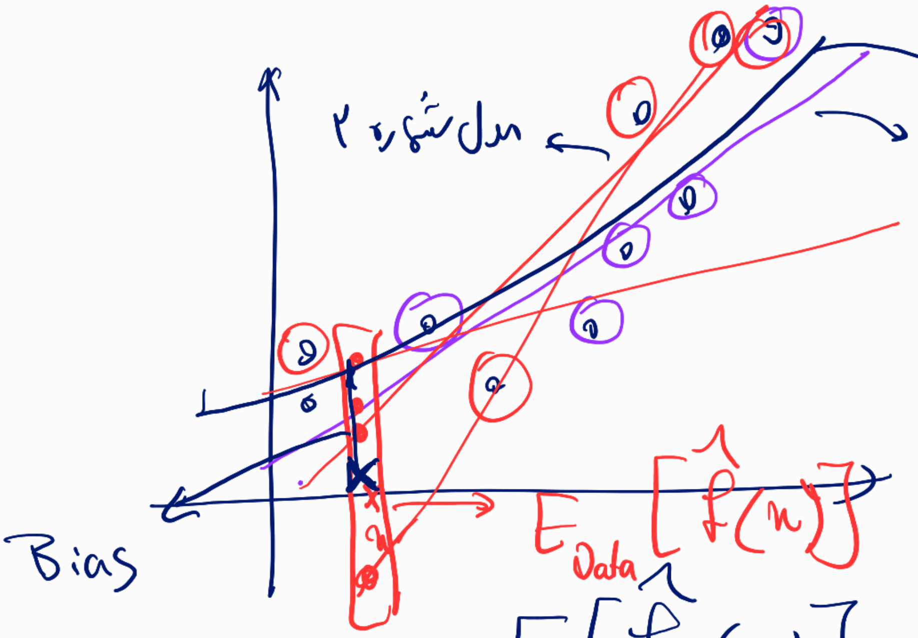

f → تابع واقعی

$E_{Data}[\hat{f}(x)]$ $\quad$ $E_{Data}[h(x)]$

$E_{D}[\hat{f}_{\theta}(x)]$

Training Data ← $E_{D}[h_{\theta}(x)]$

$$\hat{\mu} = \underset{\mu}{\arg\max} \prod_{i=1}^{n} \frac{1}{\sqrt{2\pi\sigma^2}} e^{-\frac{(x_i-\mu)^2}{2\sigma^2}}$$

$$= \underset{\theta}{\arg\max} \; Log(Likelihood(X;\theta)) =$$

$$\underset{\mu}{\arg\max} \underbrace{\sum_{i=1}^{n} \log\left(\frac{1}{\sqrt{2\pi\sigma^2}}\right)}_{\text{عدد ثابت}} + \sum_{i=1}^{n} \frac{-(x_i-\mu)^2}{2\sigma^2} \Big| \; \text{ثابت}$$

$$= \underset{\mu}{\arg\max} \underbrace{-\sum (x_i-\mu)^2}_{L}$$

$$\frac{\partial L}{\partial \mu} = \sum_{i=1}^{n} 2(x_i-\mu) = 0 \quad \rightarrow \left[\sum x_i\right] - \left[n\mu\right] = 0$$

$$\Rightarrow \hat{\mu} = \frac{\sum x_i}{n} = \bar{X}$$