



Start-Tech Academy

# Linear Discriminant Analysis

## Linear Discriminant Analysis

- Preferred when response variable has more than two classes
- Based on Bayes theorem

Height	Fit	Not Fit	
Low	13	22	35
Medium	15	25	40
High	20	5	25
	48	52	100

# Linear Discriminant Analysis

## Conditional Probability

Height	Fit	Not Fit	
Low	13	22	35
Medium	15	25	40
High	20	5	25
	48	52	100

- Probability of 'Fit' given 'Medium' =  $15/40$
- Bayes Classifier :  
Assigns conditional probability to all classes and assign the class with highest probability
- $15/100 = 15/40 * 40/100 = 15/48 * 48/100$

# Linear Discriminant Analysis

## Conditional Probability

$$p_k(x) = \frac{\pi_k \frac{1}{\sqrt{2\pi}\sigma} \exp\left(-\frac{1}{2\sigma^2}(x - \mu_k)^2\right)}{\sum_{l=1}^K \pi_l \frac{1}{\sqrt{2\pi}\sigma} \exp\left(-\frac{1}{2\sigma^2}(x - \mu_l)^2\right)}$$