AIML - Week-2

Friday, July 23, 2021 9:28 AM

$$P(A|B) = \frac{P(A \cap B)}{P(B)} \Rightarrow$$

$$P(B|A) = \frac{P(A \cap B)}{P(A)} \Rightarrow$$

$$P(A \cap B) = P(A|B) \cdot P(B) = P(B|A) \cdot P(A) \rightarrow \text{III}$$

$$P(B|A) = \frac{P(A|B) \cdot P(B)}{P(A)} \longrightarrow \text{IV}$$

P(B) - hypothesis/Prior
P(A|B) - Likelyhood
P(A) - Total Evidence

Scenario 1 ⇒

$P(\text{covid}) = 1.5\% \Rightarrow 15/1000 \longrightarrow$ I

RT-PCR Test drive —

$P(+ve|\text{covid}) = 80\% \longrightarrow$ True Positive → I

$P(-ve|\text{covid}) = 20\% \longrightarrow$ False Negative → II

$P(+ve|\text{non-covid}) = 4\% \rightarrow$ False Positive → III

$P(-ve|\text{non-covid}) = 96\% \rightarrow$ True Negative → IV

Suppose one test is conducted ⇒

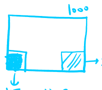
$P(\text{covid}|+ve) = ??$

$$P(B|A) = \frac{P(A|B) \cdot P(B)}{P(A)}$$

$$= \frac{P(+ve|\text{covid}) \cdot P(\text{covid})}{P(+ve) - \text{all +ve}}$$

$$= \frac{0.8 \times 0.015}{(0.8 \times 0.015) + (0.04 * 0.985)}$$

$$= 23.5\%$$



15 — covid pop.

985 - non-covid pop. ⇒ $985 \times 0.04 = 39.4$ False +ve

$15 \times 0.8 = 12/15$ - covid & +ve

$$\frac{0.8 \times 15 = 12}{12 + 39} \longrightarrow \text{Total +ve} \Rightarrow \frac{12}{51} = 23.51\%$$

https://towardsdatascience.com/exploring-normal-distribution-with-jupyter-notebook-3645ec2d83f8

$$\binom{n}{k} p^k (1-p)^{n-k}$$

$\mu = 60$

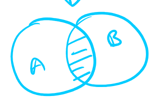
$\sigma = 12$

$$\frac{500}{2000} \times \frac{400}{500}$$

$P(A \cap B) = P(B) \cdot P(B|A)$

$= 50$

A∩B



$P(A \cap B) = P(A|B) \cdot P(B)$

$$= \frac{400}{\cancel{500}} \times \frac{\cancel{500}}{2000}$$

$$= \frac{400}{2000} = \frac{1}{5}$$

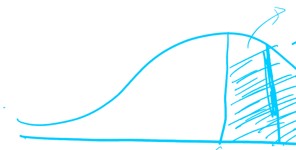
$$Z = \frac{0.28 - 0.25}{} = 0.6$$

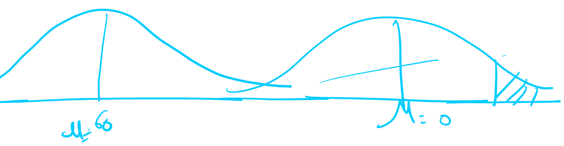
Z^2

$$Z = \frac{X - 60}{12}$$

$=$

10%





$$Z = \frac{80-60}{12} = 20/12 = 1.67$$

$1 - 0.9525$

$Z = 1.67 \quad P =$

$= 0.475$

$= \cancel{4.75}$

5%

85%

$1 - 85\% = 15\%$

(79%)

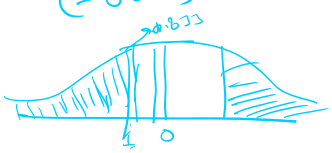
$\cancel{0.79}$

$$\frac{50-60}{12} = -10/12 = -.8333$$

(-0.8333)

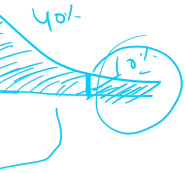
$1 - 79\%$

$= 21\%$



50%

40%



10% of the students are to be awarded distinction

X = ??

30 - people distinct