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Assignment 5

Qun! How are you going to figure out the average height of all the trees in Karnataka.?

Ans Considering given σ = ~~100~~ 20, ← Population S.D
$n = 30$,
$\bar{x} = 100$
$CI = 95\%$

$$CI = \bar{x} \pm Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$100 \pm Z_{\frac{0.05}{2}} \frac{20}{\sqrt{30}}$$

$$Z_{0.025} = 1 - 0.025$$
$$= 0.975 \rightarrow \text{check in Z table}$$

$$= 100 \pm 1.96 \times \frac{20}{\sqrt{30}}$$

$$\text{Lower Limit} = 100 - 1.96 \times \frac{20}{\sqrt{30}}$$

$$= 92.84$$

$$\text{Higher Limit} = 100 + 1.96 \times \frac{20}{\sqrt{30}}$$

$$= 107.156$$

It will range from 92.84 to 107.156. (95% confidence)

Ques 2 What is Hypothesis testing & how does it work?

Ans Hypothesis is an educated guess about something in the world.

Hypothesis testing is a way to test the result of a survey or experiment to see if you have meaningfull results or not.

Steps Involved

1. State Null & Alternate Hypothesis
2. Calculate Decision Rule
3. Perform / Figure out test you need to perform
4. State whether to support or reject Hypothesis

Ques 3 Explain difference b/w Alpha & Beta Error. Which is more in the most hazardous?

Ans We commit type I (Alpha) error if we reject the null Hypothesis when it is true. This is a false Positive, like a fire alarm that rings when there's no fire.

A type 2 error (Beta) happen when we fail to reject the null when it is not true. This a false negative. like a fire alarm that fails to sound when there is a fire.

In many case Type I is worse than type 2 error. It all depends on the situation.

Ques 4 What is the significance of the P-value?

Ans ① P-value is a statistical measurement used to validate a Hypothesis against observed data

② Pvalue measure the probability of obtaining the observed results, assuming that the null Hypothesis is true.

③ Lower Pvalue greater the statistical significance of the observed difference

④ Pvalue can serve as an alternative to or in addition to preselected confidence level for Hypothesis testing

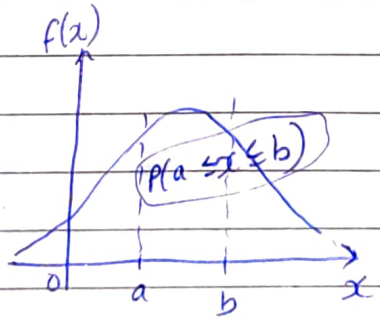
Ques 5 What is the Probability distribution Function and how does it work?

Ans ~~PDF is used to define the random Variable probability coming within a distinct range of value, as opposed to taking any one value.~~

PDF defines the probability function representing the density of a continous random variable lying b/w a specific range of values

For continous Random Variable

$$P(a \leq x \leq b) = \int_a^b f(x)\,dx$$



Properties of PDF

① PDF is non-negative for all possible values.

② $$\int_{-\infty}^{\infty} f(x)\,dx = 1$$