SNS COLLEGE OF TECHNOLOGY

An Autonomous Institution
Coimbatore-35

DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE

23ADT202 – FUNDAMENTALS OF DATA SCIENCE AND ANALYTICS

II YEAR IV SEM

UNIT III – Confidence Interval – Level of Confidence

Engaging Hook

•**Title**: What is Your Level of Confidence?

•**Content**:

- Present a curious question: "How confident are you in your data-driven decisions?"

- Brief industry example: "In healthcare, how might a doctor use confidence intervals to make treatment decisions?"

Empathize

•**Title**: Connecting to Real-World Experiences

•**Content**:

- Discuss situations where decisions are based on data (e.g., business strategies, public health).
- Ask students to reflect on times they relied on data to make critical choices.

Define the Problem

•**Title**: The Core Problem

•**Content**:

- Define what a confidence interval is: a range of values that likely contains the population parameter.
- Highlight the uncertainty in data: "How do we measure and express our confidence in statistical estimates?"

Ideate

•**Title**: Exploring Solutions

•**Content**:

- Introduce the concepts of sampling, margin of error, and confidence levels.
- Discuss the importance of sample size and variability in estimating confidence intervals.

Prototype

•**Title**: Understanding Confidence Intervals

•**Content**:

- Visual diagram of how a confidence interval is calculated:
  - Sample mean ± Margin of error.
- Example of a graph showing confidence intervals overlaid on data points.

Implementation

•**Title**: Applying Confidence Intervals

•**Content**:

- Explain the steps to calculate confidence intervals:
    - Collect sample data.
    - Determine sample mean and standard deviation.
    - Calculate margin of error using a z-score/t-score.
- Provide a simple formula for visual reference.

Test / Reflect

- **Title**: Evaluating Performance

- **Content**:

  - Discuss the limitations of confidence intervals: assumptions about normality, outliers, and sample size effects.
  - Talk about trade-offs, such as precision vs. accuracy.

Real-World Application

•**Title**: Industry Scenario

•**Content**:

- Case Study: Using confidence intervals in A/B testing for marketing.
- Discuss decisions made based on interval estimates to gauge customer behavior.

Summary & Reflection

•**Title**: Linking Back to the Core Problem

•**Content**:

- Recap: Confidence intervals help quantify uncertainty in data.
- Emphasize their importance in informed decision-making across various fields.
- Close with a reminder of their application in everyday life as future engineers.