



# Introduction to Statistics

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# Statistics

- The scientific discipline of collecting, organizing, analyzing, interpreting, and presenting data
- Statistics can be used to predict the future, determine the probability that a specific event will happen, or help answer questions about a survey.

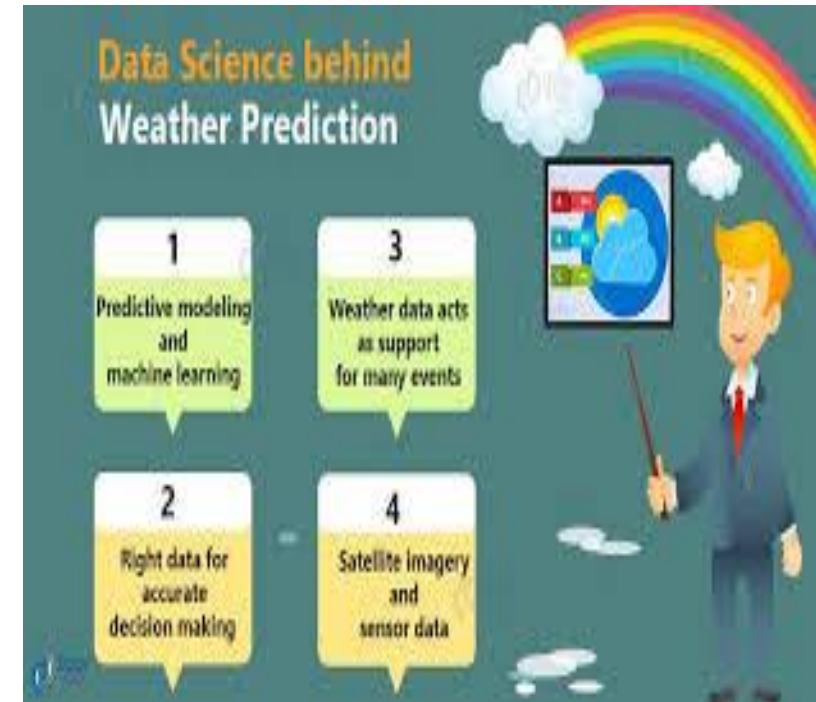
- By understanding the likelihood of rain based on past patterns  
→ Weather forecasting

**Weather today: IMD predicts rain with thunderstorm in THESE states; above normal temperatures in South Indian states**

*Weather today: IMD forecasts scattered to widespread rainfall with thunderstorms, lightning, and gusty winds in various regions from 16-20 March. Hailstorm alert for Vidarbha and East Madhya Pradesh. Light rainfall expected in Telangana, Coastal Andhra Pradesh, and Yanam.*

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# Biostatistics

- It is also called medical statistics
- It is the application of statistical principles to problems in biology, medicine, and public health.
- Uses:

disease surveillance, risk factor identification, assessing treatment efficacy, ensuring the safety and reliability of medical findings, and informing health legislation to improve population health.

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# Two Main Branches of Statistics

## **Descriptive**

**Statistics:** Focuses on describing and summarizing the main features of a dataset.

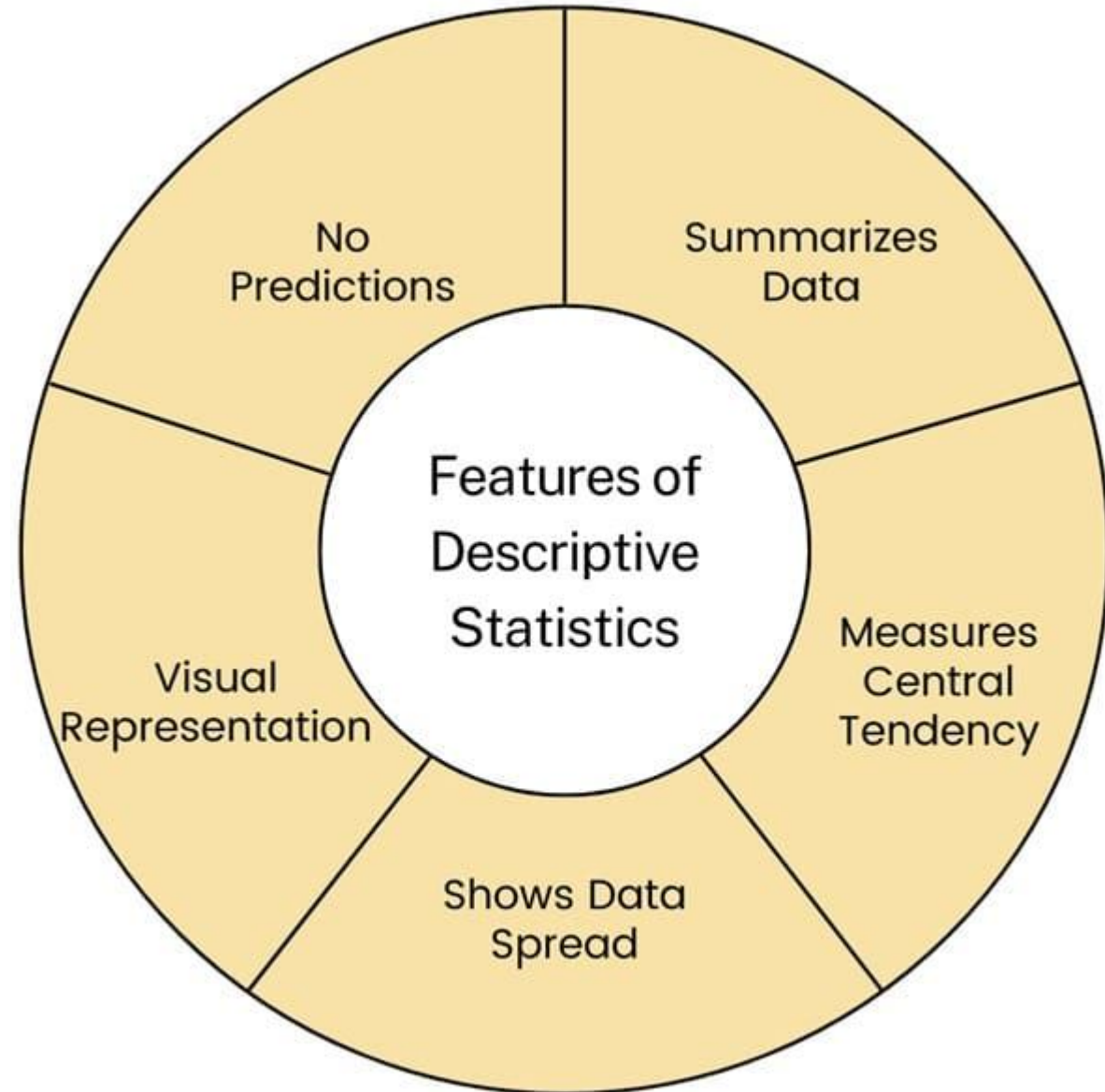
## **Inferential**

**Statistics:** Involves making generalizations, predictions, and decisions about a larger population based on data from a sample.

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# Features of Descriptive Statistics

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# Importance of Descriptive Statistics

they organize, summarize, and present large datasets in a concise, understandable way, providing a foundational understanding of the data's characteristics

This initial step is crucial for identifying trends, spotting errors, ensuring statistical assumptions are met, and forming hypotheses, thereby guiding and informing more complex inferential statistical analyses.

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# Statistics

## Descriptive Statistics

## Inferential Statistics

### Measure of Central Tendency

- Mean
- Mode
- Median

### Measure of Variability

- Range
- Variance
- Standard Deviation
- Interquartile Range (IQR)

### Graphical Representation

- Histogram
- Boxplot
- Pie chart

Probability Distributions

Hypothesis Testing

Regression Analysis

Confidence Intervals