**Descriptive vs. Inferential Statistics**

Statistics is divided into **Descriptive** and **Inferential** statistics. Both play different roles in data analysis.

### **1. Descriptive Statistics**

Descriptive statistics **summarize and describe** the main features of a dataset without making conclusions beyond the data.

✅ **Purpose**: Organizing, summarizing, and visualizing data.  
 ✅ **Used When**: You only want to describe patterns in a dataset.

#### **Types of Descriptive Statistics:**

* **Measures of Central Tendency** (Find the center of data)
  + Mean (Average)
  + Median (Middle value)
  + Mode (Most frequent value)
* **Measures of Dispersion** (Show how spread out the data is)
  + Range (Max - Min)
  + Variance
  + Standard Deviation
* **Data Representation**
  + Tables, Graphs, Charts (Histograms, Boxplots, Pie charts)

📌 **Example**:  
 A survey shows that the **average height of students in a class is 165 cm, with a standard deviation of 5 cm**.

### **2. Inferential Statistics**

Inferential statistics **make predictions or generalizations** about a population based on a sample.

✅ **Purpose**: Drawing conclusions, making predictions, and testing hypotheses.  
 ✅ **Used When**: You want to infer something about a larger group using a smaller sample.

#### **Types of Inferential Statistics:**

* **Hypothesis Testing** (Check if a claim is true)
  + t-tests, ANOVA, Chi-square tests
* **Confidence Intervals** (Estimate a range for population parameters)
* **Regression Analysis** (Find relationships between variables)

📌 **Example**:  
 A company surveys **200 customers** and finds that **70% like a new product**. Using inferential statistics, they estimate that **around 70% of all their customers (millions) may like it too**.

### **Key Differences**



