Median (Middle Value)

Detailed Study Notes

The median is the middle value in an ordered dataset. It divides the data into two equal halves and is less affected by extreme values than the mean.

Definition:
The median is the value that separates the higher half from the lower half of a data sample.

Formula:
For odd n: Median = Middle value
For even n: Median = Average of two middle values

Detailed Example:
Example 1 (Odd number of values):
Dataset: 10, 20, 30, 40, 50
Step 1: Data is already sorted
Step 2: Count = 5 (odd), so median is the 3rd value
Median = 30

Example 2 (Even number of values):
Dataset: 10, 20, 30, 40, 50, 60
Step 1: Data is already sorted
Step 2: Count = 6 (even), so median is average of 3rd and 4th values
Median = (30 + 40) / 2 = 35

Properties of the Median:
1. Not affected by extreme values (robust measure)
2. Always exists and is unique
3. Can be used with ordinal, interval, and ratio data
4. 50% of values are below the median, 50% are above

When to Use the Median:
- Use when data has outliers or is skewed
- Appropriate for ordinal, interval, and ratio data
- When you need a measure resistant to extreme values

Applications:
- House prices (often reported as median to avoid skew from luxury homes)
- Income data (median income is more representative than mean)
- Any data with potential outliers