Fundamental

# Simple Explanation of Statistical Terms

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# Mean

**The mean is simply the average of a set of numbers. You add up all the numbers in the set and then divide by how many numbers there are.**

# Example

If you have the numbers 2, 4, 6, 8, and 10, the mean would be (2 + 4 + 6 + 8 + 10) / 5 = 6.

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# Median

**The median is the middle value in a set of numbers when they are arranged in order.**

**If there's an even number of values, the median is the average of the two middle numbers.**

# Example

For the set {3, 6, 8, 12, 15}, the median is 8.

For the set {4, 6, 7, 10}, the median is (6 + 7) / 2 = 6.5.

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# Variance

Variance measures how spread out the numbers in a dataset are from the mean. It calculates the average of the squared differences from the mean.

# Example

**If the numbers are 2, 4, 6, 8, and 10, and the mean is 6.**
**The variance would be ((2-6)^2 + (4-6)^2 + (6-6)^2 + (8-6)^2 + (10-6)^2) / 5 = 8.**

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# Standard Deviation

**Standard deviation is the square root of the variance. It gives you a sense of how much the numbers in a dataset deviate from the mean.**

# Example

**If the variance is 8, the standard deviation would be √8 ≈ 2.83.**

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# Correlation

**Measures how closely two variables move together; positive correlation indicates they increase or decrease together, while negative correlation means they move in opposite directions.**

# Example

There might be a positive correlation between studying time and exam scores, meaning the more you study, the higher your exam scores tend to be.

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# Regression

Analyzes the relationship between variables to predict outcomes; for instance, predicting weight based on height.

# Example

If you want to predict someone's weight based on their height, you might use regression analysis.

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# Hypothesis Testing

**Hypothesis testing is a way to make decisions or draw conclusions about a population based on sample data.**

# Example

**Hypothesis testing can evaluate a new drug's effectiveness by comparing outcomes of patients who received the drug with those who had a placebo.**

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