Understanding Correlation: Simplified Explanation! Data Science and A.I. Lecture Series

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 - 0 (No correlation)

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Key Differences Between Correlation and Covariance

• Covariance :

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• Measures the direction of the relationship.

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- Scale-dependent.

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• Correlation :

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- Measures the direction of the relationship.
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• Correlation :

- Standardizes covariance to a range of -1 to +1.
- Removes the effect of scale.
- **Simplified Interpretation :** Correlation provides a clearer measure of the strength and direction of the relationship.

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• Use when the magnitude and scale of variables are important.

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- Example: Portfolio risk in finance .

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- Use when the magnitude and scale of variables are important.
- Example: Portfolio risk in finance .

• Correlation :

- Use to measure the strength and direction of a relationship.
- Example: Statistical research and comparisons across datasets .

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$$\operatorname{Cov}(X,Y) = \frac{\sum (X_i - \bar{X})(Y_i - \bar{Y})}{n}$$

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$$\operatorname{Cov}(X,Y) = rac{\sum (X_i - \bar{X})(Y_i - \bar{Y})}{n}$$

$$r = \frac{\operatorname{Cov}(X, Y)}{\sigma_X \sigma_Y}$$

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• **Covariance :** Shows the direction of the relationship but is scale-dependent.

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- **Covariance :** Shows the direction of the relationship but is scale-dependent.
- **Correlation :** Standardizes covariance, making it easier to interpret.
- Use correlation for a clear, unit-free measure of relationships.

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