

Variance



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Python x

Variance is a statistical measure that tells us how much the data is spread out from the average (mean).

👉 **Variance shows how far the data values are from the mean.**

If all values are close to the mean → variance is small

If values are far from the mean → variance is large

Simple Real-Life Example

Class A (Marks) = 60, 61, 59, 60, 60

Average (Mean) \approx 60



Here all marks are
around 60.



➔ Therefore, the variance will be small.

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Class B (Marks) = 20, 40, 60, 80, 100

Average (Mean) \approx 60

but the marks are
very spread out.



➡ Therefore, the variance will be large.

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Situation	Variance
Data values are very similar	Low Variance
Data values are widely spread	High Variance

In One Line

👉 Variance tells us how much the data is spread out from the average.



Field	Why Variance is Used	Example
Machine Learning	It is used to evaluate models and understand how well a model generalizes to new data.	If a model memorizes the training data too much, it creates a high variance problem (overfitting) .
Data Analysis	It helps to understand whether the data is stable or changing significantly.	A company checks whether monthly sales are consistent or varying a lot .
Finance	It is used to measure the risk of investments .	If a stock price goes up and down frequently , it indicates high variance and higher risk .
Education	It helps analyze student performance differences in a class.	Teachers check whether students have similar marks or very different scores .