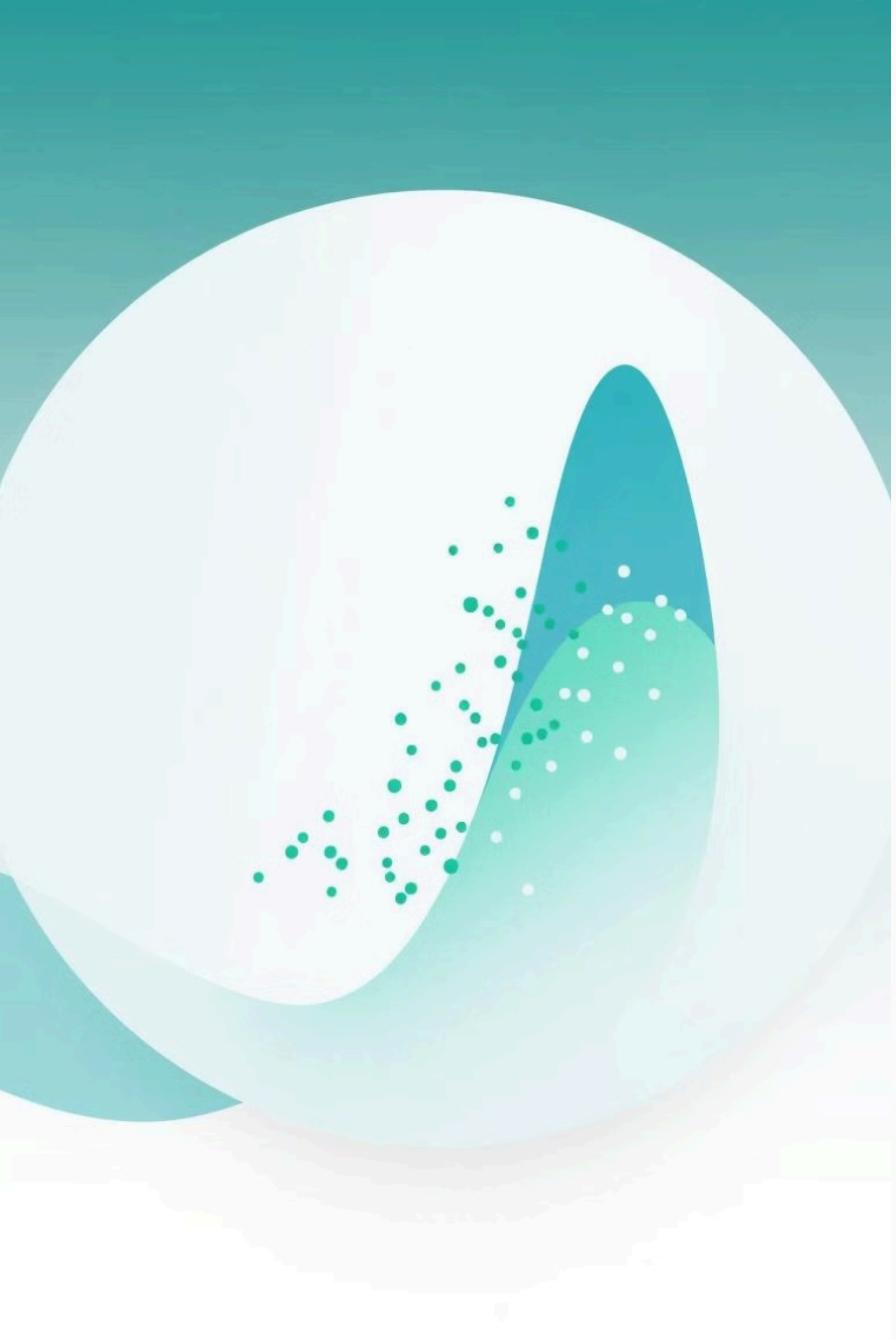

Introduction to Measures of Dispersion

Measures of dispersion quantify the spread or variability of data points around the central tendency. They are crucial for understanding how data is distributed and identifying outliers.

by Khush karan Singh

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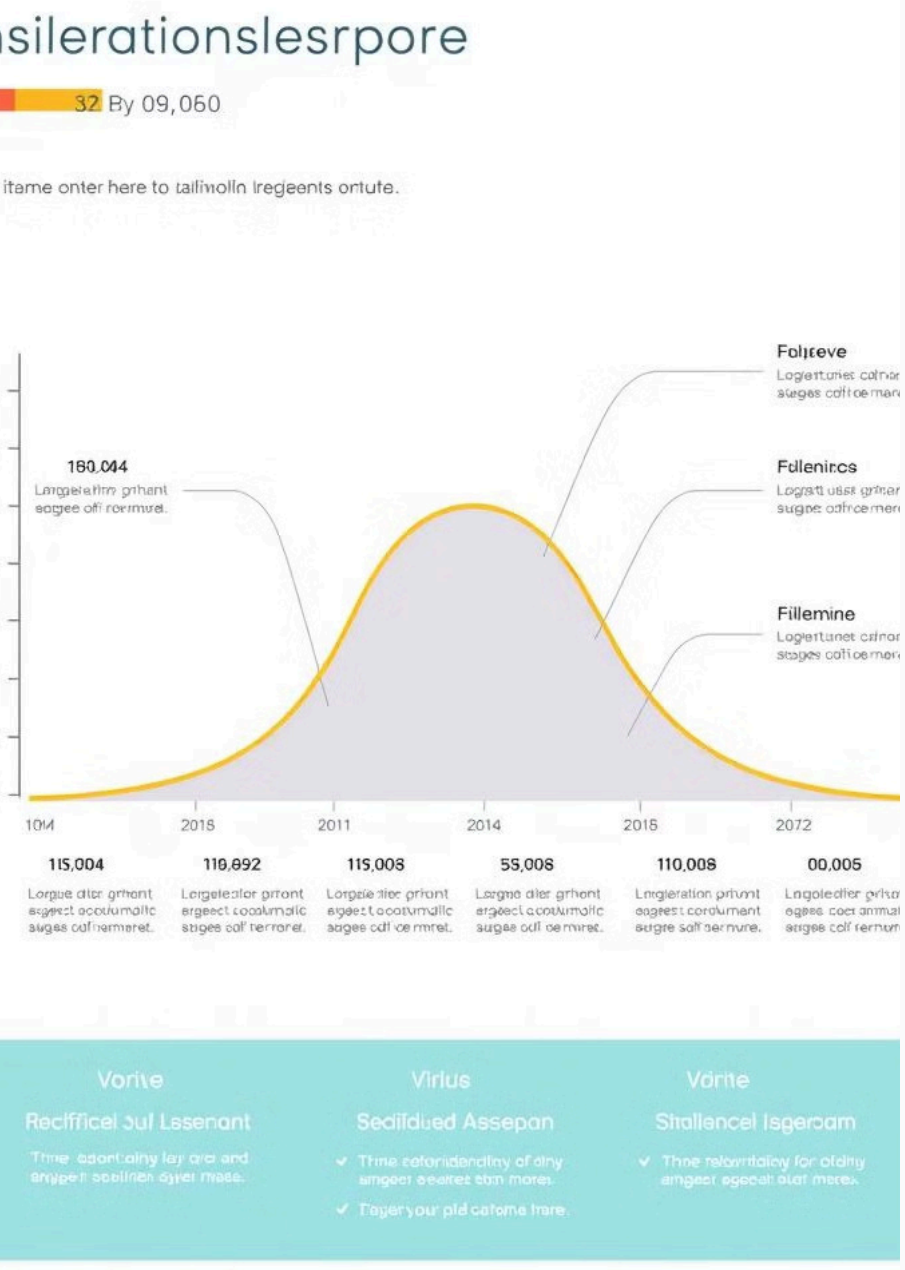

Definition of Measures of Dispersion

Measures of dispersion in statistics describe how spread out a set of data is. These measures help us understand the variability within a data set, providing insight into the distribution of values.

1 Range

The difference between the highest and lowest values in a data set.

2 Variance

The average squared deviation of each value from the mean, indicating how much the data points are spread out from the average.

3 Standard Deviation

The square root of the variance, giving a measure of dispersion in the same units as the original data.

4 Mean Deviation

The average absolute difference between each value and the mean, providing a measure of the average deviation from the center.

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Range

The range is the simplest measure of dispersion. It is calculated by subtracting the smallest value from the largest value in a data set. The range is susceptible to outliers, which can skew the results.

Advantages

Easy to calculate.

Provides a quick understanding of the spread of data.

Disadvantages

Highly affected by extreme values.

Doesn't consider all data points.

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Variance

Variance measures the average squared deviation of each data point from the mean. It gives a precise idea of how much the data points deviate from the average.

1

Step 1

Calculate the mean of the data set.

2

Step 2

Subtract the mean from each data point.

3

Step 3

Square each difference.

4

Step 4

Sum up all the squared differences.

5

Step 5

Divide the sum by the total number of data points minus 1.

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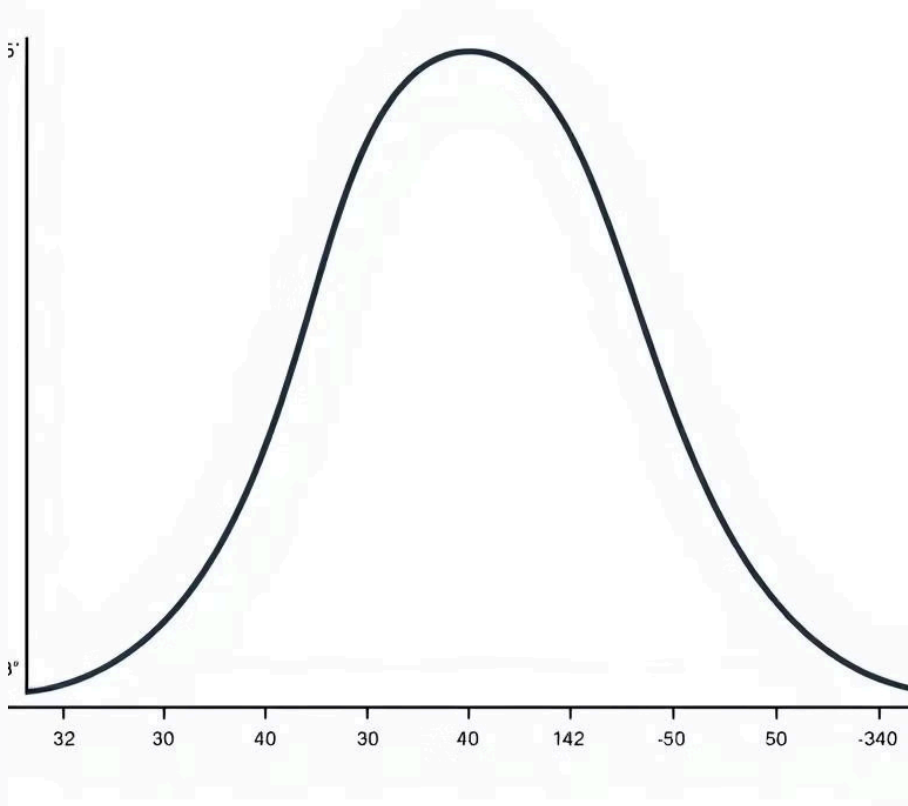
Standard Deviation

The standard deviation is the square root of the variance. It is expressed in the same units as the original data, making it easier to interpret. It is a commonly used measure of dispersion.

High Standard Deviation	Data is widely spread out.
Low Standard Deviation	Data is tightly clustered around the mean.



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Mean Deviation

The mean deviation, also known as the average deviation, is the average absolute difference between each data point and the mean. It gives a measure of the average deviation from the center of the data set.

Calculating Mean Deviation

It involves finding the absolute difference between each value and the mean, summing up these differences, and dividing by the total number of values.

Advantages

It considers all data points.

It is relatively simple to calculate.

Disadvantages

It is less commonly used than standard deviation.

It is more sensitive to outliers than standard deviation.

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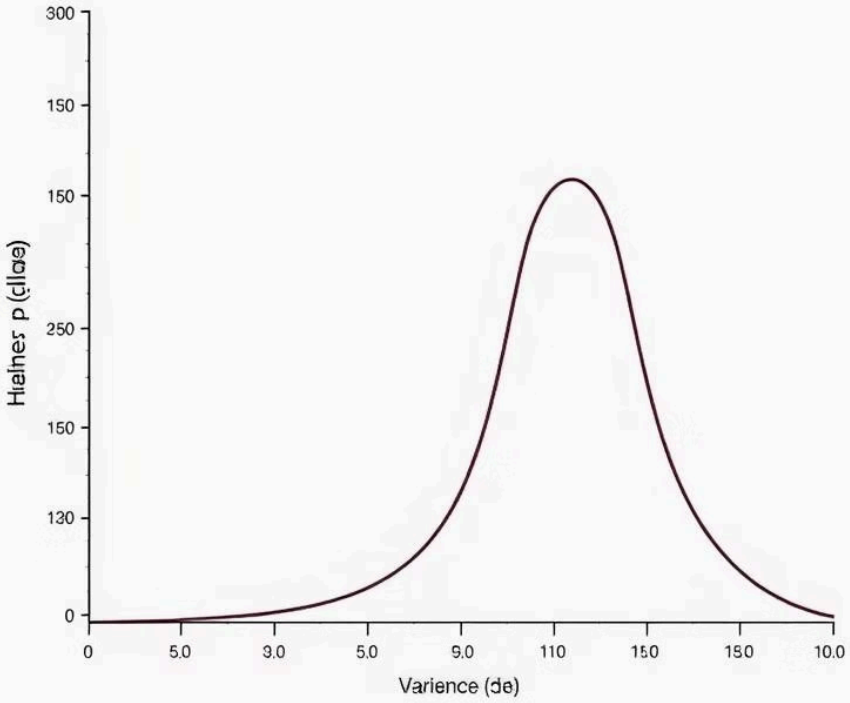

Coefficient of Variation

The coefficient of variation (CV) is a measure of relative dispersion. It is calculated by dividing the standard deviation by the mean and is expressed as a percentage.

CV is useful for comparing the variability of different data sets, even if they are measured in different units. A higher CV indicates greater variability, while a lower CV indicates less variability.

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Advantages and Disadvantages

Measures of dispersion are essential tools for understanding and analyzing data. They provide valuable insights into the spread and variability of data sets, helping us make informed decisions.

Advantages	Provide a comprehensive understanding of data distribution.	Enable comparison of different data sets.
Disadvantages	Can be sensitive to outliers.	May not always be the most intuitive measure.

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