Matthew Bradshaw

Dr. Shrikant Pawar

STAT 341 01

9 September 2023

Write a page report explaining differences between standard deviation and variance. Explain how 2 formulas differ from one another.

Variance

Variance is the average of the squared differences from the mean of a particular data set. Variance is a measurement of the spread between numbers in a data set. It provides a quantitative measure of how much individual data points in a dataset differ from the average of the dataset. Unlike standard deviation, variance is expressed in squared units of the original data set. Variance is shown to be σ2 (for population standard deviation) or s2 (for sample variance). Mathematically, the variance of a data set is calculated as follows:

1. Calculate the average of the data set.
2. For each data point, subtract the mean, and square the result to obtain the squared deviation from the mean.
3. Calculate the average of these squared deviations.

This is denoted as:

For population variance σ2:

σ2 =

For sample variance (s2):

s2 =

Where:

N = the total number of data points in the population

n = the total number of data points in the sample

xi = an individual data point

= the population mean

Standard Deviation

Standard deviation, like variance, is a mathematical concept that is used to measure how far a group of variables are from the mean in a data set. Standard deviation is expressed in the same units as the mean for a data set. Standard deviation is preferred over variance for several reasons:

* Interpretability: Standard deviation is expressed in the same units as the data se, unlike variance, making it more interpretable than variance.
* Mathematical Simplicity: Standard deviation is the square root of variance, so it is mathematically simpler to work with when dealing with normal distribution and in various statistical calculations.

Standard Deviation is often denoted as σ (for population standard deviation) or s (for sample standard deviation) is calculated as the square root of the data set’s variance.

For population standard deviation (σ):

σ =

Where:

σ = the population standard deviation

σ2 = the population variance

For sample standard deviation (s):

s =

Where:

s = the sample standard deviation

s2 = the sample variance