Start-Tech Academy

MEASURES OF DISPERSION

The measures that help us learn about the spread of a data set are called the measures of dispersion.

Steps

There are three measures of dispersion:

- Range
- Standard Deviation
- Variance

RANGE

Range is the difference between the largest and the smallest values in a data set

Example

$$\text{Range} = \text{Largest value} - \text{Smallest value}$$

For the ages of people attending a party below, what is the range?

10	14	26	25	30	34	14	33	33
13	21	25	29	28	7	31	31	30
25	33	31	13	28	33			

Range = 34 – 7 = 27

Range is influenced by outliers, therefore may not be very useful.

VARIANCE & STANDARD DEVIATION

Variance is the average of the squared differences from the Mean.
Standard Deviation is the square root of variance.

Formula

$$\sigma^2 = \frac{\Sigma(x-\mu)^2}{N} \quad \text{and} \quad s^2 = \frac{\Sigma(x-\bar{x})^2}{n-1}$$

Population standard deviation Sample standard deviation

Where Σ is the sum of, N is the population size, n is the sample size, μ is the population mean, and $\bar{x}$ is the sample mean.

Larger sigma value means that the data is more widely spread.

VARIANCE & STANDARD DEVIATION

Variance is the average of the squared differences from the Mean.
Standard Deviation is the square root of variance.

Example

For the ages of people attending a party below, what is the standard deviation?

10	14	26	25	30	34	14	33	33
13	21	25	29	28	7	31	31	30
25	33	31	13	28	33			

Variance = (10-24.875)^2+(14-24.875)^2…. / 24 = 1624.625/24 = 67.69

Standard Deviation = Sqr root of variance = 8.23