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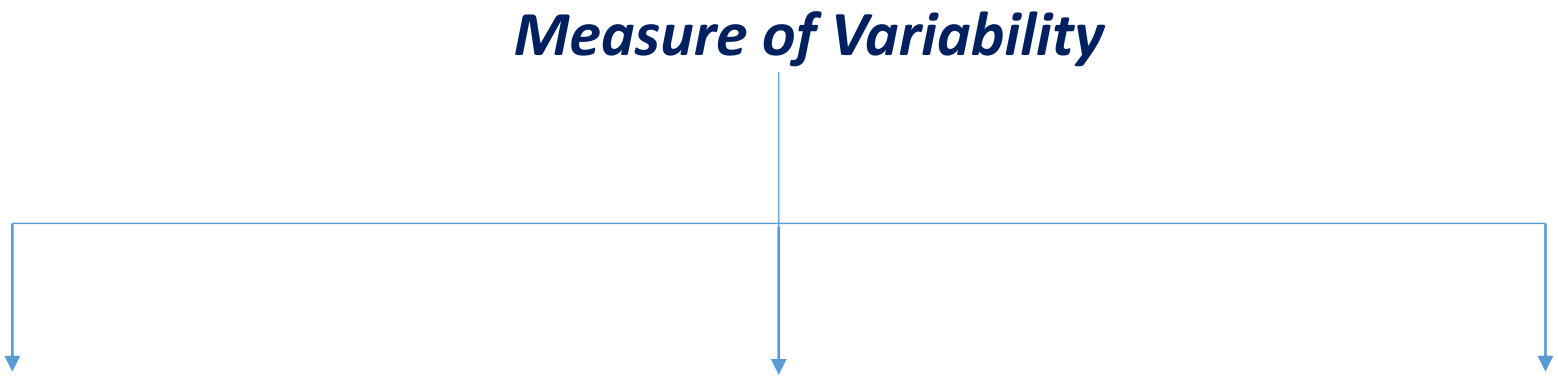
Measure of Variability: Range, Variance & Standard Deviation

Math for Machine Learning

Measure of Variability



*The **range** of a set of data is the difference between the largest and smallest values. It can give a rough idea about the distribution of our dataset.*

$$Range = Max\ value\ - Min\ Value$$

***Variance** is a measure of how far each number in the set is from the mean and therefore from every other number in the dataset.*

$$\sigma^2 = \frac{\sum(\chi - \mu)^2}{N}$$

Standard Deviation is the square root of Variance. Standard deviation looks at how spread out a group of numbers is from the mean.

$$SD = \sqrt[2]{\sigma}$$

Range ; Variance ; Standard Deviation

-5, 0, 5, 10, 15,

$$Mean = \frac{-5 + 0 + 5 + 10 + 15}{5} = 5$$

Range = 15 – (-5) = 20

$$Variance = \frac{(-5-5)^2 + (0-5)^2 + (5-5)^2 + (10-5)^2 + (15-5)^2}{5}$$

$$Variance = 50$$

$$Standard\ Deviation = 7.1$$

3, 4, 5, 6, 7

$$Mean = \frac{3 + 4 + 5 + 6 + 7}{5} = 5$$

Range = 7 – 3 = 4

$$Variance = \frac{(3-5)^2 + (4-5)^2 + (5-5)^2 + (6-5)^2 + (7-5)^2}{5}$$

$$Variance = 2$$

$$Standard\ Deviation = 1.4$$