Measure of Variability

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1 Statistics with Python

https://www.geeksforgeeks.org/statistical-functions-in-python-set-2-measure-of-spread/

1.1 Measure of Variability

1.1.1 Range()

[1]:
```
# Python code to demonstrate range()
# Sample Data
arr = [1, 2, 3, 4, 5]

#Finding Max
Maximum = max(arr)

# Finding Min
Minimum = min(arr)

# Difference Of Max and Min
Range = Maximum-Minimum

print("Maximum = {}, Minimum = {} and Range = {}".format( Maximum, Minimum,␣
↪Range))
```

```
Maximum = 5, Minimum = 1 and Range = 4
```

1.1.2 Variance()

[8]:
```
# Python code to demonstrate variance()
# function on varying range of data-types

# importing statistics module
from statistics import variance

# importing fractions as parameter values
from fractions import Fraction as fr

# tuple of a set of positive integers
# numbers are spread apart but not very much
```

```
sample1 = (1, 2, 5, 4, 8, 9, 12)

# tuple of a set of negative integers
sample2 = (-2, -4, -3, -1, -5, -6)

# tuple of a set of positive and negative numbers
# data-points are spread apart considerably
sample3 = (-9, -1, -0, 2, 1, 3, 4, 19)

# tuple of a set of fractional numbers
sample4 = (fr(1, 2), fr(2, 3), fr(3, 4),
           fr(5, 6), fr(7, 8))

# tuple of a set of floating point values
sample5 = (1.23, 1.45, 2.1, 2.2, 1.9)

# Print the variance of each samples
print("Variance of Sample1 is % s " % (variance(sample1)))
print("Variance of Sample2 is % s " % (variance(sample2)))
print("Variance of Sample3 is % s " % (variance(sample3)))
print("Variance of Sample4 is % s " % (variance(sample4)))
print("Variance of Sample5 is % s " % (variance(sample5)))
```

```
Variance of Sample1 is 15.80952380952381
Variance of Sample2 is 3.5
Variance of Sample3 is 61.125
Variance of Sample4 is 1/45
Variance of Sample5 is 0.17613000000000006
```

pvariance()

[12]:
```
# Python code to demonstrate the working of
# variance() and pvariance()

# importing statistics to handle statistical operations
import statistics

# initializing list
li = [1.5, 2.5, 2.5, 3.5, 3.5, 3.5]

# using variance to calculate variance of data
print ("The variance of data is : ",end="")
print (statistics.variance(li))

# using pvariance to calculate population variance of data
print ("The population variance of data is : ",end="")
print (statistics.pvariance(li))
```

```
The variance of data is : 0.6666666666666666
```

```
The population variance of data is : 0.5555555555555556
```

1.1.3 Standard Deviation()

[11]:
```python
# Python code to demonstrate stdev()
# function on various range of datasets

# importing the statistics module
from statistics import stdev

# importing fractions as parameter values
from fractions import Fraction as fr

# creating a varying range of sample sets
# numbers are spread apart but not very much
sample1 = (1, 2, 5, 4, 8, 9, 12)

# tuple of a set of negative integers
sample2 = (-2, -4, -3, -1, -5, -6)

# tuple of a set of positive and negative numbers
# data-points are spread apart considerably
sample3 = (-9, -1, -0, 2, 1, 3, 4, 19)

# tuple of a set of floating point values
sample4 = (1.23, 1.45, 2.1, 2.2, 1.9)

# Print the standard deviation of
# following sample sets of observations
print("Standard Deviation of Sample1 is % s" % (stdev(sample1)))
print("Standard Deviation of Sample2 is % s" % (stdev(sample2)))
print("Standard Deviation of Sample3 is % s" % (stdev(sample3)))
print("Standard Deviation of Sample4 is % s" % (stdev(sample4)))
```

```
Standard Deviation of Sample1 is 3.9761191895520196
Standard Deviation of Sample2 is 1.8708286933869707
Standard Deviation of Sample3 is 7.8182478855559445
Standard Deviation of Sample4 is 0.41967844833872525
```

pstdev()

[13]:
```python
# Python code to demonstrate the working of
# stdev() and pstdev()

# importing statistics to handle statistical operations
import statistics

# initializing list
```

```
li = [1.5, 2.5, 2.5, 3.5, 3.5, 3.5]

# using stdev to calculate standard deviation of data
print ("The standard deviation of data is : ",end="")
print (statistics.stdev(li))

# using pstdev to calculate population standard deviation of data
print ("The population standard deviation of data is : ",end="")
print (statistics.pstdev(li))
```

```
The standard deviation of data is : 0.816496580927726
The population standard deviation of data is : 0.7453559924999299
```

[ ]: