

How do you perform a Mann-Kendall Trend Test in Python?

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The Mann-Kendall Trend Test is a statistical method used to analyze trends in a given dataset. In Python, this test can be performed using the "mk_test" function from the "scipy.stats" module. To perform the test, the dataset needs to be imported into Python and the function needs to be called with the desired parameters such as the dataset and the significance level. The function will then calculate the trend and provide a p-value to determine the significance of the trend. This test is useful in detecting monotonic trends in a dataset and can be used for various applications such as climate analysis and time series data analysis.

Perform a Mann-Kendall Trend Test in Python

A Mann-Kendall Trend Test is used to determine whether or not a trend exists in time series data. It is a non-parametric test, meaning there is no underlying assumption made about the normality of the data.

The hypotheses for the test are as follows:

H0 (null hypothesis): There is no trend present in the data.

HA (alternative hypothesis): A trend is present in the data. (This could be a positive or negative trend)

If the p-value of the test is lower than some significance level (common choices are 0.10, 0.05, and 0.01), then there is statistically significant evidence that a trend is present in the time series data.

This tutorial explains how to perform a Mann-Kendall Trend Test in Python.

Example: Mann-Kendall Trend Test in Python

To perform a Mann-Kendall Trend Test in Python, we will first install the package:

```
pip install pymannkendall
```

Once we've installed this package, we can perform the Mann-Kendall Trend Test on a set of time series data:

```
#create dataset
```

```
data =
```

```
#perform Mann-Kendall Trend Test
```

```
import pymannkendall as mk
```

```
mk.original_test(data)
```

```
Mann_Kendall_Test(trend='no trend', h=False,  
p=0.422586268671707,
```

```
z=0.80194241623, Tau=0.147058823529, s=20.0,
```

```
var_s=561.33333333, slope=0.0384615384615,  
intercept=27.692307692)
```

Here is how to interpret the output of the test:

trend: This tells the trend. Possible output includes increasing, decreasing, or no trend.
h: True if trend is present. False if no trend is present.
p: The p-value of the test.
z: The normalize test statistic.
Tau: Kendall Tau.
s: Mann-Kendal's score
var_s: Variance
Sslope: Theil-Sen estimator/slope
intercept: Intercept of Kendall-Theil Robust Line

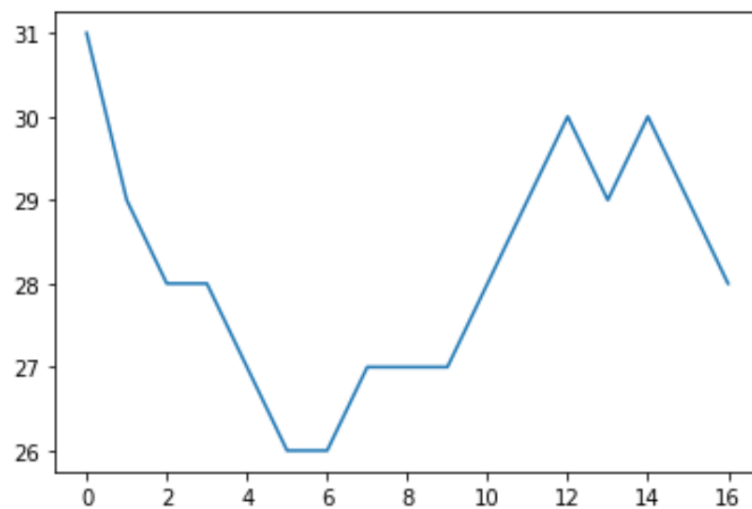
The main value we're interested in is the p-value, which tells us whether or not there is a statistically significant trend in the data.

In this example, the p-value is 0.4226 which is not less than .05. Thus, there is no significant trend in the time series data.

Along with performing the Mann-Kendall Trend test, we can create a quick line plot using Matplotlib to visualize the actual time series data:

```
import matplotlib.pyplot as plt
```

```
plt.plot(data)
```



time

From the plot we can see that the data is a bit all over the place, which confirms that there is no clear trend in the data.