Package: spectralAnomaly (via r-universe)

November 15, 2024

Type Package

Title Detect Anomalies Using the 'Spectral Residual' Algorithm

Version 0.1.1

Description Apply the spectral residual algorithm to data, such as a time series, to detect anomalies. Anomaly scores can be used to determine outliers based upon a threshold or fed into more sophisticated prediction models. Methods are based upon ``Time-Series Anomaly Detection Service at Microsoft", Ren, H., Xu, B., Wang, Y., et al., (2019) <doi:10.48550/arXiv.1906.03821>.

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Encoding UTF-8

LazyData true

Imports stats, utils

Suggests testthat (>= 3.0.0)

Config/testthat/edition 3

RoxygenNote 7.3.2

URL https://al-obrien.github.io/spectralAnomaly/, https://github.com/al-obrien/spectralAnomaly

BugReports https://github.com/al-obrien/spectralAnomaly/issues

Repository https://al-obrien.r-universe.dev

RemoteUrl https://github.com/al-obrien/spectralanomaly

RemoteRef HEAD

RemoteSha 16b031a12210d7098b1c7be54152824168917562

Contents

`anomaly_score` *Create anomaly score from input data*

Description

Convert an input of numeric data, typically a time series, into a score for anomaly detection. The data is first extended to improve the detection latency, followed by saliency map creation. The score is calculated using the sliding window average for each point in the saliency map.

Usage

```
anomaly_score(x, score_window, spec_window = 3, m = 5)
```

Arguments

`x`	Numeric vector.
`score_window`	Integer value for the window width for scoring.
`spec_window`	Positive integer value for the window to calculate the averaged log spectrum.
`m`	Integer value representing the number of preceding points for the estimation.

Value

A numeric vector of anomaly scores.

Examples

```
tmp <- ts(rnorm(12*6,10,2), start=c(2009, 1), end=c(2014, 12), frequency=12)
anomaly_score(tmp, score_window = 25)
```

`anomaly_thresh` *Apply threshold to anomaly score*

Description

A helper function that wraps around `quantile` to apply a threshold to anomaly scores.

Usage

```
anomaly_thresh(x, threshold = 0.99, ...)
```

Arguments

`x`	Numeric vector of anomaly scores (e.g. created by `anomaly_score`).
`threshold`	Numeric value to determine the threshold to flag outliers among the score.
`...`	Additional parameters passed to `quantile`.

Value

Logical vector referencing which, if any, of the provided values are outliers.

Examples

```
test_data <- c(1,2,3,4,5,100,5,4,3,2,1)
anomaly_thresh(test_data, 0.99)
```

`saliency_map` *Create saliency map*

Description

Using the provided numeric input, typically a time series, calculate the spectral residual and output the saliency map for use in anomaly detection.

Usage

```
saliency_map(x, window = 3)
```

Arguments

`x`	Numeric vector.
`window`	Positive integer value.

Value

Numeric vector representing the saliency map values.

See Also

`anomaly_score`

Examples

```
tmp <- ts(rnorm(12*6,10,2), start=c(2009, 1), end=c(2014, 12), frequency=12)
saliency_map(tmp)
```

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