

Package ‘sitsfeats’

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Type Package

Title Satellite Image Time Series Features

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Description Provides a set of temporal metrics derived from satellite image time series.

The basics metrics are composed of basic statistics, histogram-based statistics, and methods based on time series analysis.

The polar metrics, an approach proposed by Korting et al. (2013) <doi:10.1016/j.cageo.2013.02.007>, is based on the polar representation to describe cyclic events, whose events are common in agricultural applications.

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URL <https://github.com/oldlipe/sitsfeats/>

BugReports <https://github.com/oldlipe/sitsfeats/issues>

Encoding UTF-8

Depends R (>= 3.5)

Imports sf, sfheaders, geos, libgeos, ggplot2, cowplot

Suggests testthat (>= 3.0.0), Rcpp, RcppArmadillo, wk, covr

LinkingTo Rcpp, RcppArmadillo

RoxygenNote 7.1.1

NeedsCompilation yes

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<code>.get_instances</code>	...
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Description

...

Usage`.get_instances(polygon)`**Arguments**

<code>polygon</code>	a sf object...
----------------------	----------------

Value

a numeric vector..

<code>.verify_timeseries</code>
---------------------------------	------

Description

....

Usage`.verify_timeseries(timeseries)`**Arguments**

<code>timeseries</code>	...
-------------------------	-----

Value

...

`basics_metrics`*Basics metrics*

Description

The package `sitsfeats` provides a set of basics metrics:

- The `max_ts()` retrieves the maximum value contained in the time series.
- The `min_ts()` retrieves the minimum value contained in the time series.
- The `mean_ts()` retrieves the mean value of the time series.
- The `median_ts()` retrieves the median value of the time series.
- The `sum_ts()` retrieves the sum of all time series points.
- The `std_ts()` retrieves the standard deviation of the time series.
- The `skew_ts()` retrieves the skewness of the time series.
- The `kurt_ts()` retrieves the kurtosis of the time series.
- The `amplitude_ts()` retrieves the amplitude of the time series.
- The `fslope_ts()` retrieves the first slope of the time series.
- The `abs_sum_ts()` retrieves the absolute sum of the time series points.
- The `amd_ts()` retrieves the absolute mean of the difference between each point in the time series.
- The `mse_ts()` retrieves the mean spectral energy of the time series.
- The `fqr_ts()` retrieves the value of the first quartile of the time series (0.25).
- The `sqr_ts()` retrieves the value of the second quartile of the time series (0.50).
- The `tqr_ts()` retrieves the value of the third quartile of the time series (0.75).
- The `iqr_ts()` retrieves the interquartile range (difference between the third and first quartile).

Usage`max_ts(timeseries)``min_ts(timeseries)``mean_ts(timeseries)``median_ts(timeseries)``sum_ts(timeseries)``std_ts(timeseries)`

```
skew_ts(timeseries)
kurt_ts(timeseries)
amplitude_ts(timeseries)
fslope_ts(timeseries)
abs_sum_ts(timeseries)
amd_ts(timeseries)
mse_ts(timeseries)
fqr_ts(timeseries)
sqr_ts(timeseries)
tqr_ts(timeseries)
iqr_ts(timeseries)
```

Arguments

`timeseries` a numeric or matrix object where the columns is the point in time.

Value

a numeric vector for each metric in each time series

Examples

```
data("timeseries")
mean_values <- sitsfeats::mean_ts(timeseries)
```

create_polygon ...

Description

...

Usage

```
create_polygon(timeseries)
```

Arguments

timeseries ...

Value

a polygon object from sf class

create_polygon_geos ...

Description

...

Usage

`create_polygon_geos(timeseries)`

Arguments

timeseries ...

Value

a polygon object from sf class

get_all_areas ...

Description

The standard deviation of the areas per season

Usage

`get_all_areas(timeseries)`

Arguments

timeseries ...

Value

...

polar_metrics

Polar metrics

Description

The package sitsfeats provides a set of polars metrics:

- The `area_q1()` area of the closed shape over the first quadrant.
- The `area_q2()` area of the closed shape over the second quadrant.
- The `area_q3()` area of the closed shape over the third quadrant.
- The `area_q4()` area of the closed shape over the fourth quadrant.
- The `polar_balance()` the standard deviation of the areas per season.
- The `angle()` the angle of the closed shape.
- The `area_ts()` area of the closed shape.
- The `ecc_metric()` return values close to 0 if the shape is a circle and 1.
- The `gyration_radius()` equals the average distance between each point inside.
- The `csi()` this is a dimensionless quantitative measure of morphology.

Usage

```
area_q1(timeseries)
```

```
area_q2(timeseries)
```

```
area_q3(timeseries)
```

```
area_q4(timeseries)
```

```
polar_balance(timeseries)
```

```
angle(timeseries)
```

```
area_ts(timeseries)
```

```
ecc_metric(timeseries)
```

```
gyration_radius(timeseries)
```

```
csi(timeseries)
```

Arguments

`timeseries` a numeric or matrix object where the columns is the point in time.

Value

a numeric vector for each metric in each time series

Examples

```
data("timeseries")
areas_values <- rbind(sitsfeats::area_q1(timeseries),
                     sitsfeats::area_q2(timeseries),
                     sitsfeats::area_q3(timeseries),
                     sitsfeats::area_q4(timeseries))
```

polar_plot

Creates a polar plot based on areas ...

Description

Creates a polar plot based on areas ...

Usage

```
polar_plot(timeseries)
```

Arguments

timeseries a numeric or matrix object where the columns is the point in time.

Value

a polygon object from sf class

sitsfeats

R package for extracting metrics from time series of satellite images

Description

Provides a set of temporal metrics derived from satellite image time series. The basics metrics are composed of basic statistics, histogram-based statistics, and methods based on time series analysis. The polar metrics, an approach proposed by Korting et al. (2013) <doi:10.1016/j.cageo.2013.02.007>, is based on the polar representation to describe cyclic events, whose events are common in agricultural applications.

The sitsfeats functions

The sitsfeats package provides two type of metrics:

- **basics**: The basic metrics provide basic statistical functions, such as mean, median.
- **polar**: Polar metrics provide functions based on polar coordinates, implemented by Korting, T. S., Fonseca, L. M. G., & Câmara, G. (2013).

Author(s)

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See Also

Useful links:

- <https://github.com/oldlipe/sitsfeats/>
- Report bugs at <https://github.com/oldlipe/sitsfeats/issues>

timeseries

An example of time series

Description

Example of time series in matrix form

Usage

```
data(timeseries)
```


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