lconnect

March 22, 2019

Title Simple tools to derive landscape connectivity metrics

Version 0.1.0

Description Simple tools to derive landscape connectivity metrics. The objective of this package is to provide the simplest possible approach to derive landscape connectivity metrics.

Depends R (>= 3.4.4)

License GPL-3

Encoding UTF-8

LazyData true

Imports sf, igraph

RoxygenNote 6.1.1

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`con_metric` *Landscape connectivity metrics*

Description

Calculates several landscape connectivity metrics

Usage

```
con_metric(landscape, metric)
```

Arguments

landscape	landscape object produced by upload.landscape
metric	vector of landscape metrics to be computed. Can be one or more of the metrics currently available: "NC", "LNK", "SLC", "MSC", "CCP", "LCP", "CPL", "ECS", "AWF" and "IIC".

Details

con_metric

Value

vector with the selected metrics.

Author(s)

Frederico Mestre

Bruno Silva

References

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Minor, E. S., and Urban, D. L. (2008). A Graph-Theory Framework for Evaluating Landscape Connectivity and Conservation Planning. Conservation Biology, 22(2): 297-307.

O'Brien, D., Manseau, M., Fall, A., and Fortin, M. J. (2006). Testing the importance of spatial configuration of winter habitat for woodland caribou: an application of graph theory. Biological Conservation, 130(1): 70-83.

Pascual-Hortal, L., and Saura, S. (2006). Comparison and development of new graph-based landscape connectivity indices: towards the priorization of habitat patches and corridors for conservation. Landscape Ecology, 21(7): 959-967.

Saura, S., and Pascual-Hortal, L. (2007). A new habitat availability index to integrate connectivity in landscape conservation planning: comparison with existing indices and application to a case study. Landscape and Urban Planning, 83(2): 91-103.

Saura, S., Estreguil, C., Mouton, C. & Rodriguez-Freire, M. (2011a). Network analysis to assess landscape connectivity trends: application to European forests (1990-2000). Ecological Indicators 11: 407-416.

Saura, S., Gonzalez-Avila, S. & Elena-Rossello, R. (2011b). Evaluacion de los cambios en la conectividad de los bosques: el indice del area conexa equivalente y su aplicacion a los bosques de Castilla y Leon. Montes, Revista de Ambito Forestal 106: 15-21

Urban, D., and Keitt, T. (2001). Landscape connectivity: a graph-theoretic perspective. Ecology, 82(5): 1205-1218.

Examples

```
vec_path <- system.file("extdata/vec_projected.shp", package = "lconnect")
landscape <- upload_land(vec_path, bound_path = NULL,
habitat = 1, min_dist = 500)
metrics <- con_metric(landscape, metric = c("NC", "LCP"))
```

---

is.lconnect *Test for class lconnect*

Description

Tests if an object belongs to lconnect class

Usage

```
is.lconnect(x)
```

Arguments

x	object to test

Details

is.lconnect

Value

TRUE/FALSE

Author(s)

Bruno Silva

Frederico Mestre

is.pimp *Test for class pimp*

Description

Tests if an object belongs to pimp class

Usage

```
is.pimp(x)
```

Arguments

x	object to test

Details

is.pimp

Value

TRUE/FALSE

Author(s)

Bruno Silva

Frederico Mestre

patch_imp *Prioritization of patches according to individual contribution*

Description

Prioritization of patches according to individual contribution to overall connectivity. Each patch is removed at a time and connectivity metrics are calculated without that specific patch. The current version only allows the use of IIC.

Usage

```
patch_imp(landscape, metric, vector_out = F)
```

Arguments

landscape	lconnect object produced by upload_land()
metric	string indicating the landscape metric to use in the
vector_out	TRUE/FALSE

Details

patch_imp

Value

Returns a vector depicting each patch's importance to overall connectivity.

Author(s)

Frederico Mestre

Bruno Silva

References

#' Saura, S., Pascual-Hortal, L. (2007). A new habitat availability index to integrate connectivity in landscape conservation planning: Comparison with existing indices and application to a case study. Landscape and Urban Planning, 83(2-3):91-103.

Examples

```
vec_path <- system.file("extdata/vec_projected.shp", package = "lconnect")
landscape <- upload_land(vec_path, bound_path = NULL,
                         habitat = 1, min_dist = 500)
importance <- patch_imp(landscape, metric = "IIC")
plot(importance)
```

---

plot.lconnect *Plot lconnect object*

Description

Plot lconnect object with clusters indicated by different colors. Aditional arguments accepted by plot() or plot.sf() can be included.

Usage

```
## S3 method for class 'lconnect'
plot(x, ...)
```

Arguments

x	lconnect object generated by upload_land()
...	other options passed to plot().

Details

plot.lconnect

Value

Nothing. Side-effect: plots graphs.

`plot.pimp` *Plot pimp object*

Description

Plot pimp object patch importance indicated by different colors. Aditional arguments accepted by plot() or plot.sf() can be included.

Usage

```
## S3 method for class 'pimp'
plot(x, ..., main)
```

Arguments

`x`	pimp object generated by patch_imp()
`...`	other options passed to plot().
`main`	character with plot title

Details

plot.pimp

Value

Nothing. Side-effect: plots graphs.

`upload_land` *Import and convert a shapefile to a lconnect object*

Description

Import and convert a shapefile to a lconnect object. Some landscape and patch metrics which are the core of landscape connectivity metrics are calculated. The shapefile must be projected, i.e., in planar coordinates and the first field must be contain the habitat categories.

Usage

```
upload_land(land_path, bound_path = NULL, habitat, min_dist = NULL)
```

Arguments

land_path	string, indicating the full path of the landscape shapefile.
bound_path	string, indicating the full path of the boundary shapefile. If NULL (default option) a convex hull will be created and used as boundary.
habitat	vector with habitat categories. The categories can be numeric or character.
min_dist	numeric indicating the minimum distance to aggregate patches.

Details

upload_land

Value

A lconnect object is returned.

Author(s)

Bruno Silva

Frederico Mestre

Examples

```
vec_path <- system.file("extdata/vec_projected.shp", package = "lconnect")
landscape <- upload_land(vec_path, bound_path = NULL,
habitat = 1, min_dist = 500)
plot(landscape)
```

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