Package ‘conserveR’

October 12, 2022

Title Identifying Conservation Prioritization Methods Based on Data
Availability

Version 1.0.4

Description Helping biologists to choose the most suitable approach to link their research to conservation. After answering few questions on the data available, geographic and taxonomic scope, 'conserveR' ranks existing methods for conservation prioritization and systematic conservation planning by suitability. The methods data base of 'conserveR' contains 133 methods for conservation prioritization based on a systematic review of > 12,000 scientific publications from the fields of spatial conservation prioritization, systematic conservation planning, biogeography and ecology.

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Encoding UTF-8

LazyData true

RoxygenNote 7.1.1

Language en-US

Imports cowplot, GGally, ggplot2, ggrepel, magrittr, network, rlang,
scales, sna, utils

URL `https://github.com/azizka/conserveR`

BugReports `https://github.com/azizka/conserveR/issues`

Depends R (>= 3.5.0)

NeedsCompilation no

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Repository CRAN

Date/Publication 2021-08-02 09:10:06 UTC

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`connectivity_network` *connectivity_network A bipartite network of methods included in the conserveR package linked by shared cited references. Used for visualization in* `map_selection`

Description

connectivity_network A bipartite network of methods included in the conserveR package linked by shared cited references. Used for visualization in `map_selection`

Usage

```
connectivity_network
```

Format

An object of class `network` of length 5.

`edge` *edge An example dataset of the output of* `find_method`*. Conservation prioritization methods prioritized by fit to an example set of data requirements.*

Description

edge An example dataset of the output of `find_method`. Conservation prioritization methods prioritized by fit to an example set of data requirements.

Usage

```
edge
```

Format

An object of class `data.frame` with 134 rows and 9 columns.

`find_method` *Identify Most Suitable Methods for Conservation Prioritization*

Description

Identifies suitable methods for conservation prioritization based on a user dialogue on conservation targets and data availability.

Usage

```
find_method(ranking = "both", weights = NULL)
```

Arguments

`ranking`	character string. The methods used for ranking the methods. See details. One of "both", "strict", "inclusive". Default = "both".
`weights`	named list. Provide numeric values to weight questions differently. See details.

Details

Based on the `ranking` argument, the conservation prioritization methods in the database are ranked according to the user-provided information. If ranking = "strict" methods receive one point for each full agreement with user reply (yes and no), if ranking = "inclusive", methods get one point when they include a feature confirmed by the user (but non for not including it). This means that ranking = "inclusive" will likely return more general methods that can include many different types of data and perspectives. If ranking = "both", methods are first ranked as in strict and then equal ranks split by the inclusive ranking.

The `weight` argument allows to change the weighting of individual questions relative to the others. The names of the list follow `names(traits)`, from “scale” (for question 1) to “includes_simulation” (for question 17). The weights may include any numbers of questions. See examples

Value

a data.frame containing potentially suitable spatial conservation prioritization methods order by goodness of fit according to the user-selected algorithm (best fit on top). Furthermore prints the three most suitable methods to screen.

Examples

```
## Not run:
find_method()
#double weight to question 3 and 15
find_method(weights = list(phylogeny = 2, vulnerability = 2))

## End(Not run)
```

`literature` *Literature*

Description

Literature references for all conservation prioritization methods listed in `traits`, in bib2format.

Usage

```
literature
```

Format

An object of class `tbl_df` (inherits from `tbl`, `data.frame`) with 134 rows and 43 columns.

`map_selection` *Map Selected Methods to Context*

Description

Maps methods selected with `find_method` to the trait space and/or citation network of methods included in conserveR, to identify further similar methods.

Usage

```
map_selection(x, num = 3, type = "both")
```

Arguments

`x`	data.frame. As produced by `find_method`.
`num`	numerical. The number of top ranking methods to highlight.
`type`	character. The type of plot, either “mca” for the results of a multiple correspondence analyses of the trait space, “citation” for the citation network, or “both” for both.

Value

a plot highlighting the position of the best fitting methods in the context of all conservation prioritization methods included in the package. Includes two subplots

1. a multidimensional trait space resulting from a multiple correspondence analysis,
2. a citation network linking different methods by shred scientific publications.

Examples

```
data(edge)
map_selection(edge)
```

`mca_results` *mca_results*

Description

Results of a multiple correspondence analysis of all methods included in the conserveR package based on the `traits` data set. Used for visualization in `map_selection`.

Usage

```
mca_results
```

Format

An object of class `tbl_df` (inherits from `tbl`, `data.frame`) with 134 rows and 7 columns.

`traits` *Traits*

Description

The dataset of conservation prioritization methods for relevant for macro-evolution and macro-ecology including information on data needs, "method traits" and met-data

Usage

```
traits
```

Format

A data frame with thirty-one variables:

author The last name of the first author.

year The publication year.

acronym The acronym of the method as suggested by the authors, or a custom one if there was none available

method_name The full name of the method as suggested by the authors.

scale

scalability A qualitative assessment how scalable the methods are to large-scale analyses with hundreds of species or global extent.

implementation_standard How is the method implemented/how can it be used by people, i.e. a software or similar that anyone that would like to use the method could use. "none" if no implementation exists.

target The target of the method. Either "species" or "area".

scope_terrestrial Can the method be applied to terrestrial species/systems? 1 = yes, 0 = no.

scope_marine Can the method be applied to marine species/systems? 1 = yes, 0 = no.

scope_limnic Can the method be applied to limnic species/systems? 1 = yes, 0 = no

phylogeny Does the method include evolutionary aspects (i.e. does it at any point use a phylogeny as input) to prioritize conservation efforts? 1 = yes, 0 = no.

distribution Does the method include distribution aspects of species (i.e. any type of distribution information as input, e.g. species ranges, grid-cell occupancy or occurrence records) to prioritize conservation? 1 = yes, 0 = no.

functional Does the method include functional aspects of species (i.e. functional traits as input data) to prioritize conservation? 1 = yes, 0 = no.

rarity Does the method include species' rarity or commonness (i.e. species abundances as input data) to prioritize conservation? 1 = yes, 0 = no.

pop_dynamics Does the method include changes in species' population density through time? 1 = yes, 0 = no.

genetics Does the method include genetic aspects (i.e. sequence data as input)? For example genetic diversity. 1 = yes, 0 = no.

ecosystem_services Does the method include the importance of species or areas for ecosystem services to prioritize conservation? 1 = yes, 0 = no.

socio_economic Does the method include socio-economic values of species or areas to prioritize conservation effort? 1 = yes, 0 = no.

landscape_connectivity Does the method include landscape connectivity to prioritize conservation effort? 1 = yes, 0 = no.

land_use Does the method include land use factors (i.e. land use data, for instance modeled or remotely sensed) for conservation prioritization? 1 = yes, 0 = no.

protected_area Does the method include protected areas in some way to prioritize conservation effort? 1 = yes, 0 = no.

extinction_risk Does the method include species extinction risk in any way (i.e. the International Union for the Conservation of Nature assessment categories as input data) for conservation prioritization? 1 = yes, 0 = no.

environment Does the method include environmental variables (e.g., modeled precipitation, species niche or worldclim data as input data)?

vulnerability Does the method include assessments of the vulnerability of species or areas to specific threats, for instance pollution, hunting or logging? 1 = yes, 0 = no

climate_change Does the method include climate change as explicit factor for conservation prioritization?

includes_simulation Does the method include the possibility to conduct simulations?

free_text_description

DOI/link The digital object identifier or link to a scientific publication.

ID The ID to link with the `literature`

example_taxon_standard On which taxon was the method developed/tested?

example_area_standard In which area was the method developed/tested?

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