Package: rSDM (via r-universe)

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Type Package

Title Species distribution and niche modelling in R

Description Functions for niche modelling and SDM.

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License GPL-3

LazyData true

URL https://pakillo.github.io/rSDM/

BugReports https://github.com/Pakillo/rSDM/issues

Depends R (>= 4.1.0)

Imports class, ggplot2, leaflet, maptiles, scales, sf, terra (> 1.7-29), tidyterra

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Repository https://pakillo.r-universe.dev

RemoteUrl https://github.com/Pakillo/rSDM

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locs2sf *Convert matrix or data frame with point coordinates to a spatial (sf) object*

Description

Convert matrix or data frame with point coordinates to a spatial (sf) object

Usage

```
locs2sf(locs, crs = 4326, lon.col = NULL, lat.col = NULL)
```

Arguments

locs	A matrix or data frame containing point coordinates data. If a matrix, the first two columns will be assumed to contain longitude and latitude coordinates, respectively. If a data frame, the function will try to guess the columns containing the coordinates based on column names, unless `lon.col` and `lat.col` are provided.
crs	A character string, number (EPSG value), or `crs` object specifying the coordinate reference system (see `sf::st_crs()` or https://spatialreference.org). Default is geographic (unprojected) coordinates, datum WGS84 (EPSG = 4326).
lon.col	Character (optional). Name of the column containing longitude data.
lat.col	Character (optional). Name of the column containing latitude data.

Value

An `sf::sf()` object.

Examples

```
locs <- matrix(runif(20), ncol = 2)
locs2sf(locs)

locs <- data.frame(species = rep("Laurus nobilis", 10), x = runif(10), y = runif(10))
locs2sf(locs)
```

locs2vect — *Convert matrix or data frame with point coordinates to a SpatVector object*

Description

Convert matrix or data frame with point coordinates to a SpatVector object

Usage

```
locs2vect(locs, crs = 4326, lon.col = NULL, lat.col = NULL)
```

Arguments

`locs`	A matrix or data frame containing point coordinates data. If a matrix, the first two columns will be assumed to contain longitude and latitude coordinates, respectively. If a data frame, the function will try to guess the columns containing the coordinates based on column names, unless `lon.col` and `lat.col` are provided.
`crs`	A number specifying the EPSG code (see https://spatialreference.org). Default is geographic (unprojected) coordinates, datum WGS84 (EPSG = 4326).
`lon.col`	Character (optional). Name of the column containing longitude data.
`lat.col`	Character (optional). Name of the column containing latitude data.

Value

A `terra::SpatVector()` object.

Examples

```
locs <- matrix(runif(20), ncol = 2)
locs2vect(locs)

locs <- data.frame(species = rep("Laurus nobilis", 10), x = runif(10), y = runif(10))
locs2vect(locs)
```

occmap — *Map species occurrences*

Description

Plot map of species occurrences (or any set of point coordinates) on top of different background layers.

Usage

```
occmap(
  locs,
  ras = NULL,
  bg = "Esri.WorldImagery",
  type = c("base", "ggplot", "leaflet"),
  pcol = "red",
  alpha = 1,
  psize = 1,
  add = FALSE,
  prev.map = NULL,
  ...
)
```

Arguments

locs	An sf::sf() or terra::SpatVector() object with point coordinates, e.g. as generated from locs2sf() or locs2vect().
ras	A terra::SpatRaster() object to be used as background for points. If NULL (default), a background map defined by bg will be used.
bg	Character. Type of background map to be used if ras is not provided. bg should be one of the providers listed in maptiles::get_tiles() if type is 'base' or 'ggplot', or one of the providers listed in leaflet::addProviderTiles() if type is 'leaflet'.
type	Character. One of "base", "ggplot" or "leaflet" to define the type of map produced.
pcol	Colour to be used for points. Default is "red".
alpha	Colour transparency for points, between 0 (fully transparent) and 1 (fully opaque).
psize	Point size. Default is 1 (cex = 1).
add	Logical. Add locs coordinates to a previous 'base' map? (e.g. for a new species).
prev.map	Map to be used as basemap to add further points (only applicable for "leaflet" and "ggplot" map types).
...	additional parameters to be passed to terra::plot() if type = "base" tidyterra::geom_spatraster(if type = "ggplot" or leaflet::addCircleMarkers() if type = "leaflet".

Value

A map plus a leaflet or ggplot object, depending on type.

Examples

```
## Example coordinates
locs <- data.frame(lon = c(-5.8, -5.5, -5.9), lat = c(35.7, 36.2, 36.5))
locs <- locs2sf(locs, crs = 4326)
```

```
## Default map
occmap(locs, psize = 6)
occmap(locs, psize = 6, bg = "CartoDB.Positron") # Change background

## Interactive (leaflet) map
occmap(locs, psize = 6, type = "leaflet")
occmap(locs, psize = 6, type = "leaflet", bg = "CartoDB.Positron")

## ggplot map
occmap(locs, psize = 6, type = "ggplot")

## Adding points to a previous map
new.locs <- data.frame(lon = c(-5.8, -5.4), lat = c(36.2, 36.5))
new.locs.sf <- locs2sf(new.locs, crs = 4326)

## base
map <- occmap(locs, psize = 6)
occmap(new.locs.sf, add = TRUE, psize = 6, pcol = "blue")

## Adding points to a previous map (leaflet)
map <- occmap(locs, psize = 6, type = "leaflet")
occmap(new.locs.sf, prev.map = map, psize = 6, pcol = "blue")

## Adding points to a previous map (ggplot)
map <- occmap(locs, psize = 6, type = "ggplot")
occmap(new.locs.sf, prev.map = map, psize = 6, pcol = "blue")
```

`points2nearestcell` *Move point occurrences to the nearest raster cell with data*

Description

Move point occurrences falling in raster cells without data (NA) to the nearest raster cell with data.

Usage

```
points2nearestcell(
  locs = NULL,
  ras = NULL,
  layer = 1,
  move = TRUE,
  distance = NULL,
  table = TRUE,
  map = c("base", "ggplot", "leaflet", "none")
)
```

Arguments

locs	An sf::sf() or terra::SpatVector() object with point coordinates, e.g. as generated from locs2sf() or locs2vect().
ras	terra::SpatRaster() object.
layer	Integer. Raster layer to use for comparing with point locations (default = 1).
move	Logical. Change coordinates of points to those of the nearest raster cells? If FALSE, the function will show the nearest raster cells but coordinates of locs will not be changed.
distance	Numeric (optional). Maximum distance to move points. Point coordinates are only changed if the distance to the nearest raster cell is below distance.
table	Logical. Print table with old and new coordinates?
map	Character. One of "none", "base", "ggplot" or "leaflet", to choose the type of map showing the old and new point coordinates. See occmap().

Value

An sf::sf() or terra::SpatVector() object (with corrected coordinates if move is TRUE).

See Also

https://search.r-project.org/CRAN/refmans/spatstat.geom/html/nearest.raster.point.html and https://search.r-project.org/CRAN/refmans/gecko/html/move.html.

Examples

```
## Generate example point coordinates and raster
locs <- data.frame(lon = c(1, 2, 1, 2, 2.2), lat = c(1.2, 1, 2.3, 3, 2))
locs.sf <- locs2sf(locs)
library(terra)
ras <- rast(nrows = 2, ncols = 2, xmin = 0.5, xmax = 3.5, ymin = 0.5, ymax = 3.5,
 resolution = 1, vals = c(NA, 1, 1, NA, NA, 1, NA, 1, 1))
occmap(locs.sf, ras, pcol = "black", psize = 3)

## Move point coordinates falling outside of raster
moved <- points2nearestcell(locs.sf, ras)
moved

## Move points only if moving distance is lower than specified threshold:
moved <- points2nearestcell(locs.sf, ras, distance = 100000)
```

point_in_cell *Check if points (occurrences) fall within raster cells with data*

Description

This function examines which points fall within a raster cell with data (not NA). Returns TRUE for points falling in a raster cell with data, and FALSE otherwise.

Usage

```
point_in_cell(locs = NULL, ras = NULL, layer = 1)
```

Arguments

locs	An sf::sf() or terra::SpatVector() object with point coordinates, e.g. as generated from locs2sf() or locs2vect().
ras	terra::SpatRaster() object
layer	Integer. Raster layer to use for comparing with point locations (default = 1).

Value

A logical vector.

Examples

```
locs <- data.frame(lon = c(1, 2, 1, 2), lat = c(1, 1, 2, 3))
locs.sf <- locs2sf(locs)
library(terra)
ras <- rast(nrows = 2, ncols = 2, xmin = 0.5, xmax = 3.5, ymin = 0.5, ymax = 3.5,
 resolution = 1, vals = c(NA, 1, 1, NA, NA, 1, NA, 1, 1))
occmap(locs.sf, ras, pcol = "black", psize = 3)

point_in_cell(locs.sf, ras)

# adding column to original point data
locs.sf$inras <- point_in_cell(locs.sf, ras)
locs.sf
```

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