

Package ‘neighborhood’

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Type A package
Title An R package to determine the neighborhood competitive environment of trees
Version 0.2.0
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Description
Functions to define and characterize neighborhoods and estimate their effects on forest dynamics
License MIT
Encoding UTF-8
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Imports dplyr, tidyr, likelihood

R topics documented:

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create_nci_files	<i>create_nci_files</i>
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Description
function to create the files needed to estimate NCI-growth equations using the anneal function of the likelihood package.

Usage

```
create_nci_files(
  df,
  dbh,
  sp,
  x,
  y,
  self_del = T,
  ...,
  min.target.dbh = NULL,
  min.neighbor.dbh = NULL,
  max.neighbor.radius = NULL
)
```

Arguments

df	the data frame containing information about the target trees.
dbh	variable in 'df' that contains the diameter of the trees.
sp	variable in 'df' that contains the specific identity of trees
x	variable in 'df' that contains the X coordinate of the trees. Coordinates can be referred to any reference point (typically they will refer to either one of the plot corners or the plot center), but all of them must be referred to the same point to allow calculating distances between trees.
y	variable in 'df' that contains the Y coordinate of the trees. Coordinates can be referred to any reference point (typically they will refer to either one of the plot corners or the plot center), but all of them must be referred to the same point to allow calculating distances between trees. #'
self_del	If 'TRUE', a tree is not included as a neighbor of itself. If 'FALSE' the attribute if the target tree will be also included in the output as a neighbor of itself.
...	optional. Character or numeric variable that identifies the plots, or experimental units, within which the neighbors will be considered. This information is used to split the calculations per plot, and the results are merged back into a single data frame. A tree 'b' will not be considered as a neighbor of tree 'a' unless they belong to the same plot. If this argument is missing, all trees in 'df' will be considered both targets and neighbors.
min.target.dbh	numeric The minimum dbh for a tree to be considered as a target. The function will only return neighbors of those target trees with dbh >= min.target.dbh. If not specified, all trees in 'df' will be considered targets
min.neighbor.dbh	numeric The minimum dbh for a tree to be considered as a neighbor. All those neighbors of a given target with dbh above this threshold will be ignored. If not specified, all the neighbors of a given target will be considered
max.neighbor.radius	numeric maximum radius to search for neighbors. Only those neighbors located closer than this distance from a target tree will be considered their neighbors.

Details

create_nci_files

Value

a list containing three data frames with the values of dbh, species and distance to target tree for each neighbor tree. Each data frame will contain as many rows as target trees, and as many columns as the maximum number of neighbors per tree. Missing values are coded as 'NA'.

Examples

```
data(tree_data)

files <- create_nci_files(tree_data, dbh = dbh, sp = sps, x = x, y = y, plot)

# add some restrictions on target size and searching distance
files2 <- create_nci_files(tree_data, dbh, sp, x, y, self_del = T, plot,
min.target.dbh = 100, min.neighbor.dbh = 20, max.neighbor.radius = 10)
```

get_neighbors	<i>get_neighbors</i>
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Description

Function to obtain the neighbors of each tree from a file containing the identities of the trees and, optionally, a variable that identifies the plots.

Usage

```
get_neighbors(df, plot_ID, coords, suffixes, max_dist = 10000)
```

Arguments

df	the data frame containing the trees for which we want to identify the neighbors, and their associated information
plot_ID	**optional** . Variable that identifies the plots, or experimental units, within which the neighbors will be searched. If this variable exists, a tree "a" can only be a neighbor of another tree "b", if it is fulfilled that plot(a) == plot(b).
coords	**optional** Character vector containing the names of the columns in 'df' containing the x and y coordinates of the trees. By default 'coords = c("x", "y")', i.e. it assumes that the columns are called "x" and "y"
suffixes	**optional** character vector containing the suffixes that will be added to the variables in 'df' to identify target trees and neighbours. By default it takes the value 'suffixes = c("_target", "_neighbor")', but can take any other value defined by user.
max_dist	numeric Maximum distance to search for neighbours of target trees. It takes value 10000 by default.

Value

This function identifies the neighbors of each potential "target" tree and creates a data frame that contains a row for each neighbor of each tree in the original data frame. Variables characterizing target and neighbor trees are identified with the suffixes "_target" and "_neighbour", respectively. It also computes the distance between each target - neighbor pair, in the same units as provided by the "x" and "y" coordinates.

Examples

```
data(tree_data)

neighbors <- get_neighbors(tree_data, plot)

# If not plots are to be considered
all_neighbors <- get_neighbors(tree_data)

# specify suffix for target and neighbors, and maximum distance
neighbors2 <- get_neighbors(tree_data, plot, suffixes = c("cible", "voisin"), max_dist = 10)
```

```
get_neighbor_variables
```

get_neighbor_variables

Description

function to obtain the attributes of all the neighbors of a given set of target trees

Usage

```
get_neighbor_variables(df, var, self_del = T, ...)
```

Arguments

df	the data frame containing information about the target trees.
var	The variable that we want to extract from the neighbors. It can be either a numeric, logical or character variable.
self_del	If 'TRUE', a tree is not included as a neighbor of itself. If 'FALSE' the attribute of the target tree will be also included in the output as a neighbor of itself.
...	optional. Character or numeric variable that identifies the plots, or experimental units, within which the neighbors will be considered. This information is used to split the calculations per plot, and the results are merged back into a single data frame. A tree 'b' will not be considered as a neighbor of tree 'a' unless they belong to the same plot. If this argument is missing, all trees in 'df' will be considered both targets and neighbors.

Details

```
get_neighbor_variables
```

Value

a data frame containing as many rows as target trees, and as many columns as the maximum number of neighbors per tree. Cells contain values of the variable "var" for each neighbor tree, and missing values are coded as 'NA'.

Examples

```
data(tree_data)

# Get dbhs of all the neighbors, as if they were all in the same plot
dbhs <-get_neighbor_variables(tree_data, var = dbh, self_del = F)

# Get species of all the neighbors (including target tree as its own neighbor)
species <-get_neighbor_variables(tree_data, var = sps, plot, self_del = T)
```

neighbors	<i>Forest inventory data in Pyrenean forests</i>
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Description

Forest inventory data in Pyrenean forests

Usage

```
neighbors
```

Format

A data frame with columns:

plot Plot identifier

sps_target Target tree species, with 3 possible values: ABAL, PINI or PISY

dbh_target Target tree diameter(cm).

x_target x coordinates of the target tree within the plot, as measured from the plot center (m).

y_target y coordinates of the target tree within the plot, as measured from the plot center (m).

n_target Correlative number identifying target tree position within the plot.

ID_target Unique identifier for target trees

sps_neighbor Neighbor tree species, with 3 possible values: ABAL, PINI or PISY

dbh_neighbor Neighbor tree diameter(cm).

x_neighbor x coordinates of the neighbor tree within the plot, as measured from the plot center (m).

y_neighbor y coordinates of the neighbor tree within the plot, as measured from the plot center (m).

n_neighbor Correlative number identifying neighbor position within the plot.

ID_neighbor Unique identifier for neighbor trees

Source

Aitor Ameztegui

Examples

```
## Not run:  
  neighbors  
  
## End(Not run)
```

tree_data

Forest inventory data in Pyrenean forests

Description

Forest inventory data in Pyrenean forests

Usage

tree_data

Format

A data frame with columns:

plot Plot identifier

sps Tree species, with 3 possible values: ABAL, PINI or PISY

dbh Tree diameter(cm).

x x coordinates of the tree within the plot, as measured from the plot center (m).

y y coordinates of the tree within the plot, as measured from the plot center (m).

Source

Aitor Ameztegui

Examples

```
## Not run:  
  tree_data  
  
## End(Not run)
```

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