

Package ‘grainchanger’

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Title Moving-Window and Direct Data Aggregation

Version 0.1.0

Description Data aggregation via moving window or direct methods. Aggregate a fine-resolution raster to a grid. The moving window method smooths the surface using a specified function within a moving window of a specified size and shape prior to aggregation. The direct method simply aggregates to the grid using the specified function.

Depends R (>= 3.3)

License GPL-3

Encoding UTF-8

LazyData true

Imports raster, sf, furr, checkmate, methods

Suggests testthat, spelling, knitr, rmarkdown, covr, ggplot2,
landscapetools

RoxygenNote 6.1.0

Language en-GB

VignetteBuilder knitr

URL <https://github.com/laurajane-graham/grainchanger>

BugReports <https://github.com/laurajane-graham/grainchanger/issues>

NeedsCompilation no

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| | |
|--------|-----------------------------------|
| cat_ls | <i>Example categorical raster</i> |
|--------|-----------------------------------|

Description

An example map to show functionality on categorical surfaces.

Usage

```
cat_ls
```

Format

A raster layer object.

Details

Generated with `n1m_mpd()` from NLMR and classified with `util_classify()` from landscapetools.

Source

Sciaini M, Fritsch M, Scherer C, Simpkins CE. NLMR and landscapetools: An integrated environment for simulating and modifying neutral landscape models in R. *Methods in Ecology and Evolution*. 2018; 00:1-9. <https://doi.org/10.1111/2041-210X.13076>

Marco Sciaini and Matthias Fritsch (2018). landscapetools: Landscape Utility Toolbox. R package version 0.4.0. <https://CRAN.R-project.org/package=landscapetools>

`cont_ls`*Example continuous raster*

Description

An example map to show functionality on continuous surfaces.

Usage

```
cont_ls
```

Format

A raster layer object.

Details

Generated with `n1m_mpd()` from NLMR.

Source

Sciaini M, Fritsch M, Scherer C, Simpkins CE. NLMR and landscapetools: An integrated environment for simulating and modifying neutral landscape models in R. *Methods in Ecology and Evolution*. 2018; 00:1-9. <https://doi.org/10.1111/2041-210X.13076>

`create_torus`*Pad a raster by a specified radius*

Description

This function pads a raster by a specified number of cells, creating the effect of a torus. Allows for moving window analysis that avoids edge effects (e.g. on simulated landscapes).

Usage

```
create_torus(dat, r)
```

Arguments

| | |
|------------------|---------------------------------------|
| <code>dat</code> | The raster dataset to pad |
| <code>r</code> | The radius by which to pad the raster |

Value

raster. Original raster padded by radius `r` with torus effect

Examples

```
data(cat_ls)
d = create_torus(dat = cat_ls, r = 5)
```

g_sf

Example grid

Description

An example grid to show functionality when aggregating using an sf object.

Usage

```
g_sf
```

Format

An sf object.

Details

Generated with `n1m_mpd()` and converted to sf.

Source

Sciaini M, Fritsch M, Scherer C, Simpkins CE. NLMR and landscapetools: An integrated environment for simulating and modifying neutral landscape models in R. *Methods in Ecology and Evolution*. 2018; 00:1-9. <https://doi.org/10.1111/2041-210X.13076>

nomove_agg

Direct data aggregation

Description

Calculate the value for a given function for each cell in a larger resolution grid.

Usage

```
nomove_agg(g, dat, fun, ...)
```

Arguments

| | |
|------------------|---|
| <code>g</code> | the grid across which to calculate the aggregated moving window function (raster, SpatialPolygonsDataFrame, or sf object) |
| <code>dat</code> | The raster dataset to aggregate |
| <code>fun</code> | The function to apply. The function <code>fun</code> should take multiple numbers, and return a single number. For example <code>mean</code> , <code>modal</code> , <code>min</code> or <code>max</code> . It should also accept a <code>na.rm</code> argument (or ignore it, e.g. as one of the 'dots' arguments. For example, <code>length</code> will fail, but <code>function(x, ...)na.omit(length(x))</code> works. See Details |
| <code>...</code> | further arguments passed to or from other methods |

Details

`grainchanger` has several built-in functions. Functions currently included are:

- `nm_shei` - Shannon evenness, requires the additional argument `lc_class` (vector or scalar)
- `nm_prop` - Proportion, requires the additional argument `lc_class` (scalar)
- `var_range` - Range (max - min)

Value

Raster (if input is Raster) or numeric vector (if input is `sp` or `sf` object) containing values calculated for each coarser cell

Examples

```
# load required data
data(g_sf)
data(cont_ls)
data(cat_ls)

# aggregate using mean
d = nomove_agg(g_sf, cont_ls, "mean")

# aggregate using Shannon evenness
d = nomove_agg(g_sf, cont_ls, "nm_shei", lc_class = 0:3)
```

winmove

Create moving window surface

Description

Smooth a raster surface using a moving window with a given function, radius and shape.

Usage

```
winmove(dat, d, type, fun, ...)
```

Arguments

| | |
|-------------------|---|
| <code>dat</code> | The raster dataset on which to calculate the moving window function |
| <code>d</code> | numeric. If <code>type=circle</code> , the radius of the circle (in units of the CRS). If <code>type=rectangle</code> the dimension of the rectangle (one or two numbers). If <code>type=Gauss</code> the size of sigma, and optionally another number to determine the size of the matrix returned (default is 3 times sigma) |
| <code>type</code> | The shape of the moving window |
| <code>fun</code> | The function to apply. The function <code>fun</code> should take multiple numbers, and return a single number. For example <code>mean</code> , <code>modal</code> , <code>min</code> or <code>max</code> . It should also accept a <code>na.rm</code> argument (or ignore it, e.g. as one of the 'dots' arguments. For example, <code>length</code> will fail, but <code>function(x, ...)na.omit(length(x))</code> works. See Details |
| <code>...</code> | further arguments passed to or from other methods |

Details

`grainchanger` has several built-in functions. Functions currently included are:

- `wm_shei` - Shannon evenness, requires the additional argument `lc_class` (vector or scalar)
- `wm_prop` - Proportion, requires the additional argument `lc_class` (scalar)
- `wm_classes` - Unique number of classes in a categorical landscape
- `var_range` - Range (max - min)

Value

A smoothed raster with the moving window values calculated

Examples

```
# load required data
data(cat_ls)
data(cont_ls)

# calculate the moving window mean
d = winmove(cont_ls, 5, "rectangle", "mean")

# calculate the moving window Shannon evenness
d = winmove(cat_ls, 5, "rectangle", "shei", lc_class = 0:3)
```

winmove_agg

*Moving-window data aggregation***Description**

Calculate the mean moving window value for a given radius, shape and function for each cell in a larger resolution grid.

Usage

```
winmove_agg(g, dat, d, type, fun, ...)
```

Arguments

| | |
|-------------------|---|
| <code>g</code> | the grid across which to calculate the aggregated moving window function (raster, SpatialPolygonsDataFrame, or sf object) |
| <code>dat</code> | The raster dataset to aggregate |
| <code>d</code> | numeric. If <code>type=circle</code> , the radius of the circle (in units of the CRS). If <code>type=rectangle</code> the dimension of the rectangle (one or two numbers). If <code>type=Gauss</code> the size of sigma, and optionally another number to determine the size of the matrix returned (default is 3 times sigma) |
| <code>type</code> | The shape of the moving window |
| <code>fun</code> | The function to apply. The function <code>fun</code> should take multiple numbers, and return a single number. For example <code>mean</code> , <code>modal</code> , <code>min</code> or <code>max</code> . It should also accept a <code>na.rm</code> argument (or ignore it, e.g. as one of the 'dots' arguments. For example, <code>length</code> will fail, but <code>function(x, ...)na.omit(length(x))</code> works. See Details |
| <code>...</code> | further arguments passed to or from other methods |

Details

`grainchanger` has several built-in functions. Functions currently included are:

- `wm_shei` - Shannon evenness, requires the additional argument `lc_class` (vector or scalar)
- `wm_prop` - Proportion, requires the additional argument `lc_class` (scalar)
- `wm_classes` - Unique number of classes in a categorical landscape
- `var_range` - Range (max - min)

Value

Numeric vector containing moving window values calculated for each grid cell

Examples

```
# load required data
data(g_sf)
data(cont_ls)
data(cat_ls)

### aggregate using mean
d = winmove_agg(g_sf, cont_ls, 5, "rectangle", "mean")

# aggregate using Shannon evenness
d = winmove_agg(g_sf, cat_ls, 5, "rectangle", "shei", lc_class = 0:3)
```


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