Package: sfislands (via r-universe)

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Type Package

Title Streamlines the Process of Fitting Areal Spatial Models

Version 1.0.0

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Description Helpers for addressing the issue of disconnected spatial units. It allows for convenient adding and removal of neighbourhood connectivity between areal units prior to modelling, with the visual aid of maps. Post-modelling, it reduces the human workload for extracting, tidying and mapping predictions from areal models.

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Encoding UTF-8

LazyData true

Imports dplyr, ggplot2, methods, purrr, sf, spdep, stats, stringr, tidyr, broom.mixed

Suggests mgcv, testthat (>= 3.0.0)

RoxygenNote 7.2.3

URL https://github.com/horankev/sfislands, https://horankev.github.io/sfislands/

BugReports https://github.com/horankev/sfislands/issues

Depends R (>= 2.10)

Config/Needs/website rmarkdown

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

RemoteUrl https://github.com/horankev/sfislands

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Contents

st_augment 2
st_bridges 3
st_check_islands 4
st_manual_cut_nb 4
st_manual_join_nb 5
st_quickmap_nb 6
st_quickmap_preds 7
uk_election 8

Index **10**

`st_augment` *Augment dataframe with predictions of model*

Description

Augment dataframe with predictions of model

Usage

```
st_augment(model, df)
```

Arguments

`model`	an ‘mgcv‘, ‘lme4‘ or ‘nlme‘ model.
`df`	an ‘sf‘ data frame to be augmented with model predictions.

Value

An augmented ‘sf‘ data frame with extra columns showing estimates of random effects from model.

Examples

```
prepdata <- st_bridges(uk_election,"constituency_name")
mgcv::gam(health_not_good ~
  s(constituency_name, bs='mrf', xt=list(nb=prepdata$nb), k=100),
  data=prepdata, method="REML") |>
st_augment(uk_election)
```

st_bridges *Create first-order queen contiguity neighbourhood structure with additional connections when islands are present, ensuring that there are no unconnected units*

Description

Create first-order queen contiguity neighbourhood structure with additional connections when islands are present, ensuring that there are no unconnected units

Usage

```
st_bridges(
  df,
  geom_col_name,
  remove_islands = FALSE,
  link_islands_k = 1,
  nb_structure = "list",
  add_to_dataframe = TRUE
)
```

Arguments

df	an ‘sf‘ or ‘sfc‘ object.
geom_col_name	name of a column from ‘df‘ containing names (or unique identifiers) for each row.
remove_islands	default ‘FALSE‘. Whether or not to omit islands from contiguity construction.
link_islands_k	an integer, k. The number of nearest units to which each island should be connected.
nb_structure	default ‘"list"‘. Can also be ‘"matrix"‘. The format in which to return the named contiguity structure.
add_to_dataframe	default ‘TRUE‘. Whether or not to augment existing df with contiguity output as ‘"nb"‘ column. ‘FALSE‘ returns only the contiguity structure.

Value

Either a named neighbourhood list or matrix, or an ‘sf‘ dataframe with list or matrix included as ‘"nb"‘ column.

Examples

```
st_bridges(uk_election,"constituency_name")
```

st_check_islands — *Examine contiguity actions which have been performed on islands by ‘st_bridges()‘*

Description

Examine contiguity actions which have been performed on islands by ‘st_bridges()‘

Usage

```
st_check_islands(data)
```

Arguments

data	an ‘sf‘ dataframe with a neighbourhood column called ‘"nb"‘ such as the output of ‘st_bridges()‘.

Value

A dataframe reporting non-contiguous connections made by ‘st_bridges()‘.

Examples

```
st_bridges(uk_election,"constituency_name") |>
st_check_islands()
```

st_manual_cut_nb — *Manual remove contiguity between two areas*

Description

Manual remove contiguity between two areas

Usage

```
st_manual_cut_nb(nb, x, y)
```

Arguments

nb	a neighbourhood ‘"list"‘ or ‘"matrix"‘, or an ‘sf‘ dataframe with a neighbourhood column called ‘"nb"‘.
x	name or number of first area.
y	name or number of second area.

Value

An amended neighbourhood ‘"list"‘, ‘"matrix"‘, or ‘sf‘ dataframe with a neighbourhood column called ‘"nb"‘.

Examples

```
st_bridges(uk_election,"constituency_name") |>
st_manual_cut_nb("Ynys Mon","Arfon") |>
st_manual_cut_nb(292,378)
```

`st_manual_join_nb` *Manually enforce contiguity between two areas*

Description

Manually enforce contiguity between two areas

Usage

```
st_manual_join_nb(nb, x, y)
```

Arguments

nb	a neighbourhood ‘"list"‘ or ‘"matrix"‘, or an ‘sf‘ dataframe with a neighbourhood column called ‘"nb"‘.
x	name or number of first area.
y	name or number of second area.

Value

An amended neighbourhood ‘"list"‘, ‘"matrix"‘, or ‘sf‘ dataframe with a neighbourhood column called ‘"nb"‘.

Examples

```
st_bridges(uk_election,"constituency_name") |>
st_manual_join_nb("Gower","St Ives")
```

st_quickmap_nb *Visualise a neighbourhood structure on a map*

Description

Visualise a neighbourhood structure on a map

Usage

```
st_quickmap_nb(
  nbsf,
  linkcol = "dodgerblue",
  bordercol = "gray7",
  pointcol = "darkred",
  fillcol = "gray95",
  linksize = 0.2,
  bordersize = 0.1,
  pointsize = 0.8,
  title = NULL,
  subtitle = NULL,
  nodes = "point",
  numericsize = 5,
  numericcol = "black",
  concavehull = FALSE,
  hullratio = 0.8,
  hullcol = "darkgreen",
  hullsize = 0.5
)
```

Arguments

nbsf	an ‘sf‘ dataframe with a neighbourhood column called "nb", such as the output of ‘st_bridges()‘
linkcol	colour of lines connecting neighbours.
bordercol	colour of boundary lines between areas.
pointcol	colour of centroid points if nodes are ‘"point"‘.
fillcol	fill of areas.
linksize	linewidth of lines connecting neighbours.
bordersize	linewidth of borders between areas.
pointsize	size of centroid points if nodes are ‘"point"‘.
title	plot title.
subtitle	plot subtitle.
nodes	default ‘"point"‘. Can also be ‘"numeric"‘.
numericsize	font size if nodes are ‘"numeric"‘.

numericcol	font colour if nodes are ‘"numeric"‘.
concavehull	default ‘FALSE‘. Whether or not to show concave hulls.
hullratio	value between 0 and 1. 1 returns the convex hulls, 0 maximally concave hulls.
hullcol	colour of concave hull lines.
hullsize	line width of concave hull lines.

Value

A ‘ggplot‘ showing areas and neighbourhood structure.

Examples

```
st_bridges(uk_election,"constituency_name") |>
st_quickmap_nb()
```

---

st_quickmap_preds *Visualise the predictions generated by the ‘st_augment()‘ function*

Description

Visualise the predictions generated by the ‘st_augment()‘ function

Usage

```
st_quickmap_preds(
  output,
  scale_low = "firebrick4",
  scale_mid = "white",
  scale_high = "darkblue",
  scale_midpoint = 0,
  borderwidth = 0.05,
  bordercol = "black",
  legendlimits = "individual",
  titlesize = 12,
  subtitlesize = 10,
  framefill = "white",
  frameline = "black",
  framesize = 1
)
```

Arguments

output	an augmented ‘sf‘ dataframe produced by ‘st_augment()‘.
scale_low	fill of lowest extreme of scale.
scale_mid	fill of midpoint of scale.
scale_high	fill of highest extreme of scale.

scale_midpoint	value of midpoint of scale.
borderwidth	linewidth of borders between units.
bordercol	colour of borders between units.
legendlimits	default ‘"individual"‘. legend of each plot scaled within its own limits. ‘"min-max"‘ means all plot have common legend limits according to the global min-max.
titlesize	font size for title.
subtitlesize	font size for subtitle.
framefill	colour for background fill.
frameline	colour for frame.
framesize	line width of frame.

Value

A list of ggplots.

Examples

```
prepdata <- st_bridges(uk_election,"constituency_name")
mgcv::gam(health_not_good ~
 s(constituency_name, bs='mrf', xt=list(nb=prepdata$nb), k=100), data=prepdata, method="REML") |>
st_augment(uk_election) |>
st_quickmap_preds()
```

---

uk_election *UK election data*

Description

Swing and socio-economic data for England, Scotland & Wales Census and voting data sourced from parlitools R package Spatial data sourced from UK government geoportal

Usage

```
uk_election
```

Format

‘uk_election‘ An sf and data.frame object with 632 rows and 9 columns

degree_educated Percentage of constituency population with level 4 qualifications or higher, scaled to mean 0 and standard deviation 1

health_not_good Percentage of constituency of population reporting health to be fair, bad, or very bad, scaled to mean 0 and standard deviation 1

white Percentage of constituency of population of exclusively white ethnicity, scaled to mean 0 and standard deviation 1

con_swing Butler swing to the Conservative Party from the Labour Party from election 2019 to election 2019

population Constituency population

region Regions

county Counties

constituency_name Westminster parliamentary constituencies, as of 2019

geometry sfc polygons column ...

Source

<https://geoportal.statistics.gov.uk/datasets/ons::wpc-dec-2019-ultra-generalised-clipped-boundaries-uk>, <https://docs.evanodell.com/parlitools/>

Index

∗ **datasets**
uk_election, 8

st_augment, 2
st_bridges, 3
st_check_islands, 4
st_manual_cut_nb, 4
st_manual_join_nb, 5
st_quickmap_nb, 6
st_quickmap_preds, 7

uk_election, 8