

# Package ‘sfislands’

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**Type** Package

**Title** Streamlines the Process of Fitting Areal Spatial Models

**Version** 1.1.2

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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.

**License** MIT + file LICENSE

**Encoding** UTF-8

**LazyData** true

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

**Suggests** mgcv, testthat (>= 3.0.0)

**RoxygenNote** 7.3.2

**URL** <https://github.com/horankev/sfislands>,  
<https://horankev.github.io/sfislands/>

**BugReports** <https://github.com/horankev/sfislands/issues>

**Depends** R (>= 4.1.0)

**Config/Needs/website** rmarkdown

**Config/testthat/edition** 3

**NeedsCompilation** no

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**Repository** CRAN

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st_augment	<i>Augment dataframe with predictions of model</i>
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### 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	<i>Create first-order queen contiguity neighbourhood structure with additional connections when islands are present, ensuring that there are no unconnected units</i>
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---

### 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,
  row_identifier,
  remove_islands = FALSE,
  link_islands_k = 1,
  nb_structure = "list",
  add_to_dataframe = TRUE,
  threshold = 1.001,
  geom_col_name = lifecycle::deprecated()
)
```

### Arguments

df	an 'sf' or 'sfc' object.
row_identifier	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.
threshold	default 1.001. factor by which to change the size of buffer automatically generated around islands to account for imprecisions which may arise from sf::st_buffer() functionality. This can be increased if connections to islands are not occurring as expected.
geom_col_name	name of a column from 'df' containing names (or unique identifiers) for each row. This argument is now deprecated and the new "row_identifier" argument replaces it with the same functionality.

**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")
```

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st_check_islands	<i>Examine contiguity actions which have been performed on islands by 'st_bridges()'</i>
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---

**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_force_cut_nb	<i>Remove contiguity between pairs of areas</i>
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**Description**

Remove contiguity between pairs of areas

**Usage**

```
st_force_cut_nb(nb, x = NULL, y = NULL, xy_df = NULL)
```

**Arguments**

nb	a neighbourhood <code>"list"</code> or <code>"matrix"</code> , or an <code>'sf'</code> dataframe with a neighbourhood column called <code>"nb"</code> .
x	name or number of first area (optional if <code>'xy_df'</code> is provided).
y	name or number of second area (optional if <code>'xy_df'</code> is provided).
xy_df	(optional) a dataframe with two columns: <code>'x'</code> and <code>'y'</code> , containing the names or numbers of areas to cut.

**Value**

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

**Examples**

```
# For individual x and y
st_bridges(uk_election,"constituency_name") |>
st_force_cut_nb(x = "Llanelli", y = "Swansea West")

# For multiple x and y pairs
st_bridges(uk_election,"constituency_name") |>
st_force_cut_nb(xy_df = data.frame(
  x = c("Llanelli", "Swansea West"),
  y = c("Bridgend", "Vale Of Glamorgan")))

```

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st_force_join_nb	<i>Enforce contiguity between pairs of areas</i>
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**Description**

Enforce contiguity between pairs of areas

**Usage**

```
st_force_join_nb(nb, x = NULL, y = NULL, xy_df = NULL)
```

**Arguments**

nb	a neighbourhood <code>"list"</code> or <code>"matrix"</code> , or an <code>'sf'</code> dataframe with a neighbourhood column called <code>"nb"</code> .
x	name or number of first area (optional if <code>'xy_df'</code> is provided).
y	name or number of second area (optional if <code>'xy_df'</code> is provided).
xy_df	(optional) a dataframe with two columns: <code>'x'</code> and <code>'y'</code> , containing the names or numbers of areas to join.

**Value**

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

**Examples**

```
# For individual x and y
st_bridges(uk_election,"constituency_name") |>
st_force_join_nb(x = "Gower", y = "Bridgend")

# For multiple x and y pairse") |>
st_bridges(uk_election,"constituency_name") |>
st_force_join_nb(xy_df = data.frame(
  x = c("Gower", "Llanelli"),
  y = c("Bridgend", "Vale Of Glamorgan"))))
```

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st_manual_cut_nb	<i>Manual remove contiguity between two areas</i>
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---

**Description**

Manual remove contiguity between two areas

**Usage**

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

**Arguments**

nb	a neighbourhood <code>"list"</code> or <code>"matrix"</code> , or an <code>'sf'</code> dataframe with a neighbourhood column called <code>"nb"</code> .
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)
```

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st_manual_join_nb	<i>Manually enforce contiguity between two areas</i>
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---

**Description**

Manually enforce contiguity between two areas

**Usage**

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

**Arguments**

nb	a neighbourhood "list", "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	<i>Visualise a neighbourhood structure on a map</i>
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---

**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*

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## 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()

```

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uk_election	<i>UK election data</i>
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**Description**

Swing and socio-economic data for England, Scotland & Wales Census and voting data sourced from parltools 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/parltools/>>

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