

Package ‘populR’

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Type Package

Title Population Downscaling Using Areal Interpolation

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Description Downscaling of population data obtained by census surveys using areal interpolation. Given a set of source zone polygons such as census tracts or city blocks alongside with population counts and a target zone of incogruent yet superimposed polygon features (such as individual buildings) populR transforms population counts from the former to the latter using Areal Weighting and Volume Weighting Interpolation methods.

License GPL-3

URL <https://github.com/mbatsaris/populR/>

BugReports <https://github.com/mbatsaris/populR/issues/>

Encoding UTF-8

LazyData true

Imports sf, rlang, Metrics, usethis, osmdata, dplyr, units

Depends R (>= 3.3.0)

RoxygenNote 7.2.3

Suggests rmarkdown, microbenchmark, areal, knitr, testthat (>= 3.0.0)

Config/testthat/edition 3

VignetteBuilder knitr

NeedsCompilation no

Repository CRAN

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pp_ancillary	<i>Ancillary Information from OSM Features</i>
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Description

Ancillary Information from OSM Features

Usage

```
pp_ancillary(x, volume = NULL, key)
```

Arguments

x	an object of class <code>sf</code> that is used to associate OSM features to. Usually, <code>x</code> may include polygon features representing building units
volume	<code>x</code> volume information (height or number of floors) useful for float ancillary information
key	OSM feature keys or values available in <code>x</code>

Value

an object of class `sf` including ancillary information either for night or day estimates

Examples

```
## Not run:
data('trg')

# Download OSM amenities
dt <- pp_vgi(trg, key = amenity)

# create binary ancillary information
dt <- pp_ancillary(dt, 'amenity')

# create ancillary information both binary and float
dt <- pp_ancillary(dt, floors, 'amenity')
```

```
## End(Not run)
```

pp_compare	<i>Comparison to Other Data</i>
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Description

Comparison to Other Data

Usage

```
pp_compare(x, estimated, actual, title)
```

Arguments

x	An object of class <i>sf</i> including estimated and actual values
estimated	Population estimates using pp_estimate function
actual	Actual population values
title	Scatterplot title string

Value

A list including rmse, mae, linear model details and correlation coefficient

Examples

```
# read lib data
data('src')
data('trg')

# areal weighting interpolation - awi
awi <- pp_estimate(trg, src, sid = sid, spop = pop,
  method = awi)

# volume weighting interpolation - vwi
vwi <- pp_estimate(trg, src, sid = sid, spop = pop,
  method = vwi, volume = floors)

# awi - rmse
pp_compare(awi, estimated = pp_est, actual = rf,
  title = 'awi')

# vwi - rmse
pp_compare(vwi, estimated = pp_est, actual = rf,
  title = 'vwi')
```

pp_estimate

*Areal Interpolation of Population Data***Description**

Areal Interpolation of Population Data

Usage

```
pp_estimate(
  target,
  source,
  sid,
  spop,
  volume = NULL,
  ancillary = NULL,
  point = FALSE,
  method
)
```

Arguments

target	An object of class <i>sf</i> that is used to interpolate data to. Usually, target may include polygon features representing building units
source	An object of class <i>sf</i> including data to be interpolated. Source may be a set of coarse polygon features such as city blocks or census tracts
sid	Source identification number
spop	Source population values to be interpolated
volume	Target feature volume information (height or number of floors). Required when method= <i>vwi</i>
ancillary	ancillary information
point	Whether to return point geometries (FALSE by default)
method	Two methods provided: <i>awi</i> (areal weighting interpolation) and <i>vwi</i> (volume weighting interpolation). <i>awi</i> proportionately interpolates the population values based on areal weights calculated by the area of intersection between the source and target zones. <i>vwi</i> proportionately interpolates the population values based on areal weights calculated by the area of intersection between the source and target zones multiplied by the volume information (height or number of floors).

Value

An object of class *sf* including estimated population counts for target features using either *awi* or *vwi* methods. The estimated population counts are stored in a new column called *pp_est*.

Examples

```
# read lib data
data('src')
data('trg')

# areal weighted interpolation - awi
pp_estimate(trg, src, sid = sid, spop = pop,
            method = awi)

# areal weighted interpolation - awi using point geometries
pp_estimate(trg, src, sid = sid, spop = pop,
            method = awi, point = TRUE)

# volume weighted interpolation - vwi
pp_estimate(trg, src, sid = sid, spop = pop,
            method = vwi, volume = floors)

# volume weighted interpolation - vwi using point geometries
pp_estimate(trg, src, sid = sid, spop = pop,
            method = vwi, volume = floors, point = TRUE)
```

pp_round

Rounding Function

Description

Rounding Function

Usage

```
pp_round(x, tpop, spop, sid)
```

Arguments

x	An object of class sf obtained by the pp_estimate function
tpop	Target population estimates obtained by the pp_estimate function
spop	Initial source population values (included after the implementation of the pp_estimate function)
sid	Source identification number

Value

An object of class sf including rounded population counts stored in a new column called pp_int

Examples

```
# read lib data
data('src')
data('trg')

# areal weighted interpolation - awi
awi <- pp_estimate(trg, src, sid = sid, spop = pop,
  method = awi)

# volume weighted interpolation - vwi
vwi <- pp_estimate(trg, src, sid = sid, spop = pop,
  method = vwi, volume = floors)

# awi - round
pp_round(awi, tpop = pp_est, spop = pop, sid = sid)

# vwi - round
pp_round(vwi, tpop = pp_est, spop = pop, sid = sid)
```

pp_vgi

Download and Count OSM Features Over Target

Description

Download and Count OSM Features Over Target

Usage

```
pp_vgi(x, key)
```

Arguments

x	an object of class <code>sf</code> that is used to interpolate data to. Usually, x may include polygon features representing building units
key	osm feature key see available_features

Value

an object of class `sf` including OSM features

Examples

```
## Not run:
data('trg')

# example using just key
pp_vgi(trg, key = amenity)
```

```
# example using both key and value arguments
pp_vgi(trg, key = amenity)

## End(Not run)
```

src	<i>Source (src)</i>
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Description

object of sf class representing the blocks of a fictional area

Usage

```
src
```

Format

object of sf class with 9 rows and 3 columns:

sid Source identification number

pop Source population values to be interpolated

geometry Geometry

Source

<http://www.mbatsaris.gr/>

trg	<i>Target (trg)</i>
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Description

An object of sf class representing the buildings of a subset area of the city of Mytilini, Greece. The data set contains 179 building units along with the number of floors and residential use in binary format where 0 for non-residential floors and 1 for residential floors.

Usage

```
trg
```

Format

object of sf class with 179 rows and 12 columns:

tid Target identification number

floors Number of floors

rf Reference population estimates

geometry Geometry

Source

<http://mbatsaris.gr/>

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