Package: denhotspots (via r-universe)

September 17, 2024

Type Package

Title a package for calculate gi and hi local spatial statistics

Version 0.1.0

Author Felipe Antonio Dzul Manzanilla

Maintainer The package maintainer <felipe.dzul.m@gmail.com>

Description the denhotspots package calculate the gi and hi local
spatial statistics for areal data.

Encoding UTF-8

LazyData true

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RoxygenNote 7.3.1

Depends R (>= 2.10)

Suggests knitr, rmarkdown

VignetteBuilder knitr

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

RemoteUrl https://github.com/fdzul/denhotspots

RemoteRef HEAD

RemoteSha 1afb6938505505f1f823026c825af39bc23573b0

Contents

---

bivariate_map   *bivariate_map*

Description

generate a bivariate map

Usage

```
bivariate_map(w, x, y, dim, pal, style, size_axis, scale_leg, x_leg, y_leg)
```

Arguments

w	Is the sf object with the variables to map.
x	Is the variable x in the sf object to be mapped.
y	Is the variable x in the sf object to be mapped.
dim	The dimensions of the palette, either 2 for a two-by-two palette or 3 for a three-by-three palette
pal	A palette name; one of "Brown", "DkBlue", "DkCyan", "DkViolet", or "Gr-Pink". As biscale::bi_legend.
style	A string identifying the style used to calculate breaks. Currently supported styles are "quantile", "equal", "fisher", and "jenks"
size_axis	Size of axis labels.
scale_leg	Scales the grob relative to the rectangle defined by x, y, width, height. A setting of scale = 1 indicates no scaling.
x_leg	The x location of the legend in the plot.
y_leg	The y location of the legend in the plot.

Value

a ggplot object.

Author(s)

Felipe Antonio Dzul Manzanilla `<felipe.dzul.m@gmail.com>`

---

cases_by_agem	*cases_by_agem*

Description

this function left joint sf AGEM and the cases by municipality.

Usage

```
cases_by_agem(path, disease)
```

Arguments

path	is the directory where the txt of dengue file exist.
disease	is a string for define the vector borne disease. The option are "Paludismo", "Dengue" & "covid.

Value

a sf object. The municipality with the dengue cases by year.

Examples

```
1+1
```

---

data_geocoden	*data_geocoden*

Description

this function creates an address vector and replaces incorrect text.

Usage

```
data_geocoden(infile, data, sinave_new)
```

Arguments

`infile`	is the name of file create with [subset_den](#).
`data`	is a string for define the addreses or data. if data TRUE, is return the dataset.
`sinave_new`	is logical value. If is TRUE the subset ir for 2016-2019 dengue dataset, else the subset ir for 2008-2015 dengue dataset.

Value

a vector.

Author(s)

Felipe Antonio Dzul Manzanilla <felipe.dzul.m@gmail.com>

`geocoden`	*geocoden*

Description

this function geocodes the addresses of the sinave database using Geocoding API.

Usage

```
geocoden(infile, address)
```

Arguments

`infile`	is the name of the location that is being geocoded and is used to be saved in a file with extension rds.
`address`	is vector addresses.

Details

The function use the [geocode](#) of ggmap.

Value

a file with extension rds.

Note

The code for geocoding was taken from the personal page of Shane Lynn https://www.shanelynn.ie/massive-geocoding-with-r-and-google-maps/ and adapted to work with the sinave http://www.sinave.gob.mx/ database.

Author(s)

Felipe Antonio Dzul Manzanilla <felipe.dzul.m@gmail.com>

See Also

[geocode](#)

---

gihi	*gihi*

Description

Calculate gi and hi local spatial statistic

Usage

```
gihi(x, gi_hi, id, dis, time, alpha = NULL)
```

Arguments

x	it is an sf object with the number of events for each spatial unit
gi_hi	Define the local spatial statistic. It includes three options ("gi", "hi", "gi_hi", if "gi" calculates the spatial local statistic getis & ord, if it is "hi" calculates hi, and if it is "gi_hi" calculates both statistic
id	is or are the identifiers of each spatial unit
dis	it is the prefix of the variable name. Example den_2018 or denv_2018, dis is den and denv
time	is the unit of time or the time scale of the analyzed time series. example in years, times, months, weeks
alpha	is the value of alpha to determine the threshold of value of gi to discriminate hotspots from non-hotspots

Value

a sf object with the ids and the intensity and hotspots for hi, gi or each.

Author(s)

Felipe Antonio Dzul Manzanilla <felipe.dzul.m@gmail.com>

References

Getis A, Ord JK. 1992. The analysis of spatial association by the use of distance statistics.Geographical Analysis, 24(2):189-206. Ord JK, Getis A. 1995. Local spatial autocorrelation statistics: distributional issues and an application. Geographical Analysis, 27, 286–306. Ord JK, Getis A. 2012. Local spatial heteroscedasticity (LOSH), The Annals of Regional Science, 48 (2), 529–539. Bivand RS, Wong DWS. 2018. Comparing implementations of global and local indicators of spatial association. TEST, 27(3), 716–748.

See Also

[LOSH.cs](#), [localG](#)

intensity_plot	*intensity_plot*

Description

this function plot the event hotspots by polygon.

Usage

```
intensity_plot(
  x,
  pal,
  option = NULL,
  name = NULL,
  pal_name,
  breaks,
  dir_pal = NULL,
  x_leg,
  y_leg
)
```

Arguments

x	is the hotspots dataset.
pal	is the palette.
option	is the palette option.
name	is the palette name. the option and name are very similar, some package use name (ej. rcartocolor::carto_pal) and other option (ex. viridis:viridis)
pal_name	is a logical value, if pal_name TRUE is for packages that use name, else the packages that use option.
breaks	is a numeric value. Is the increment of the sequence.
dir_pal	is the direction of the palette, 1 forward, -1 reverse.
x_leg	is the x coordinates of legend.
y_leg	is the x coordinates of legend.

Value

a ggplot

Examples

```
1+1
```

knox	*knox test*

Description

This function implement space-time analysis with the knox test

Usage

```
knox(x, crs, dt, ds, sym, sp_link, planar_coord)
```

Arguments

x	is the dataset with the coordinates and onset of symptoms
crs	is the coordinate reference system.
dt	is the temporal windows.
ds	is the spatial windows.
sym	is the MonteCarlo replications number.
sp_link	is the logical value. If sp_link is true the space-time link is built with sp, else with sf.
planar_coord	is the logical value.if planar_coord is false, the dataset is projected to a planar system.

Details

This function implements the space-time analysis with the knox test. x is a dataframe with three variables: x (longitude), y (latitude) and onset (onset of symptoms) The coordinates should be projected to a planar system. The function rknox test use the (knox)[https://github.com/thanhleviet/knox] package of (github)[https://github.com/].

Value

a list with three elements: knox, st_link, space-time link. - *knox* is a list with three elements:

knox	Knox statistic, which is the number of pairs of points found in a given space-time distance.
p_value	p-value calculated from MonteCarlo simulation.
RR	Relative Risk - calculated by observed value (Knox statistics) divided by mean of simulated values.

- *st_link* is a origen-destination dataset of class dataframe. This dataset has four variables:

Xo	is the longitude of the point of origin.
Yo	are the latitud of the point of origin.
Xd	are the longitude of the destination point.
Yd	are the latitud of the destination point.

- *space-time link* is a sf object (LINESTRING) with crs 4326.

Author(s)

Felipe Antonio Dzul Manzanilla <felipe.dzul.m@gmail.com>

References

Knox, E. (1964). *The detection of space-time interactions.* Journal of the Royal Statistical Society. Series C (13(1), 25-30. **Tango, T. (2010)**. *Statistical methods for disease clustering. Springer.*

See Also

knox_mc, st_link, knox

---

map_risk   *map_risk*

Description

The map_risk function generates the map of the operational scenarios or epidemiological scenarios based on the hotspots of dengue transmission and the hotspots of the abundance of dengue vector eggs.

Usage

```
map_risk(risk, staticmap)
```

Arguments

risk   is the spatial risk dataset.

staticmap   is a logical value, if true the map is static else the map is interactive.

Value

a ggplot o mapview object

Note

To generate the map with this function, you must first run the risk_ageb function.

Author(s)

Felipe Antonio Dzul Manzanilla <felipe.dzul.m@gmail.com>

Examples

```
1+1
```

---

point_to_polygons   *point_to_polygon*

Description

this function counts how many events for spatial unit

Usage

```
point_to_polygons(x, y, ids, time, coords, crs, dis)
```

Arguments

x	is the point pattern data with the coordinate.
y	is the sf areal data.
ids	is the unique o uniques identifiers of each spatial unit.
time	is the temporal resolution of datasets.
coords	is the coordinates of geocoded dataset.
crs	is the coordinate reference system.
dis	is the name of vector-borne diseases.

Value

a sf object.

Author(s)

Felipe Antonio Dzul Manzanilla <felipe.dzul.m@gmail.com>

---

power_laws   *Power Laws data.*

Description

A dataset containing the Power Laws dataset.

Usage

```
power_laws
```

Format

A dataframe object with 606 rows and 3 variables:

y are the percentiles of the y variable

x are the percentiles of the x variable

power_law are the power distributions ...

Source

<https://www.tandfonline.com/doi/abs/10.1080/00207390802213609>

---

power_law_plot   *power_law_plot*

Description

this plot generate the all Power Law for hotspots and spatial units.

Usage

```
power_law_plot(x)
```

Arguments

x   is the dataset.

Value

a ggplot.

Author(s)

Felipe Antonio Dzul Manzanilla <felipe.dzul.m@gmail.com>

Examples

```
1+1
```

---

read_dengue_dataset   *read_dengue_dataset*

Description

Read the dengue dataset of [SINAVE](https://www.sinave.gob.mx/)

Usage

```
read_dengue_dataset(
  path,
  spatial_resolution,
  status_caso,
  des_edo_res = NULL,
  des_mpo_res = NULL
)
```

Arguments

path	is the path of dengue dataset.
spatial_resolution	
	is the spatial resolution or the administrative level. The values are country, state and municipality.
des_edo_res	is a string for define the state in uppercase.
des_mpo_res	is a string for define the municipality in uppercase.
estatus_caso	1 probable, 2 confirmado, & 3 descartado.

Value

a data.table object.

Author(s)

Felipe Antonio Dzul Manzanilla <felipe.dzul.m@gmail.com>

---

read_den_dataset   *Read the dengue dataset for geocoding*

Description

Read the dengue dataset for geocoding

Usage

```
read_den_dataset(x, des_edo_res, des_mpo_res)
```

Arguments

x	is the path of dengue dataset.
des_edo_res	is a string for define the state in uppercase.
des_mpo_res	is a string for define the municipality in uppercase

Value

a data.table

Examples

```
1+1
```

---

risk_ageb   *risk_ageb*

Description

risk ageb identifies epidemiological scenarios based on historical epidemiological and entomological information.

Usage

```
risk_ageb(betas, hotspots, intensity_perc, locality, cve_edo)
```

Arguments

betas	It is the dataset of the regression coefficients of the geostatistical model with INLA-SPDE. The betas are calculated with the deneggs package.
hotspots	It is the database of the results of the hotspots analysis with the local statistician Getis&Ord. Hotspots are calculated with the denhotspots package.
intensity_perc	It is the percentage of intensity of egg hotspots.
locality	is the locality name.
cve_edo	is the id of state.

Value

a sf object.

Author(s)

Felipe Antonio Dzul Manzanilla <felipe.dzul.m@gmail.com>

See Also

eggs_hotspots, spde_pred_map, eggs_hotspots_week & @seealso inla

---

risk_h3   *risk_h3*

Description

risk h3 identifies epidemiological scenarios based on historical epidemiological and entomological information.

Usage

```
risk_h3(betas, hotspots, intensity_perc, locality, cve_edo)
```

Arguments

betas	It is the dataset of the regression coefficients of the geostatistical model with INLA-SPDE. The betas are calculated with the deneggs package.
hotspots	It is the database of the results of the hotspots analysis with the local statistician Getis&Ord. Hotspots are calculated with the denhotspots package.
intensity_perc	It is the percentage of intensity of egg hotspots.
locality	is the locality name.
cve_edo	is the id of state.

Value

a sf object.

Author(s)

Felipe Antonio Dzul Manzanilla <felipe.dzul.m@gmail.com>

See Also

eggs_hotspots, spde_pred_map, eggs_hotspots_week & @seealso inla

---

satscanR   *satscanR*

Description

This function performs space-time analysis with SaTScan.

Usage

```
satscanR(
  cas_file,
  geo_file,
  start_date,
  end_date,
  spatial_window,
  temporal_window,
  ssbatchfilename = "SaTScanBatch",
  path_satscan
)
```

Arguments

`cas_file`	is the case file (cas for short).
`geo_file`	is the geographic or coordinates file (geo for short).
`start_date`	is the earliest date to be included in the study period. Is calculated with min(x_cas$date).
`end_date`	is the latest date to be included in the study period. Is calculated with max(x_cas$date).
`spatial_window`	is the spatial window. The spatial resolution is in km.
`temporal_window`	
	is the temporal window. The time resolution is in days.
`ssbatchfilename`	
	is the name of the file containing the SaTScan executable.
`path_satscan`	is the path of directory of SatScan installation.

Details

the stascanR implements ths space-time analysis with [rsatscan](https://cran.r-project.org/web/packages/rsatscan/vignettes/rs
package. The rsatscan package only does anything useful if you have installed [SaTScan](https://www.satscan.org/)

Value

a list with eight object (main, col, rr, gis, llr, sci, shapeclust, prm)

Author(s)

Felipe Antonio Dzul Manzanilla `<felipe.dzul.m@gmail.com>`.

See Also

ss.options, satscan

---

save_geocoden	*save_geocoden*

Description

This function generates the RData file where it contains the geocoded data and the sinave database.

Usage

```
save_geocoden(x, y, directory, loc)
```

Arguments

x	is the geocoded data.
y	is the dataset o sinave.
directory	is the folder where the RData file is to be saved
loc	is the name of geocoded name locality

Value

a RData

Author(s)

Felipe Antonio Dzul Manzanilla `<felipe.dzul.m@gmail.com>`

---

sf_joint_cov	*sf_joint_cov this function apply the dplyr::left_join between sf and covid data of México*

Description

sf_joint_cov this function apply the dplyr::left_join between sf and covid data of México

Usage

```
sf_joint_cov(path_dat, path_sf)
```

Arguments

path_dat	is the directory of the covid data.
path_sf	is the directory of the municipality shapefile of Mexico.

Details

The function use the left_join of dplyr.

Value

a sf object with a dengue cases accumulated by municipality.

Note

the dataset of SARS-COV2 of Mexico is downloaded homepage of DGE https://www.gob.mx/ [salud/documentos/datos-abiertos-152127?idiom=es](https://www.gob.mx/salud/documentos/datos-abiertos-152127?idiom=es) and adapted to work with the sinave http://www.sinave.gob.mx/ database.

Author(s)

Felipe Antonio Dzul Manzanilla <felipe.dzul.m@gmail.com>

---

space_time_link_map   *space-time link map*

Description

The purpose of this function is to visualize the transmission chains resulting from the knox test.

Usage

```
space_time_link_map(x, locality, cve_edo, maptype, facetmap = NULL)
```

Arguments

x	is the result of knox test.
locality	is the locality target.
cve_edo	is the id of state.
maptype	is the map type, the values are staticmap & interactive_map.
facetmap	is a logical value for facet, if true the map is facet, else is not facet.

Value

a ggmap

Author(s)

Felipe Antonio Dzul Manzanilla <felipe.dzul.m@gmail.com>

---

spatial_lgcp   *Spatial Log Gaussian Cox Process*

Description

The spatial_lgcp has the objective of performing the spatial analysis with the log gaussian cox process model in order to predict the intensity of cases in urban and metropolitan endemic dengue locations in Mexico.

Usage

```
spatial_lgcp(
  dataset,
  locality,
  cve_edo,
  longitude,
  latitude,
  k,
  plot,
  resolution,
  aproximation,
  integration,
  approach,
  cell_size = NULL,
  name
)
```

Arguments

dataset	is the dengue geocoded dataset.
locality	is the locality target.
cve_edo	is the text id of the state..
longitude	is the name of the column of the longitude in the geocoded dataset.
latitude	is the name of the column of the latitude in the geocoded dataset.
k	is the parameter for define the triagulization of delauney in the inner and the outer area in the argument max.edge in the INLA:inla.mesh.2d.
plot	is a logical value for the plot the mesh.
resolution	is a value for set the resolution of the locality raster. resolution 0.1 = 11.132 km, 0.009 = 1.00 km, 0.005 = 500 m, 0.0027 = 300 m, & 0.001 = 100 m.
aproximation	aproximation is the aproximation of the joint posterior of the marginals and hyperparameter. The options are "adaptative", "gaussian", "simplified.laplace" & "laplace".
integration	integration is the integration strategy. The options are "auto","grid", "eb" & "ccd".

approach	is algorithm for spatial Log Gaussian Cox Process. The option are "lattice", "inlabru" & "simpson" according to Illian 2012, Bachl et al 2018 & Simpson et al 2016,respectively.
cell_size	is the sample number per location (area of locality/n)
name	is the name of the palette.

Value

a list with several object.

---

staticmap_intensity   *staticmap_intensity*

Description

This function generate the intensity map of hotspots.

Usage

```
staticmap_intensity(
  x,
  pal,
  option = NULL,
  name = NULL,
  pal_name,
  breaks,
  dir_pal = NULL,
  x_leg,
  y_leg,
  ageb
)
```

Arguments

x	is the hotspots dataset.
pal	is the palette.
option	is the palette option.
name	is the palette name. the option and name are very similar, some package use name (ej. rcartocolor::carto_pal) and other option (ex. viridis:viridis)
pal_name	is a logical value, if pal_name TRUE is for packages that use name, else the packages that use option.
breaks	is a numeric value. Is the increment of the sequence.
dir_pal	is the direction of the palette, 1 forward, -1 reverse.
x_leg	is the x coordinates of legend.
y_leg	is the x coordinates of legend.
ageb	is a logical value, if ageb is TRUE plot the intensity map of ageb, else plot the intensity map by other spatial unit.

Value

a ggplot map.

Author(s)

Felipe Antonio Dzul Manzanilla <felipe.dzul.m@gmail.com>.

Examples

```
1+1
```

---

staticmap_knoxs   *staticmap_knoxs*

Description

This function generate the space-time link map.

Usage

```
staticmap_knoxs(
  locality,
  cve_geo,
  path_data,
  path_knoxs,
  pal,
  option = NULL,
  name = NULL,
  pal_name,
  breaks,
  dir_pal = NULL,
  x_leg,
  y_leg
)
```

Arguments

locality	is the locality target.
cve_geo	is the id of state.
path_data	is the directory of geocoded dengue cases dataset.
path_knoxs	is the output of the space-time analysis (Knoxs method) with ClusterSeer.
pal	is the palette.
option	is the palette option.
name	is the palette name. the option and name are very similar, some package use name (ej. rcartocolor::carto_pal) and other option (ex. viridis:viridis).

pal_name	is a logical value, if pal_name TRUE is for packages that use name, else the packages that use option.
breaks	is a numeric value. Is the increment of the sequence.
dir_pal	is the direction of the palette, 1 forward, -1 reverse.
x_leg	is the x coordinates of legend.
y_leg	is the x coordinates of legend.

Details

The staticmap_knox implement the space-time link map with Knoxs method in [ClusterSeer](https://www.biomedware.com/s

Value

a ggplot map.

Author(s)

Felipe Antonio Dzul Manzanilla `<felipe.dzul.m@gmail.com>`.

Examples

```
1+1
```

---

staticmap_satscan   *staticmap_satscan*

Description

This function generate the map of the output for [SaTScan](https://www.satscan.org/) or [rsatscan](https://cran.r-project.org/web/packages/rsatscan/vignettes/rsatscan.html).

Usage

```
staticmap_satscan(
  x,
  rsatscan = NULL,
  satscan,
  locality,
  cve_edo,
  path_shapeclust = NULL,
  path_gis = NULL
)
```

Arguments

x	is the dengue cases of the target locality.
rsatscan	is the output of the space-time analysis with [rsatscan](https://cran.r-project.org/web/packages/rsatscan/vi package.
satscan	is a logical value for indicating if TRUE for output of [SaTScan](https://www.satscan.org/).
locality	is the target locality.
cve_edo	is the id of state.
path_shapeclust	
	is the directory of the output of the space-time analysis with [SaTScan](https://www.satscan.org/). is the col.shp file.
path_gis	is the directory of the output of the space-time analysis with [SaTScan](https://www.satscan.org/).is the gis.shp file.

Value

a ggplot map.

Author(s)

Felipe Antonio Dzul Manzanilla `<felipe.dzul.m@gmail.com>`.

---

subset_den	*subset_den*

Description

is a function for subset de dengue dataset

Usage

```
subset_den(x = NULL, path = NULL, edo, mun, loc, sinave_new, age_group, name)
```

Arguments

x	is the 2008-2015 dengue dataset. Is NULL for 2016-2019 dengue dataset.
path	is the path of the 2016-2019 dengue dataset. Is NULL for 2008-2015 dengue dataset.
edo	is a string for define the state in uppercase.
mun	is a string for define the municipality in uppercase.
loc	is a string for define the locality in uppercase.
sinave_new	is logical value. If is TRUE the subset ir for 2016-2019 dengue dataset, else the subset ir for 2008-2015 dengue dataset.
age_group	is a logical value. If is TRUE the subset for age group (<= 12 & >= 65), else all age group.
name	is the name the csv output

Value

a object names x and a csv file in working dircetory.

Author(s)

Felipe Antonio Dzul Manzanilla <felipe.dzul.m@gmail.com>

---

transmission_chains_map

transmission_chain_map

Description

the function generate the space-time links map with mapview package.

Usage

```
transmission_chains_map(geocoded_dataset, cve_edo, locality, dengue_cases)
```

Arguments

geocoded_dataset

                is the dengue geocoded dataset.

cve_edo   is the id of state.

locality   is the target locality

dengue_cases   is string for define the positive of suspected dengue cases

Value

a mapview

Author(s)

Felipe Antonio Dzul Manzanilla <felipe.dzul.m@gmail.com>

Examples

```
1+1
```

Index