

Package ‘mapReasy’

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Type Package

Title Producing Administrative Boundary Map with Additional Features Embedded

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Description

Produce administrative boundary map, visualize and compare different factors on map, tracking latitude and longitude, bubble plot. The package provides some handy functions to produce different administrative maps easily. Functions to obtain colorful visualization of different regions of interest and sub-divisional administrative map at different levels are included. This can be used to increase feasibility of mapping disease pattern across different regions (disease mapping) with appropriate colors having intensity coherent with magnitude of prevalence. In many surveys, information on location of sample are collected. Sometimes it is of interest to quick look at the spreadness of the collected sample, check if any observation falls outside of the survey area and identify them. The package provides unique function to perform these tasks easily. Besides, some additional features have been added to make ad-lib comparison of different factors across the region through these maps. Visual presentation of two different variables on a particular map using two way bubble plot is also provided. Simple bar chart and pie chart can be produced on map to compare several factors. This package will be helpful to researchers-both statistician and non-statistician, to create geographic location wise plotting of different indicators. These types of maps are used in different research areas such public health, economics, environment, journalism etc. It provides functions that will also be helpful to users to create map using two indicators at a time (for example, shade on a map will give the information of one indicator variable, bar/pie/bubble chart will give the information on another indicator). Users only need to select the indicator's value and country wise region specific shapefile and run the functions to find their graphs quickly. The distinguishable features of the functions in this package are they are easy to understand to new R users who are searching some ad-lib functions to produce administrative map with different features and easy to use for those who are unfamiliar with file format of spatial data or geographic location data. Functions in this package adopt, compile and implement functions from some well-known packages on handling spatial data to make an user friendly functionality. So users do not need any additional knowl-

edge about spatial statistics or geographic location data. All the examples presented in this package use shapefile of country Bangladesh downloaded from <http://www.gadm.org>. Users are requested to visit <http://www.gadm.org>, then select Download, then choose country and shapefile from country and File format dropdown menu. After downloading the shapefile of any particular country as compressed file, unzip the file and keep them in a known directory or working directory. Shapefiles of respective countries will be required to produce corresponding country maps. Use shapefile of corresponding country to produce all types of maps available in this package.

Depends sp, rgdal, Hmisc, R (>= 3.0.2)

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mapReasy-package	<i>Producing Administrative Boundary Map with Additional Features Embedded</i>
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Description

Produce administrative map, visualize and compare different factors on administrative map, tracking latitude and longitude, bubble plot.

The package provides some handy functions to produce different administrative maps easily. Functions are included to obtain colorful visualization of different regions of interest or sub-divisional administrative map at different levels. Main objective of the package is to increase feasibility of mapping disease pattern across different regions (disease mapping) with appropriate colors having intensity coherent with magnitude of prevalence (Lawson, 2001; DOI: 10.1002/sim.933).

In many surveys, information on location of sample are collected. Sometimes it is of interest to quick look at the spreadness of the collected sample, check if any observation falls outside of the survey area and identify them. This package provides unique ways to perform these tasks easily. Besides, some additional features are available to make ad-lib comparison of different factors across regions through the maps. Visual presentation of two different variables on a particular map using two way bubble plot is an important feature. Simple bar chart and pie chart can be produced on maps to compare several factors.

Details

Produce country subdivision or administrative division map with colorful indication, partial mapping, tracking latitude and longitude on map, comparing different factors on map, disease mapping and bubble plot.

Author(s)

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References

www.gadm.org, version 2.8, November 2015.

Pineda, M. C., Lopez-Legentil, S., & Turon, X. (2011). The whereabouts of an ancient wanderer: global phylogeography of the solitary ascidian *Styela plicata*. *PLoS One*, 6(9), e25495. DOI: 10.1371/journal.pone.0025495.

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Bivand, R. S., Pebesma, E. J., Gomez-Rubio, V., & Pebesma, E. J. (2008). *Applied spatial data analysis with R* (Vol. 747248717). New York: Springer.

Lawson, A. B. (2001). Disease map reconstruction. *Statistics in medicine*, 20(14), 2183-2204.

<http://www.caliper.com/Support/answer11.htm>

<http://www.fao.org/geonetwork/srv/en/metadata.show?id=12691&currTab=simple>

<http://ungiwg.org/coreDB>

Examples

```
color10(5)
```

```
filePATH <- system.file("Bangladesh", package="mapReasy")
map.country(shapedir= filePATH, shapename="BGD_adm1", boundary.label="NAME_1")
```

```
map.country(shapedir= filePATH, shapename="BGD_adm1", boundary.label="NAME_1",
spe.vector=c("Dhaka", "Sylhet", "Khulna"), col=color10(3))
```

color10

Generate sequence of colors

Description

A sequence of colors will be generated which have pattern of increasing intensity.

Usage

```
color10(n)
```

Arguments

n	No of areas needed to be colored. A minimum value of 1 to the maximum value of 10 are allowed.
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Details

In many scenario, including disease mapping, different areas are needed to be colored with intensity proportion to frequency (or percentage). A set of such colors will be provided to shade different regions.

Value

Vector

Author(s)

Mazharul Islam, Jahidur Rahman Khan and Hasinur Rahaman Khan

See Also

map.country

Examples

```
color10(5)
```

country.regionTRAC	<i>Longitude and latitude tracking on administrative boundary map and subset of administrative boundary map</i>
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Description

Plotting longitude and latitude on administrative boundary map of a country or a particular region of a country. This is particularly useful to track any point, visualize spreadness of points, identifying points fall outside the area of interest etc. It is also possible to map subset of any particular regions of interest.

The function reads shapefile using readOGR function of the package "rgdal" which requires both the directory location of shapefiles and the name of the shapefile (without the .shp extension). Reading shapefile using readOGR function creates an object of class "SpatialPolygonsDataFrame" which has been used to produce administrative boundary map of different regions.

Usage

```
country.regionTRAC(shapedir = "WorkingDir", shapename, boundary.label, spc.level,
long.vector = NULL, lat.vector = NULL, cex = 0.8, point.col = "red", point.pch = 19,
point.cex = 0.5, point.trc = FALSE)
```

Arguments

shapedir	Directory path where the shape files were kept. If not specified, it assumes that the shape files are in the current working directory. Default is "WorkingDir".
shapename	Name of shape file excluding extension (.shp). Character.
boundary.label	Boundary label vector name supplied from the shape file. See info.shape() to know this variable. Character. See details below.
spc.level	Vector of area names for which sub-map will be produced. Vector of character(s). See details below.
long.vector	Vector of longitude. Default is NULL.
lat.vector	Vector of latitude. Default is NULL.
cex	Size of area label. Default is 0.8. See also par().
point.col	Color of longitude-latitude point(s). Default is "red".
point.pch	Symbol of longitude-latitude point(s). Default is 19. See also par().
point.cex	Size of longitude-latitude point(s). Default is 0.5. See also par().
point.trc	Logical. If TRUE corresponding values of longitude and latitude will also be shown in the map.

Details

Object of class "SpatialPolygonsDataFrame" has different slots to hold polygons with attributes. A shapefile usually contains country subdivision or administrative division (province, district, upazila etc). The largest administrative subdivision is called "first administrative level" followed by "second administrative level" and so on. If we want administrative boundary map of first administrative level having administrative areas "X", "Y" and "Z", we need to specify, in boundary.label parameter, which column (column name) contains "X", "Y" and "Z".

Map of certain portion of country subdivision, for example areas "X" and "Z", can also be obtained by specifying the parameter spc.level. See examples below.

The above information of country subdivision columns and area names can be viewed by info.shape function. Use same spelling as viewed by info.shape() function.

Author(s)

Mazharul Islam, Jahidur Rahman Khan and Hasinur Rahaman Khan

References

www.gadm.org, version 2.8, November 2015.

Pineda, M. C., Lopez-Legentil, S., & Turon, X. (2011). The whereabouts of an ancient wanderer: global phylogeography of the solitary ascidian *Styela plicata*. *PLoS One*, 6(9), e25495. DOI: 10.1371/journal.pone.0025495.

Zhao, K., Tung, C. W., Eizenga, G. C., Wright, M. H., Ali, M. L., Price, A. H., ... & McClung, A. M. (2011). Genome-wide association mapping reveals a rich genetic architecture of complex traits in *Oryza sativa*. *Nature communications*, 2, 467. doi:10.1038/ncomms1467.

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<http://www.fao.org/geonetwork/srv/en/metadata.show?id=12691&currTab=simple>

<http://ungiwg.org/coreDB>

See Also

info.shape

Examples

```
filePATH <- system.file("Bangladesh", package="mapReasy")

country.regionTRAC(shapedir=filePATH, shapename="BGD_adm1", boundary.label="NAME_1",
  spc.level=c("Khulna", "Dhaka", "Rangpur", "Sylhet"))
```

info.shape

Extract information of shape file

Description

Extract and provide data features, different fields, country subdivisions and area names from shape file. This function is particularly useful to know "boundary.label" parameter input and spelling of current names of different areas.

Usage

```
info.shape(shapedir, shapename)
```

Arguments

shapedir	Directory path where the shape files were kept. If not specified, it assumes that the shape files are in the current working directory. Character. Default is "WorkingDir".
shapename	Name of shape file excluding extension (.shp). Character.

Value

List of values including boundary label parameter input, names of areas

Note

Shape files can be used academic purpose only

Author(s)

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References

www.gadm.org, version 2.8, November 2015.

Pineda, M. C., Lopez-Legentil, S., & Turon, X. (2011). The whereabouts of an ancient wanderer: global phylogeography of the solitary ascidian *Styela plicata*. *PLoS One*, 6(9), e25495. DOI: 10.1371/journal.pone.0025495.

Zhao, K., Tung, C. W., Eizenga, G. C., Wright, M. H., Ali, M. L., Price, A. H., ... & McClung, A. M. (2011). Genome-wide association mapping reveals a rich genetic architecture of complex traits in *Oryza sativa*. *Nature communications*, 2, 467. doi:10.1038/ncomms1467.

Bivand, R. S., Pebesma, E. J., Gomez-Rubio, V., & Pebesma, E. J. (2008). *Applied spatial data analysis with R* (Vol. 747248717). New York: Springer.

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<http://www.fao.org/geonetwork/srv/en/metadata.show?id=12691&currTab=simple>

<http://ungiwg.org/coreDB>

See Also

map.country

Examples

```
filePATH <- system.file("Bangladesh", package="mapReasy")  
info<-info.shape(shapedir= filePATH, shapename="BGD_adm1")  
info
```

 map.bubble

Two way bubble plot

Description

Bubble plot can be produced. It is also possible to produce two way bubble plot to visualize 2 different variables at the same time on this plot. One variable is shown by shaded region and other by bubble. This is mainly visualizing corresponding impact on different regions. For example, viewing "no of potential customers" and "message coverage" at different administrative areas.

The function reads shapefile using readOGR function of the package "rgdal" which requires both the directory location of shapefiles and the name of the shapefile (without the .shp extension). Reading shapefile using readOGR function creates an object of class "SpatialPolygonsDataFrame" which has been used to produce administrative boundary map of different regions.

Usage

```
map.bubble(shapedir = "WorkingDir", shapename, boundary.label, spe.vector
= NULL, cex=0.8,col="lightblue",bubcex,bubpch=1,bublwd=2,bubcol="green")
```

Arguments

shapedir	Directory path where the shape files were kept. If not specified, it assumes that the shape files are in the current working directory. Character. Default is "WorkingDir".
shapename	Name of shape file excluding extension (.shp). Character.
boundary.label	Boundary label vector name supplied from the shape file. See info.shape() to know this input. Character. See details.
spe.vector	Vector of character(names of areas) for which color shades will be implied. Default is NULL; which gives only bubble plot. Specify this parameter to visualize one variable of interest (let, X).
cex	Size of area label. Default is 0.8. See also par().
col	Colors of shaded regions. Specify this parameter for predefined spe.vector argument (for variable X). Default is "lightblue". See color10() for sequence of colors.
bubcex	Bubble size (usually proportion to another variable of interest, say Y). See examples below.
bubpch	Symbol of Bubble. Default is 1. See also par().
bublwd	Line width of bubble. Default is 2. See also par().
bubcol	Color of bubble. Default is "green".

Details

Object of class "SpatialPolygonsDataFrame" has different slots to hold polygons with attributes. A shapefile usually contains country subdivision or administrative division (province, district, upazila etc). The largest administrative subdivision is called "first administrative level" followed by "second administrative level" and so on. If we want administrative boundary map of first administrative level having administrative areas "X", "Y" and "Z", we need to specify, in boundary.label parameter, which column (column name) contains "X", "Y" and "Z".

The above information of country subdivision columns and area names can be viewed by info.shape function. Use same spelling as viewed by info.shape() function.

Author(s)

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References

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Zhao, K., Tung, C. W., Eizenga, G. C., Wright, M. H., Ali, M. L., Price, A. H., ... & McClung, A. M. (2011). Genome-wide association mapping reveals a rich genetic architecture of complex traits in *Oryza sativa*. *Nature communications*, 2, 467. doi:10.1038/ncomms1467.

Bivand, R. S., Pebesma, E. J., Gomez-Rubio, V., & Pebesma, E. J. (2008). *Applied spatial data analysis with R* (Vol. 747248717). New York: Springer.

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<http://ungiwg.org/coreDB>

See Also

info.shape

Examples

```
filePATH <- system.file("Bangladesh", package="mapReasy")  
  
map.bubble(shapedir=filePATH, shapename="BGD_adm1", boundary.label="NAME_1", cex=0.8,  
bubcol="green", bubpch=1, bublwd=2, bubcex=c(17, 12, 12, 18, 23, 18, 29)/3)
```

 map.country

Produce map, color map and disease map of a country

Description

Produce map of a country including simple map, color-shaded map and disease mapping.

The function reads shapefile using readOGR function of the package “rgdal” which requires both the directory location of shapefiles and the name of the shapefile (without the .shp extension). Reading shapefile using readOGR function creates an object of class “SpatialPolygonsDataFrame” which has been used to produce administrative boundary map of different regions.

Usage

```
map.country(shapedir = "WorkingDir", shapename, boundary.label = NULL,
            spe.vector = NULL, cex = 0.8, col = "lightblue")
```

Arguments

shapedir	Directory path where the shape files were kept. If not specified, it assumes that the shape files are in the current working directory. Character. Default is "WorkingDir".
shapename	Name of shape file excluding extension (.shp). Character.
boundary.label	Boundary label vector name supplied from the shape file. See info.shape() to know this input. Default is NULL. See details below.
spe.vector	Vector of region (names of areas). Default is NULL. See details below.
cex	Size of region name. Default is 0.8.
col	Color of shaded areas. Default is "lightblue". See color10() for more colors, particularly disease mapping.

Details

Object of class “SpatialPolygonsDataFrame” has different slots to hold polygons with attributes. A shapefile usually contains country subdivision or administrative division (province, district, upazila etc). The largest administrative subdivision is called “first administrative level” followed by “second administrative level” and so on. If we want administrative boundary map of first administrative level having administrative areas “X”, “Y” and “Z”, we need to specify, in boundary.label parameter, which column (column name) contains “X”, “Y” and “Z”.

The above information of country subdivision columns and area names can be viewed by info.shape function. Use same spelling as viewed by info.shape() function.

Author(s)

Mazharul Islam, Jahidur Rahman Khan and Hasinur Rahaman Khan

References

www.gadm.org, version 2.8, November 2015.

Pineda, M. C., Lpez-Legentil, S., & Turon, X. (2011). The whereabouts of an ancient wanderer: global phylogeography of the solitary ascidian *Styela plicata*. *PLoS One*, 6(9), e25495. DOI: 10.1371/journal.pone.0025495.

Zhao, K., Tung, C. W., Eizenga, G. C., Wright, M. H., Ali, M. L., Price, A. H., ... & McClung, A. M. (2011). Genome-wide association mapping reveals a rich genetic architecture of complex traits in *Oryza sativa*. *Nature communications*, 2, 467. doi:10.1038/ncomms1467.

Bivand, R. S., Pebesma, E. J., Gomez-Rubio, V., & Pebesma, E. J. (2008). *Applied spatial data analysis with R* (Vol. 747248717). New York: Springer.

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<http://ungiwg.org/coreDB>

See Also

info.shape

Examples

```
filePATH <- system.file("Bangladesh", package="mapReasy")
```

```
map.country(shapedir= filePATH, shapename="BGD_adm1")
```

plotonMAP

Comparison of different factors on administrative map with bar and pie charts

Description

Two different types of plots (bar and pie charts) can be produced to make comparison of different factors on administrative map.

The function reads shapefile using readOGR function of the package "rgdal" which requires both the directory location of shapefiles and the name of the shapefile (without the .shp extension). Reading shapefile using readOGR function creates an object of class "SpatialPolygonsDataFrame" which has been used to produce administrative boundary map of different regions.

Usage

```
plotonMAP(shapedir = "WorkingDir", shapename, boundary.label, all.label = FALSE,
lab.cex = 0.8, plot.type = "bar", plot.data, plot.col, plot.label.col = "blue",
pie.radius = 0.8, plot.size = c(0.5, 0.5))
```

Arguments

shapedir	Directory path where the shape files were kept. If not specified, it assumes that the shape files are in the current working directory. Character. Default is "WorkingDir".
shapename	Name of shape file excluding extension (.shp). Character.
boundary.label	Boundary label vector name supplied from the shape file. See info.shape() to know this variable. Character. See details below.
all.label	Logical. If TRUE all area label will be shown.
lab.cex	Size of area label. Default is 0.8.
plot.type	Type of plot. Default is bar chart. Another argument is "pie", which produce pie chart.
plot.data	A data frame of variable of interest. See example for more details.
plot.col	Specify colors of respective plot.
plot.label.col	Label color of area. Default is "blue".
pie.radius	Radius of pie chart. Default is 0.8.
plot.size	Vector of size of plot. Default is c(0.5, 0.5).

Details

Object of class "SpatialPolygonsDataFrame" has different slots to hold polygons with attributes. A shapefile usually contains country subdivision or administrative division (province, district, upazila etc). The largest administrative subdivision is called "first administrative level" followed by "second administrative level" and so on. If we want administrative boundary map of first administrative level having administrative areas "X", "Y" and "Z", we need to specify, in boundary.label parameter, which column (column name) contains "X", "Y" and "Z".

The above information of country subdivision columns and area names can be viewed by info.shape function. Use same spelling as viewed by info.shape() function.

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- Zhao, K., Tung, C. W., Eizenga, G. C., Wright, M. H., Ali, M. L., Price, A. H., ... & McClung, A. M. (2011). Genome-wide association mapping reveals a rich genetic architecture of complex traits in *Oryza sativa*. *Nature communications*, 2, 467. doi:10.1038/ncomms1467.
- Bivand, R. S., Pebesma, E. J., Gomez-Rubio, V., & Pebesma, E. J. (2008). *Applied spatial data analysis with R* (Vol. 747248717). New York: Springer.
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<http://www.fao.org/geonetwork/srv/en/metadata.show?id=12691&currTab=simple>
<http://ungiwg.org/coreDB>

See Also

map.bubble

Examples

```
filePATH <- system.file("Bangladesh", package="mapReasy")

dat <- data.frame(region=c("Dhaka","Khulna","Sylhet"),
baseline=c(10,20,30),endline=c(20,20,15))

plotonMAP(shapedir=filePATH, shapename="BGD_adm1",boundary.label="NAME_1",all.label
=TRUE,plot.type="bar",plot.data=dat,plot.col=c("red","green"),plot.label.col
="red",plot.size=c(0.6,0.6))
```

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