Package 'rbenvo'

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Type Package

Title Built Environment Objects

Version 1.0.5

Description Provides S3 class objects and methods for built environment data to ease the use of working with these data and facilitate other packages that make use of this data structure.

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LazyData true

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Depends R (>= 2.10)

Suggests ggmap, knitr, glue, rmarkdown, testthat (>= 2.1.0), tidygraph, lwgeom

VignetteBuilder knitr

URL https://github.com/apeterson91/rbenvo

NeedsCompilation no

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R topics documented:

`rbenvo-package` *The 'rbenvo' package.*

Description

rbenvo is package that holds S4 class objects and methods for built environment data to ease the use of working with these data and improve interoperability with other packages.

`activate` *Determine the context of subsequent manipulation*

Description

A benvo is a essentially a small relational database with a specific one-to-many structure between the subject table and each BEF tables. In order to know which data frame is of interest for displaying/manipulating at any given time use the activate function (akin to `activate`) to do so.

Usage

```
activate(x, what)

active(x)
```

Arguments

x	benvo object
what	name of df to activate

Value

a benvo

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add_BEF *Add Built Environment Feature to Benvo*

Description

Add Built Environment Feature to Benvo

Usage

```
add_BEF(x, bef_data, bef_id, d_function = sf::st_distance)
```

Arguments

x	benvo or base benvo
bef_data	'tidy' data frame containing date/spatial information for one unique bef
bef_id	unique bef_id column name
d_function	function for calculating distance. Default is st_distance

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aggrenvo *Aggregate Matrix to Subject or Subject - Measurement Level*

Description

Aggregate Matrix to Subject or Subject - Measurement Level

Usage

```
aggrenvo(x, M, stap_term, component)

## S3 method for class 'benvo'
aggrenvo(x, M, stap_term, component)
```

Arguments

x	benvo object
M	matrix to aggregate
stap_term	relevant stap term
component	one of c("Distance","Time","Distance-Time") indicating which column(s) of the bef dataset should be returned

Methods (by class)

- benvo: method

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base_benvo *Base Benvo*

Description

When building a benvo iteratively the base benvo allows you to start with no bef data constructed a priori and build up from subject data that contains spatial and/or temporal raw data in the form of sf structures or Date columns.

Usage

```
base_benvo(subject_data, by, ...)
```

Arguments

subject_data	data.frame containing subject level covariates.
by	optional key
...	optional arguments for specifying date-time columns see set_datetime_cols

Value

a benvo with attribute base = TRUE

benvo *Create a benvo object*

Description

Create a benvo object

Usage

```
benvo(subject_data, sub_bef_data = NULL, by = NULL, ...)
```

Arguments

subject_data	data.frame containing subject level covariates.
sub_bef_data	named list of data frames that contain subject-bef relevant data. NULL by default which returns a "base benvo" Which can be built upon/added to.
by	optional key to link subject - sub_bef data. Will use the intersection of column names if not specified directly.
...	optional arguments for specifying date-time columns see set_datetime_cols

Details

benvo is a constructor function which creates benvo objects. In particular, note that the benvo function will explicitly check the data you provide, to ensure benvo methods can be performed without error.

Value

benvo object

See Also

Introductory and more Specialized vignettes.

benvo-methods *Benvo Methods*

Description

Benvo Methods

Usage

```
bef_names(x)

components(x)

component_lookup(x, term)

subject_has_sf(x)

bef_has_sf(x, term)

num_BEF(x)

## S3 method for class 'benvo'
head(x, ...)

## S3 method for class 'benvo'
tail(x, ...)

get_id(x)

has_subject_dt(x)

has_bef_dt(x, term)

is.benvo(x)
```

Arguments

x	a benvo object
term	bef_name string
...	optional arguments

`create_CA_benvo` *Create California Benvo*

Description

This function exists primarily to save the hassle of having an sf object stored as an R data object, as it introduces non-ascii characters into the package. With this function, the appropriate benvo is returned.

Usage

```
create_CA_benvo()
```

Value

a benvo with the Los Angeles data converted to sf objects.

See Also

The building benvos vignette

`drop_BEF` *Drop Built Environment Feature from Benvo*

Description

Remove the active BEF data table and corresponding sub-bef data from the benvo

Usage

```
drop_BEF(x)
```

Arguments

`x`	benvo or base benvo

Value

benvo without the active bef data

`example_benvo` *Small benvo for use in* **benvo** *examples and vignettes.*

Description

Small benvo for use in **benvo** examples and vignettes.

Usage

```
FFbenvo
```

Format

A benvo with 1000 subjects and nearby simulated FFRs

`FFR_subjects` see FFR_subjects dataset

`FFR_distances` see FFR_distances dataset

FFR_distances *Small dataset for use in* **benvo** *examples and vignettes.*

Description

Small dataset for use in **benvo** examples and vignettes.

Usage

```
FFR_distances
```

Format

A data frame with 9501 rows and 2 columns

`id` The subject unique identifier

`Distance` The simulated distance between a hypothetical subject and fast food restaurant.

FFR_subjects *Small dataset for use in* **benvo** *examples and vignettes.*

Description

Small dataset for use in **benvo** examples and vignettes.

Usage

```
FFR_subjects
```

Format

A data frame with 1000 rows and 3 columns

`id` The subject unique identifier

`sex` The measurement unique identifier

`BMI` The Built Environment Unique identifier

HFS_distances_times *Small dataset for use in* **benvo** *examples and vignettes.*

Description

Small dataset for use in **benvo** examples and vignettes.

Usage

```
HFS_distances_times
```

Format

A data frame with 5709 rows and 3 columns

`id` The subject unique identifier

`measurement` The subject repeat measurement id

`Distance` The simulated distance between a hypothetical subject and fast food restaurant.

`Time` The simulated time between a hypothetical subject and fast food restaurant.

HFS_subjects *Longitudinal Dataset for use in* **benvo** *examples and vignettes.*

Description

Longitudinal Dataset for use in **benvo** examples and vignettes.

Usage

```
HFS_subjects
```

Format

A data frame with 596 rows and 4 columns

`id` The subject unique identifier

`measurement` The subject repeat measurement id

`sex` The measurement unique identifier

`BMI` The Built Environment Unique identifier

`subj_effect` subject specific intercept used in simulating BMI

`exposure` The hypothetical Healthy Food Store exposure effect

joinvo *Join BEF and subject data within a benvo*

Description

Join BEF and subject data within a benvo

Usage

```
joinvo(x, term, component = "Distance", NA_to_zero = F)

## S3 method for class 'benvo'
joinvo(x, term, component = "Distance", NA_to_zero = F)
```

Arguments

x	benvo object
term	string of bef name to join on in sub_bef_data
component	one of c("Distance","Time","Distance-Time") indicating which column(s) of the bef dataset should be returned
NA_to_zero	replaces NA values with zeros - potentially useful when constructing design matrices

Details

Joins the subject dataframe within a benvo to the supplied BEF dataframe keeping the selected component

Methods (by class)

- benvo: method

LA_restaurants *Los Angeles Fast Food Restaurants*

Description

Los Angeles Fast Food Restaurants

Usage

```
LA_FF
```

Format

A dataframe with 8101 rows and 4 columns

`name` Restaurant Name

`osm_id` openstreetmap unique id

`Latitude` Self Explanatory

`Longitude` Self Explanatory

Details

data downloaded from the openstreetmap overpass api classified as "amenity:fast_food".

LA_schools *California Public Schools Fitnessgram Data*

Description

California Public Schools Fitnessgram Data

Usage

```
LA_schools
```

Format

A dataframe with 308 rows and 8 columns

`Perc5c` Proportion of Obese 5th Graders

`NoStud5` Number of 5th Graders in the class

`Charter` Factor variable indicating whether or not school is a charter school or not

`cdscode` School identifier

`City` Self Explanatory

`County` Self Explanatory

`Latitude` Self Explanatory

`Longitude` Self Explanatory

Details

data downloaded from the CA department of education website, subset to include just those schools in Los Angeles.

longitudinal_design *Longitudinal design dataframe*

Description

For use with glmer type formulas/models

Usage

```
longitudinal_design(x, formula, ...)

longitudinal_design(x, formula, ...)
```

Arguments

x	benvo object
formula	similar to glmer.
...	other arguments passed to the model frame

Functions

- longitudinal_design: method

longitudinal_HFS *Small benvo for use in* **benvo** *longitudinal examples and vignettes.*

Description

Small benvo for use in **benvo** longitudinal examples and vignettes.

Usage

```
longitudinal_HFS
```

Format

A benvo with 1000 subjects and nearby simulated FFRs

HFS_subjects see HFS_subjects dataset

HFS_subjects see HFS_distances dataset

Details

A hypothetical example showing how exposure to Healthy Food Stores (HFS) over time may decrease BMI

plot.benvo *Benvo plots*

Description

Variety of plotting functions for benvo objects

Usage

```
## S3 method for class 'benvo'
plot(x, plotfun = "pointrange", ...)
```

Arguments

x	benvo object
plotfun	one of c("pointrange","map")
...	extra arguments for plotfun

plot_map *Spatial Plot of benvo*

Description

Provides a plot of benvo subjects and (one) BEF's locations

Usage

```
plot_map(x, term = NULL)
```

Arguments

x	benvo object
term	BEF term

plot_pointrange *Plot Pointrange*

Description

Plot Pointrange

Usage

```
plot_pointrange(x, term = NULL, component = NULL, p = 0.95)
```

Arguments

x	benvo object
term	name of BEF to plot. If NULL plots the first component listed in the Benvo.
component	one of c("Distance","Time") indicating which measure to use. Defaults to Distance if both measures are available, otherwise uses the only option.
p	The probability of distances/times that should be included in interval

plot_timeline *Temporal Plot of benvo*

Description

Provides a plot of benvo subjects temporal exposure over time.

Usage

```
plot_timeline(x, ...)
```

Arguments

x	benvo object
...	currently ignored

print.benvo *benvo Print Method*

Description

benvo Print Method

Usage

```
## S3 method for class 'benvo'
print(x, ...)
```

Arguments

x	benvo object
...	ignored

set_datetime_cols *Set DateTime Columns*

Description

When exposure time and lag exposure time need to be calculated the measurement date, and start/stop date columns can be provided to the benvo and base_benvo functions as optional arguments. Note that these columns will be converted to `Date` objects if they're not already.

Usage

```
set_datetime_cols(
  measurement_date = NULL,
  start_date_col = NULL,
  stop_date_col = NULL
)
```

Arguments

measurement_date	column string for the date at which a subject was measured
start_date_col	column string for the date at which a subject/bef moved to their corresponding location
stop_date_col	column string for the date at which a subject/bef stopped having exposure at the corresponding location.

summary.benvo *benvo BEF Summary Generic*

Description

benvo BEF Summary Generic

Usage

```
## S3 method for class 'benvo'
summary(object, ...)
```

Arguments

object	a benvo object
...	ignored

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