Package ‘spbabel’

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Type Package

Version 0.5.0

Title Convert Spatial Data Using Tidy Tables

Description Tools to convert from specific formats to more general forms of spatial data. Using tables to store the actual entities present in spatial data provides flexibility, and the functions here deliberately minimize the level of interpretation applied, leaving that for specific applications. Includes support for simple features, round-trip for 'Spatial' classes and long-form tables, analogous to 'ggplot2::fortify'. There is also a more 'normal form' representation that decomposes simple features and their kin to tables of objects, parts, and unique coordinates.

URL https://mdsumner.github.io/spbabel

BugReports https://github.com/mdsumner/spbabel/issues

Depends R (>= 3.2.3)

Imports dplyr, methods, sp, tibble

Suggests testthat, ggplot2, maptools, raster, rmarkdown, knitr, covr, broom, ggpolytypath, maps, sf, trip, viridis

VignetteBuilder knitr

LazyData yes

License GPL-3

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ByteCompile TRUE

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R topics documented:

- spbabel-package ................................................. 2
- as_tibble.sfg .................................................. 2
- feature_table .................................................. 3
- holey ........................................................... 3
- map_table ....................................................... 4
- mpoint1 ........................................................ 5
- semap ........................................................... 5
- sf ............................................................... 5
- show, SpatialPolygonsDataFrame-method .................. 6
- sp ............................................................... 6
- sptable.SpatialPolygons ....................................... 7
- track ........................................................... 9

Index 10

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### spbabel-package

Convert between different types of spatial objects.

**Description**

Facilities for converting between different types of spatial objects, including an in-place method to modify the underlying geometry of 'Spatial' classes using data frame idioms. The spbabel package provides functions to round-trip a Spatial object to a single table and back.

**Details**

- `sptable<-` modify a Spatial object in-place
- `sptable` create a **tibble** from Spatial DataFrame object
- `sp` create Spatial DataFrame object from table

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### as_tibble.sfg

Individual geometries as tibbles.

**Description**

Individual geometries as tibbles.

**Usage**

```
## S3 method for class 'sfg'
as_tibble(x)
```
feature_table

Arguments
x sf geometry of type sfg

Value
tibble

Examples
tibble::as_tibble(sf::st_point(c(1L, 1, 1)))

feature_table Normal form for sf

Description
A 'feature_table' is a normal form for simple features, where all branches are recorded in one table with attributes object_, branch_, type_, parent_. All instances of parent_ are NA except for the holes in multipolygon.

Usage
feature_table(x, ...)

Arguments
x sf object
...

Details
There is wasted information stored this way, but that’s because this is intended as a lowest common denominator format.

There are three tables, objects (the feature attributes and ID), branches (the parts), coordinates (the X, Y, Z, M values).

holey Multi-part, multi-holed, neighbouring, not completely topological polygons.

Description
Created in /data-raw/ from a manual drawing built in Manifold GIS.
map_table

A decomposition of 'vector' map data structures to tables.

Description

Creates a set of related tables to store the appropriate entities in spatial map data.

Usage

map_table(x, ...)

Arguments

x object to tidy

... arguments passed to methods

Details

The basic entities behind spatial data, and hence the "map tables" are:

vertices the positions in geometric space, e.g. x, y, z, time, long, lat, salinity etc.

branches a single connected chain of vertices, or "parts"

objects a collection of branches aligned to a row of metadata

This is the basic "topology" of traditional GIS vector data, for points, lines, polygons and their multi-counterparts. By default map_tables will produce these tables and also de-duplicated the input vertices, adding a fourth table to link vertices to branches.

Other topology types such as triangle or quad meshes can extend this four-entity model, or exist without the branches at all. See "mesh_table" ??

These are currently classed as object_table, branch_table, branch_link_vertex_table, and vertex_table. But there are no methods.

Value

list of tibbles

Examples

data(holey)
spholey <- sp(holey)
map_table(spholey)
mpoint1

MultiPointsDataFrame data set

Description
MultiPointsDataFrame data set

semap
"South-east" map data.

Description
Created in /data-raw/ semap is the sptable version of some of wrld_simpl, and seatt is the matching attribute data, linked by 'object_'.
Created in /data-raw/.

Examples
# recreate as sp object
mp <- sp(semap, attr_tab = seatt, crs = "+proj=longlat +ellps=WGS84")

sf
TBD Convert from dplyr tbl form to simple features.

Description
Not yet implemented.

Usage
sf(x, ...)

## S3 method for class 'data.frame'
sf(x, attr_tab = NULL, crs, ...)

Arguments

x tibble as created by sptable
...
attr_tab remaining data from the attributes
crs projection, defaults to NA_character_

Value
sf
### Description

Sp methods

### Usage

```r
## S4 method for signature 'SpatialPolygonsDataFrame'
show(object)

## S4 method for signature 'SpatialLinesDataFrame'
show(object)

## S4 method for signature 'SpatialPointsDataFrame'
show(object)

## S4 method for signature 'Spatial'
print(x, ...)
```

### Arguments

- `object`: Spatial object
- `x`: Spatial object
- `...`: ignored

### Description

Convert from dplyr tbl form to Spatial*DataFrame.

```r
sp(x, ...)
```

### Usage

```r
sp(x, ...)
```

```r
# S3 method for class 'data.frame'
sp(x, attr_tab = NULL, crs, ...)
```
Convert from various forms to a table.

Arguments

x  tibble as created by `sptable`
... unused
attr_tab remaining data from the attributes
crs projection, defaults to `NA_character_`

Value

Spatial*

Examples

```r
library(dplyr)
semap1 <- semap %>% dplyr::filter(y_ > -89.9999)
sp_obj <- sp(semap1, attr_tab = seatt, crs = "+proj=longlat +ellps=WGS84")
## look, seamless Antarctica!
## library(rgdal); plot(spTransform(sp_obj, "+proj=laea +lat_0=-70"))
```

Decompose a `Spatial` or `sf` object to a single table structured as a row for every coordinate in all the sub-geometries, including duplicated coordinates that close polygonal rings, close lines and shared vertices between objects.

Usage

```r
## S3 method for class 'SpatialPolygons'
sptable(x, ...)

## S3 method for class 'SpatialLines'
sptable(x, ...)

## S3 method for class 'SpatialPointsDataFrame'
sptable(x, ...)

## S3 method for class 'SpatialMultiPointsDataFrame'
sptable(x, ...)

sptable(object) <- value

sptable(x, ...)

## S3 method for class 'trip'
map_table(x, ...)
```
`sp::sp.table.SpatialPolygons`

**Arguments**

- `x` - *Spatial* object
- `...` - ignored
- `object` - *Spatial object*
- `value` - modified `sp.table` version of object

**Details**

Input can be any of type `sf::SpatialPolygonsDataFrame, SpatialLinesDataFrame, SpatialMultiPointsDataFrame` or a `SpatialPointsDataFrame`. For simplicity `sp.table` and its inverses `sp` and `sf` assume that all geometry can be encoded with `object`, `branch`, `island`, `order`, `x` and `y`, and that the type of topology is identified by which of these are present.

For simple features objects with mixed types of topology the result is consistent, but probably not useful. Columns that aren’t present in one type will be present, padded with NA. (This is work in progress).

This is analogous to the following but in `spatial` provides a consistent way to round-trip back to `Spatial` classes and other forms.

- `sp::sp::tidiers` (replacement of `ggplot2::fortify`).
- `geom`
- `spatial::sp::SpatialPolygonsDataFrame-class` with its `as(as(x, "SpatialLinesDataFrame"), "SpatialPointsDataFrame")` workflow.

**Value**

`tibble` with columns

- `SpatialPolygonsDataFrame "object_" "branch_" "island_" "order_" "x_" "y_"`
- `SpatialLinesDataFrame "object_" "branch_" "order_" "x_" "y_"`
- `SpatialPointsDataFrame "object_" "x_" "y_"`
- `SpatialMultiPointsDataFrame "object_" "branch_" "x_" "y_"`
- `sf` some combination of the above

**Examples**

```r
# holey is a decomposed SpatialPolygonsDataFrame
spdata <- sp(holey)
library(sp)
plot(spdata, col = rainbow(nrow(spdata), alpha = 0.4))
points(holey$x_, holey$y_, cex = 4)
holes <- subset(holey, !island_)
# add the points that only belong to holes
points(holes$x_, holes$y_, pch = "*", cex = 2)
```

## manipulate based on topology
## convert to not-holes
notahole <- holes
notahole$island_ <- TRUE
# also convert to singular objects - note that this now means we have an overlapping pair of polys
# because the door had a hole filled by another object
notahole$object_ <- notahole$branch_
plot(sp(notahole), add = TRUE, col = "red")

## example using in-place modification with sptable-
library(maptools)
data(wrld_simpl)
spdata2 <- spdata
library(dplyr)
# modify the geometry on this object without separating the vertices from the objects
sptable(spdata2) <- sptable(spdata2) %>% dplyr::mutate(x_ = x_ + 10, y_ = y_ + 5)

---

track

*Multi-object track with x, y, z, and time.*

**Description**

Created in /data-raw/track.r
Index

as_tibble.sfg, 2
tibble, 2, 8

feature_table, 3
track, 9

geom, 8

holey, 3

map_table, 4
wrld_simpl, 5

map_table.trip

(sptable.SpatialPolygons), 7

mpointl, 5

print,Spatial-method
(show, SpatialPolygonsDataFrame-method),
6

seatt (semap), 5

semap, 5

sf, 5, 7, 8

show, SpatialLinesDataFrame-method
(show, SpatialPolygonsDataFrame-method),
6

show, SpatialPointsDataFrame-method
(show, SpatialPolygonsDataFrame-method),
6

show, SpatialPolygonsDataFrame-method,
6

sp, 2, 6

sp_tidiers, 8

Spatial, 7, 8

SpatialLinesDataFrame, 8

SpatialMultiPointsDataFrame, 8

SpatialPointsDataFrame, 8

SpatialPolygonsDataFrame, 8

spbabel-package, 2

sptable, 2, 5, 7

sptable (sptable.SpatialPolygons), 7

sptable.SpatialPolygons, 7

sptable<-, 2

sptable<-(sptable.SpatialPolygons), 7