Package 'aiRpollution'

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Type Package

Title CCAAPS air pollution exposure predictions

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Description Produce elemental PM concentration predictions for specific locations based on the Cincinnati Children's Asthma and Air Pollution Study (CCAAPS)

Depends R (>= 3.1.2)

Imports CB,
rgdal,
rgeos,
sp,
raster,
randomForest,
stringr,
pbapply

License GPL

LazyData TRUE

R topics documented:

`depIndex` *Extract the deprivation index*

Description

Deprivation index derived from PC analysis of 8 different SES Census Tract variables from the 2010 ACS.

Usage

```
depIndex(loc, buffer.radius = 0)
```

Arguments

`loc`	loc spatial object (with valid proj4string)
`buffer.radius`	if set to 0, returns the dep index of the containing census tract, if set to > 0, returns the mean dep index for the census tracts that are at least partially contained in the buffer circle

Value

data.frame, named dep.index or dep.index_buffer.radius

`distanceToClosest` *Distance to closest*

Description

Function which calculates the distance to a closest spatial object. Anything that works with rgeos::gDistance will work in this function. loc will be reprojected to the projection of the lines.shapefile and the units will be of that projection.

Usage

```
distanceToClosest(loc, lines.shapefile)
```

Arguments

`loc`	spatial object (with valid proj4string)
`lines.shapefile`	spatial object for which to calculate minimum distance

Value

data.frame with distance; named based on lines.shapefile input (units are assumed to be meters; if feet back transform output by 0.3048006096 m/ft)

greenspace_static *Calculate greenspace*

Description

Uses the greenspace raster (ndvi2000_3735.tif) to extract average greenspace values

Usage

```
greenspace_static(loc, buffer.radius = 400)
```

Arguments

loc	spatial object (with valid proj4string)
buffer.radius	(radius of circle in which to calculate average NDVI)

Value

data.frame with value; named greenspace_buffer.radius

linesLength *calculate the length of lines within a buffer radius*

Description

calculate the length of lines within a buffer radius

Usage

```
linesLength(loc, lines.shapefile, buffer.radius = 100)
```

Arguments

loc	sp object with coordinates and valid proj4string
lines.shapefile	shapefile of lines to use in calculation
buffer.radius	buffer radius in meters (assumes that lines.shapefile is projected to unit of feet)

Value

data.frame named based on buffer radius and lines shapefile

predictPollution *predict pollution exposure*

Description

This function is an implementation of the elemental PM exposure (random forest and regression) models developed for the Cincinnati Children's Asthma and Air Pollution Study (CCAAPS). The underlying functions are not available to the user. Not meant to be a generalizable package, its sole purpose is to generate exposure estimates for the Cincinnati area. It will return NA if any of the necessary predictors are not available for the location.

Usage

```
predictPollution(loc, element, model.type, prog.bar = TRUE)
```

Arguments

loc	the location for which to estimate the concentration (must be a spatial object and have a valid proj4string)
element	element for which to predict the concentration (one of "Cu", "Fe", "Zn", "S", "Ni", "V", "Si", "K", "Pb", "Mn", "Al", "TRAP", "PM25")
model.type	either "rf" for random forest or "lm" for regression
prog.bar	logical, show a progress bar?

Examples

```
library(sp)
sample.loc <- data.frame('x'=-84.5371597,'y'=39.1603015)
coordinates(sample.loc) <- c('x','y')
proj4string(sample.loc) <- CRS("+init=epsg:4326")
predictPollution(loc=sample.loc,element='TRAP',model.type='rf')
predictPollution(loc=sample.loc,element='Cu',model.type='lm')
```

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