

Package ‘Rvoterdistance’

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Type Package

Title Voter Distance to Polling Locations

Version 2.0.0

Description Calculates the distance between each voter in a voter file (given lat/long coordinates or sf point geometries) and multiple polling or vote-by-mail drop box locations. Returns nearest location, k-nearest locations, or all locations within a distance threshold. Core computation uses the Haversine formula implemented in C++ via 'Rcpp'.

License GPL (>= 2)

URL <https://github.com/lorenc5/Rvoterdistance>

BugReports <https://github.com/lorenc5/Rvoterdistance/issues>

Encoding UTF-8

LazyData true

Depends R (>= 4.0)

Imports Rcpp (>= 1.0.0)

Suggests sf, testthat (>= 3.0.0), knitr, rmarkdown

LinkingTo Rcpp

RoxygenNote 7.3.2

VignetteBuilder knitr

Config/testthat/edition 3

NeedsCompilation yes

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dbox	<i>King County ballot drop box locations</i>
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Description

A data frame of ballot drop box locations in King County, Washington.

Usage

dbox

Format

A data frame with columns including lat and long.

Source

King County Elections

dist_km	<i>Calculate minimum distance in kilometers</i>
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Description

Given lat/lon vectors for voters and locations, returns the minimum Haversine distance in kilometers for each voter to the nearest location.

Usage

dist_km(lat1, lon1, lat2, lon2)

Arguments

lat1 Numeric vector of voter latitudes.
lon1 Numeric vector of voter longitudes.
lat2 Numeric vector of location latitudes.
lon2 Numeric vector of location longitudes.

Value

Numeric vector of minimum distances in kilometers.

Examples

```
data(meck_ev)
d <- dist_km(voter_meck$lat, voter_meck$long,
             early_meck$lat, early_meck$long)
summary(d)
```

dist_mile *Calculate minimum distance in miles*

Description

Given lat/lon vectors for voters and locations, returns the minimum Haversine distance in miles for each voter to the nearest location.

Usage

```
dist_mile(lat1, lon1, lat2, lon2)
```

Arguments

lat1 Numeric vector of voter latitudes.
lon1 Numeric vector of voter longitudes.
lat2 Numeric vector of location latitudes.
lon2 Numeric vector of location longitudes.

Value

Numeric vector of minimum distances in miles.

Examples

```
data(meck_ev)
d <- dist_mile(voter_meck$lat, voter_meck$long,
               early_meck$lat, early_meck$long)
summary(d)
```

early_meck	<i>Mecklenburg County early voting locations</i>
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Description

A data frame of early voting locations in Mecklenburg County, North Carolina.

Usage

```
early_meck
```

Format

A data frame with columns including lat and long.

Source

Mecklenburg County Board of Elections

haversine	<i>Haversine distance between two points</i>
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Description

Compute the Haversine (great-circle) distance between a single pair of lat/lon coordinates.

Usage

```
haversine(lat1, lon1, lat2, lon2, units = c("meters", "km", "miles"))
```

Arguments

lat1	Latitude of point 1 (degrees).
lon1	Longitude of point 1 (degrees).
lat2	Latitude of point 2 (degrees).
lon2	Longitude of point 2 (degrees).
units	One of "meters", "km", or "miles". Default "meters".

Value

Numeric scalar distance in the specified units.

Examples

```
# New York to London
haversine(40.7128, -74.0060, 51.5074, -0.1278, units = "km")
```

king_geo	<i>King County voter sample with geocoded addresses</i>
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Description

A sample of geocoded voter records from King County, Washington, including latitude and longitude of residential addresses.

Usage

```
king_geo
```

Format

A data frame with columns including Residence_Addresses_Latitude and Residence_Addresses_Longitude.

Source

King County voter file (anonymized sample)

nearest_location	<i>Find nearest polling locations for each voter</i>
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Description

Calculates the distance between each voter and a set of polling/drop box locations using the Haversine formula. Can return the single nearest location, the k nearest, or all locations within a distance threshold.

Usage

```
nearest_location(  
  voters,  
  locations,  
  voter_coords = NULL,  
  location_coords = NULL,  
  k = 1L,  
  max_dist = NULL,  
  units = c("km", "miles", "meters"),  
  append_data = TRUE,  
  progress = FALSE  
)
```

Arguments

voters	A data frame, matrix, or sf POINT object containing voter locations. If a data frame or matrix, must contain lat/lon columns specified by voter_coords.
locations	A data frame, matrix, or sf POINT object containing polling/drop box locations. If a data frame or matrix, must contain lat/lon columns specified by location_coords.
voter_coords	Character vector of length 2: c("lat_col", "lon_col") identifying the latitude and longitude columns in voters. Ignored if voters is an sf object.
location_coords	Character vector of length 2: c("lat_col", "lon_col") identifying the latitude and longitude columns in locations. Ignored if locations is an sf object.
k	Integer. Number of nearest locations to return per voter. Default 1.
max_dist	Numeric or NULL. If not NULL, return all locations within this distance of each voter. Units controlled by units. Overrides k.
units	Character. One of "km", "miles", or "meters". Default "km".
append_data	Logical. If TRUE (default), include voter and matched location columns in the output. When k = 1, also appends the matched location row.
progress	Logical. If TRUE, print progress for large computations. Default FALSE.

Value

A data frame. If k = 1 and max_dist is NULL: one row per voter with distance columns (distance_m, distance_km, distance_miles). If k > 1 or max_dist is not NULL: one row per voter-location pair with a rank column.

Examples

```
data(meck_ev)

# Nearest single location for each voter
result <- nearest_location(voter_meck, early_meck,
  voter_coords = c("lat", "long"),
  location_coords = c("lat", "long"))
head(result)

# 3 nearest locations per voter
result_k3 <- nearest_location(voter_meck, early_meck,
  voter_coords = c("lat", "long"),
  location_coords = c("lat", "long"),
  k = 3)
head(result_k3)

# All locations within 10 km
result_10km <- nearest_location(voter_meck, early_meck,
  voter_coords = c("lat", "long"),
  location_coords = c("lat", "long"),
  max_dist = 10, units = "km")
head(result_10km)
```

voter_meck	<i>Mecklenburg County voter sample with geocoded addresses</i>
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Description

A sample of geocoded voter records from Mecklenburg County, North Carolina, including latitude and longitude.

Usage

voter_meck

Format

A data frame with columns including lat and long.

Source

Mecklenburg County voter file (anonymized sample)

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