

Package ‘Rvoterdistance’

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Type Package

Title Calculates the Distance Between Voter and Multiple Polling Locations

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Author Loren Collingwood

Maintainer Loren Collingwood <loren.collingwood@ucr.edu>

Description Designed to calculate the distance between each voter in a voter file -- given lat/long coordinates -- and many potential (early) polling or vote by mail drop box locations, then return the minimum distance.

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Rvoterdistance-package

Calculates the Distance Between Voter and Multiple Polling Locations

Description

This package is designed to calculate the distance between each voter in a voter file – given lat/long coordinates – and many potential (early) polling or vote by mail drop box locations, then return the minimum distance.

Details

See demo(demo, "Rvoterdistance") for examples on how to use the code

Author(s)

Loren Collingwood, UC Riverside

Maintainer: Loren Collingwood <loren.collingwood@ucr.edu>

dbox

Dataset of drop box locations

Description

Dataset of drop box locations in King County, Washington, as of 2016 general election.

Usage

```
data(king_dbox)
```

Format

A dataset with 43 rows and five columns:

location_name Character vector

address_city Character vector

state Character vector

lat Numeric vector, latitude coordinate

long Numeric vector, longitude coordinate

Author(s)

Loren Collingwood <loren.collingwood@ucr.edu>

References

King County, Washington

Examples

```
data(king_dbox)
str(dbox)
```

distanceEarth	<i>Calculate the distance between two points</i>
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Description

Calculates the distance between two points on Earth, in Haversines

Usage

```
distanceEarth(lat1d, lon1d, lat2d, lon2d)
```

Arguments

lat1d	Numeric/Double, Latitude coordinate of point 1
lon1d	Numeric/Double, Longitude coordinate of point 1
lat2d	Numeric/Double, Latitude coordinate of point 2
lon2d	Numeric/Double, Longitude coordinate of point 2

Value

Haversine distance output, in meters

References

Haversine: CC Robusto, 1957

Examples

```
data(king_dbox)
# Calculate distance between two points
distanceEarth(king_geo$Residence_Addresses_Latitude[1],
king_geo$Residence_Addresses_Longitude[1],
dbox$lat[1], dbox$long[1])
```

dist_km	<i>Calculates nearest drop box or polling location, in kilometers</i>
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Description

Given a set of lat-long coordinates for each voter, and a set of coordinates for all drop boxes or polling locations; OR a vector of haversine distances from nearest_dbox(), calculates the nearest drop box or polling location for each voter in kilometers.

Usage

```
dist_km(lat1d_vec, lon1d_vec, lat2d_vec, lon2d_vec, num_vec=NULL, vec_only=FALSE)
```

Arguments

lat1d_vec	Numeric vector, latitude coordinate of voter
lon1d_vec	Numeric vector, longitude coordinate of voter
lat2d_vec	Numeric vector, latitude coordinate of drop box, polling location
lon2d_vec	Numeric vector, longitude coordinate of drop box, polling location
num_vec	Numeric vector, haversine output, default is NULL however.
vec_only	Logical, default is FALSE, set to TRUE if putting in Haversine output already calculated from nearest_dbox()

Value

A numeric vector of minimum distances for each voter to their nearest drop box or polling location, in kilometers

Author(s)

Loren Collingwood <loren.collingwood@ucr.edu>

References

Haversine: CC Robusto, 1957

See Also

dist_mile, nearest_dbox

Examples

```
data(meck_ev)
# Voter and early vote location, Mecklenburg County
hav_meck <- nearest_dbox (voter_meck$lat, voter_meck$long,
early_meck$lat, early_meck$long)
summary(hav_meck)
hav_km <- dist_km(num_vec=hav_meck, vec_only=TRUE)
head(hav_km)

# Calculate mile distance directly
have_km2 <- dist_km (voter_meck$lat, voter_meck$long,
early_meck$lat, early_meck$long)
head(have_km2)
```

dist_mile	<i>Calculates nearest drop box or polling location, in miles</i>
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Description

Given a set of lat-long coordinates for each voter, and a set of coordinates for all drop boxes or polling locations; OR a vector of haversine distances from nearest_dbox(), calculates the nearest drop box or polling location for each voter in miles.

Usage

```
dist_mile(lat1d_vec, lon1d_vec, lat2d_vec, lon2d_vec, num_vec=NULL, vec_only=FALSE)
```

Arguments

lat1d_vec	Numeric vector, latitude coordinate of voter
lon1d_vec	Numeric vector, longitude coordinate of voter
lat2d_vec	Numeric vector, latitude coordinate of drop box, polling location
lon2d_vec	Numeric vector, longitude coordinate of drop box, polling location
num_vec	Numeric vector, haversine output, default is NULL however.
vec_only	Logical, default is FALSE, set to TRUE if putting in Haversine output already calculated from nearest_dbox()

Value

A numeric vector of minimum distances for each voter to their nearest drop box or polling location, in miles

Author(s)

Loren Collingwood <loren.collingwood@ucr.edu>

References

Haversine: CC Robusto, 1957

See Also

dist_km, nearest_dbox

Examples

```
data(meck_ev)
# Voter and early vote location, Mecklenburg County
hav_meck <- nearest_dbox (voter_meck$lat, voter_meck$long,
early_meck$lat, early_meck$long)
summary(hav_meck)
hav_mile <- dist_mile(num_vec=hav_meck, vec_only=TRUE)
head(hav_mile)

# Calculate mile distance directly
have_mile2 <- dist_mile (voter_meck$lat, voter_meck$long,
early_meck$lat, early_meck$long)
head(have_mile2)
```

early_meck

Dataset of early vote locations

Description

Dataset of early vote locations in Mecklenburg County, North Carolina, as of 2016 general election.

Usage

```
data(meck_ev)
```

Format

A dataset with 21 rows and five columns:

match_addr Character vector
county Character vector
office Character vector
long Numeric vector, longitude coordinate
lat Numeric vector, latitude coordinate

Author(s)

Loren Collingwood <loren.collingwood@ucr.edu>, Hannah Walker <hlw25@georgetown.edu>

References

Mecklenburg County, Loren Collingwood

Examples

```
data(meck_ev)
str(early_meck)
```

king_geo

Dataset of King County voters' lat/long

Description

Dataset of 5,000 randomly selected King County voters' lat/long, as of 2016

Usage

```
data(king_dbox)
```

Format

A dataset of 5,000 rows and two columns:

Residence_Address_Longitude Numeric vector, longitude coordinate of voter

Residence_Address_Latitude Numeric vector, latitude coordinate of voter

Author(s)

Loren Collingwood <loren.collingwood@ucr.edu>

References

King County, WA

Examples

```
data(king_dbox)
str(king_geo)
```

nearest_dbox	<i>Calculates nearest drop box or polling location</i>
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Description

Given a set of lat-long coordinates for each voter, and a set of coordinates for all drop boxes or polling locations, nearest_dbox() calculates the nearest drop box or polling location for each voter, in haversines. The function ports to C++, which greatly expedites speed.

Usage

```
nearest_dbox(lat1d_vec, lon1d_vec, lat2d_vec, lon2d_vec)
```

Arguments

lat1d_vec	Numeric vector, latitude coordinate of voter
lon1d_vec	Numeric vector, longitude coordinate of voter
lat2d_vec	Numeric vector, latitude coordinate of drop box, polling location
lon2d_vec	Numeric vector, longitude coordinate of drop box, polling location

Value

A numeric vector of minimum distances for each voter to their nearest drop box or polling location

Author(s)

Loren Collingwood <loren.collingwood@ucr.edu>

References

Haversine: CC Robusto, 1957

Examples

```
data(king_dbox)
# Haversine distance between voter and drop boxes, King County
hav_calc <- nearest_dbox (king_geo$Residence_Addresses_Latitude,
king_geo$Residence_Addresses_Longitude,
dbox$lat, dbox$long)

summary(hav_calc)

data(meck_ev)
# Voter and early vote location, Mecklenburg County
hav_meck <- nearest_dbox (voter_meck$lat, voter_meck$long,
early_meck$lat, early_meck$long)
summary(hav_meck)
```

smorgesboard	<i>Calculates nearest drop box or polling location, Smorgesboard back</i>
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Description

Given a set of lat-long coordinates for each voter, and a set of coordinates for all drop boxes or polling locations; this function returns a dataframe length data1 (usually voter file), including haversine, mile, and kilometer distance output, as well as any other data2 variables (perhaps address).

Usage

```
smorgesboard(data1, data2 , lat_long1_char, lat_long2_char)
```

Arguments

data1	Dataset, probably a voter file, including lat/long coordinates
data2	Dataset, probably of drop box locations/polling locations, including lat/long coordinates
lat_long1_char	Character vector, latitude/longitude column names found in data1
lat_long2_char	Character vector, latitude/longitude column names found in data2

Value

A data frame of length data1, with all columns from data2 and distance_haversine, distance_mile, and distance_km appended.

Author(s)

Loren Collingwood <loren.collingwood@ucr.edu>

References

Haversine: CC Robusto, 1957

See Also

dist_km, dist_mile, nearest_dbox

Examples

```
data(meck_ev)
str(voter_meck)
str(early_meck)

# Grab smorgesboard of distance information from polling location
vote_distance <- smorgesboard(voter_meck, early_meck[,-1], c("lat", "long"), c("lat", "long"))
head(vote_distance)
```

`voter_meck`*Dataset of registered voters, Mecklenburg County*

Description

Dataset of random registered voter locations in Mecklenburg County, North Carolina, as of 2016 general election.

Usage

```
data(meck_ev)
```

Format

A dataset with 4,552 rows and three columns:

`county` Character vector

`long` Numeric vector, longitude coordinate

`lat` Numeric vector, latitude coordinate

Author(s)

Loren Collingwood <loren.collingwood@ucr.edu>, Hannah Walker <hlw25@at>georgetown.edu

References

Mecklenburg County, North Carolina

Examples

```
data(meck_ev) # Read in the stored RData file  
str(voter_meck) # This is the actual dataset
```

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