Package ‘Rvoterdistance’

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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

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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>
**distanceEarth**

**References**

King County, Washington

**Examples**

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

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**distanceEarth**  
*Calculate the distance between two points*

**Description**

Calculates the distance between two points on Earth, in Haversines

**Usage**

```r
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**

```r
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

Calculates nearest drop box or polling location, in kilometers

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
dist_mile

Examples

```r
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  Calculates nearest drop box or polling location, in miles

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

```r
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:
mach_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>
**king_geo**

**References**

Mecklenburg County, Loren Collingwood

**Examples**

```r
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**

```r
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**

```r
data(king_dbox)
str(king_geo)
```
nearest_dbox

Calculates nearest drop box or polling location

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
```r
data(king_dbox)
# Haversine distance between voter and drop boxes, King County
hav_calc <- nearest_dbox(king_geo$Residence_Addresses_Latitude, 
kong_geo$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)
```
Calculates nearest drop box or polling location, Smorgesboard back

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**

```r
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@georgetown.edu>

**References**

Mecklenburg County, North Carolina

**Examples**

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