Package 'Rvoterdistance'

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Type Package

Title Calculates the distance between voter and multiple potential polling locations

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Description Rvoterdistance 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.

License GPL (>= 2)

Imports Rcpp (>= 0.12.9)

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Rvoterdistance-package

Calculate the distance between voter and multiple potential polling locations

Description

Rvoterdistance 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)

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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>

References

King County, Washington

Examples

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

`distanceEarth` *Calculate the distance between two points*

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
```

`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

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 *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

```
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<at>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 *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

```
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, dbo
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 *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

```
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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