Package ‘hereR’

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     https://github.com/munterfinger/hereR/
BugReports https://github.com/munterfinger/hereR/issues/
Description Interface to the 'HERE' REST APIs <https://developer.here.com/develop/rest-apis>:
(1) geocode and autocomplete addresses or reverse geocode POIs using the 'Geocoder' API;
(2) route directions, travel distance or time matrices and isolines using the 'Routing' API;
(3) request real-time traffic flow and incident information from the 'Traffic' API;
(4) find request public transport connections and nearby stations from the 'Public Transit' API;
(5) get weather forecasts, reports on current weather conditions, astronomical
    information and alerts at a specific location from the 'Destination Weather' API.
    Locations, routes and isolines are returned as 'sf' objects.
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hereR-package

R topics documented:

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HereR-package

'sf'-Based Interface to the 'HERE' REST APIs

Description

The hereR package provides an interface to the 'HERE' REST APIs:

- Geocode and autocomplete addresses or reverse geocode POIs using the 'Geocoder' API;
- Route directions, travel distance or time matrices and isolines using the 'Routing' API;
- Request real-time traffic flow and incident information from the 'Traffic' API;
- Find request public transport connections and nearby stations from the 'Public Transit' API;
- Get weather forecasts, reports on current weather conditions, astronomical information and alerts at a specific location from the 'Destination Weather' API.

Locations, routes and isolines are returned as sf objects.

Application credentials

This package requires an API key for a HERE project. The key is set for the current R session and is used to authenticate in the requests to the APIs. A free login and project can be created on https://developer.here.com/. In order to obtain the API key navigate to a project of your choice in the developer portal, select 'REST: Generate APP' and then 'Create API Key'. To set the API key, please use: set_key("<YOUR API KEY>")
Functions to access the APIs

- `autocomplete` - Get suggestions for address strings.
- `geocode` - Get coordinates from addresses.
- `reverse_geocode` - Get addresses or landmarks from locations.
- `route` - Find the fastest routes between places.
- `route_matrix` - Request a matrix of route summaries between places.
- `isoline` - Create isochrone, isodistance or isoconumption lines around places.
- `traffic` - Get information about traffic jam and incidents in areas.
- `connection` - Request public transport connections between places.
- `station` - Find stations nearby places.
- `weather` - Get weather observations, forecasts and alerts at places.

Author(s)

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See Also

- https://github.com/munterfinger/hereR/
- https://munterfinger.github.io/hereR/

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## aoi

### Example Areas of Interest

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</table>
autocomplete  HERE Geocoder API: Autocomplete

Description

Completes addresses using the HERE 'Geocoder Autocomplete' API.

Usage

autocomplete(addresses, results = 5, url_only = FALSE)

Arguments

addresses  character, addresses to autocomplete.
results  numeric, maximum number of suggestions (Valid range: 1 and 20).
url_only  boolean, only return the generated URLs (default = FALSE)?

Value

A data.table object, containing the autocomplete suggestions for the addresses.

References

HERE Geocoder API: Autocomplete

Examples

# Provide an API Key for a HERE project
set_key("<YOUR API KEY>"")

suggestions <- autocomplete(addresses = poi$city, url_only = TRUE)

connection  HERE Public Transit API: Transit Route

Description

Route public transport connections with geometries (LINESTRING) between pairs of points using the HERE 'Public Transit' API. Two modes are provided:

- **summary = FALSE**: The public transport connections are returned as multiple sections with the same vehicle and transport mode. Each section has a detailed route geometry.
- **summary = TRUE**: A summary of the connections is retrieved, where each connection is represented as one row with a unified and simplified geometry.
connection

Usage

collection(
    origin,
    destination,
    datetime = Sys.time(),
    arrival = FALSE,
    results = 3,
    transfers = -1,
    summary = FALSE,
    url_only = FALSE
)

Arguments

- **origin**: sf object, the origin locations of geometry type POINT.
- **destination**: sf object, the destination locations of geometry type POINT.
- **datetime**: POSIXct object, datetime for the departure (or arrival if arrival = TRUE).
- **arrival**: boolean, calculate connections for arrival at the defined time (default = FALSE).
- **results**: numeric, maximum number of suggested public transport routes (Valid range: 1 and 6).
- **transfers**: numeric, maximum number of transfers allowed per route (Valid range: -1 and 6, default = -1).
- **summary**: boolean, return a summary of the public transport connections instead of the sections of the routes (default = FALSE).
- **url_only**: boolean, only return the generated URLs (default = FALSE).

Value

An sf object containing the requested routes.

Note

As it is not possible to match the "maneuvers" to the "connections-sections" in the API response using the section id (sec_id), the returned geometries of walking sections are straight lines between the station (or origin and destination) points instead of routed lines on the pedestrian network. The walking segments can be routed in hindsight using the route function with mode set to "pedestrian".

References

HERE Public Transit API: Transit Route

Examples

# Provide an API Key for a HERE project
set_key("<YOUR API KEY>")
# Connection sections
sections <- connection(
  origin = poi[3:4, ], destination = poi[5:6, ],
  summary = FALSE, url_only = TRUE
)

# Connection summary
summary <- connection(
  origin = poi[3:4, ], destination = poi[5:6, ],
  summary = TRUE, url_only = TRUE
)

---

**flow**

*HERE Traffic API: Flow*

---

### Description

Real-time traffic flow from the HERE 'Traffic' API in areas of interest (AOIs). The traffic flow data contains speed ("SP") and congestion (jam factor: "JF") information, which corresponds to the status of the traffic at the time of the query.

### Usage

```r
flow(aoi, min_jam_factor = 0, url_only = FALSE)
```

### Arguments

- **aoi**
  - sf object, Areas of Interest (POIs) of geometry type POLYGON.
- **min_jam_factor**
  - numeric, only retrieve flow information with a jam factor greater than the value provided (default = 0).
- **url_only**
  - boolean, only return the generated URLs (default = FALSE)?

### Value

An sf object containing the requested traffic flow information.

### Note

The maximum width and height of the bounding box of the input AOIs is 10 degrees. This means that each polygon (= one row) in the AOI sf object should fit in a 10 x 10 degree bbox.

Explanation of the traffic flow variables:

- "PC": Point TMC location code.
- "DE": Text description of the road.
- "QD": Queuing direction. '+' or '-'. Note this is the opposite of the travel direction in the fully qualified ID, For example for location 107+03021 the QD would be,-,.
- "LE": Length of the stretch of road.
• "TY": Type information for the given Location Referencing container. This may be a freely defined string.
• "SP": Speed (based on UNITS) capped by speed limit.
• "FF": The free flow speed on this stretch of the road.
• "JF": The number between 0.0 and 10.0 indicating the expected quality of travel. When there is a road closure, the Jam Factor will be 10. As the number approaches 10.0 the quality of travel is getting worse. -1.0 indicates that a Jam Factor could not be calculated.
• "CN": Confidence, an indication of how the speed was determined. -1.0 road closed. 1.0=100%.

References

• HERE Traffic API: Flow
• Flow explanation, stackoverflow

Examples

# Provide an API Key for a HERE project
set_key("<YOUR API KEY>")

# Real-time traffic flow
flow <- flow(
  aoi = aoi[aoi$code == "LI", ],
  url_only = TRUE
)

---

description

Geocodes addresses using the HERE 'Geocoder' API.

Usage

geocode(addresses, autocomplete = FALSE, url_only = FALSE)

Arguments

addresses character, addresses to geocode.
autocomplete boolean, use the 'Geocoder Autocomplete' API to autocomplete addresses?
  Note: This options doubles the amount of requests (default = FALSE).
url_only boolean, only return the generated URLs (default = FALSE)?

Value

An sf object, containing the coordinates of the geocoded addresses.
References

HERE Geocoder API: Geocode

Examples

# Provide an API Key for a HERE project
set_key("<YOUR API KEY>")

locs <- geocode(addresses = poi$city, url_only = TRUE)

incident

HERE Traffic API: Incidents

Description

Traffic incident information from the HERE 'Traffic' API in areas of interest (AOIs). The incidents contain information about location, duration, severity, type, description and further details.

Usage

incident(aoi, from = Sys.time() - 60 * 60 * 24 * 7, url_only = FALSE)

Arguments

aoi sf object, Areas of Interest (POIs) of geometry type POLYGON.
from POSIXct object, datetime of the earliest traffic incidents (default = FALSE).
url_only boolean, only return the generated URLs (default = FALSE)?

Value

An sf object containing the traffic incidents.

Note

The maximum width and height of the bounding box of the input AOIs is 10 degrees. This means that each polygon (= one row) in the AOI sf object should fit in a 10 x 10 degree bbox.

References

HERE Traffic API: Incidents
Examples

# Provide an API Key for a HERE project
set_key("<YOUR API KEY>")

# All traffic incidents from the beginning of 2018
incidents <- incident(
  aoi = aoi,
  from = as.POSIXct("2018-01-01 00:00:00"),
  url_only = TRUE
)

**isoline**

**HERE Routing API: Calculate Isoline**

**Description**

Calculates isolines (POLYGON or MULTIPOLYGON) using the HERE 'Routing' API that connect the end points of all routes leaving from defined centers (POIs) with either a specified length, a specified travel time or consumption.

**Usage**

isoline(
  poi,
  datetime = Sys.time(),
  arrival = FALSE,
  range = seq(5, 30, 5) * 60,
  range_type = "time",
  type = "fastest",
  mode = "car",
  traffic = FALSE,
  aggregate = TRUE,
  url_only = FALSE
)

**Arguments**

- **poi** sf object, Points of Interest (POIs) of geometry type POINT.
- **datetime** POSIXct object, datetime for the departure (or arrival if arrival = TRUE).
- **arrival** boolean, are the provided Points of Interest (POIs) the origin or destination locations (default = FALSE)?
- **range** numeric, a vector of type integer containing the breaks for the generation of the isolines: (1) time in seconds; (2) distance in meters; (3) consumption in costfactor.
- **range_type** character, unit of the isolines: "distance", "time" or "consumption".
- **type** character, set the routing type: "fastest" or "shortest".
mode character, set the transport mode: "car", "pedestrian" or "truck".
traffic boolean, use real-time traffic or prediction in routing (default = FALSE)? If no datetime is set, the current timestamp at the moment of the request is used for datetime.
aggregate boolean, aggregate (with function min) and intersect the isolines from geometry type POLYGON to geometry type MULTIPOLYGON (default = TRUE)?
url_only boolean, only return the generated URLs (default = FALSE)?

Value
An sf object containing the requested isolines.

References
HERE Routing API: Calculate Isoline

Examples

# Provide an API Key for a HERE project
set_key("<YOUR API KEY>")

# Isochrone for 5, 10, 15, 20, 25 and 30 minutes driving time
isolines <- isoline(
    poi = poi,
    range = seq(5, 30, 5) * 60,
    url_only = TRUE
)

Description
Some example Points of Interest (POIs): Cities in Switzerland and Liechtenstein with more than 100'000 inhabitants.

Usage
data(poi)

Format
An object of class "sf", "data.frame".

Source
Made with Natural Earth. Free vector and raster map data @naturalearthdata.com
Examples

    data(poi)

---

**reverse_geocode**  
**HERE Geocoder API: Reverse Geocode**

Description

Get addresses or landmarks from locations using the HERE 'Geocoder' API. The return value is an sf object, containing point geometries with suggestions for addresses or landmarks near the provided POIs.

Usage

    reverse_geocode(poi, results = 1, landmarks = FALSE, url_only = FALSE)

Arguments

- `poi`: sf object, Points of Interest (POIs) of geometry type POINT.
- `results`: numeric, maximum number of results (Valid range: 1 and 20).
- `landmarks`: boolean, retrieve landmarks instead of addresses (default = FALSE)?.
- `url_only`: boolean, only return the generated URLs (default = FALSE)?

Value

An sf object, containing the suggested addresses or landmark names of the reverse geocoded POIs.

Note

If no addresses or landmarks are found near a POI, NULL for this POI is returned. In this case the rows corresponding to this particular POI are missing and merging the POIs by row is not possible. However, in the returned sf object, the column "id" matches the rows of the input POIs. The "id" column can be used to join the original POIs.

References

    HERE Geocoder API: Geocode

Examples

    # Provide an API Key for a HERE project
    set_key("<YOUR API KEY>")

    # Get addresses
    addresses <- reverse_geocode(poi = poi, results = 3, landmarks = FALSE, url_only = TRUE)

    # Get landmarks
    landmarks <- reverse_geocode(poi = poi, results = 3, landmarks = TRUE, url_only = TRUE)
route

**HERE Routing API: Calculate Route**

**Description**

Calculates route geometries (LINESTRING) between given pairs of points using the HERE 'Routing' API. Routes can be created for various transport modes, as for example 'car' or 'public transport', incorporating current traffic information, if available. For routes using the transport mode "car" a vehicle type can be specified, to obtain an estimate of the consumption.

**Usage**

```r
route(
  origin,
  destination,
  datetime = Sys.time(),
  arrival = FALSE,
  type = "fastest",
  mode = "car",
  traffic = FALSE,
  vehicle_type = "diesel,5.5",
  url_only = FALSE
)
```

**Arguments**

- `origin` sf object, the origin locations of geometry type POINT.
- `destination` sf object, the destination locations of geometry type POINT.
- `datetime` POSIXct object, datetime for the departure (or arrival if `arrival = TRUE`).
- `arrival` boolean, calculate routes for arrival at the defined time (default = FALSE)?
- `type` character, set the routing type: "fastest", "shortest" or "balanced".
- `mode` character, set the transport mode: "car", "pedestrian", "carHOV", "publicTransport", "truck" or "bicycle".
- `traffic` boolean, use real-time traffic or prediction in routing (default = FALSE)? If no datetime is set, the current timestamp at the moment of the request is used for datetime.
- `vehicle_type` character, specify the motor type of the vehicle: "diesel", "gasoline" or "electric". And set the consumption per 100km in liters (default = "diesel,5.5").
- `url_only` boolean, only return the generated URLs (default = FALSE)?

**Value**

An sf object containing the requested routes.
Note
The public transport routes (mode = "publicTransport") provided by route are not considering the time tables of the public transport providers. Use connection for public transport routes that consider time tables.

References
HERE Routing API: Calculate Route

Examples

# Provide an API Key for a HERE project
set_key("<YOUR API KEY>")

# Get all from - to combinations from POIs
to <- poi[rep(seq_len(nrow(poi)), nrow(poi)), ]
from <- poi[rep(seq_len(nrow(poi)), each = nrow(poi)), ]
idx <- apply(to != from, any, MARGIN = 1)
to <- to[idx, ]
from <- from[idx, ]

# Routing
routes <- route(
  origin = from, destination = to,
  mode = "car", type = "fastest", traffic = TRUE,
  vehicle_type = "diesel,5.5",
  url_only = TRUE
)

route_matrix
HERE Routing API: Calculate Matrix

Description
Calculates a matrix of M:N, M:1 or 1:N route summaries between given points of interest (POIs) using the HERE 'Routing' API. Various transport modes and traffic information at a provided times-tamp are supported. The requested matrix is split into (sub-)matrices of dimension 15x100 to use the maximum matrix size per request and thereby minimize the number of overall needed requests. The result is one route summary matrix, that fits the order of the provided POIs: origIndex, destIndex.

Usage

route_matrix(
  origin,
  destination = origin,
  datetime = Sys.time(),
  type = "fastest",
  mode = "car",
)
route_matrix

traffic = FALSE,
search_range = 99999999,
attribute = c("distance", "traveltime"),
url_only = FALSE
)

Arguments

origin sf object, the origin locations (M) of geometry type POINT.
destination sf object, the destination locations (N) of geometry type POINT.
datetime POSIXct object, datetime for the departure.
type character, set the routing type: "fastest", "shortest" or "balanced".
mode character, set the transport mode: "car", "pedestrian", "carHOV" or "truck".
traffic boolean, use real-time traffic or prediction in routing (default = FALSE)? If no
datetime is set, the current timestamp at the moment of the request is used for
datetime.
search_range numeric, value in meters to limit the search radius in the route generation (default = 99999999).
attribute character, attributes to be calculated on the routes: "distance" or "traveltime"
(default = c("distance", "traveltime").
url_only boolean, only return the generated URLs (default = FALSE)?

Value

A data.frame, which is an edge list containing the requested M:N route combinations.

References

HERE Routing API: Calculate Matrix

Examples

# Provide an API Key for a HERE project
set_key("<YOUR API KEY>")

# Create routes summaries between all POIs
mat <- route_matrix(
  origin = poi,
  traffic = TRUE,
  url_only = TRUE
)
set_key

**Description**

Provide an API Key for a HERE project of type 'REST'. The key is set for the current R session and is used to authenticate in the requests to the APIs.

**Usage**

```
set_key(api_key)
```

**Arguments**

- `api_key` character, the API key from a HERE project.

**Details**

No login yet? Get a free login and key here: klick

**Value**

None.

**Examples**

```
set_key("<YOUR API KEY>")
```

set_proxy

**Description**

If a proxy is needed, for example because the computer is behind a corporate proxy, it can be set as follows: `proxy = "http://your-proxy.net:port/"` or `https://your-proxy.net:port/"` and "proxyuserpwd" = "user:pwd".

**Usage**

```
set_proxy(proxy, proxyuserpwd)
```

**Arguments**

- `proxy` character, the URL of the proxy ("https://your-proxy.net:port/").
- `proxyuserpwd` character, user and password for the authentication ("user:pwd").
Value
None.

Examples
```
set_proxy(
    proxy = "https://your-proxy.net:port/",
    proxyuserpwd = "user:pwd"
)
```

set_verbose
Verbose API usage of hereR

Description
If set to TRUE the hereR package is messaging information about the amount of requests sent to the APIs and data size received.

Usage
```
set_verbose(ans = FALSE)
```

Arguments
```
ans           boolean, verbose or not (default = FALSE)?
```

Value
None.

Examples
```
set_verbose(TRUE)
```

station
HERE Public Transit API: Find Stations Nearby

Description
Retrieve stations with the corresponding line information around given locations using the HERE 'Public Transit' API.

Usage
```
station(poi, radius = 500, results = 5, url_only = FALSE)
```
Arguments

- **poi**: sf object, Points of Interest (POIs) of geometry type POINT.
- **radius**: numeric, the search radius in meters (default = 500).
- **results**: numeric, maximum number of suggested public transport stations (Valid range: 1 and 50, default = 5).
- **url_only**: boolean, only return the generated URLs (default = FALSE)?

Value

An sf object containing the requested stations with the corresponding line information.

References

HERE Public Transit API: Find Stations Nearby

Examples

```r
# Provide an API Key for a HERE project
set_key("<YOUR API KEY>")

# Stations
stations <- station(poi = poi, url_only = TRUE)
```

---

**unset_key**  
Remove HERE Application Credentials

Description

Remove previously set HERE API key from the current R session.

Usage

```r
unset_key()
```

Value

None.

Examples

```r
unset_key()
```
unset_proxy  

Remove Proxy Configuration

Description

Remove a previously set proxy configuration from the current R session.

Usage

unset_proxy()

Value

None.

Examples

unset_proxy()

---

weather  

HERE Destination Weather API: Observations, Forecasts, Astronomy and Alerts

Description

Weather forecasts, reports on current weather conditions, astronomical information and alerts at a specific location (coordinates or location name) based on the HERE 'Destination Weather' API. The information comes from the nearest available weather station and is not interpolated.

Usage

weather(poi, product = "observation", url_only = FALSE)

Arguments

- **poi**: sf object or character, Points of Interest (POIs) of geometry type POINT or location names (e.g. cities or regions).
- **product**: character, weather product of the 'Destination Weather API'. Supported products: "observation", "forecast_hourly", "forecast_astronomy" and "alerts".
- **url_only**: boolean, only return the generated URLs (default = FALSE)?

Value

An sf object containing the requested weather information at the nearest weather station. The point geometry in the sf object is the location of the weather station.
weather

References

HERE Destination Weather API: Observation

Examples

# Provide an API Key for a HERE project
set_key("<YOUR API KEY>")

# Observation
observation <- weather(poi = poi, product = "observation", url_only = TRUE)

# Forecast
forecast <- weather(poi = poi, product = "forecast_hourly", url_only = TRUE)

# Astronomy
astronomy <- weather(poi = poi, product = "forecast_astronomy", url_only = TRUE)

# Alerts
alerts <- weather(poi = poi, product = "alerts", url_only = TRUE)
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