

Package ‘activatr’

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Type Package

Title Utilities for Parsing and Plotting Activities

Version 0.2.1

Description This contains helpful functions for parsing, managing, plotting, and visualizing activities, most often from GPX (GPS Exchange Format) files recorded by GPS devices. It allows easy parsing of the source files into standard R data formats, along with functions to compute derived data for the activity, and to plot the activity in a variety of ways.

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URL <https://github.com/dschafer/activatr>,
<https://dschafer.github.io/activatr/>

BugReports <https://github.com/dschafer/activatr/issues>

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act_tbl-class	act_tbl class
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Description

The `act_tbl` S3 class is a subclass of `data.frame` and `tibble`.

Details

In nearly every respect, it can be treated like a `tibble`; however, this allows the package to provide an improved `summary.act_tbl()` function to get an overview of the activity.

get_ggmap_from_df	Get a map for a given <code>act_tbl</code>
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Description

`get_ggmap_from_df` takes an `act_tbl` object, computes the correct zoom and center for that activity, then returns a `ggmap` object for that zoom and center.

Usage

```
get_ggmap_from_df(df, ...)
```

Arguments

<code>df</code>	An <code>act_tbl</code> object.
<code>...</code>	Additional arguments forwarded to <code>ggmap::get_googlemap()</code> .

Details

Note that since this calls `ggmap::get_googlemap()`, you must have previously called `ggmap::register_google()` to register an API key.

Value

A ggmap object, the result of calling `ggmap::get_googlemap()`, with the correct center and size to include the entire activity represented by the `act_tbl`.

See Also

`ggmap::get_googlemap()`

Examples

```
## Not run:
example_gpx_file <- system.file(
  "extdata",
  "running_example.gpx.gz",
  package = "activatr"
)
act_tbl <- parse_gpx(example_gpx_file)
ggmap::ggmap(get_ggmap_from_df(act_tbl))

## End(Not run)
```

`localize_to_time_zone` *Localize time zone values*

Description

`localize_to_time_zone` uses Google Maps Time Zone APIs to localize the time zone in an `act_tbl`. This modifies a mutated `act_tbl` with the time column updated to contain the same absolute time, but with the appropriate time zone for where the activity took place.

Usage

```
localize_to_time_zone(df)
```

Arguments

`df` An `act_tbl` object.

Details

Note that to avoid overuse of the APIs, this does an "approximation", in that it finds the correct time zone for the first point in the data frame, and assumes all points in that data frame use that time zone. Runs between time zones (or runs that cross daylight savings time shifts) will hence be recorded using a consistent, but not always pointwise correct, timezone.

Note that you must have previously called `ggmap::register_google()` to register an API key before calling this.

Value

That same `act_tbl`, but with the `time` column updated to be in the local time zone rather than UTC.

Examples

```
## Not run:
example_gpx_file <- system.file(
  "extdata",
  "running_example.gpx.gz",
  package = "activatr"
)
act_tbl <- parse_gpx(example_gpx_file)
act_tbl_with_tz <- localize_to_time_zone(act_tbl)

## End(Not run)
```

<code>mutate_with_speed</code>	<i>Augments an <code>act_tbl</code> with a speed column</i>
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Description

This returns a mutated `act_tbl` with a new column representing speed, in meters per second. See `vignette("pace")` for examples.

Usage

```
mutate_with_speed(df, method = c("2D", "3D"), lead = 0, lag = 1)
```

Arguments

<code>df</code>	An <code>act_tbl</code> object
<code>method</code>	If "2D" (default), ignores elevation. If "3D", includes elevation. "3D" is not often necessary, but for skiing activities is likely to yield a more accurate value.
<code>lead</code>	How far ahead to look for the "end" point.
<code>lag</code>	How far behind to look for the "start" point.

Details

The speed is determined by looking at the time difference between the current point and the previous point: hence, it is always NA for the first row in the data frame.

The `lead` and `lag` values are helpful to get "smoother" values, especially if the provided activity file has GPS errors in it.

Value

That same `act_tbl`, but with a new speed column, in meters per second.

Examples

```
example_gpx_file <- system.file(
  "extdata",
  "running_example.gpx.gz",
  package = "activatr"
)
example_act_tbl <- parse_gpx(example_gpx_file)
example_act_tbl_with_speed <- mutate_with_speed(example_act_tbl)
example_act_tbl_with_speed
```

pace_formatter	<i>Format pace durations</i>
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Description

pace_formatter takes a pace duration and returns a formatted string.

Usage

```
pace_formatter(pace)
```

Arguments

pace	A lubridate duration, returned by lubridate::duration or other methods in that family.
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Details

This is most useful when plotting pace as one of the axes in a graph; rather than having the "number of seconds" as the axis value, this method can convert that to a more readable format.

Most commonly, using something like ggplot2::scale_y_reverse(label = pace_formatter) will ensure the y-axis goes from "slowest" to "fastest", and shows paces like "8:30" rather than "510"

Value

A formatted string representing the pace.

Examples

```
pace_formatter(lubridate::dseconds(380))
pace_formatter(lubridate::dseconds(510))
pace_formatter(lubridate::dseconds(680))
```

parse_gpx	Parses a GPX file into a <code>act_tbl</code>
-----------	---

Description

This parses a standard GPS Exchange Format XML (GPX) file into an data frame with class `act_tbl`. See `vignette("parsing")` for examples.

Usage

```
parse_gpx(filename, detail = c("basic", "latlon", "advanced"), every = NA)
```

Arguments

filename	The GPX file to parse
detail	How much detail to parse from the GPX. <ul style="list-style-type: none"> • If <code>basic</code> (the default), this will parse <code>lat / lon / ele / time</code> columns. • If <code>latlon</code>, this will only parse <code>lat/lon</code>. This is particularly useful for GPX files exported without time information, such as from Strava. • If <code>advanced</code>, it will load everything from <code>basic</code>, plus <code>hr / cad</code>. This is most useful for files that have heart rate and cadence information.
every	Optional. If provided, determines how frequently points will be sampled from the file, so if 10 is provided, every tenth point will be selected. If omitted or set to 1, every point will be selected. Must be a positive integer. This is most useful to quickly analyze a large file, since parsing is much faster when skipping 90% of the data points.

Value

A `act_tbl` with one row for each trackpoint in the . GPX (modified by `every`), and with the columns determined by `detail`.

lat	Latitude, a double in degrees between -90 and 90.
lon	Longitude, a double in degrees between -180 and 180.
ele	Elevation, a double in meters.
time	A date-time representing the time of the point.
hr	Heart rate, an int in beats per minute.
cad	Cadence, an int in one-foot steps per minute.

Additionally, attributes are set on the returned object containing top level data from the GPX. Each of these will be `NA` when not provided in the file.

filename	The filename this was parsed from, a string. This is always present, and is always the value of the <code>filename</code> parameter.
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time	A date-time representing the time of the activity.
title	A string.
desc	A string.
type	A string.

See Also

https://en.wikipedia.org/wiki/GPS_Exchange_Format

<https://www.topografix.com/gpx.asp>

Examples

```
example_gpx_file <- system.file(
  "extdata",
  "running_example.gpx.gz",
  package = "activatr"
)
act_tbl <- parse_gpx(example_gpx_file)
print(act_tbl, n = 5)
attr(act_tbl, "title")

nrow(parse_gpx(example_gpx_file))
nrow(parse_gpx(example_gpx_file, every = 100))

colnames(parse_gpx(example_gpx_file))
colnames(parse_gpx(example_gpx_file, detail = "latlon"))
colnames(parse_gpx(example_gpx_file, detail = "advanced"))
```

parse_tcx	<i>Parses a TCX file into a act_tbl</i>
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Description

This parses a standard Training Center XML (TCX) file into a data frame with class [act_tbl](#). See `vignette("parsing")` for examples.

Usage

```
parse_tcx(filename, detail = c("basic", "latlon", "advanced"), every = NA)
```

Arguments

filename	The TCX file to parse
detail	How much detail to parse from the TCX <ul style="list-style-type: none"> • If basic (the default), this will parse lat / lon / ele / time columns. • If latlon, this will only parse lat/lon. This is particularly useful for TCX files exported without time information, such as from Strava.

- If advanced, it will load everything from basic, plus hr / cad. This is most useful for files that have heart rate and cadence information.
- every Optional. If provided, determines how frequently points will be sampled from the file, so if 10 is provided, every tenth point will be selected. If omitted or set to 1, every point will be selected. Must be a positive integer.
- This is most useful to quickly analyze a large file, since parsing is much faster when skipping 90% of the data points.

Value

A `act_tbl` with one row for each trackpoint in the TCX (modified by `every`), and with the columns determined by `detail`.

lat	Latitude, a double in degrees between -90 and 90.
lon	Longitude, a double in degrees between -180 and 180.
ele	Elevation, a double in meters.
time	A date-time representing the time of the point.
hr	Heart rate, an int in beats per minute.
cad	Cadence, an int in one-foot steps per minute.

Additionally, attributes are set on the tibble containing top level data from the TCX. Each of these will be NA when not provided in the file.

filename	The filename this was parsed from, a string. This is always present, and is always the value of the <code>filename</code> parameter.
time	A date-time representing the time of the activity.
type	A string.

See Also

https://en.wikipedia.org/wiki/Training_Center_XML

Examples

```
example_tcx_file <- system.file(
  "extdata",
  "running_example.tcx.gz",
  package = "activatr"
)
act_tbl <- parse_tcx(example_tcx_file)
print(act_tbl, n = 5)
attr(act_tbl, "title")

nrow(parse_tcx(example_tcx_file))
nrow(parse_tcx(example_tcx_file, every = 100))

colnames(parse_tcx(example_tcx_file))
colnames(parse_tcx(example_tcx_file, detail = "latlon"))
colnames(parse_tcx(example_tcx_file, detail = "advanced"))
```

speed_to_mile_pace *Convert speed to mile pace*

Description

speed_to_mile_pace converts a speed (in meters per second) to a mile pace. This method is vectorized, so it works on a column in a data frame. This is most useful after calling `mutate_with_speed()`, to convert that speed to the more-commonly-used pace. See `vignette("pace")` for examples.

Usage

```
speed_to_mile_pace(speed)
```

Arguments

speed A vector of doubles representing speed in meters per second, as from `mutate_with_speed()`.

Value

A corresponding vector of `lubridate::duration` values, representing the mile pace.

Examples

```
speed_to_mile_pace(3)
speed_to_mile_pace(1)
```

summary.act_tbl *Summarizes `act_tbl` objects.*

Description

summary.act_tbl returns a tibble with canonical information about the activity.

Usage

```
## S3 method for class 'act_tbl'
summary(object, full = FALSE, units = c("imperial", "metric"), ...)
```

Arguments

object an object for which a summary is desired

full Whether every column should be included, and filled with NA if missing. Most useful to ensure the tibble has the same shape for every file, allowing eventual use of `dplyr::bind_rows()` or `purrr::map_dfr()` to create a full summary data set.

units Which units should be used?

- "imperial" returns distance in miles, pace in minutes per mile, and elevation in feet.
- "metric" returns distance in kilometers, pace in minutes per kilometer, and elevation in meters.

... Additional arguments.

Details

This is designed to allow for easy creation of activity summary data sets by mapping `summary` over each `act_tbl` then using `dplyr::bind_rows()`, `purrr::map_dfr()`, or equivalent to create a complete data set.

Value

Returns a tibble with a single row, containing a summary of the given `act_tbl`.

Examples

```
example_gpx_file <- system.file(
  "extdata",
  "running_example.gpx.gz",
  package = "activatr"
)
act_tbl <- parse_gpx(example_gpx_file)
summary(act_tbl)

## Not run:
files <- list.files("path/to/many/files", pattern = "*.gpx")
gpxs <- files |> purrr::map(\(f) parse_gpx(f))
summaries <- gpxs |> purrr::map_dfr(\(g) summary(g, full = TRUE))

## End(Not run)
```

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