Package 'timefully'

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Type Package

Title Time-Series Management Made Easy

Version 0.1.0

Description Manage time-series data frames across time zones, resolutions, and date ranges, while filling gaps using weekday/hour patterns or simple fill helpers or plotting them interactively. It is designed to work seamlessly with the tidyverse and dygraphs environments.

License GPL-3

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LazyData true

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Imports dplyr, lubridate, rlang, purrr, dygraphs

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Contents

`adapt_timeseries` *Adapt time-series dataframe to timezone, date range and fill gaps*

Description

This function adapts the date range of a time series by reusing historical patterns based on the same weekday occurrence within the year and decimal hour of the day. It also can fill gaps in the data based on past data, so it is recommended to use it for time series with weekly or yearly patterns (so for example energy demand but not solar generation). It can also adapt the timezone of the time series, for example if the data was stored in UTC but corresponds to a different timezone.

Usage

```
adapt_timeseries(dtf, start_date, end_date, tzone = NULL, fill_gaps = FALSE)
```

Arguments

dtf	data.frame or tibble, first column of name datetime being of class datetime and rest of columns being numeric
start_date	Date, start date of the output datetime sequence
end_date	Date, end date of the output datetime sequence (included)
tzone	character, desired time-zone of the datetime sequence. If NULL, the timezone of dtf$datetime is kept.
fill_gaps	boolean, whether to fill gaps based on same weekday and hour from past data (See fill_from_past function).

Value

tibble

Examples

```
# Example data set
print(dtf)

# Original date range
range(dtf$datetime)

dtf2 <- adapt_timeseries(
  dtf,
  start_date = as.Date("2021-01-01"),
  end_date = as.Date("2021-01-31"),
  tzone = "America/New_York",
  fill_gaps = FALSE
)

# New date range
range(dtf2$datetime)
```

---

add_extra_days *Add an extra day at the beginning and the end of datetime sequence using the last and first day of the data*

Description

Add an extra day at the beginning and the end of datetime sequence using the last and first day of the data

Usage

```
add_extra_days(dtf)
```

Arguments

dtf	data.frame or tibble, first column of name datetime being of class datetime and rest of columns being numeric

Value

tibble

---

aggregate_timeseries *Aggregate multiple timeseries columns to a single one*

Description

The first column datetime will be kept.

Usage

```
aggregate_timeseries(dtf, varname, omit = NULL)
```

Arguments

dtf	data.frame or tibble, first column of name datetime being of class datetime and rest of columns being numeric
varname	character, name of the aggregation column
omit	character, name of columns to not aggregate

Value

tibble

Examples

```
building_flows <- data.frame(
  datetime = as.POSIXct("2024-01-01 00:00:00", tz = "UTC") + 0:3 * 3600,
  building1 = c(2.1, 2.5, 2.3, 2.0),
  building2 = c(1.0, 1.1, 0.9, 1.2)
)
aggregate_timeseries(building_flows, varname = "total_building")
```

`change_timeseries_resolution` *Change time resolution of a time-series data frame*

Description

Change time resolution of a time-series data frame

Usage

```
change_timeseries_resolution(dtf, resolution, method)
```

Arguments

`dtf`	data.frame or tibble, first column of name `datetime` being of class datetime and rest of columns being numeric
`resolution`	integer, desired interval of minutes between two consecutive datetime values
`method`	character, being `interpolate`, `repeat` or `divide` if the resolution has to be increased, or `average`, `first` or `sum` if the resolution has to be decreased. See Examples for more information.

Value

tibble

Examples

```
fifteen_min <- data.frame(
  datetime = as.POSIXct("2024-01-01 00:00:00", tz = "UTC") + 0:7 * 900,
  load = c(10, 12, 14, 16, 14, 12, 10, 8)
)
change_timeseries_resolution(
  fifteen_min,
  resolution = 60,
  method = "average"
)
```

change_timeseries_tzone *Adapt the timezone of a time series dataframe*

Description

The timezone of the `datetime` column is changed while keeping the same date time sequence. This is useful when the time series data is known to be in a different timezone. If you just want the same time series in a different timezone, use `lubridate::force_tz` function instead.

Usage

```
change_timeseries_tzone(dtf, tzone = "Europe/Amsterdam")
```

Arguments

`dtf`	data.frame or tibble, first column of name `datetime` being of class datetime and rest of columns being numeric
`tzone`	character, desired time-zone of the datetime sequence

Value

tibble

Examples

```
# Example data set
get_timeseries_tzone(dtf)
range(dtf$datetime)

#  Change timezone
new_dtf <- change_timeseries_tzone(dtf, tzone = "Europe/Paris")
get_timeseries_tzone(new_dtf)
range(new_dtf$datetime)
```

check_timeseries_gaps *Check if there are any gaps in the datetime sequence*

Description

This means all rows a part from "datetime" will be NA. Note that timefully considers a full datetime sequence when days are complete.

Usage

```
check_timeseries_gaps(dtf)
```

Arguments

dtf	data.frame or tibble, first column of name datetime being of class datetime and rest of columns being numeric

Value

tibble

Examples

```
# Sample just some hours
dtf_gaps <- dtf[c(1:3, 7:10), ]

# Note that the full day is provided
check_timeseries_gaps(
   dtf_gaps
)
```

---

convert_time_num_to_period

Convert numeric time value to a datetime period (hour-based)

Description

Convert numeric time value to a datetime period (hour-based)

Usage

```
convert_time_num_to_period(time_num)
```

Arguments

time_num	Numeric time value (hour-based)

Value

lubridate::period vector with hours and minutes corresponding to the numeric input.

Examples

```
convert_time_num_to_period(1.5)
convert_time_num_to_period(c(0.25, 2))
```

date_to_timestamp *Convert date or datetime value to timestamp number*

Description

Convert date or datetime value to timestamp number

Usage

```
date_to_timestamp(date, tzone = "Europe/Paris", milliseconds = TRUE)
```

Arguments

date	date or datetime value
tzone	character, time-zone of the current time
milliseconds	logical, whether the timestamp is in milliseconds or seconds

Value

numeric

Examples

```
date_to_timestamp(as.Date("2024-01-01"))
date_to_timestamp(as.POSIXct("2024-01-01 08:00:00", tz = "UTC"), milliseconds = FALSE)
```

fill_datetime *Fill NA values of a datetime sequence vector*

Description

Fill NA values of a datetime sequence vector

Usage

```
fill_datetime(dttm)
```

Arguments

dttm	datetime sequence vector

Value

filled datetime sequence vector

Examples

```
incomplete_seq <- as.POSIXct("2024-01-01 00:00:00", tz = "UTC") + 0:4 * 3600
incomplete_seq[c(2, 3)] <- NA
fill_datetime(incomplete_seq)
```

`fill_down_until` *Fill down tibble columns until a maximum number of time slots*

Description

Fill down tibble columns until a maximum number of time slots

Usage

```
fill_down_until(dtf, varnames, max_timeslots = 1)
```

Arguments

`dtf`	data.frame or tibble, first column of name `datetime` being of class datetime and rest of columns being numeric
`varnames`	character or vector of characters, column names with NA values
`max_timeslots`	integer, maximum number of time slots to fill

Value

tibble

Examples

```
down_data <- data.frame(
  datetime = as.POSIXct("2024-01-01 00:00:00", tz = "UTC") + 0:5 * 3600,
  temperature = c(15, 15, NA, NA, NA, 16)
)
fill_down_until(down_data, "temperature", max_timeslots = 2)
```

fill_from_past *Fill from past values*

Description

If back index (NA index - back) is lower than zero then the it is filled with the first value of the data frame. If the value in the back index is also NA, it iterates backwards until finding a non-NA value.

Usage

```
fill_from_past(dtf, varnames, back = 24)
```

Arguments

dtf	data.frame or tibble, first column of name datetime being of class datetime and rest of columns being numeric
varnames	character or vector of characters, column names with NA values
back	integer, number of indices (rows) to go back and get the filling value

Value

tibble or data.frame

Examples

```
past_data <- data.frame(
  datetime = as.POSIXct("2024-01-01 00:00:00", tz = "UTC") + 0:3 * 3600,
  consumption = c(1.2, NA, NA, 2.5)
)
fill_from_past(past_data, "consumption", back = 1)
```

fill_na *Fill gaps with a specific value*

Description

This is useful when the gaps in a numeric timeseries can be filled with the same number (e.g. zero)

Usage

```
fill_na(dtf, varnames, with = 0)
```

Arguments

dtf	data.frame or tibble, first column of name datetime being of class datetime and rest of columns being numeric
varnames	character or vector of characters, column names with NA values
with	numeric, value to fill NA values

Value

tibble or data.frame

Examples

```
past_data <- data.frame(
  datetime = as.POSIXct("2024-01-01 00:00:00", tz = "UTC") + 0:3 * 3600,
  consumption = c(1.2, NA, NA, 2.5)
)
fill_na(past_data, "consumption", with = 0)
```

---

get_datetime_seq *Date time sequence with time zone and resolution*

Description

Date time sequence with time zone and resolution

Usage

```
get_datetime_seq(start_date, end_date, tzone, resolution)
```

Arguments

start_date	Date, start date of the output datetime sequence
end_date	Date, end date of the output datetime sequence (included)
tzone	character, desired time-zone of the datetime sequence
resolution	integer, interval of minutes between two consecutive datetime values

Value

vector of datetime values

Examples

```
get_datetime_seq(
  start_date = as.Date("2024-01-01"),
  end_date = as.Date("2024-01-03"),
  tzone = "UTC",
  resolution = 120
)
```

`get_timeseries_resolution` *Return the time resolution of a time series dataframe*

Description

Return the time resolution of a time series dataframe

Usage

```
get_timeseries_resolution(dtf, units = "mins")
```

Arguments

`dtf`	data.frame or tibble, first column of name `datetime` being of class datetime and rest of columns being numeric
`units`	character being one of "auto", "secs", "mins", "hours", "days" and "weeks"

Value

numeric

Examples

```
get_timeseries_resolution(dtf, units = "mins")
```

get_timeseries_tzone *Get the time zone of a time series dataframe*

Description

Get the time zone of a time series dataframe

Usage

```
get_timeseries_tzone(dtf)
```

Arguments

dtf	data.frame or tibble, first column of name datetime being of class datetime and rest of columns being numeric

Value

character

Examples

```
get_timeseries_tzone(dtf)
```

get_time_resolution *Return the time resolution of a datetime sequence*

Description

Return the time resolution of a datetime sequence

Usage

```
get_time_resolution(dttm_seq, units = "mins")
```

Arguments

dttm_seq	datetime sequence
units	character being one of "auto", "secs", "mins", "hours", "days" and "weeks"

Value

numeric

Examples

```
seq_15m <- as.POSIXct(
  c("2024-01-01 00:00:00", "2024-01-01 00:15:00", "2024-01-01 00:30:00"),
  tz = "UTC"
)
get_time_resolution(seq_15m, units = "mins")
```

`get_week_from_datetime` *Week date from datetime value*

Description

Week date from datetime value

Usage

```
get_week_from_datetime(dttm)
```

Arguments

`dttm`	datetime vector

Value

date vector

Examples

```
dttm <- as.POSIXct(
  c("2024-01-01 08:00:00", "2024-01-02 09:00:00", "2024-01-08 10:00:00"),
  tz = "UTC"
)
get_week_from_datetime(dttm)
```

get_week_total *Summarise dataframe with weekly total column values*

Description

Converts the numeric columns of a time-series data frame to total values per week (sum). Note that if the input values are in power units (e.g., kW), the output values will be in energy units (e.g., kWh).

Usage

```
get_week_total(dtf)
```

Arguments

dtf	data.frame or tibble, first column of name datetime being of class datetime and rest of columns being numeric

Value

tibble

Examples

```
get_week_total(dtf[1:100, ])
```

get_yearly_datetime_seq *Yearly date time sequence with time zone and resolution*

Description

Yearly date time sequence with time zone and resolution

Usage

```
get_yearly_datetime_seq(year, tzone, resolution)
```

Arguments

year	integer, year of the datetime sequence
tzone	character, desired time-zone of the datetime sequence
resolution	integer, interval of minutes between two consecutive datetime values

Value

vector of datetime values

Examples

```
get_yearly_datetime_seq(
  year = 2024,
  tzone = "UTC",
  resolution = 60
)
```

`plot_ts` *Interactive plot for time-series tibbles*

Description

First column of the `df` tibble must be a `datetime` or date variable. The rest of columns must be numeric of the same units. This functions makes use of `dygraphs` package to generate an HTML dygraphs plot.

Usage

```
plot_ts(
  df,
  title = NULL,
  xlab = NULL,
  ylab = NULL,
  legend_show = "auto",
  legend_width = 250,
  group = NULL,
  width = NULL,
  height = NULL,
  ...
)
```

Arguments

`df`	data.frame or tibble, first column of name `datetime` being of class datetime and rest of columns being numeric
`title`	character, title of the plot (accepts HTML code)
`xlab`	character, X axis label (accepts HTML code)
`ylab`	character, Y axis label (accepts HTML code)

legend_show	character, when to display the legend. Specify "always" to always show the legend. Specify "onmouseover" to only display it when a user mouses over the chart. Specify "follow" to have the legend show as overlay to the chart which follows the mouse. The default behavior is "auto", which results in "always" when more than one series is plotted and "onmouseover" when only a single series is plotted.
legend_width	integer, width (in pixels) of the div which shows the legend.
group	character, dygraphs group to associate this plot with. The x-axis zoom level of dygraphs plots within a group is automatically synchronized.
width	Width in pixels (optional, defaults to automatic sizing)
height	Height in pixels (optional, defaults to automatic sizing)
...	extra arguments to pass to dygraphs::dyOptions function.

Value

dygraph

Examples

```
plot_ts(dtf, ylab = "kW", legend_show = "onmouseover")
```

---

tic *Time difference start function*

Description

Use this function together with toc() to control time spent by functions

Usage

```
tic()
```

Value

numeric

toc *Time difference end function*

Description

Use this function together with `tic()` to control time spent by functions

Usage

```
toc(units = "secs", digits = 2)
```

Arguments

`units`	character, one of "auto", "secs", "mins", "hours", "days" and "weeks"
`digits`	integer, number of decimals

Value

numeric

to_hhmm *Convert a number of minutes in string format "HH:MM"*

Description

Convert a number of minutes in string format "HH:MM"

Usage

```
to_hhmm(mins)
```

Arguments

`mins`	integer, number of minutes (from 0 to 1439)

Value

character

Examples

```
to_hhmm(75)
```

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