Package: healthyR (via r-universe)

September 2, 2024

Title Hospital Data Analysis Workflow Tools

Version 0.2.2.9000

Description Hospital data analysis workflow tools, modeling, and automations. This library provides many useful tools to review common administrative hospital data. Some of these include average length of stay, readmission rates, average net pay amounts by service lines just to name a few. The aim is to provide a simple and consistent verb framework that takes the guesswork out of everything.

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Encoding UTF-8

LazyData true

Roxygen list(markdown = TRUE)

RoxygenNote 7.3.2

URL https://github.com/spsanderson/healthyR

BugReports https://github.com/spsanderson/healthyR/issues

Imports magrittr, rlang (>= 0.1.2), tibble, timetk, ggplot2, dplyr, lubridate, graphics, purrr, stringr, writexl, cowplot, scales, sqldf, plotly

Suggests knitr, rmarkdown, pacman, healthyR.data, broom, tidyselect

VignetteBuilder knitr

Depends R (>= 3.3)

Repository https://spsanderson.r-universe.dev

RemoteUrl https://github.com/spsanderson/healthyR

RemoteRef HEAD

RemoteSha f65be48dfb156a3ec5dfa93d037ce1296ac39c66

Contents

`category_counts_tbl` *Counts by Category*

Description

Get the counts of a column by a particular grouping if supplied, otherwise just get counts of a column.

Usage

```
category_counts_tbl(.data, .count_col, .arrange_value = TRUE, ...)
```

Arguments

.data	The data.frame/tibble supplied.
.count_col	The column that has the values you want to count.
.arrange_value	Defaults to true, this will arrange the resulting tibble in descending order by .count_col
...	Place the values you want to pass in for grouping here.

Details

- Requires a data.frame/tibble.
- Requires a value column, a column that is going to counted.

Author(s)

Steven P. Sanderson II, MPH

See Also

Other Data Table Functions: los_ra_index_summary_tbl(), named_item_list(), top_n_tbl(), ts_census_los_daily_tbl(), ts_signature_tbl()

Examples

```
library(healthyR.data)
library(dplyr)

healthyR_data %>%
  category_counts_tbl(
    .count_col = payer_grouping
    , .arrange = TRUE
    , ip_op_flag
  )

healthyR_data %>%
  category_counts_tbl(
    .count_col = ip_op_flag
    , .arrange_value = TRUE
    , service_line
  )
```

color_blind *Provide Colorblind Compliant Colors*

Description

8 Hex RGB color definitions suitable for charts for colorblind people.

Usage

```
color_blind()
```

Details

This function is used in others in order to help render plots for those that are color blind.

Value

A vector of 8 Hex RGB definitions.

Author(s)

Steven P. Sanderson II, MPH

See Also

Other Color Blind: `hr_scale_color_colorblind()`, `hr_scale_fill_colorblind()`

Examples

```
color_blind()
```

diverging_bar_plt *Diverging Bar Chart*

Description

Diverging Bars is a bar chart that can handle both negative and positive values. This can be implemented by a smart tweak with `geom_bar()`. But the usage of `geom_bar()` can be quite confusing. That's because, it can be used to make a bar chart as well as a histogram. Let me explain.

By default, `geom_bar()` has the stat set to count. That means, when you provide just a continuous X variable (and no Y variable), it tries to make a histogram out of the data.

In order to make a bar chart create bars instead of histogram, you need to do two things. Set `stat = identity` and provide both `x` and `y` inside `aes()` where, `x` is either character or factor and `y` is numeric. In order to make sure you get diverging bars instead of just bars, make sure, your categorical variable has 2 categories that changes values at a certain threshold of the continuous variable. In below example, the mpg from mtcars data set is normalized by computing the z score. Those vehicles with mpg above zero are marked green and those below are marked red.

Usage

```
diverging_bar_plt(
  .data,
  .x_axis,
  .y_axis,
  .fill_col,
  .plot_title = NULL,
  .plot_subtitle = NULL,
  .plot_caption = NULL,
  .interactive = FALSE
)
```

Arguments

.data	The data to pass to the function, must be a tibble/data.frame.
.x_axis	The data that is passed to the x-axis.
.y_axis	The data that is passed to the y-axis. This will also equal the parameter label
.fill_col	The column that will be used to fill the color of the bars.
.plot_title	Default is NULL
.plot_subtitle	Default is NULL
.plot_caption	Default is NULL
.interactive	Default is FALSE. TRUE returns a plotly plot

Details

This function takes only a few arguments and returns a ggplot2 object.

Value

A plotly plot or a ggplot2 static plot

Author(s)

Steven P. Sanderson II, MPH

See Also

Other Plotting Functions: diverging_lollipop_plt(), gartner_magic_chart_plt(), los_ra_index_plt(), ts_alos_plt(), ts_median_excess_plt(), ts_plt(), ts_readmit_rate_plt()

Examples

```
suppressPackageStartupMessages(library(ggplot2))

data("mtcars")
mtcars$car_name <- rownames(mtcars)
mtcars$mpg_z <- round((mtcars$mpg - mean(mtcars$mpg))/sd(mtcars$mpg), 2)
mtcars$mpg_type <- ifelse(mtcars$mpg_z < 0, "below", "above")
```

```
mtcars <- mtcars[order(mtcars$mpg_z), ]  # sort
mtcars$car_name <- factor(mtcars$car_name, levels = mtcars$car_name)

diverging_bar_plt(
  .data          = mtcars
  , .x_axis      = car_name
  , .y_axis      = mpg_z
  , .fill_col    = mpg_type
  , .interactive = FALSE
)
```

`diverging_lollipop_plt` *Diverging Lollipop Chart*

Description

This is a diverging lollipop function. Lollipop chart conveys the same information as bar chart and diverging bar. Except that it looks more modern. Instead of geom_bar, I use geom_point and geom_segment to get the lollipops right. Let's draw a lollipop using the same data I prepared in the previous example of diverging bars.

Usage

```
diverging_lollipop_plt(
  .data,
  .x_axis,
  .y_axis,
  .plot_title = NULL,
  .plot_subtitle = NULL,
  .plot_caption = NULL,
  .interactive = FALSE
)
```

Arguments

`.data`	The data to pass to the function, must be a tibble/data.frame.
`.x_axis`	The data that is passed to the x-axis. This will also be the `x` and `xend` parameters of the `geom_segment`
`.y_axis`	The data that is passed to the y-axis. This will also equal the parameters of `yend` and `label`
`.plot_title`	Default is NULL
`.plot_subtitle`	Default is NULL
`.plot_caption`	Default is NULL
`.interactive`	Default is FALSE. TRUE returns a plotly plot

Details

This function takes only a few arguments and returns a ggplot2 object.

Value

A `plotly` plot or a `ggplot2` static plot

Author(s)

Steven P. Sanderson II, MPH

See Also

Other Plotting Functions: `diverging_bar_plt()`, `gartner_magic_chart_plt()`, `los_ra_index_plt()`, `ts_alos_plt()`, `ts_median_excess_plt()`, `ts_plt()`, `ts_readmit_rate_plt()`

Examples

```
suppressPackageStartupMessages(library(ggplot2))

data("mtcars")
mtcars$car_name <- rownames(mtcars)
mtcars$mpg_z <- round((mtcars$mpg - mean(mtcars$mpg))/sd(mtcars$mpg), 2)
mtcars$mpg_type <- ifelse(mtcars$mpg_z < 0, "below", "above")
mtcars <- mtcars[order(mtcars$mpg_z), ]  # sort
mtcars$car_name <- factor(mtcars$car_name, levels = mtcars$car_name)

diverging_lollipop_plt(.data = mtcars, .x_axis = car_name
, .y_axis = mpg_z)
```

---

dx_cc_mapping *Diagnosis to Condition Code Mapping file*

Description

Diagnosis to Condition Code Mapping file

Usage

```
data(dx_cc_mapping)
```

Format

A data frame with 86852 rows and 5 variables

See Also

Other AHRQ: `px_cc_mapping`

`gartner_magic_chart_plt` *Gartner Magic Chart - Plotting of two continuous variables*

Description

Plot a Gartner Magic Chart of two continuous variables.

Usage

```
gartner_magic_chart_plt(
  .data,
  .x_col,
  .y_col,
  .point_size_col = NULL,
  .y_lab = "",
  .x_lab = "",
  .plot_title = "",
  .top_left_label = "",
  .top_right_label = "",
  .bottom_right_label = "",
  .bottom_left_label = ""
)
```

Arguments

`.data`	The dataset you want to plot.
`.x_col`	The x-axis for the plot.
`.y_col`	The y-axis for the plot.
`.point_size_col`	The default is NULL. If you want to size the dots by a column in the data frame/tibble, enter the column name here.
`.y_lab`	The y-axis label (default: "").
`.x_lab`	The x-axis label (default: "").
`.plot_title`	The title of the plot (default: "").
`.top_left_label`	The top left label (default: "").
`.top_right_label`	The top right label (default: "").
`.bottom_right_label`	The bottom right label (default: "").
`.bottom_left_label`	The bottom left label (default: "").

Value

A ggplot plot.

Author(s)

Steven P. Sanderson II, MPH

See Also

Other Plotting Functions: diverging_bar_plt(), diverging_lollipop_plt(), los_ra_index_plt(), ts_alos_plt(), ts_median_excess_plt(), ts_plt(), ts_readmit_rate_plt()

Examples

```
library(dplyr)
library(ggplot2)

data_tbl <- tibble(
  x = rnorm(100, 0, 1),
  y = rnorm(100, 0, 1),
  z = abs(x) + abs(y)
)

gartner_magic_chart_plt(
  .data = data_tbl,
  .x_col = x,
  .y_col = y,
  .point_size_col = z,
  .x_lab = "los",
  .y_lab = "ra",
  .plot_title = "tst",
  .top_right_label = "High RA-LOS",
  .top_left_label = "High RA",
  .bottom_left_label = "Leader",
  .bottom_right_label = "High LOS"
)

gartner_magic_chart_plt(
  .data = data_tbl,
  .x_col = x,
  .y_col = y,
  .point_size_col = NULL,
  .x_lab = "los",
  .y_lab = "ra",
  .plot_title = "tst",
  .top_right_label = "High RA-LOS",
  .top_left_label = "High RA",
  .bottom_left_label = "Leader",
  .bottom_right_label = "High LOS"
)
```

hr_scale_color_colorblind

Provide Colorblind Compliant Colors

Description

8 Hex RGB color definitions suitable for charts for colorblind people.

Usage

```
hr_scale_color_colorblind(..., theme = "hr")
```

Arguments

...	Data passed in from a ggplot object
theme	Right now this is hr only. Anything else will render an error.

Details

This function is used in others in order to help render plots for those that are color blind.

Value

A gggplot layer

Author(s)

Steven P. Sanderson II, MPH

See Also

Other Color Blind: color_blind(), hr_scale_fill_colorblind()

hr_scale_fill_colorblind

Provide Colorblind Compliant Colors

Description

8 Hex RGB color definitions suitable for charts for colorblind people.

Usage

```
hr_scale_fill_colorblind(..., theme = "hr")
```

Arguments

...	Data passed in from a ggplot object
theme	Right now this is hr only. Anything else will render an error.

Details

This function is used in others in order to help render plots for those that are color blind.

Value

A gggplot layer

Author(s)

Steven P. Sanderson II, MPH

See Also

Other Color Blind: color_blind(), hr_scale_color_colorblind()

---

los_ra_index_plt *Plot LOS and Readmit Index with Variance*

Description

Plot the index of the length of stay and readmit rate against each other along with the variance

Usage

```
los_ra_index_plt(.data)
```

Arguments

.data	The data supplied from los_ra_index_summary_tbl()

Details

- Expects a tibble
- Expects a Length of Stay and Readmit column, must be numeric
- Uses cowplot to stack plots

Value

A patchwork ggplot2 plot

Author(s)

Steven P. Sanderson II, MPH

See Also

Other Plotting Functions: diverging_bar_plt(), diverging_lollipop_plt(), gartner_magic_chart_plt(), ts_alos_plt(), ts_median_excess_plt(), ts_plt(), ts_readmit_rate_plt()

Examples

```
suppressPackageStartupMessages(library(dplyr))

data_tbl <- tibble(
  "alos"                = runif(186, 1, 20)
  , "elos"              = runif(186, 1, 17)
  , "readmit_rate"      = runif(186, 0, .25)
  , "readmit_rate_bench" = runif(186, 0, .2)
)

los_ra_index_summary_tbl(
  .data = data_tbl
  , .max_los       = 15
  , .alos_col      = alos
  , .elos_col      = elos
  , .readmit_rate  = readmit_rate
  , .readmit_bench = readmit_rate_bench
) %>%
  los_ra_index_plt()

los_ra_index_summary_tbl(
  .data = data_tbl
  , .max_los       = 10
  , .alos_col      = alos
  , .elos_col      = elos
  , .readmit_rate  = readmit_rate
  , .readmit_bench = readmit_rate_bench
) %>%
  los_ra_index_plt()
```

---

los_ra_index_summary_tbl

Make LOS and Readmit Index Summary Tibble

Description

Create the length of stay and readmit index summary tibble

Usage

```
los_ra_index_summary_tbl(
  .data,
  .max_los = 15,
```

```
  .alos_col,
  .elos_col,
  .readmit_rate,
  .readmit_bench
)
```

Arguments

.data	The data you are going to analyze.
.max_los	You can give a maximum LOS value. Lets say you typically do not see los over 15 days, you would then set .max_los to 15 and all values greater than .max_los will be grouped to .max_los
.alos_col	The Average Length of Stay column
.elos_col	The Expected Length of Stay column
.readmit_rate	The Actual Readmit Rate column
.readmit_bench	The Expected Readmit Rate column

Details

- Expects a tibble
- Expects the following columns and there should only be these 4
  - Length Of Stay Actual - Should be an integer
  - Length Of Stacy Benchmark - Should be an integer
  - Readmit Rate Actual - Should be 0/1 for each record, 1 = readmitted, 0 did not.
  - Readmit Rate Benchmark - Should be a percentage from the benchmark file.
- This will add a column called visits that will be the count of records per length of stay from 1 to .max_los
- The .max_los param can be left blank and the function will default to 15. If this is not a good default and you don't know what it should be then set it to 75 percentile from the `stats::quantile()` function using the defaults, like so .max_los = `stats::quantile(data_tbl$alos)[[4]]`
- Uses all data to compute variance, if you want it for a particular time frame you will have to filter the data that goes into the .data argument. It is suggested to use `timetk::filter_by_time()`
- The index is computed as the excess of the length of stay or readmit rates over their respective expectations.

Value

A tibble

Author(s)

Steven P. Sanderson II, MPH

See Also

Other Data Table Functions: `category_counts_tbl()`, `named_item_list()`, `top_n_tbl()`, `ts_census_los_daily_tbl()`
`ts_signature_tbl()`

Examples

```
suppressPackageStartupMessages(library(dplyr))

data_tbl <- tibble(
  "alos"            = runif(186, 1, 20)
  , "elos"          = runif(186, 1, 17)
  , "readmit_rate"  = runif(186, 0, .25)
  , "readmit_bench" = runif(186, 0, .2)
)

los_ra_index_summary_tbl(
  .data = data_tbl
  , .max_los       = 15
  , .alos_col      = alos
  , .elos_col      = elos
  , .readmit_rate  = readmit_rate
  , .readmit_bench = readmit_bench
)

los_ra_index_summary_tbl(
  .data = data_tbl
  , .max_los       = 10
  , .alos_col      = alos
  , .elos_col      = elos
  , .readmit_rate  = readmit_rate
  , .readmit_bench = readmit_bench
)
```

---

named_item_list *Tibble to named list*

Description

Takes in a data.frame/tibble and creates a named list from a supplied grouping variable. Can be used in conjunction with `save_to_excel()` to create a new sheet for each group of data.

Usage

```
named_item_list(.data, .group_col)
```

Arguments

`.data`	The data.frame/tibble.
`.group_col`	The column that contains the groupings.

Details

- Requires a data.frame/tibble and a grouping column.

Author(s)

Steven P. Sanderson II, MPH

See Also

Other Data Table Functions: `category_counts_tbl()`, `los_ra_index_summary_tbl()`, `top_n_tbl()`, `ts_census_los_daily_tbl()`, `ts_signature_tbl()`

Examples

```
library(healthyR.data)

df <- healthyR_data
df_list <- named_item_list(.data = df, .group_col = service_line)
df_list
```

---

opt_bin *Get the optimal binwidth for a histogram*

Description

Gives the optimal binwidth for a histogram given a data set, it's value and the desired amount of bins

Usage

```
opt_bin(.data, .value_col, .iters = 30)
```

Arguments

`.data`	The data set in question
`.value_col`	The column that holds the values
`.iters`	How many times the cost function loop should run

Details

- Supply a data.frame/tibble with a value column. from this an optimal binwidth will be computed for the amount of binds desired

Value

A tibble of histogram breakpoints

Author(s)

Steven P. Sanderson II, MPH

Modified from Hideaki Shimazaki Department of Physics, Kyoto University shimazaki at ton.scphys.kyoto-u.ac.jp Feel free to modify/distribute this program.

See Also

Other Utilities: save_to_excel(), sql_left(), sql_mid(), sql_right()

Examples

```
suppressPackageStartupMessages(library(purrr))
suppressPackageStartupMessages(library(dplyr))

df_tbl <- rnorm(n = 1000, mean = 0, sd = 1)
df_tbl <- df_tbl %>%
  as_tibble() %>%
  set_names("value")

df_tbl %>%
  opt_bin(
    .value_col = value
    , .iters = 100
  )
```

---

px_cc_mapping *Procedure to Condition Code Mapping file*

Description

Procedure to Condition Code Mapping file

Usage

```
data(px_cc_mapping)
```

Format

A data frame with 79721 rows and 5 variables

See Also

Other AHRQ: dx_cc_mapping

save_to_excel *Save a file to Excel*

Description

Save a tibble/data.frame to an excel `.xlsx` file. The file will automatically with a save_dtime in the format of 20201109_132416 for November 11th, 2020 at 1:24:16PM.

Usage

```
save_to_excel(.data, .file_name)
```

Arguments

`.data`	The tibble/data.frame that you want to save as an `.xlsx` file.
`.file_name`	the name you want to give to the file.

Details

- Requires a tibble/data.frame to be passed to it.

Value

A saved excel file

Author(s)

Steven P. Sanderson II, MPH

See Also

Other Utilities: `opt_bin()`, `sql_left()`, `sql_mid()`, `sql_right()`

service_line_augment *Service Line Grouper Augment Function*

Description

Takes a few arguments from a data.frame/tibble and returns a service line augmented to a data.frame/tibble for a set of patients.

Usage

```
service_line_augment(.data, .dx_col, .px_col, .drg_col)
```

Arguments

.data	The data being passed that will be augmented by the function.
.dx_col	The column containing the Principal Diagnosis for the discharge.
.px_col	The column containing the Principal Coded Procedure for the discharge. It is possible that this could be blank.
.drg_col	The DRG Number coded to the inpatient discharge.

Details

This is an augment function in that appends a vector to an data.frame/tibble that is passed to the .data parameter. A data.frame/tibble is required, along with a principal diagnosis column, a principal procedure column, and a column for the DRG number. These are needed so that the function can join the dx_cc_mapping and px_cc_mapping columns to provide the service line. This function only works on visits that are coded using ICD Version 10 only.

Lets take an example discharge, the DRG is 896 and the Principal Diagnosis code maps to DX_660, then this visit would get grouped to alcohol_abuse

DRG 896: ALCOHOL, DRUG ABUSE OR DEPENDENCE WITHOUT REHABILITATION THERAPY WITH MAJOR COMPLICATION OR COMORBIDITY (MCC)

DX_660 Maps to the following ICD-10 Codes ie F1010 Alcohol abuse, uncomplicated:

```
library(healthyR)
dx_cc_mapping %>%
  filter(CC_Code == "DX_660", ICD_Ver_Flag == "10")
```

Value

An augmented data.frame/tibble with the service line appended as a new column.

Author(s)

Steven P. Sanderson II, MPH

Examples

```
df <- data.frame(
  dx_col = "F10.10",
  px_col = NA,
  drg_col = "896"
)

service_line_augment(
  .data = df,
  .dx_col = dx_col,
  .px_col = px_col,
  .drg_col = drg_col
)
```

`service_line_vec` *Service Line Grouper Vectorized Function*

Description

Takes a few arguments from a data.frame/tibble and returns a service line vector for a set of patients.

Usage

```
service_line_vec(.data, .dx_col, .px_col, .drg_col)
```

Arguments

`.data`	The data being passed that will be augmented by the function.
`.dx_col`	The column containing the Principal Diagnosis for the discharge.
`.px_col`	The column containing the Principal Coded Procedure for the discharge. It is possible that this could be blank.
`.drg_col`	The DRG Number coded to the inpatient discharge.

Details

This is a vectorized function in that it returns a vector. It can be applied inside of a `mutate` statement when using `dplyr` if desired. A data.frame/tibble is required, along with a principal diagnosis column, a principal procedure column, and a column for the DRG number. These are needed so that the function can join the dx_cc_mapping and px_cc_mapping columns to provide the service line. This function only works on visits that are coded using ICD Version 10 only.

Lets take an example discharge, the DRG is 896 and the Principal Diagnosis code maps to DX_660, then this visit would get grouped to `alcohol_abuse`

DRG 896: ALCOHOL, DRUG ABUSE OR DEPENDENCE WITHOUT REHABILITATION THERAPY WITH MAJOR COMPLICATION OR COMORBIDITY (MCC)

DX_660 Maps to the following ICD-10 Codes ie F1010 Alcohol abuse, uncomplicated:

```
library(healthyR)
dx_cc_mapping %>%
  filter(CC_Code == "DX_660", ICD_Ver_Flag == "10")
```

Value

A vector of service line assignments.

Author(s)

Steven P. Sanderson II, MPH

Examples

```
df <- data.frame(
  dx_col = "F10.10",
  px_col = NA,
  drg_col = "896"
)

service_line_vec(
  .data = df,
  .dx_col = dx_col,
  .px_col = px_col,
  .drg_col = drg_col
)
```

---

sql_left *Use SQL LEFT type function*

Description

Perform an SQL LEFT() type function on a piece of text

Usage

```
sql_left(.text, .num_char)
```

Arguments

.text	A piece of text/string to be manipulated
.num_char	How many characters do you want to grab

Details

- You must supply data that you want to manipulate.

Author(s)

Steven P. Sanderson II, MPH

See Also

Other Utilities: opt_bin(), save_to_excel(), sql_mid(), sql_right()

Examples

```
sql_left("text", 3)
```

`sql_mid` *Use SQL MID type function*

Description

Perform an SQL SUBSTRING type function

Usage

```
sql_mid(.text, .start_num, .num_char)
```

Arguments

`.text`	A piece of text/string to be manipulated
`.start_num`	What place to start at
`.num_char`	How many characters do you want to grab

Details

- You must supply data that you want to manipulate.

Author(s)

Steven P. Sanderson II, MPH

See Also

Other Utilities: `opt_bin()`, `save_to_excel()`, `sql_left()`, `sql_right()`

Examples

```
sql_mid("this is some text", 6, 2)
```

`sql_right` *Use SQL RIGHT type functions*

Description

Perform an SQL RIGHT type function

Usage

```
sql_right(.text, .num_char)
```

Arguments

.text	A piece of text/string to be manipulated
.num_char	How many characters do you want to grab

Details

- You must supply data that you want to manipulate.

Author(s)

Steven P. Sanderson II, MPH

See Also

Other Utilities: opt_bin(), save_to_excel(), sql_left(), sql_mid()

Examples

```
sql_right("this is some more text", 3)
```

---

top_n_tbl *Top N tibble*

Description

Get a tibble returned with n records sorted either by descending order (default) or ascending order.

Usage

```
top_n_tbl(.data, .n_records, .arrange_value = TRUE, ...)
```

Arguments

.data	The data you want to pass to the function
.n_records	How many records you want returned
.arrange_value	A boolean with TRUE as the default. TRUE sorts data in descending order
...	The columns you want to pass to the function.

Details

- Requires a data.frame/tibble
- Requires at least one column to be chosen inside of the ...
- Will return the tibble in sorted order that is chosen with descending as the default

Author(s)

Steven P. Sanderson II, MPH

See Also

Other Data Table Functions: `category_counts_tbl()`, `los_ra_index_summary_tbl()`, `named_item_list()`, `ts_census_los_daily_tbl()`, `ts_signature_tbl()`

Examples

```
library(healthyR.data)

df <- healthyR_data

df_tbl <- top_n_tbl(
  .data = df
  , .n_records = 3
  , .arrange_value = TRUE
  , service_line
  , payer_grouping
)

print(df_tbl)
```

---

ts_alos_plt *Plot ALOS - Average Length of Stay*

Description

Plot ALOS - Average Length of Stay

Usage

```
ts_alos_plt(.data, .date_col, .value_col, .by_grouping, .interactive)
```

Arguments

`.data`	The time series data you need to pass
`.date_col`	The date column
`.value_col`	The value column
`.by_grouping`	How you want the data summarized - "sec", "min", "hour", "day", "week", "month", "quarter" or "year"
`.interactive`	TRUE or FALSE. TRUE returns a `plotly` plot and FALSE returns a static `ggplot2` plot

Details

- Expects a tibble with a date time column and a value column
- Uses `timetk` for underlying sumarization and plot
- If .by_grouping is missing it will default to "day"
- A static ggplot2 object is return if the .interactive function is FALSE otherwise a `plotly` plot is returned.

Value

A timetk time series plot

Author(s)

Steven P. Sanderson II, MPH

See Also

Other Plotting Functions: `diverging_bar_plt()`, `diverging_lollipop_plt()`, `gartner_magic_chart_plt()`, `los_ra_index_plt()`, `ts_median_excess_plt()`, `ts_plt()`, `ts_readmit_rate_plt()`

Examples

```
library(healthyR)
library(healthyR.data)
library(timetk)
library(dplyr)
library(purrr)

# Make A Series of Dates ----
data_tbl <- healthyR_data

df_tbl <- data_tbl %>%
    filter(ip_op_flag == "I") %>%
    select(visit_end_date_time, length_of_stay) %>%
    summarise_by_time(
        .date_var = visit_end_date_time
        , .by     = "day"
        , visits  = mean(length_of_stay, na.rm = TRUE)
    ) %>%
    filter_by_time(
        .date_var     = visit_end_date_time
        , .start_date = "2012"
        , .end_date   = "2019"
    ) %>%
    set_names("Date","Values")

ts_alos_plt(
  .data = df_tbl
  , .date_col = Date
  , .value_col = Values
```

```
  , .by = "month"
  , .interactive = FALSE
)
```

`ts_census_los_daily_tbl`

Time Series - Census and LOS by Day

Description

Sometimes it is important to know what the census was on any given day, or what the average length of stay is on given day, including for those patients that are not yet discharged. This can be easily achieved. This will return one record for every account so the data will still need to be summarized. If there are multiple entries per day then those records will show up and you will therefore have multiple entries in the column `date` in the resulting `tibble`. If you want to aggregate from there you should be able to do so easily.

If you have a record where the `.start_date_col` is filled in but the corresponding `end_date` is null then the end date will be set equal to `Sys.Date()`

If a record has a `start_date` that is `NA` then it will be discarded.

This function can take a little bit of time to run while the join comparison runs.

Usage

```
ts_census_los_daily_tbl(
  .data,
  .keep_nulls_only = FALSE,
  .start_date_col,
  .end_date_col,
  .by_time = "day"
)
```

Arguments

`.data`	The data you want to pass to the function
`.keep_nulls_only`	A boolean that will keep only those records that have a NULL end date, meaning the patient is still admitted. The default is FALSE which brings back all records.
`.start_date_col`	The column containing the start date for the record
`.end_date_col`	The column containing the end date for the record.
`.by_time`	How you want the data presented, defaults to day and should remain that way unless you need more granular data.

Details

- Requires a dataset that has at least a start date column and an end date column
- Takes a single boolean parameter

Value

A tibble object

Author(s)

Steven P. Sanderson II, MPH

See Also

Other Data Table Functions: `category_counts_tbl()`, `los_ra_index_summary_tbl()`, `named_item_list()`, `top_n_tbl()`, `ts_signature_tbl()`

Examples

```
library(healthyR)
library(healthyR.data)
library(dplyr)

df <- healthyR_data

df_tbl <- df %>%
  filter(ip_op_flag == "I") %>%
  select(visit_start_date_time, visit_end_date_time) %>%
  timetk::filter_by_time(.date_var = visit_start_date_time, .start_date = "2020")

ts_census_los_daily_tbl(
   .data              = df_tbl
   , .keep_nulls_only = FALSE
   , .start_date_col  = visit_start_date_time
   , .end_date_col    = visit_end_date_time
)
```

---

ts_median_excess_plt *Create a plot showing the excess of the median value*

Description

Plot out the excess +/- of the median value grouped by certain time parameters.

Usage

```
ts_median_excess_plt(
  .data,
  .date_col,
  .value_col,
  .x_axis,
  .ggplot_group_var,
  .years_back
)
```

Arguments

.data	The data that is being analyzed, data must be a tibble/data.frame.
.date_col	The column of the tibble that holds the date.
.value_col	The column that holds the value of interest.
.x_axis	What is the be the x-axis, day, week, etc.
.ggplot_group_var	The variable to group the ggplot on.
.years_back	How many yeas back do you want to go in order to compute the median value.

Details

- Supply data that you want to view and you will see the excess +/- of the median values over a specified time series tibble.

Value

A ggplot2 plot

See Also

Other Plotting Functions: diverging_bar_plt(), diverging_lollipop_plt(), gartner_magic_chart_plt(), los_ra_index_plt(), ts_alos_plt(), ts_plt(), ts_readmit_rate_plt()

Examples

```
suppressPackageStartupMessages(library(timetk))

ts_signature_tbl(
  .data       = m4_daily
  , .date_col = date
) %>%
ts_median_excess_plt(
  .date_col           = date
  , .value_col        = value
  , .x_axis           = month
  , .ggplot_group_var = year
  , .years_back       = 1
)
```

`ts_plt` *Time Series Plot*

Description

This is a warpper function to the `timetk::plot_time_series()` function with a limited functionality parameter set. To see the full reference please visit the `timetk` package site.

Usage

```
ts_plt(
  .data,
  .date_col,
  .value_col,
  .color_col = NULL,
  .facet_col = NULL,
  .facet_ncol = NULL,
  .interactive = FALSE
)
```

Arguments

`.data`	The data to pass to the function, must be a tibble/data.frame.
`.date_col`	The column holding the date.
`.value_col`	The column holding the value.
`.color_col`	The column holding the variable for color.
`.facet_col`	The column holding the variable for faceting.
`.facet_ncol`	How many columns do you want.
`.interactive`	Return a `plotly` plot if set to TRUE and a static `ggplot2` plot if set to FALSE. The default is FALSE.

Details

This function takes only a few of the arguments in the function and presets others while choosing the defaults on others. The smoother functionality is turned off.

Value

A `plotly` plot or a `ggplot2` static plot

Author(s)

Steven P. Sanderson II, MPH

See Also

https://business-science.github.io/timetk/reference/plot_time_series.html

Other Plotting Functions: diverging_bar_plt(), diverging_lollipop_plt(), gartner_magic_chart_plt(), los_ra_index_plt(), ts_alos_plt(), ts_median_excess_plt(), ts_readmit_rate_plt()

Examples

```
suppressPackageStartupMessages(library(dplyr))
library(timetk)
library(healthyR.data)

healthyR.data::healthyR_data %>%
  filter(ip_op_flag == "I") %>%
  select(visit_end_date_time, service_line) %>%
  filter_by_time(
    .date_var = visit_end_date_time
    , .start_date = "2020"
    ) %>%
  group_by(service_line) %>%
  summarize_by_time(
    .date_var = visit_end_date_time
    , .by = "month"
    , visits = n()
  ) %>%
 ungroup() %>%
 ts_plt(
   .date_col = visit_end_date_time
   , .value_col = visits
   , .color_col = service_line
 )
```

---

ts_readmit_rate_plt *Plot Readmit Rate*

Description

Plot Readmit Rate

Usage

```
ts_readmit_rate_plt(.data, .date_col, .value_col, .by_grouping, .interactive)
```

Arguments

.data	The data you need to pass.
.date_col	The date column.
.value_col	The value column.

.by_grouping	How you want the data summarized - "sec", "min", "hour", "day", "week", "month", "quarter" or "year".
.interactive	TRUE or FALSE. TRUE returns a plotly plot and FALSE returns a static ggplot2 plot.

Details

- Expects a tibble with a date time column and a value column
- Uses timetk for underlying sumarization and plot
- If .by_grouping is missing it will default to "day"

Value

A timetk time series plot that is interactive

Author(s)

Steven P. Sanderson II, MPH

See Also

Other Plotting Functions: diverging_bar_plt(), diverging_lollipop_plt(), gartner_magic_chart_plt(), los_ra_index_plt(), ts_alos_plt(), ts_median_excess_plt(), ts_plt()

Examples

```
set.seed(123)

suppressPackageStartupMessages(library(timetk))
suppressPackageStartupMessages(library(purrr))
suppressPackageStartupMessages(library(dplyr))

ts_tbl <- tk_make_timeseries(
  start = "2019-01-01"
  , by = "day"
  , length_out = "1 year 6 months"
)
values <- arima.sim(
  model = list(
    order = c(0, 1, 0))
    , n = 547
    , mean = 1
    , sd = 5
)

df_tbl <- tibble(
  x = ts_tbl
  , y = values
  ) %>%
  set_names("Date","Values")
```

```
ts_readmit_rate_plt(
  .data = df_tbl
  , .date_col = Date
  , .value_col = Values
  , .by = "month"
  , .interactive = FALSE
)
```

`ts_signature_tbl` *Make a Time Enhanced Tibble*

Description

Returns a tibble that adds the time series signature from the `timetk::tk_augment_timeseries_signature()` function. All added from a chosen date column defined by the `.date_col` parameter.

Usage

```
ts_signature_tbl(.data, .date_col, .pad_time = TRUE, ...)
```

Arguments

`.data`	The data that is being analyzed.
`.date_col`	The column that holds the date.
`.pad_time`	Boolean TRUE/FALSE. If TRUE then the `timetk::pad_by_time()` function is called and used on the data.frame before the modification. The default is TRUE.
`...`	Grouping variables to be used by `dplyr::group_by()` before using `timetk::pad_by_time()`

Details

- Supply data with a date column and this will add the year, month, week, week day and hour to the tibble. The original date column is kept.
- Returns a time-series signature tibble.
- You must know the data going into the function and if certain columns should be dropped or kept when using further functions

Value

A tibble

Author(s)

Steven P. Sanderson II, MPH

See Also

Other Data Table Functions: category_counts_tbl(), los_ra_index_summary_tbl(), named_item_list(), top_n_tbl(), ts_census_los_daily_tbl()

Examples

```
library(timetk)

ts_signature_tbl(
  .data       = m4_daily
  , .date_col = date
  , .pad_time = TRUE
  , id
)
```

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