Package ‘ggTimeSeries’
September 3, 2018

Type Package
Title Time Series Visualisations Using the Grammar of Graphics
Version 1.0.1
Date 2018-08-17
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Description Provides additional display mediums for time series visualisations, such as calendar heat map, steamgraph, marimekko, etc.

License MIT + file LICENSE
Encoding UTF-8
LazyData true
Depends R (>= 3.4.0), ggplot2
Imports data.table, stats, utils
RoxygenNote 6.1.0
Suggests knitr, markdown, gghthemes, prettydoc
VignetteBuilder knitr, rmarkdown
NeedsCompilation no
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Repository CRAN
Date/Publication 2018-09-03 11:30:10 UTC

R topics documented:

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**dtClimate**

The climate data used in the blogpost.

**Usage**

```r
data(dtClimate)
```

**Format**

An object of class *data.table* (inherits from *data.frame*) with 23628 rows and 5 columns.

**Source**

http://doi.org/10.7289/V5D21VHZ Downloaded from ftp://ftp.ncdc.noaa.gov/pub/data/ghcn/daily/by_year/

**Description**

A calendar heatmap provides context for weeks, and day of week which makes it a better way to visualise daily data than line charts. Largely uses Codoremifa’s code from stackoverflow.com/questions/22815688/calendar-time-series-with-r.

**Usage**

```r
ggplot_calendar_heatmap(dtDateValue, cDateColumnName = "", cValueColumnName = "", vcGroupingColumnNames = "Year", dayBorderSize = 0.25, dayBorderColour = "black", monthBorderSize = 2, monthBorderColour = "black", monthBorderLineEnd = "round")
```

**Arguments**

- `dtDateValue`: Data set which may include other columns apart from date and values.
- `cDateColumnName`: Column name of the dates.
- `cValueColumnName`: Column name of the data.
- `vcGroupingColumnNames`: The set of columns which together define the group for the chart to operate within. If you plan to facet your plot, you should specify the same column names to this argument. The function will automatically add the variable for the year to the facet.
- `dayBorderSize`: Size of the border around each day.
- `dayBorderColour`: Colour of the border around each day.
- `monthBorderSize`: Size of the border around each month.
- `monthBorderColour`: Colour of the border around each month.
- `monthBorderLineEnd`: Line end for the border around each month.

**Value**

Returns a ggplot friendly object which means the user can use ggplot scales to modify the look, add more geoms, etc.
Cosmetic Tips

The minimalist look can be achieved by appending the following chunk of code to the output object:
```r
+ xlab(NULL) + ylab(NULL) + scale_fill_continuous(low = 'green', high = 'red') + theme(  axis.text = element_blank(),  axis.ticks = element_blank(),  legend.position = 'none',  strip.plot.background = element_blank(),  panel.border = element_blank(),  panel.background = element_blank() )
```

Also See

`stat_calendar_heatmap`, a flexible but less polished alternative.

Examples

```r
{
  library(data.table)
  library(ggplot2)
  set.seed(1)
  dtData = data.table(    DateCol = seq(      as.Date("1/01/2014", "%d/%m/%Y"),      as.Date("31/12/2015", "%d/%m/%Y"),      "days"    ),    ValueCol = runif(730)
  )
  # you could also try categorical data with
  # ValueCol = sample(c('a','b','c'), 730, replace = T)
  p1 = ggplot_calendar_heatmap(    dtData,    'DateCol',    'ValueCol'
  )
  p1
  # add new geoms
  p1 +
  geom_text(label = '!!!') +
  scale_colour_continuous(low = 'red', high = 'green')
}
```

---

**ggplot_horizon**  
*Plot a time series as a horizon plot*

**Description**

A horizon plot breaks the Y dimension down using colours. This is useful when visualising y values spanning a vast range and / or trying to highlight outliers without losing context of the rest of the data. Horizon plots are best viewed in an aspect ratio of very low vertical length.
Usage

```r
ggplot_horizon(dtData, cXColumnNAme, cYColumnNAme, bandwidth = NULL,
               vcGroupingColumnNames = NULL)
```

Arguments

- `dtData`: Data set which may include other columns apart from date and values.
- `cXColumnNAme`: Column name of dates.
- `cYColumnNAme`: Column name of values.
- `bandwidth`: the width of one band of Y values. easier to differentiate between the bands.
- `vcGroupingColumnNames`: The set of columns which together define the group for the chart to operate within. If you plan to facet your plot, you should specify the same column names to this argument.

Value

Returns a ggplot friendly object which means the user can use ggplot scales, etc. to modify the look.

Cosmetic Tips

The minimalist look can be achieved by appending the following chunk of code to the example output object:

```r
+ xlab(NULL) + ylab(NULL) + scale_fill_continuous(low = 'green', high = 'red') + theme( axis.text = element_blank(), axis.ticks = element_blank(), legend.position = 'none', plot.background = element_blank(), panel.border = element_blank(), panel.background = element_blank() ) + coord_fixed( 0.5 * diff(range(dtData$x)) / diff(range(dtData$y)))
```

Also See

`stat_horizon`, a less polished but more flexible alternative.

Examples

```r
{
  library(ggplot2)
  set.seed(1)
  dfData = data.frame(x = 1:1000, y = cumsum(rnorm(1000)))
p1 = ggplot_horizon(dfData, 'x', 'y')
p1
  # add new geoms or colours
p1 + geom_text(label = '!!!') +
scale_colour_continuous(low = 'red', high = 'green')
}
```
ggplot_waterfall  

Plots a waterfall plot

Description

A waterfall plot highlights the change in the time series rather than the value of the time series itself.

Usage

```r
ggplot_waterfall(dtData, cXColumnName, cYColumnName, nArrowSize = 0.25,
vcGroupingColumnNames = NULL)
```

Arguments

- `dtData` Data set which may include other columns apart from the columns mapped to x and y.
- `cXColumnName` Column name of the x mapping.
- `cYColumnName` Column name of the y mapping.
- `nArrowSize` the size of the arrow head on the plot in cm
- `vcGroupingColumnNames` The set of columns which together define the group for the chart to operate between. If you plan to facet your plot, you should specify the same column names to this argument.

Value

Returns a ggplot friendly object which means the user can use ggplot scales to modify the look, add more geoms, etc.

Cosmetic Tips

The minimalist look can be achieved by appending the following chunk of code to the output object:

```r
+ xlab(NULL) + ylab(NULL) + scale_fill_continuous(low = 'green', high = 'red') +
theme( axis.text = element_blank(), axis.ticks = element_blank(), legend.position = 'none', strip.background = element_blank(), panel.background = element_blank(), panel.border = element_blank())
```

Also See

`stat_waterfall`, a flexible but less polished alternative.
Examples

```r
{ library(ggplot2) set.seed(1) dfData = data.frame(x = 1:100, y = cumsum(rnorm(100)))
  ggplot_waterfall(    dtData = dfData, 'x', 'y')
}
```

Description

Marimekko

Usage

`Marimekko(data, xbucket = "xbucket", ybucket = "ybucket", weight = NULL)`

Arguments

- `data` : dataframe
- `xbucket` : x value
- `ybucket` : y value
- `weight` : weight value

Value

df

StatCalendarMonthBreaks

`Transforms data for the month breaks of the calendar heatmap`

Description

Transforms data for the month breaks of the calendar heatmap

Usage

`StatCalendarMonthBreaks`
### StatHorizon

An object of class `StatCalendarMonthBreaks` (inherits from `Stat, ggproto, gg`) of length 3.

**Description**

Transforms data for a horizon plot

**Usage**

StatHorizon

### StatMarimekko

An object of class `StatMarimekko` (inherits from `Stat, ggproto, gg`) of length 4.

**Description**

Transforms data for the tiles of the heatmap

**Usage**

StatMarimekko

### StatOccurrence

An object of class `StatOccurrence` (inherits from `Stat, ggproto, gg`) of length 3.

**Description**

Transforms data for an occurrence plot

**Usage**

StatOccurrence
StatSteamgraph

Transforms data for a steam graph

Description
Transforms data for a steam graph

Usage
StatSteamgraph

Format
An object of class StatSteamgraph (inherits from Stat.ggproto, gg) of length 4.

StatWaterfall
Transforms data for a horizon plot

Description
Transforms data for a horizon plot

Usage
StatWaterfall

Format
An object of class StatWaterfall (inherits from Stat.ggproto, gg) of length 3.

stat_calendar_heatmap
Plots a calendar heatmap

Description
A calendar heatmap provides context for weeks, and day of week and is a better way to visualise daily data than line charts.

Usage
stat_calendar_heatmap(mapping = NULL, data = NULL, show.legend = NA, inherit.aes = TRUE, na.rm = T, bandwidth = NULL, ...)
Arguments

- `mapping`
- `data`
- `show.legend`
- `inherit.aes`
- `na.rm`
- `bandwidth`
- ... (more functions)

Aesthetics

- `date`, `fill`

Data Tips

`strftime` can help extract the value of the year, week of year, and day of week from the date column. You might need to extract the year to facet multiple years as demonstrated in the example. This stat uses the following transformation to obtain the x and y coordinate to be used in the heatmap:

```r
data$x = 1 + as.integer(strftime(data$date, "%W"))
data$y = as.integer(strftime(data$date, "%w"))
data$y[data$y == 0L] = 7
data$y = 8 - data$y
```

Cosmetic Tips

The minimalist look can be achieved by appending the following chunk of code to the output object:

```r
+ xlab(NULL) + ylab(NULL) + scale_fill_continuous(low = 'green', high = 'red') +
theme( axis.text = element_blank(), axis.ticks = element_blank(), legend.position = 'none', ...
```

Also See

`ggplot_calendar_heatmap`, a polished but less flexible alternative.

Examples

```r
library(ggplot2)
DailyData = data.frame(
  DateCol = seq(
    as.Date("1/01/2014", "%d/%m/%Y"),
    as.Date("31/12/2015", "%d/%m/%Y"),
    "days"
  ),
  ValueCol = runif(730)
)
DailyData$Year = strftime(DailyData$DateCol, "%Y")
ggplot(
  DailyData,
  aes(
```
**Description**

Plot a time series as a horizon plot

**Usage**

```r
stat_horizon(mapping = NULL, data = NULL, show.legend = NA,
  inherit.aes = TRUE, na.rm = T, bandwidth = NULL, ...)
```

**Arguments**

- `mapping`  
- `data`  
- `show.legend`  
- `inherit.aes`  
- `na.rm`  
- `bandwidth`  
- `...`  

Other functions

A horizon plot breaks the Y dimension down using colours. This is useful when visualising y values spanning a vast range and / or trying to highlight outliers without losing context of the rest of the data. Horizon plots are best viewed in an aspect ratio of very low vertical length.

**Aesthetics**

- `x`, `y`, `fill`. Fill argument is overridden internally but is required for ggplot to assign a colour / fill scale.

**Other parameters**

- `bandwidth`, to dictate the span of a band.
Cosmetic Tips

The minimalist look can be achieved by appending the following chunk of code to the output object:
+ xlab(NULL) + ylab(NULL) + scale_fill_continuous(low = 'green', high = 'red') +
theme(  axis.text = element_blank(),  axis.ticks = element_blank(),  legend.position = 'none',  plot.background = element_blank(),  panel.border = element_blank(),  panel.background = element_blank())

Also See

ggplot_horizon, a more polished but less flexible alternative.

Examples

```{r}
library(ggplot2)
ggplot(data.frame(x = 1:89, y = as.numeric(unlist(austres))), aes(x = x, y = y, fill = y)) +
  stat_horizon() +
  scale_fill_continuous(low = 'white', high = 'red')
set.seed(10)
ggplot(data.frame(x = 1:1000, y = cumsum(rnorm(1000))), aes(x = x, y = y, fill = y)) +
  stat_horizon() +
  scale_fill_continuous(low = 'white', high = 'red')
```
A marimekko plot, or a mosaic plot, visualises the co-occurrence of two categorical / ordinal variables. In a time series, it could be used to visualise the transitions from one state to another by considering each state to be a category and plotting current category vs. next category.

**Aesthetics**

xbucket, ybucket, fill. Fill argument needs to be assigned to ybucket., or some other column which is a one to one mapping of ybucket.

**Cosmetic Tips**

The minimalist look can be achieved by appending the following chunk of code to the output object:

```r
+ xlab(NULL) + ylab(NULL) + scale_fill_continuous(low = 'green', high = 'red') + theme(  axis.text = element_blank(), axis.ticks = element_blank(), legend.position = 'none', stratplot.background = element_blank(), panel.border = element_blank(), panel.background = element_blank() )
```

**Examples**

```r
{
  library(ggplot2)
  ggplot(
    data.frame(
      x1 = round(3 * runif(10000), 0),
      y1 = pmax(pmin(round(3 * rnorm(10000), 0), 3), -3),
      weight = 1:10000
    )
  ) +
  stat_marimekko(
    aes(
      xbucket = x1,
      ybucket = y1,
      fill = factor(y1),
      weight = weight
    ),
    xlabyposition = 1.1,
    color = 'black'
  )
}
```
Usage

```
stat_occurrence(mapping = NULL, data = NULL, show.legend = NA,
    inherit.aes = TRUE, na.rm = T, bandwidth = NULL, ...)
```

Arguments

- `mapping` (mapping)
- `data` (df)
- `show.legend` (logical)
- `inherit.aes` (logical)
- `na.rm` (logical)
- `bandwidth` (bandwidth)
- ... (more functions)

For rare events, it's convenient to have the count of events encoded in the chart itself. A bar chart requires the user to perceive the y axis which this does not.

Aesthetics

- `x`, `y`

Cosmetic Tips

The minimalist look can be achieved by appending the following chunk of code to the output object:

```
+ xlab(NULL) + ylab(NULL) + scale_fill_continuous(low = 'green', high = 'red') +
  theme(
    axis.text.y = element_blank(),
    axis.ticks.y = element_blank(),
    legend.position = ) +
  coord_fixed(ylim = c(0,1 + max(dfData$y)))
```

`coord_fixed` can provide a balance to the aspect ratio of the chart.

Examples

```
{
  library(data.table)
  library(ggplot2)
  set.seed(1)
  dfData = data.table(x = 1:100, y = floor(4 * abs(rnorm(100, 0, 0.4))))
  ggplot(dfData, aes(x = x, y = y))+
    stat_occurrence()+
    coord_fixed()
}
Description

Plot multiple time series as a steamgraph

Usage

stat_steamgraph(mapping = NULL, data = NULL, show.legend = NA,
               inherit.aes = TRUE, na.rm = T, ...)

Arguments

mapping
  mapping
data
  data
show.legend
  logical
inherit.aes
  logical
na.rm
  logical
...  other functions

Plots geom_ribbon for each time series and stacks them one on top of the other.
It’s a more aesthetically appealing version of a stacked area chart. The groups
with the most variance are placed on the outside, and the groups with the least
variance are placed on the inside.

Aesthetics

geom_steamgraph needs x, y, group, fill.

Cosmetic Tips

The minimalist look can be achieved by appending the following chunk of code to the example out-
put object: + xlab(NULL) + ylab(NULL) + theme(... axis.text = element_blank(), axis.ticks = element_blank(),
plot.background = element_blank(), panel.background = element_blank(), panel.border = element_blank(),
) + coord_fixed(0.2 * diff(range(df$Time)) / diff(range(df$Signal)))

Examples

{
library(ggplot2)
set.seed(10)
df = data.frame(
  Time=1:1000,
  Signal=abs(c(cumsum(rnorm(1000, 0, 3)),
     cumsum(rnorm(1000, 0, 4)), cumsum(rnorm(1000, 0, 1)),
     cumsum(rnorm(1000, 0, 2))))),
  Variable = c(rep('a', 1000), rep('b', 1000), rep('c',


stat_waterfall

A waterfall plot highlights the change in the time series rather than the value of the time series itself.

Aesthetics

stat_waterfall needs x, y

Cosmetic Tips

The minimalist look can be achieved by appending the following chunk of code to the output object:

```r
+ xlab(NULL) + ylab(NULL) + theme(
  axis.text = element_blank(),
  axis.ticks = element_blank(),
  ...)
```

Also See

`ggplot_waterfall`, a flexible but less polished alternative.
Examples

{library(ggplot2)
 set.seed(1)
 dfData = data.frame(x = 1:20, y = cumsum(rnorm(20)))
ggplot(dfData, aes(x = x, y = y)) +
  stat_waterfall()}

stat_waterfall
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