

Package ‘loon.ggplot’

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Type Package

Title Making 'ggplot2' Plots Interactive with 'loon' and Vice Versa

Version 1.2.1

Description It provides a bridge between the 'loon' and 'ggplot2' packages. Data analysts who value the grammar pipeline provided by 'ggplot2' can turn these static plots into interactive 'loon' plots. Conversely, data analysts who explore data interactively with 'loon' can turn any 'loon' plot into a 'ggplot2' plot structure. The function 'loon.ggplot()' is applied to one plot structure will return the other.

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BugReports <https://github.com/great-northern-diver/loon.ggplot/issues>

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active	<i>Modify the active component</i>
--------	------------------------------------

Description

Set active or activeGeomLayers

Usage

```
active(active = NULL, activeGeomLayers = NULL)
```

Arguments

active	a logical determining whether points appear or not (default is TRUE for all points). If a logical vector is given of length equal to the number of points, then it identifies which points appear (TRUE) and which do not (FALSE).
--------	--

`activeGeomLayers`

determine which geom layer is interactive. Only `geom_point()` and `geom_histogram()` can be set as active geom layer(s) so far. (Notice, more than one `geom_point()` layers can be set as active layers, but only one `geom_histogram()` can be set as an active geom layer)

Value

a ggproto object

See Also

[linking](#), [selection](#), [zoom](#), [hover](#), [interactivity](#)

Examples

```
if(interactive()) {
  # set active layer
  l_ggplot(mtcars, aes(mpg, wt, shape = factor(cyl))) +
    geom_point(colour = "black", size = 4.5) +
    geom_point(colour = "pink", size = 4) +
    geom_point(aes(shape = factor(cyl))) +
    # only show manual transmission cars
    # in the second interactive layer
    active(active = mtcars$am == 1,
           activeGeomLayers = 2)

  # Then, click the `reactivate` button on loon inspector
  # to display all interactive points
}
```

`Cartesianxy2Polarxy` *Transform the x, y positions from a Cartesian coordinate to a polar coordinate*

Description

Used in the 'loonLayer' construction to access the x, y positions embedded in the polar coordinate system.

Usage

```
Cartesianxy2Polarxy(layerGeom, coordinates, data, ggplotPanelParams, ...)
```

Arguments

layerGeom	A ggplot layer object
coordinates	A ggplot object coordinate system
data	the data used for the transformation
ggplotPanelParams	some non-data panel parameters, i.e. the range of theta, the range of radius, theta major, theta minor, etc. It is obtained from the <code>ggplot_build(p)\$layout\$panel_params</code> where "p" is a ggplot object
...	for further use

Examples

```
p <- ggplot(mtcars, aes(wt, mpg)) +
  geom_point() +
  coord_polar()

layerGeom <- p$layers[[1L]]$geom
coordinates <- p$coordinates
build <- ggplot_build(p)
data <- build$data[[1L]]
ggplotPanelParams <- build$layout$panel_params[[1L]]

polarXY <- Cartesianxy2Polarxy(layerGeom, coordinates, data, ggplotPanelParams)
plot(polarXY$x, polarXY$y)
```

get_activeGeomLayers *active geom layers*

Description

'get_activeGeomLayers' will return the geom layer index which can be active

Usage

```
get_activeGeomLayers(ggObj)
```

Arguments

ggObj	a ggplot object
-------	-----------------

Details

'ggplot2loon' has an argument called 'activeGeomLayers'. It is a vector to determine which geom layers can be active. The default setting is 'integer(0)', however, 'ggplot2loon' will automatically search the first 'geom_histogram' or 'geom_point' layer to make it active. 'get_activeGeomLayers' is more like a guidance and give us a hint which one can be set as active.

Value

a numerical vector of indices (which layer can be interactive)

See Also

[ggplot2loon](#)

Examples

```
df <- data.frame(x = 1:3, y = 1:3, colour = c(1,3,5))
xgrid <- with(df, seq(min(x), max(x), length = 50))
interp <- data.frame(
  x = xgrid,
  y = approx(df$x, df$y, xout = xgrid)$y,
  colour = approx(df$x, df$colour, xout = xgrid)$y
)
p1 <- ggplot(data = df, aes(x, y, colour = colour)) +
  geom_line(interp, mapping = aes(x, y, colour = colour), size = 2) +
  geom_point(size = 5)
agl <- get_activeGeomLayers(p1)
ggplot2loon(p1, activeGeomLayers = agl)

p2 <- ggplot(economics) +
  geom_rect(
    aes(xmin = start, xmax = end, fill = party),
    ymin = -Inf, ymax = Inf, alpha = 0.2,
    data = presidential
  ) +
  geom_text(
    aes(x = start, y = 2500, label = name), data = presidential,
    size = 3, vjust = 0, hjust = 0, nudge_x = 50
  ) +
  geom_line(aes(date, unemploy)) +
  scale_fill_manual(values = c("blue", "red"))
# none can be interactive
agl <- get_activeGeomLayers(p2)
#transparency is not allowed in tcltk
ggplot2loon(p2, ggGuides = TRUE, activeGeomLayers = agl)
```

get_scaledData

scale data

Description

It is mainly used in serial axes

Usage

```

get_scaledData(
  data,
  sequence = NULL,
  scaling = c("variable", "data", "observation", "none"),
  displayOrder = NULL,
  keep = FALSE,
  as.data.frame = FALSE
)

```

Arguments

<code>data</code>	A data frame
<code>sequence</code>	vector with variable names that defines the axes sequence. If NULL, it will be set as the column names automatically.
<code>scaling</code>	one of 'variable', 'data', 'observation' or 'none' to specify how the data is scaled.
<code>displayOrder</code>	the order of the display
<code>keep</code>	If TRUE, return the variables not shown in sequence as well; else only return the variables defined in sequence.
<code>as.data.frame</code>	Return a matrix or a data.frame

ggplot2loon

ggplot *to* loon

Description

Create an interactive 'loon' widget from a ggplot object

Usage

```

ggplot2loon(
  ggObj,
  ...,
  activeGeomLayers = integer(0),
  layerId = NULL,
  scaleToFun = NULL,
  ggGuides = FALSE,
  parent = NULL,
  pack = TRUE,
  exteriorLabelProportion = 1/5,
  canvasHeight = 700,
  canvasWidth = 850,
  tkLabels = NULL
)

```

Arguments

<code>ggObj</code>	a ggplot or ggmatrix object
<code>...</code>	named arguments to modify loon plot states
<code>activeGeomLayers</code>	to determine which geom layer is active. Only <code>geom_point()</code> and <code>geom_histogram()</code> can be set as active geom layer(s) so far. (Notice, more than one <code>geom_point()</code> layers can be set as active layers, but only one <code>geom_histogram()</code> can be set as an active geom layer)
<code>layerId</code>	numerical; which layer to scale to
<code>scaleToFun</code>	scale to function. See zoom .
<code>ggGuides</code>	logical (default FALSE) to determine whether to draw a ggplot background or not.
<code>parent</code>	parent widget path (Tk toplevel)
<code>pack</code>	logical (default TRUE) to pack widgets. If FALSE, widgets will be produced but won't be packed and so will not appear in the display.
<code>exteriorLabelProportion</code>	space assigned to the vertical height/horizontal width of each exterior label expressed as a proportion of a single plot's height/width. Default is 0.2. This is translated to a row/column span = $1 / \text{exteriorLabelProportion}$ for the plot size in <code>tkgrid()</code> .
<code>canvasHeight</code>	the height of canvas
<code>canvasWidth</code>	the width of canvas
<code>tkLabels</code>	Deprecated: logical (or NULL) to indicate whether the plot(s) are to be wrapped by exterior labels (title, subtitle, xlabel or ylabel) using <code>tk.grid()</code>

Value

a loon single or compound widget

Examples

```
if(interactive()) {
  p <- ggplot(mtcars, aes(wt, mpg)) + geom_point()
  g <- ggplot2loon(p)

  p <- ggplot(mtcars) + geom_point(aes(x = wt, y = mpg,
    colour = factor(gear))) + facet_wrap(~am)
  g1 <- ggplot2loon(p)
}

df <- data.frame(
  x = rnorm(120, c(0, 2, 4)),
  y = rnorm(120, c(1, 2, 1)),
  z = letters[1:3]
```

```

)
df2 <- dplyr::select(df, -z)
scatterplots <- ggplot(df, aes(x, y)) +
  geom_point(data = df2, colour = "grey70") +
  geom_point(aes(colour = z)) +
  facet_wrap(~z)

# We can select the first geom_point layer to be
# the active layer as in
suppressWarnings(
  lp_scatterplots_active1 <- ggplot2loon(scatterplots,
    activeGeomLayers = 1,
    linkingGroup = "test")
)
# Here the grey points are linked (not the coloured ones)

# We can select the second geom_point layer to be
# the active layer as in
lp_scatterplots_active2 <- ggplot2loon(scatterplots, activeGeomLayers = 2)
# Here the colour points are linked

# We can also select the both geom_point layers to be
# the active layer as in
suppressWarnings(
  lp_scatterplots_active12 <- ggplot2loon(scatterplots, activeGeomLayers = c(1,2))
)
# Here the colour points and grey points are both linked

##### ggmatrix to loon #####
pm <- GGally::ggpairs(iris, column = 1:4, ggplot2::aes(colour=Species))
lg <- ggplot2loon(pm)

```

gg_pipe

Pipe ggplot object

Description

Pack a ggplot object forward to ggplot2loon expressions via a pipe-operator "%>%".

Usage

```
gg_pipe(data, ggObj)
```

Arguments

data	a data frame to use for ggplot
ggObj	a ggplot object to be passed though

Details

When "+" and "%>%" both appear in pipe operations, "%>%" takes the priority of "+", e.g:
`mtcars %>% ggplot(aes(mpg, wt, colour = cyl)) + geom_point() %>% ggplot2looon()`,
 error would occur. The reason is
`geom_point() %>% ggplot2looon()`
 would run before
`ggplot(aes(mpg, wt, colour = cyl)) + geom_point()`.

Hence, we need a function `gg_pipe()` to pack the ggplot object and force operations happen in order.

Value

a ggplot evaluate object

Examples

```
if(require(magrittr) && interactive()) {
## Not run:
# Error
g <- mtcars %>%
  ggplot(aes(mpg, wt, colour = cyl)) +
  geom_point() %>%
  ggplot2looon()

## End(Not run)
g <- mtcars %>%
  gg_pipe(
    ggplot(aes(mpg, wt, colour = cyl)) + geom_point()
  ) %>%
  ggplot2looon()
}
```

`g_getLocations`

get locations for ggmatrix

Description

For the target compound loon plot, determines location in ggmatrix

Usage

```
g_getLocations(target)

## Default S3 method:
g_getLocations(target)

## S3 method for class 'l_pairs'
g_getLocations(target)
```

Arguments

target the (compound) loon plot whose locations are needed to lay out.

Value

a list of an appropriate subset of the named location arguments 'c("ncol", "nrow", "layout_matrix", "heights", "widths)". `layout_matrix` is an `nrow` by `ncol` matrix whose entries identify the location of each plot in `g_getPlots()` by their index.

See Also

[l_getLocations](#), [g_getPlots](#)

`g_getPlots`

get ggplots

Description

For the target compound loon plot, determines all the `ggplots` based on the compound loon plot.

Usage

```
g_getPlots(target, asAes = TRUE, selectedOnTop = TRUE)
```

```
## Default S3 method:
```

```
g_getPlots(target, asAes = TRUE, selectedOnTop = TRUE)
```

```
## S3 method for class 'l_pairs'
```

```
g_getPlots(target, asAes = TRUE, selectedOnTop = TRUE)
```

Arguments

target the (compound) loon plot

asAes logical; set aesthetics attributes, i.e. 'color', 'fill' as variables (default TRUE) or general visual properties (FALSE). See details

selectedOnTop logical and default is TRUE; whether to display the selected points on top. See details.

Value

a list of `ggplots`.

See Also

[l_getPlots](#), [g_getLocations](#)

hover	<i>Modify the hover component</i>
-------	-----------------------------------

Description

Query in interactive graphics

Usage

```
hover(itemLabel = NULL, showItemLabels = NULL)
```

Arguments

`itemLabel` The customized querying information.
`showItemLabels` A logical value. Show item labels or not. Default is FALSE

Value

a ggproto object

See Also

[active](#), [linking](#), [zoom](#), [selection](#), [interactivity](#)

Examples

```
if(interactive()) {  
  l_ggplot(mpg, mapping = aes(x = displ, y = cty)) +  
    geom_point(size = 4) +  
    # push the states of scatter plot to the histogram  
    hover(itemLabel =  
      with(mpg,  
        paste0("model: ", manufacturer, " ", model, "\n",  
              "year: ", year, "\n",  
              "drive way: ", drv, "\n",  
              "fuel type: ", fl)  
      ),  
      showItemLabels = TRUE  
    )  
    # hover the mouse on top of any point to query  
}
```

interactivity

Modify the interactivity component

Description

Set interactive components (e.g. linking, selection, etc)

Usage

```
interactivity(
  linkingGroup = NULL,
  linkingKey = NULL,
  linkedStates = NULL,
  sync = NULL,
  active = NULL,
  activeGeomLayers = NULL,
  selected = NULL,
  selectBy = NULL,
  selectionLogic = NULL,
  layerId = NULL,
  scaleToFun = NULL,
  itemLabel = NULL,
  showItemLabels = NULL,
  ...
)
```

Arguments

linkingGroup	A character. Plots only in the same linkingGroup can be linked
linkingKey	LinkingKey is the key of linking. Each object in one plot has a unique linking key. Elements in different plots are linked if they share the same linking keys.
linkedStates	The states to be linked. It can be "color", "selected", "active", "size" and "glyph" for a 'l_plot' object and "color", "selected", "active" for a 'l_hist' object.
sync	The way to synchronize several linked plots. It can be either "pull" (default) or "push". If the sync is "pull", the linked states (aesthetics attributes, e.g. "color", "selected", ...) of the new plot will be pulled from the linked plots; if the sync is "push", the linked states of the new plot will be pushed to the linked plots.
active	a logical determining whether points appear or not (default is TRUE for all points). If a logical vector is given of length equal to the number of points, then it identifies which points appear (TRUE) and which do not (FALSE).
activeGeomLayers	determine which geom layer is interactive. Only geom_point() and geom_histogram() can be set as active geom layer(s) so far. (Notice, more than one geom_point() layers can be set as active layers, but only one geom_histogram() can be set as an active geom layer)

selected	A logical vector. If it is set as TRUE, the elements are highlighted as the graphics are constructed. Default is FALSE
selectBy	Select by "sweeping" (default) or "brushing".
selectionLogic	Selection logic. One of "select" (default), "deselect" and "invert". See details.
layerId	numerical; which layer to scale to
scaleToFun	scale to function. See zoom .
itemLabel	The customized querying information.
showItemLabels	A logical value. Show item labels or not. Default is FALSE
...	named arguments to modify loon plot states. See l_info_states

Details

In interactive graphics, there are several fundamental infrastructures, such as querying, linking and selection. Component `interactivity` is used to set these features.

Interactivity	Description	Subfunction
Linking	Linking several plots to discover the pattern of interest	linking
Selection	Highlight the subset of interest	selection
Active	Determine which points appear	active
Hover	Query in interactive graphics	hover
Zoom	Region Modification	zoom

Value

a ggproto object

Examples

```
if(interactive()) {
  # Modify the 'linkingGroup' and 'origin' of a hist object
  l_ggplot(mtcars, mapping = aes(x = wt)) +
    geom_histogram() +
    interactivity(linkingGroup = "mt", origin = 2)

  # linking with the histogram
  l_ggplot(mtcars, mapping = aes(x = wt, y = hp)) +
    geom_point(size = 4) +
    interactivity(linkingGroup = "mt") +
    facet_wrap(~cyl)

  p <- ggplot(economics_long, aes(value)) +
    facet_wrap(~variable, scales = 'free_x') +
    geom_histogram()
  # `p` is a ggplot object
  p
  # turn static `ggplot` to interactive `loon`
  p + interactivity()
}
```

<code>is.CoordPolar</code>	<i>Is polar coordinate system?</i>
----------------------------	------------------------------------

Description

Determine whether the ggplot object has polar coordinate system

Usage

```
is.CoordPolar(coord)
```

Arguments

<code>coord</code>	A ggplot object coordinate system
--------------------	-----------------------------------

<code>is.l_ggplot</code>	<i>Reports whether x is a l_ggplot object</i>
--------------------------	---

Description

Reports whether x is a l_ggplot object

Usage

```
is.l_ggplot(x)
```

Arguments

<code>x</code>	An object to test
----------------	-------------------

<code>layout_coords</code>	<i>layout matrix</i>
----------------------------	----------------------

Description

return the layout matrix of a list of loon plots

Usage

```
layout_coords(target)
```

Arguments

<code>target</code>	an object ggplot2loon() returns
---------------------	---------------------------------

Value

a layout coordinate matrix

linking	<i>Modify the linking component</i>
---------	-------------------------------------

Description

In interactive graphics, linking is often used to discover the patterns of interest in several plots.

Usage

```
linking(
  linkingGroup = NULL,
  linkingKey = NULL,
  linkedStates = NULL,
  sync = NULL
)
```

Arguments

linkingGroup	A character. Plots only in the same linkingGroup can be linked
linkingKey	LinkingKey is the key of linking. Each object in one plot has a unique linking key. Elements in different plots are linked if they share the same linking keys.
linkedStates	The states to be linked. It can be "color", "selected", "active", "size" and "glyph" for a 'l_plot' object and "color", "selected", "active" for a 'l_hist' object.
sync	The way to synchronize several linked plots. It can be either "pull" (default) or "push". If the sync is "pull", the linked states (aesthetics attributes, e.g. "color", "selected", ...) of the new plot will be pulled from the linked plots; if the sync is "push", the linked states of the new plot will be pushed to the linked plots.

Value

a ggproto object

See Also

[active](#), [selection](#), [zoom](#), [hover](#), [interactivity](#)

Examples

```
if(interactive() && requireNamespace("dplyr")) {
  h <- l_hist(mtcars$hp,
             linkingKey = rownames(mtcars),
             linkingGroup = "mtcars")

  mtcars %>%
```

```

mutate(carName = rownames(mtcars)) %>%
l_ggplot(mapping = aes(x = wt, y = hp, color = factor(cyl))) +
  geom_point(size = 4) +
  # push the states of scatter plot to the histogram
  linking(linkingGroup = "mtcars",
          linkingKey = ~carName,
          sync = "push")
}

```

loon.ggplot

loon.ggplot

Description

A bridge between loon widgets and gg objects. It can take either a loon widget, a gg object (ggplot, GGally::ggmatrix) or a l_ggplot object, then create a corresponding gg (or loon) graphics.

Usage

```

loon.ggplot(x, ...)

## S3 method for class 'gg'
loon.ggplot(x, ...)

## S3 method for class 'loon'
loon.ggplot(x, ...)

## S3 method for class 'l_ggplot'
loon.ggplot(x, ...)

```

Arguments

x A loon widget, a ggplot object or a l_ggplot object.
... arguments used in either loon2ggplot() or ggplot2loon()

Value

If the input is a ggplot object, the output would be a loon widget; conversely, if the input is a loon widget, then it returns a ggplot object. If it is a l_ggplot object, loon.ggplot helps to return a loon widget.

See Also

Richer examples are in [loon2ggplot](#), [ggplot2loon](#), [l_ggplot](#)

Examples

```

if(interactive()) {
##### loon --> gg #####
# loon 3D plot
l <- with(quakes,
  l_plot3D(long, lat, depth, linkingGroup = "quakes")
)
# equivalent to `loon2ggplot(l)`
g <- loon.ggplot(l)
g # a ggplot object

##### gg --> loon #####

# ggplot histogram
g <- ggplot(iris, mapping = aes(Sepal.Length, fill = Species)) +
  geom_histogram()
# equivalent to `ggplot2loon(g)`
l <- loon.ggplot(g)
l # a loon widget

##### l_ggplot #####
p <- l_ggplot(mpg, aes(displ, fill = factor(cyl))) +
  geom_histogram()
class(p)
# Function `print.l_ggplot` is called automatically
p
# Function `loon.ggplot` helps to return a loon widget
q <- loon.ggplot(p)
q
}

```

loon2ggplot

Turn a loon widget to a ggplot object

Description

Create a ggplot object from a loon widget

Usage

```
loon2ggplot(target, asAes = TRUE, selectedOnTop = TRUE, ...)
```

```
## Default S3 method:
```

```
loon2ggplot(target, asAes = TRUE, selectedOnTop = TRUE, ...)
```

```
## S3 method for class 'l_plot'
```

```
loon2ggplot(target, asAes = TRUE, selectedOnTop = TRUE, ...)
```

```

## S3 method for class 'l_hist'
loon2ggplot(target, asAes = TRUE, selectedOnTop = TRUE, ...)

## S3 method for class 'l_plot3D'
loon2ggplot(target, asAes = TRUE, selectedOnTop = TRUE, ...)

## S3 method for class 'l_compound'
loon2ggplot(target, asAes = TRUE, selectedOnTop = TRUE, ...)

## S3 method for class 'l_layer_graph'
loon2ggplot(target, asAes = TRUE, selectedOnTop = TRUE, ...)

## S3 method for class 'l_layer_histogram'
loon2ggplot(target, asAes = TRUE, selectedOnTop = TRUE, ...)

## S3 method for class 'l_layer_scatterplot'
loon2ggplot(target, asAes = TRUE, selectedOnTop = TRUE, ...)

## S3 method for class 'l_pairs'
loon2ggplot(target, asAes = TRUE, selectedOnTop = TRUE, ...)

## S3 method for class 'l_serialaxes'
loon2ggplot(target, asAes = TRUE, selectedOnTop = TRUE, ...)

## S3 method for class 'l_ts'
loon2ggplot(target, asAes = TRUE, selectedOnTop = TRUE, ...)

```

Arguments

target	a loon or a vector that specifies the widget, layer, glyph, navigator or context completely. The widget is specified by the widget path name (e.g. '.l0.plot'), the remaining objects by their ids.
asAes	logical; set aesthetics attributes, i.e. 'color', 'fill' as variables (default TRUE) or general visual properties (FALSE). See details
selectedOnTop	logical and default is TRUE; whether to display the selected points on top. See details.
...	arguments used inside loon2ggplot(), not used by this method

Details

in ggplot, generally speaking, there are two ways to set the aesthetics attributes, either take it as variables `asAes = TRUE` (set in function `aes()`) or visual properties `asAes = FALSE`. The main benefits to consider it as variables are that 1. legend could be shown; 2. convenient for further analysis.

In loon, if the selected state is changed, the order of the points will be changed so that the highlighted points will be displayed on top. To turn it static, if `selectedOnTop = TRUE`, the points will be partitioned into two groups, one group presents the un-selected (un-highlighted) points and the other group presents selected (highlighted) points. the un-selected group will be drawn first, then

selected group will be displayed on top of it; if `selectedOnTop = FALSE`, no partition is applied so that the displayed order will be identical to the original data set order. This is very helpful when further analysis will be operated in ggplot graphical system, e.g. `+ facet_wrap(...)`. See examples.

Value

a ggplot object

Examples

```
if(interactive()) {
lp <- l_plot(iris,
             color = iris$Species,
             glyph = "circle")
gp <- loon2ggplot(lp)
gp # a ggplot object

# add smooth layer, grouped by color
gp +
  geom_smooth(aes(color = color)) +
  # give meaningful legend label names
  scale_color_manual(
    # make sure the order is correct
    values = unique(hex12tohex6(lp['color'])),
    labels = c("setosa", "versicolor", "virginica")
  )

# histogram
lh <- l_hist(mtcars$mpg,
            color = factor(mtcars$gear))

gh0 <- loon2ggplot(lh)
# facet by `fill`
gh0 + facet_wrap(~fill)

# set `asAes = FALSE`
gh1 <- loon2ggplot(lh, asAes = FALSE)
# Expect the legend, they both are identical
gh1
## Not run:
# ERROR
# The bins are constructed by `ggplot2::geom_rect()`
# Very limited operations can be made
gh1 + facet_wrap(~fill)

## End(Not run)

# Argument `selectedOnTop`
p <- l_plot(iris, color = iris$Species)
p['selected'][iris$Petal.Length > 5] <- TRUE
g <- loon.ggplot(p)
```

```

# It looks correct.
g
# facet by "Species"
## Not run:
g + facet_wrap(iris$Species)
## End(Not run)
# Something is wrong here. There is a pink point (at least one)
# in species "versicolor"! The reason is because after points are
# highlighted, the displayed order has been changed. One way to
# fix it is to set the `selectedOnTop` as FALSE.

loon.ggplot(p, selectedOnTop = FALSE) +
  facet_wrap(iris$Species)
}

```

loonLayer

Transform geom layers to loon layers

Description

Function `loonLayer` is used to create loon non-interactive layers. For some `ggplot2` extension packages, one can edit this function to realize the transformation.

Usage

```

loonLayer(
  widget,
  layerGeom,
  data,
  ggplotPanelParams,
  ggObj,
  parent,
  label,
  ...
)

```

Arguments

<code>widget</code>	a loon widget
<code>layerGeom</code>	a <code>ggplot</code> Geom layer object
<code>data</code>	a data frame (i.e. x, y, etc) of this particular layer
<code>ggplotPanelParams</code>	<code>ggplot</code> panel parameters
<code>ggObj</code>	the <code>ggplot</code> object
<code>parent</code>	a valid Tk parent widget path.
<code>label</code>	label used in the layers inspector
<code>...</code>	not for users

l_getSubtitles	<i>Return the subtitles from an l_facet_ggplot object</i>
----------------	---

Description

Return the subtitles from an l_facet_ggplot object

Usage

```
l_getSubtitles(target)
```

Arguments

target an l_facet_ggplot object. If the ggplot object is faceted (either by facet_wrap or facet_grid), an l_facet_ggplot object will be returned once it is turned to a loon plot.

Value

A list of labels, i.e. subtitles, labels, title, etc

Examples

```
if(interactive()) {  
  p <- ggplot(mpg, aes(displ, hwy)) +  
    geom_point() +  
    facet_wrap(vars(class))  
  lp <- loon.ggplot(p)  
  l_getSubtitles(lp)  
}
```

l_ggplot	<i>Automatically create a loon widget</i>
----------	---

Description

Create a loon widget with ggplot syntax

Usage

```
l_ggplot(data = NULL, mapping = aes(), ..., environment = parent.frame())
```

Arguments

data	Default dataset to use for plot. If not already a data.frame, will be converted to one by fortify(). If not specified, must be supplied in each layer added to the plot.
mapping	Default list of aesthetic mappings to use for plot. If not specified, must be supplied in each layer added to the plot.
...	Other arguments passed on to methods. Not currently used.
environment	DEPRECATED. Used prior to tidy evaluation.

Details

function `l_ggplot()` wraps function `ggplot()` with assigning an additional class `"l_ggplot"` to the output. The returned object is called an `l_ggplot` object. To draw a `ggplot` object, S3 method `print.ggplot` will be rendered so that a static graphic is displayed. While, for an `l_ggplot()` object, S3 method `print.l_ggplot` will be rendered which will return an interactive loon widget.

Value

It will return an `l_ggplot` object with class `c("l_ggplot", "gg", "ggplot")`. Then print a loon plot automatically.

See Also

[ggplot](#), [ggplot2loon](#), [print.l_ggplot](#)
[loon.ggplot](#)

Examples

```
if(interactive()) {
  p <- l_ggplot(mpg, aes(displ, cty)) +
    geom_point(
      size = 4,
      mapping = aes(color = factor(cyl))
    )
  # p is an `l_ggplot` object, `print.l_ggplot(p)` will be called automatically.
  # Then, at printing time, an `l_ggplot` object will be transformed to a `loon` widget
  p

  ## Not run:
  # Assign a widget from current path
  # suppose the path of `p` is `.l0.ggplot`
  q <- l_getFromPath('.l0.ggplot')
  # q is a `loon` widget
  q

  ## End(Not run)

  # An alternative way to return a real loon widget from `p` (a `l_ggplot` object)
  # is to call the function `loon.ggplot()`.
}
```

```
q <- loon.ggplot(p)
q

# pipe more components
p +
  facet_grid(rows = vars(drv)) +
  linking(linkingGroup = "mpg") +
  ggtitle("displ versus cty")
# a linked bar plot
l_hist(mpg$class, linkingGroup = "mpg")

# a 3D object
# press the button key `R` to rotate the plot
l_ggplot(mtcars,
  mapping = aes(x = wt, y = hp, z = drat)) +
  geom_point(size = 4) +
  scale_multi()
}
```

print.l_ggplot

Explicitly draw plot

Description

Explicitly draw plot

Usage

```
## S3 method for class 'l_ggplot'
print(x, message = TRUE, ...)
```

Arguments

x	plot to display
message	logical; if TRUE, the way to create handle will be printed out.
...	other arguments used to modify function ggplot2loon

Value

Invisibly returns a loon widget

scaleBox	<i>Box scaling in 3D rotation</i>
----------	-----------------------------------

Description

the variable is scaled to have equal ranges and, when center = TRUE, to be centred by the average of the min and max.

Usage

```
scaleBox(center = TRUE)
```

Arguments

center	either a logical value or numeric-alike vector of length equal to the number of columns of x, where 'numeric-alike' means that <code>as.numeric(.)</code> will be applied successfully if <code>is.numeric(.)</code> is not true.
--------	---

Value

A trans object

See Also

[l_scale3D](#)

scale_multi	<i>Position scales for continuous data (x, y & z)</i>
-------------	---

Description

Scaling the coordinates for 3D visualization

Usage

```
scale_multi(trans = scaleBox(center = TRUE), ...)
```

Arguments

trans	For continuous scales, the name of a transformation object or the object itself. Built-in transformations include "asn", "atanh", "boxcox", "date", "exp", "hms", "identity", "log", "log10", "log1p", "log2", "logit", "modulus", "probability", "probit", "pseudo_log", "reciprocal", "reverse", "sqrt" and "time". A transformation object bundles together a transform, its inverse, and methods for generating breaks and labels. Transformation objects are defined in the scales package, and are called <code><name>_trans</code> (e.g., <code>scales::boxcox_trans()</code>). You can create your own transformation with <code>scales::trans_new()</code> .
-------	--

... Other arguments passed on to `scale_(x|y)_continuous()`. To set the position scales, three scales (x, y, z) has to be set simultaneously.

Details

In 3D rotation, different scales of variables x, y and z may cause an issue that the points appear to be off the window even with a minor tweak. Additionally, if one variable is in a large scale, the shape of the 3D plot may be dominated. Setting `scale_multi` can ensure the scales in the same measurement, as we rotate the plot, most points will stay inside the current view.

Value

a list of the ggproto objects

Examples

```
if(interactive()) {
  dsamp <- dplyr::sample_n(diamonds, 100)

  ## Not run:
  # press `R`, then rotate with a minor tweak,
  # Issues:
  # 1: the points are off the window
  # 2: Always in a line shape
  l_ggplot(dsamp, aes(x = carat, y = price,
                     z = depth, colour = color)) +
    geom_point()
  ## End(Not run)

  # set scales
  l_ggplot(dsamp, aes(x = carat, y = price,
                     z = depth, colour = color)) +
    geom_point() +
    scale_multi()

  # customized `trans`
  logp1_base10_trans <- scales::trans_new(
    name = "logp",
    trans = function(x) log(x + 1, base = 10),
    inverse = function(x) 10**x - 1,
    breaks = scales::log_breaks())

  l_ggplot(dsamp, aes(x = carat, y = price,
                     z = depth, colour = color)) +
    geom_point() +
    scale_multi(trans = logp1_base10_trans)
}
```

selection	<i>Modify the selected component</i>
-----------	--------------------------------------

Description

In interactive graphics, selection is one of the most fundamental tool and used to highlight the subset of interest

Usage

```
selection(selected = NULL, selectBy = NULL, selectionLogic = NULL)
```

Arguments

selected A logical vector. If it is set as TRUE, the elements are highlighted as the graphics are constructed. Default is FALSE

selectBy Select by "sweeping" (default) or "brushing".

selectionLogic Selection logic. One of "select" (default), "deselect" and "invert". See details.

Details

There are two ways to directly select elements on the scatterplot using the mouse: either by "sweep" or by "brushing". "Sweeping" allows us to sweep out a contiguous area of the plot, while, in "brushing", the area is always fixed during the selection.

The selection logic give users more flexibility that users cannot only highlight the elements, but also can delight or invert (the highlighted to delighted, vice verse) the elements.

Value

a ggproto object

See Also

[active](#), [linking](#), [zoom](#), [hover](#), [interactivity](#)

Examples

```
if(interactive()) {  
  
  # highlight the four gear cars  
  fourGear <- rep(FALSE, nrow(mtcars))  
  fourGear[mtcars$gear == 4] <- TRUE  
  
  l_ggplot(mtcars, mapping = aes(x = wt, y = hp, color = factor(cyl))) +  
    geom_point(size = 4) +  
    # push the states of scatter plot to the histogram  
    selection(selected = fourGear)  
}
```

zoom

*Zoom Plot Region***Description**

Modify the zoomX, zoomY, panX, panY, etc to change the plot region

Usage

```
zoom(layerId = NULL, scaleToFun = NULL)
```

Arguments

layerId	numerical; which layer to scale to
scaleToFun	scale to function. See details.

Details

Argument layerId is used for additional plot region settings. If the layerId is set as NULL (default), the region of the interactive graphics loon will be determined by the ggplot object (i.e. coord_cartesian, xlim, etc); else one can use scaleToFun to modify the region of the layer.

The scaleToFun is a function to scale the region. If it is NULL (default), based on different layers, different scale functions will be applied. For example, if the layer is the main graphic model, i.e. l_plot l_hist, then the default scaleToFun is [l_scaleto_plot](#); else if the layer is a general l_layer widget, the default scaleToFun would be [l_scaleto_layer](#) (see [get_activeGeomLayers](#)).

If it is not NULL, users can select one that precisely tailor their own problems. The table shows the available scaleToFun functions

scale to	Subfunction
plot	l_scaleto_plot
world	l_scaleto_world
active	l_scaleto_active
selected	l_scaleto_selected
layer	l_scaleto_layer

Expect all these, users can customize their own function. Note that, the arguments should match the ones of functions shown in the table.

Value

a ggproto object

See Also

[active](#), [linking](#), [selection](#), [hover](#), [interactivity](#)

Examples

```
if(interactive()) {  
  p <- l_ggplot(mtcars,  
               mapping = aes(x = hp, y = mpg)) +  
         geom_point(mapping = aes(color = factor(gear))) +  
         geom_smooth(data = mtcars[mtcars$gear == 4, ],  
                     method = "lm")  
  # a scatter plot with a fitted line on 4 gear cars  
  p  
  # scale to the second layer (smooth line)  
  p + zoom(layerId = 2)  
  # highlight the 3 gear cars  
  # scale to the selected points  
  p +  
    selection(mtcars$gear == 3) +  
    zoom(layerId = 1,  
         scaleToFun = loon::l_scaleto_selected)  
}
```

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