

# Package ‘easyalluvial’

May 7, 2020

**Title** Generate Alluvial Plots with a Single Line of Code

**Version** 0.2.3

**URL** <https://github.com/erblast/easyalluvial>

**Description** Alluvial plots are similar to sankey diagrams and visualise categorical data over multiple dimensions as flows. (Rosvall M, Bergstrom CT (2010) Mapping Change in Large Networks. PLoS ONE 5(1): e8694. <doi:10.1371/journal.pone.0008694> Their graphical grammar however is a bit more complex than that of a regular x/y plots. The 'ggalluvial' package made a great job of translating that grammar into 'ggplot2' syntax and gives you many options to tweak the appearance of an alluvial plot, however there still remains a multi-layered complexity that makes it difficult to use 'ggalluvial' for explorative data analysis. 'easyalluvial' provides a simple interface to this package that allows you to produce a decent alluvial plot from any dataframe in either long or wide format from a single line of code while also handling continuous data. It is meant to allow a quick visualisation of entire dataframes with a focus on different colouring options that can make alluvial plots a great tool for data exploration.

**License** CC0

**Encoding** UTF-8

**LazyData** true

**Depends** R(>= 2.10)

**Suggests** testthat, covr, ISLR, nycflights13, vdiffr (>= 0.3.1),  
parcats

**RoxygenNote** 7.1.0

**Imports** purrr , tidyr (>= 1.0.0) , dplyr , forcats , ggalluvial (>= 0.9.1) , ggplot2 (>= 3.2.0) , ggridges , RColorBrewer , recipes (>= 0.1.5) , rlang , stringr , magrittr , tibble , caret , progress , gridExtra , randomForest , e1071

**Language** en-US

**NeedsCompilation** no

**Author** Bjoern Koneswarakantha [aut, cre]  
(<<https://orcid.org/0000-0003-4585-7799>>)

**Maintainer** Bjoern Koneswarakantha <[datistics@gmail.com](mailto:datistics@gmail.com)>

**Repository** CRAN

**Date/Publication** 2020-05-07 08:40:20 UTC

## R topics documented:

|   |           |
|---|-----------|
| add_imp_plot . . . . .                  | 2         |
| add_marginal_histograms . . . . .       | 3         |
| alluvial_long . . . . .                 | 5         |
| alluvial_model_response . . . . .       | 7         |
| alluvial_model_response_caret . . . . . | 10        |
| alluvial_wide . . . . .                 | 12        |
| get_data_space . . . . .                | 14        |
| get_pdp_predictions . . . . .           | 15        |
| manip_bin_numerics . . . . .            | 16        |
| manip_factor_2_numeric . . . . .        | 18        |
| mtcars2 . . . . .                       | 18        |
| palette_filter . . . . .                | 19        |
| palette_increase_length . . . . .       | 21        |
| palette_plot_intensity . . . . .        | 21        |
| palette_plot_rgp . . . . .              | 22        |
| palette_qualitative . . . . .           | 23        |
| plot_all_hists . . . . .                | 23        |
| plot_condensation . . . . .             | 24        |
| plot_hist . . . . .                     | 25        |
| plot_imp . . . . .                      | 26        |
| quarterly_flights . . . . .             | 27        |
| quarterly_sunspots . . . . .            | 27        |
| tidy_imp . . . . .                      | 28        |
| titanic . . . . .                       | 29        |
| <b>Index</b>                            | <b>30</b> |

---

|              |   |
|--------------|---|
| add_imp_plot | <i>add bar plot of important features to model response alluvial plot</i> |
|--------------|---|

---

### Description

adds bar plot of important features to model response alluvial plot

### Usage

```
add_imp_plot(grid, p = NULL, data_input, plot = T, ...)
```

**Arguments**

|            |   |
|------------|---|
| grid       | gtable or ggplot  |
| p          | alluvial plot, optional if alluvial plot has already been passed as grid. Default: NULL |
| data_input | dataframe used to generate alluvial plot  |
| plot       | logical if plot should be drawn or not  |
| ...        | additional parameters passed to <a href="#">plot_imp</a>                                |

**Value**

gtable

**See Also**

[arrangeGrob](#) [plot\\_imp](#)

**Examples**

```
## Not run:
df = mtcars2[, ! names(mtcars2) %in% 'ids' ]

train = caret::train( disp ~ .
                    , df
                    , method = 'rf'
                    , trControl = caret::trainControl( method = 'none' )
                    , importance = TRUE )

pred_train = caret::predict.train(train, df)

p = alluvial_model_response_caret(train, degree = 4, pred_train = pred_train)

p_grid = add_marginal_histograms(p, data_input = df)

p_grid = add_imp_plot(p_grid, p, data_input = df)

## End(Not run)
```

---

add\_marginal\_histograms

*add marginal histograms to alluvial plot*

---

**Description**

will add density histograms and frequency plots of original data to alluvial plot

**Usage**

```
add_marginal_histograms(
  p,
  data_input,
  top = TRUE,
  keep_labels = FALSE,
  plot = TRUE,
  ...
)
```

**Arguments**

|                          |  |
|--------------------------|--|
| <code>p</code>           | alluvial plot  |
| <code>data_input</code>  | dataframe, input data that was used to create dataframe                                |
| <code>top</code>         | logical, position of histograms, if FALSE adds them at the bottom, Default: TRUE       |
| <code>keep_labels</code> | logical, keep title and caption, Default: FALSE  |
| <code>plot</code>        | logical if plot should be drawn or not   |
| <code>...</code>         | additional arguments for model response alluvial plot concerning the response variable |

**pred\_train** display training prediction, not necessary if pred\_train has already been passed to alluvial\_model\_response()

**scale** int, y-axis distance between the ridge plots, Default: 400

**pred\_var** character vector, specify response variable in data\_input, if not set response variable will try to be inferred, Default: NULL

**Value**

gtable

**See Also**

[arrangeGrob](#)

**Examples**

```
p = alluvial_wide(mtcars2, max_variables = 4)
p_grid = add_marginal_histograms(p, mtcars2)
```

---

|               |   |
|---------------|---|
| alluvial_long | <i>alluvial plot of data in long format</i> |
|---------------|---|

---

### Description

Plots two variables of a dataframe on an alluvial plot. A third variable can be added either to the left or the right of the alluvial plot to provide coloring of the flows. All numerical variables are scaled, centered and YeoJohnson transformed before binning.

### Usage

```
alluvial_long(
  data,
  key,
  value,
  id,
  fill = NULL,
  fill_right = T,
  bins = 5,
  bin_labels = c("LL", "ML", "M", "MH", "HH"),
  NA_label = "NA",
  order_levels_value = NULL,
  order_levels_key = NULL,
  order_levels_fill = NULL,
  complete = TRUE,
  fill_by = "first_variable",
  col_vector_flow = palette_qualitative() %>% palette_filter(greys = F),
  col_vector_value = RColorBrewer::brewer.pal(9, "Greys")[c(3, 6, 4, 7, 5)],
  verbose = F,
  stratum_labels = T,
  stratum_label_size = 4.5,
  stratum_width = 1/4,
  auto_rotate_xlabs = T,
  ...
)
```

### Arguments

|            |  |
|------------|--|
| data       | a dataframe  |
| key        | unquoted column name or string of x axis variable  |
| value      | unquoted column name or string of y axis variable  |
| id         | unquoted column name or string of id column  |
| fill       | unquoted column name or string of fill variable which will be used to color flows, Default: NULL |
| fill_right | logical, TRUE fill variable is added to the right FALSE to the left, Default: T                  |

**bins**                    number of bins for automatic binning of numerical variables, Default: 5  
**bin\_labels**            labels for bins, Default: c("LL", "ML", "M", "MH", "HH")  
**NA\_label**              character vector define label for missing data  
**order\_levels\_value**     character vector denoting order of y levels from low to high, does not have to be complete can also just be used to bring levels to the front, Default: NULL  
**order\_levels\_key**       character vector denoting order of x levels from low to high, does not have to be complete can also just be used to bring levels to the front, Default: NULL  
**order\_levels\_fill**      character vector denoting order of color fill variable levels from low to high, does not have to be complete can also just be used to bring levels to the front, Default: NULL  
**complete**               logical, insert implicitly missing observations, Default: TRUE  
**fill\_by**                 one\_of(c('first\_variable', 'last\_variable', 'all\_flows', 'values')), Default: 'first\_variable'  
**col\_vector\_flow**        HEX color values for flows, Default: palette\_filter( greys = F)  
**col\_vector\_value**       HEX color values for y levels/values, Default:RColorBrewer::brewer.pal(9, 'Greys')[c(3,6,4,7,5)]  
**verbose**                logical, print plot summary, Default: F  
**stratum\_labels**        logical, Default: TRUE  
**stratum\_label\_size**     numeric, Default: 4.5  
**stratum\_width**         double, Default: 1/4  
**auto\_rotate\_xlabs**     logical, Default: TRUE  
**...**                    additional parameter passed to [manip\\_bin\\_numerics](#)

**Value**

ggplot2 object

**See Also**

[alluvial\\_wide](#), [geom\\_flow](#), [geom\\_stratum](#), [manip\\_bin\\_numerics](#)

**Examples**

```

data = quarterly_flights

alluvial_long( data, key = qu, value = mean_arr_delay, id = tailnum, fill_by = 'last_variable' )

## Not run:
# more flow coloring variants -----

```

```

alluvial_long( data, key = qu, value = mean_arr_delay, id = tailnum, fill_by = 'first_variable' )
alluvial_long( data, key = qu, value = mean_arr_delay, id = tailnum, fill_by = 'all_flows' )
alluvial_long( data, key = qu, value = mean_arr_delay, id = tailnum, fill_by = 'value' )

# color by additional variable carrier -----

alluvial_long( data, key = qu, value = mean_arr_delay, fill = carrier, id = tailnum )

# use same color coding for flows and y levels -----

palette = c('green3', 'tomato')

alluvial_long( data, qu, mean_arr_delay, tailnum, fill_by = 'value'
              , col_vector_flow = palette
              , col_vector_value = palette )

# reorder levels -----

alluvial_long( data, qu, mean_arr_delay, tailnum, fill_by = 'first_variable'
              , order_levels_value = c('on_time', 'late') )

alluvial_long( data, qu, mean_arr_delay, tailnum, fill_by = 'first_variable'
              , order_levels_key = c('Q4', 'Q3', 'Q2', 'Q1') )

require(dplyr)
require(magrittr)

order_by_carrier_size = data %>%
  group_by(carrier) %>%
  count() %>%
  arrange( desc(n) ) %>%
  .[['carrier']]

alluvial_long( data, qu, mean_arr_delay, tailnum, carrier
              , order_levels_fill = order_by_carrier_size )

## End(Not run)

```

---

alluvial\_model\_response

*create model response plot*


---

## Description

alluvial plots are capable of displaying higher dimensional data on a plane, thus lend themselves to plot the response of a statistical model to changes in the input data across multiple dimensions. The practical limit here is 4 dimensions. We need the data space (a sensible range of data calculated

based on the importance of the explanatory variables of the model as created by [get\\_data\\_space](#) and the predictions returned by the model in response to the data space.

### Usage

```
alluvial_model_response(
  pred,
  dspace,
  imp,
  degree = 4,
  bins = 5,
  bin_labels = c("LL", "ML", "M", "MH", "HH"),
  col_vector_flow = c("#FF0065", "#009850", "#A56F2B", "#005EAA", "#710500", "#7B5380",
    "#9DD1D1"),
  method = "median",
  force = FALSE,
  params_bin_numeric_pred = list(center = T, transform = T, scale = T),
  pred_train = NULL,
  stratum_label_size = 3.5,
  ...
)
```

### Arguments

|                  |  |
|------------------|--|
| pred             | vector, predictions, if method = 'pdp' use <a href="#">get_pdp_predictions</a> to calculate predictions  |
| dspace           | data frame, returned by <a href="#">get_data_space</a>   |
| imp              | dataframe, with not more than two columns one of them numeric containing importance measures and one character or factor column containing corresponding variable names as found in training data.   |
| degree           | integer, number of top important variables to select. For plotting more than 4 will result in too many flows and the alluvial plot will not be very readable, Default: 4   |
| bins             | integer, number of bins for numeric variables, increasing this number might result in too many flows, Default: 5   |
| bin_labels       | labels for the bins from low to high, Default: c("LL", "ML", "M", "MH", "HH")  |
| col_vector_flow, | character vector, defines flow colours, Default: c('#FF0065', '#009850', '#A56F2B', '#005EAA', '#710500')  |
| method,          | character vector, one of c('median', 'pdp')  |
|                  | <b>median</b> sets variables that are not displayed to median mode, use with regular predictions   |
|                  | <b>pdp</b> partial dependency plot method, for each observation in the training data the displayed variables are set to the indicated values. The predict function is called for each modified observation and the result is averaged, calculate predictions using <a href="#">get_pdp_predictions</a> |



. Default: 'median'

force logical, force plotting of over 1500 flows, Default: FALSE

params\_bin\_numeric\_pred list, additional parameters passed to [manip\\_bin\\_numerics](#) which is applied to the pred parameter. Default: list( bins = 5, center = T, transform = T, scale = T)

pred\_train numeric vector, base the automated binning of the pred vector on the distribution of the training predictions. This is useful if marginal histograms are added to the plot later. Default = NULL

stratum\_label\_size numeric, Default: 3.5

... additional parameters passed to [alluvial\\_wide](#)

### Details

this model visualisation approach follows the "visualising the model in the dataspace" principle as described in Wickham H, Cook D, Hofmann H (2015) Visualizing statistical models: Removing the blindfold. *Statistical Analysis and Data Mining* 8(4) <doi:10.1002/sam.11271>

### Value

ggplot2 object

### See Also

[alluvial\\_wide](#), [get\\_data\\_space](#), [alluvial\\_model\\_response\\_caret](#)

### Examples

```
df = mtcars2[, ! names(mtcars2) %in% 'ids' ]
m = randomForest::randomForest( disp ~ ., df)
imp = m$importance
dspace = get_data_space(df, imp, degree = 3)
pred = predict(m, newdata = dspace)
alluvial_model_response(pred, dspace, imp, degree = 3)

# partial dependency plotting method
## Not run:
pred = get_pdp_predictions(df, imp
                          , .f_predict = randomForest::predict.randomForest
                          , m
                          , degree = 3
                          , bins = 5)

alluvial_model_response(pred, dspace, imp, degree = 3, method = 'pdp')

## End(Not run)
```

---

```
alluvial_model_response_caret
  create model response plot for caret models
```

---

## Description

Wraps [alluvial\\_model\\_response](#) and [get\\_data\\_space](#) into one call for caret models.

## Usage

```
alluvial_model_response_caret(
  train,
  degree = 4,
  bins = 5,
  bin_labels = c("LL", "ML", "M", "MH", "HH"),
  col_vector_flow = c("#FF0065", "#009850", "#A56F2B", "#005EAA", "#710500", "#7B5380",
    "#9DD1D1"),
  method = "median",
  params_bin_numeric_pred = list(center = T, transform = T, scale = T),
  pred_train = NULL,
  stratum_label_size = 3.5,
  force = F,
  ...
)
```

## Arguments

|                  |  |
|------------------|--|
| train            | caret train object   |
| degree           | integer, number of top important variables to select. For plotting more than 4 will result in two many flows and the alluvial plot will not be very readable, Default: 4 |
| bins             | integer, number of bins for numeric variables, increasing this number might result in too many flows, Default: 5   |
| bin_labels       | labels for the bins from low to high, Default: c("LL", "ML", "M", "MH", "HH")  |
| col_vector_flow, | character vector, defines flow colours, Default: c('#FF0065', '#009850', '#A56F2B', '#005EAA', '#710500')  |
| method,          | character vector, one of c('median', 'pdp')  |

**median** sets variables that are not displayed to median mode, use with regular predictions

**pdp** partial dependency plot method, for each observation in the training data the displayed variables are set to the indicated values. The predict function is called for each modified observation and the result is averaged

. Default: 'median'

|                         |  |
|-------------------------|--|
| params_bin_numeric_pred | list, additional parameters passed to <a href="#">manip_bin_numerics</a> which is applied to the pred parameter. Default: list( bins = 5, center = T, transform = T, scale = T)                  |
| pred_train              | numeric vector, base the automated binning of the pred vector on the distribution of the training predictions. This is useful if marginal histograms are added to the plot later. Default = NULL |
| stratum_label_size      | numeric, Default: 3.5  |
| force                   | logical, force plotting of over 1500 flows, Default: FALSE   |
| ...                     | additional parameters passed to <a href="#">alluvial_wide</a>  |

### Details

this model visualisation approach follows the "visualising the model in the dataspace" principle as described in Wickham H, Cook D, Hofmann H (2015) Visualizing statistical models: Removing the blindfold. *Statistical Analysis and Data Mining* 8(4) <doi:10.1002/sam.11271>

### Value

ggplot2 object

### See Also

[alluvial\\_wide](#), [get\\_data\\_space](#), [varImp](#), [extractPrediction](#), [get\\_data\\_space](#), [get\\_pdp\\_predictions](#)

### Examples

```
df = mtcars2[, ! names(mtcars2) %in% 'ids' ]

train = caret::train( disp ~ .
  , df
  , method = 'rf'
  , trControl = caret::trainControl( method = 'none' )
  , importance = TRUE )

alluvial_model_response_caret(train, degree = 3)

# partial dependency plotting method
## Not run:
alluvial_model_response_caret(train, degree = 3, method = 'pdp')

## End(Not run)
```

---

|               |   |
|---------------|---|
| alluvial_wide | <i>alluvial plot of data in wide format</i> |
|---------------|---|

---

### Description

plots a dataframe as an alluvial plot. All numerical variables are scaled, centered and YeoJohnson transformed before binning. Plots all variables in the sequence as they appear in the dataframe until maximum number of values is reached.

### Usage

```
alluvial_wide(
  data,
  id = NULL,
  max_variables = 20,
  bins = 5,
  bin_labels = c("LL", "ML", "M", "MH", "HH"),
  NA_label = "NA",
  order_levels = NULL,
  fill_by = "first_variable",
  col_vector_flow = palette_qualitative() %>% palette_filter(greys = F),
  col_vector_value = RColorBrewer::brewer.pal(9, "Greys")[c(4, 7, 5, 8, 6)],
  colorful_fill_variable_stratum = T,
  verbose = F,
  stratum_labels = T,
  stratum_label_size = 4.5,
  stratum_width = 1/4,
  auto_rotate_xlabs = T,
  ...
)
```

### Arguments

|                 |  |
|-----------------|--|
| data            | a dataframe  |
| id              | unquoted column name of id column or character vector with id column name                      |
| max_variables   | maximum number of variables, Default: 20   |
| bins            | number of bins for numerical variables, Default: 5   |
| bin_labels      | labels for the bins from low to high, Default: c("LL", "ML", "M", "MH", "HH")                  |
| NA_label        | character vector, define label for missing data, Default: 'NA'                                 |
| order_levels    | character vector denoting levels to be reordered from low to high                              |
| fill_by         | one_of(c('first_variable', 'last_variable', 'all_flows', 'values')), Default: 'first_variable' |
| col_vector_flow | HEX colors for flows, Default: palette_filter( greys = F)                                      |

```

col_vector_value      Hex colors for y levels/values, Default: RColorBrewer::brewer.pal(9, "Greys")[c(3,
                      6, 4, 7, 5)]
colorful_fill_variable_stratum logical, use flow colors to colorize fill variable stratum, Default: TRUE
verbose               logical, print plot summary, Default: F
stratum_labels        logical, Default: TRUE
stratum_label_size    numeric, Default: 4.5
stratum_width         double, Default: 1/4
auto_rotate_xlabs     logical, Default: TRUE
...                   additional arguments passed to manip\_bin\_numerics

```

### Details

Under the hood this function converts the wide format into long format. `ggalluvial` also offers a way to make alluvial plots directly from wide format tables but it does not allow individual colouring of the stratum segments. The tradeoff is that we can only order levels as a whole and not individually by variable, Thus if some variables have levels with the same name the order will be the same. If we want to change level order independently we have to assign unique level names first.

### Value

ggplot2 object

### See Also

[alluvial\\_wide](#), [geom\\_flow](#), [geom\\_stratum](#), [manip\\_bin\\_numerics](#)

### Examples

```

alluvial_wide( data = mtcars2, id = ids
               , max_variables = 5
               , fill_by = 'first_variable' )
## Not run:

# more coloring variants-----
alluvial_wide( data = mtcars2, id = ids
               , max_variables = 5
               , fill_by = 'last_variable' )

alluvial_wide( data = mtcars2, id = ids
               , max_variables = 5
               , fill_by = 'all_flows' )

alluvial_wide( data = mtcars2, id = ids
               , max_variables = 5
               , fill_by = 'first_variable' )

```

```
# manually order variable values and colour by stratum value

alluvial_wide( data = mtcars2, id = ids
              , max_variables = 5
              , fill_by = 'values'
              , order_levels = c('4', '8', '6') )

## End(Not run)
```

---

|                             |                             |
|-----------------------------|-----------------------------|
| <code>get_data_space</code> | <i>calculate data space</i> |
|-----------------------------|-----------------------------|

---

### Description

calculates a dataspace based on the modelling dataframe and the importance of the explanatory variables. It only considers the most important variables as defined by the degree parameter. It selects a number (defined by bins) of sensible single values spread over the range of the numeric variables and creates all possible value combinations among the most important variables. The values of the remaining variables are set to mode(factors) or median( numerics).

### Usage

```
get_data_space(df, imp, degree = 4, bins = 5, max_levels = 10)
```

### Arguments

|                         |  |
|-------------------------|--|
| <code>df</code>         | dataframe, training data   |
| <code>imp</code>        | dataframe, with not more then two columns one of them numeric containing importance measures and one character or factor column containing corresponding variable names as found in training data. |
| <code>degree</code>     | integer, number of top important variables to select. For plotting more than 4 will result in two many flows and the alluvial plot will not be very readable, Default: 4                           |
| <code>bins</code>       | integer, number of bins for numeric variables, and maximum number of levels for factor variables, increasing this number might result in too many flows, Default: 5                                |
| <code>max_levels</code> | integer, maximum number of levels per factor variable, Default: 10   |

### Details

It selects a the top most important variables based on the degree parameter and bins the numeric variables using [manip\\_bin\\_numerics](#), while leaving categoric variables unchanged. The number of bins for each numeric variable is set to bins -2. Next the median is picked for each of the bins and the min and the max value is added for each numeric variable So that we get median(bin) X bins -2, max, min for each numeric variable. Then all possible combinations between those values and the categoric factor levels are created. The total number of all possible combinations defines

the range of the data space. The values of the remaining variables are set to mode(factors) or median(numerics).

this model visualisation approach follows the "visualising the model in the dataspace" principle as described in Wickham H, Cook D, Hofmann H (2015) Visualizing statistical models: Removing the blindfold. *Statistical Analysis and Data Mining* 8(4) <doi:10.1002/sam.11271>

### Value

data frame

### See Also

[alluvial\\_wide](#), [manip\\_bin\\_numerics](#)

### Examples

```
df = mtcars2[, ! names(mtcars2) %in% 'ids' ]
m = randomForest::randomForest( disp ~ ., df)
imp = m$importance
dspace = get_data_space(df, imp)
```

---

get\_pdp\_predictions *get predictions compatible with the partial dependence plotting method*

---

### Description

Alluvial plots are capable of displaying higher dimensional data on a plane, thus lend themselves to plot the response of a statistical model to changes in the input data across multiple dimensions. The practical limit here is 4 dimensions while conventional partial dependence plots are limited to 2 dimensions.

Briefly the 4 variables with the highest feature importance for a given model are selected and 5 values spread over the variable range are selected for each. Then a grid of all possible combinations is created. All none-plotted variables are set to the values found in the first row of the training data set. Using this artificial data space model predictions are being generated. This process is then repeated for each row in the training data set and the overall model response is averaged in the end. Each of the possible combinations is plotted as a flow which is coloured by the bin corresponding to the average model response generated by that particular combination.

### Usage

```
get_pdp_predictions(df, imp, m, degree = 4, bins = 5, .f_predict = predict)
```

**Arguments**

|            |  |
|------------|--|
| df         | dataframe, training data   |
| imp        | dataframe, with not more then two columns one of them numeric containing importance measures and one character or factor column containing corresponding variable names as found in training data. |
| m          | model object   |
| degree     | integer, number of top important variables to select. For plotting more than 4 will result in two many flows and the alluvial plot will not be very readable, Default: 4                           |
| bins       | integer, number of bins for numeric variables, increasing this number might result in too many flows, Default: 5   |
| .f_predict | corresponding model predict() function. Needs to accept 'm' as the first parameter and use the 'newdata' parameter. Supply a wrapper for predict functions with x-y synthax.                       |

**Details**

see <https://christophm.github.io/interpretable-ml-book/pdp.html>

**Value**

vector, predictions

**See Also**

[progress\\_bar](#)

**Examples**

```
df = mtcars2[, ! names(mtcars2) %in% 'ids' ]
m = randomForest::randomForest( disp ~ ., df)
imp = m$importance

pred = get_pdp_predictions(df, imp
                           , m
                           , degree = 3
                           , bins = 5)
```

---

manip\_bin\_numerics      *bin numerical columns*

---

**Description**

centers, scales and Yeo Johnson transforms numeric variables in a dataframe before binning into n bins of equal range. Outliers based on boxplot stats are capped (set to min or max of boxplot stats).



**Usage**

```
manip_bin_numerics(  
  x,  
  bins = 5,  
  bin_labels = c("LL", "ML", "M", "MH", "HH"),  
  center = T,  
  scale = T,  
  transform = T,  
  round_numeric = T,  
  digits = 2,  
  NA_label = "NA"  
)
```

**Arguments**

|                |  |
|----------------|--|
| x              | dataframe with numeric variables, or numeric vector  |
| bins           | number of bins for numerical variables, Default: 5   |
| bin_labels     | labels for the bins from low to high, Default: c("LL", "ML", "M", "MH", "HH"). Can also be one of c('mean', 'median', 'min_max', 'cuts'), the corresponding summary function will supply the labels. |
| center         | logical, Default: T  |
| scale          | logical, Default: T  |
| transform      | logical, apply Yeo Johnson Transformation, Default: T  |
| round_numeric, | logical, rounds numeric results if bin_labels is supplied with a supported summary function name.  |
| digits,        | integer, number of digits to round to  |
| NA_label       | character vector, define label for missing data, Default: 'NA'   |

**Value**

dataframe

**Examples**

```
summary( mtcars2 )  
summary( manip_bin_numerics(mtcars2) )  
summary( manip_bin_numerics(mtcars2, bin_labels = 'mean'))  
summary( manip_bin_numerics(mtcars2, bin_labels = 'cuts'  
  , scale = FALSE, center = FALSE, transform = FALSE))
```

`manip_factor_2_numeric`

*converts factor to numeric preserving numeric levels and order in character levels.*

---

### Description

before converting we check whether the levels contain a number, if they do the number will be preserved.

### Usage

```
manip_factor_2_numeric(vec)
```

### Arguments

`vec`                    vector

### Value

vector

### See Also

[str\\_detect](#)

### Examples

```
fac_num = factor( c(1,3,8) )
fac_chr = factor( c('foo','bar') )
fac_chr_ordered = factor( c('a','b','c'), ordered = TRUE )

manip_factor_2_numeric( fac_num )
manip_factor_2_numeric( fac_chr )
manip_factor_2_numeric( fac_chr_ordered )
```

---

`mtcars2`

*mtcars dataset with cyl, vs, am ,gear, carb as factor variables and car model names as id*

---

### Description

mtcars dataset with cyl, vs, am ,gear, carb as factor variables and car model names as id

### Usage

```
mtcars2
```

**Format**

A data frame with 32 rows and 12 variables

**mpg** Miles/(US) gallon

**cyl** Number of cylinders

**disp** Displacement (cu.in.)

**hp** Gross horsepower

**drat** Rear axle ratio

**wt** Weight (1000 lbs)

**qsec** 1/4 mile time

**vs** Engine

**am** Transmission

**gear** Number of forward gears

**carb** Number of carburetors

**ids** car model name

**Source**

datasets

---

palette\_filter

*color filters for any vector of hex color values*

---

**Description**

filters are based on rgb values

**Usage**

```
palette_filter(  
  palette = palette_qualitative(),  
  similar = F,  
  greys = T,  
  reds = T,  
  greens = T,  
  blues = T,  
  dark = T,  
  medium = T,  
  bright = T,  
  thresh_similar = 25  
)
```

**Arguments**

|                 |  |
|-----------------|--|
| palette         | any vector with hex color values, Default: palette_qualitative()   |
| similar,        | logical, allow similar colours, similar colours are detected using a threshold (thresh_similar), two colours are similar when each value for RGB is within threshold range of the corresponding RGB value of the second colour, Default: F |
| greys,          | logical, allow grey colours, blue == green == blue , Default: T  |
| reds,           | logical, allow red colours, blue < 50 & green < 50 & red > 200 , Default: T  |
| greens,         | logical, allow green colours, green > red & green > blue, Default: T   |
| blues,          | logical, allow blue colours, blue > green & green > red, Default: T  |
| dark,           | logical, allow colours of dark intensity, sum( red, green, blue) < 420 , Default: T  |
| medium,         | logical, allow colours of medium intensity, between( sum( red, green, blue), 420, 600) , Default: T  |
| bright,         | logical, allow colours of bright intensity, sum( red, green, blue) > 600, Default: T   |
| thresh_similar, | int, threshold for defining similar colours, see similar, Default: 25  |

**Value**

vector with hex colors

**Examples**

```
require(magrittr)

palette_qualitative() %>%
  palette_filter(thresh_similar = 0) %>%
  palette_plot_intensity()

## Not run:
# more examples-----

palette_qualitative() %>%
  palette_filter(thresh_similar = 25) %>%
  palette_plot_intensity()

palette_qualitative() %>%
  palette_filter(thresh_similar = 0, blues = FALSE) %>%
  palette_plot_intensity()

## End(Not run)
```

---

`palette_increase_length`*increases length of palette by repeating colours*

---

**Description**

works for any vector

**Usage**

```
palette_increase_length(palette = palette_qualitative(), n = 100)
```

**Arguments**

`palette` any vector, Default: `palette_qualitative()`  
`n`, int, length, Default: 100

**Value**

vector with increased length

**Examples**

```
require(magrittr)

length(palette_qualitative())

palette_qualitative() %>%
  palette_increase_length(100) %>%
  length()
```

---

`palette_plot_intensity`*plot colour intensity of palette*

---

**Description**

sum of red green and blue values

**Usage**

```
palette_plot_intensity(palette)
```

**Arguments**

`palette` any vector containing color hex values

**Value**

ggplot2 plot

**See Also**

[palette\\_plot\\_rgp](#)

**Examples**

```
## Not run:  
if(interactive()){  
  palette_qualitative() %>%  
    palette_filter( thresh = 25) %>%  
    palette_plot_intensity()  
}  
  
## End(Not run)
```

---

|                  |                                   |
|------------------|-----------------------------------|
| palette_plot_rgp | <i>plot rgb values of palette</i> |
|------------------|-----------------------------------|

---

**Description**

grouped bar chart

**Usage**

```
palette_plot_rgp(palette)
```

**Arguments**

palette            any vector containing color hex values

**Value**

ggplot2 plot

**See Also**

[palette\\_plot\\_intensity](#)

**Examples**

```
## Not run:
if(interactive()){
  palette_qualitative() %>%
    palette_filter( thresh = 50) %>%
    palette_plot_rgp()
}

## End(Not run)
```

---

palette\_qualitative     *compose palette from qualitative RColorBrewer palettes*

---

**Description**

uses `c('#FF0065', '#009850', '#A56F2B', '#005EAA', '#710500', '#7B5380', '#9DD1D1')` and then adds all unique values found in all qualitative RColorBrewer palettes

**Usage**

```
palette_qualitative()
```

**Value**

vector with hex values

**See Also**

[RColorBrewer](#)

**Examples**

```
palette_qualitative()
```

---

plot\_all\_hists     *plot marginal histograms of alluvial plot*

---

**Description**

will create gtable with density histograms and frequency plots of all variables of a given alluvial plot.

**Usage**

```
plot_all_hists(p, data_input, top = TRUE, keep_labels = FALSE, ...)
```

**Arguments**

|             |   |
|-------------|---|
| p           | alluvial plot   |
| data_input  | dataframe, input data that was used to create dataframe   |
| top         | logical, position of histograms, if FALSE adds them at the bottom, Default: TRUE  |
| keep_labels | logical, keep title and caption, Default: FALSE   |
| ...         | additional arguments for specific alluvial plot types: pred_train can be used to pass training predictions for model response alluvials |

**Value**

gtable

**See Also**

[arrangeGrob](#)  
[add\\_marginal\\_histograms](#)

**Examples**

```
p = alluvial_wide(mtcars2, max_variables = 4)
plot_all_hists(p, mtcars2)
```

---

plot\_condensation      *Plot dataframe condensation potential*

---

**Description**

plotting the condensation potential is meant as a decision aid for which variables to include in an alluvial plot. All variables are transformed to categoric variables and then two variables are selected by which the dataframe will be grouped and summarized by. The pair that results in the greatest condensation of the original dataframe is selected. Then the next variable which offers the greatest condensation potential is chosen until all variables have been added. The condensation in percent is then plotted for each step along with the number of groups (flows) in the dataframe. By experience it is not advisable to have more than 1500 flows because then the alluvial plot will take a long time to render. If there is a particular variable of interest in the dataframe this variable can be chosen as a starting variable.

**Usage**

```
plot_condensation(df, first = NULL)
```

**Arguments**

|       |  |
|-------|--|
| df    | dataframe  |
| first | unquoted expression or string denoting the first variable to be picked for condensation, Default: NULL |



**Value**

ggplot2 plot

**See Also**

[quosure](#) [reexports](#) [RColorBrewer](#)

**Examples**

```
plot_condensation(mtcars2)

plot_condensation(mtcars2, first = 'disp')
```

---

plot\_hist *plot histogram of alluvial plot variable*

---

**Description**

helper function used by add\_marginal\_histograms

**Usage**

```
plot_hist(var, p, data_input, ...)
```

**Arguments**

- var character vector, variable name
- p alluvial plot
- data\_input dataframe used to create alluvial plot
- ... additional arguments for specific alluvial plot types: pred\_train can be used to pass training predictions for model response alluvials

**Value**

ggplot object

---

|          |                                |
|----------|--------------------------------|
| plot_imp | <i>plot feature importance</i> |
|----------|--------------------------------|

---

### Description

plot important features of model response alluvial as bars

### Usage

```
plot_imp(p, data_input, truncate_at = 50, color = "darkgrey")
```

### Arguments

|             |  |
|-------------|--|
| p           | alluvial plot  |
| data_input  | dataframe used to generate alluvial plot                     |
| truncate_at | integer, limit number of features to that value, Default: 50 |
| color       | character vector, Default: 'darkgrey'                        |

### Value

ggplot object

### Examples

```
## Not run:
df = mtcars2[, ! names(mtcars2) %in% 'ids' ]

train = caret::train( disp ~ .
                      , df
                      , method = 'rf'
                      , trControl = caret::trainControl( method = 'none' )
                      , importance = TRUE )

pred_train = caret::predict.train(train, df)

p = alluvial_model_response_caret(train, degree = 3, pred_train = pred_train)

plot_imp(p, mtcars2)

## End(Not run)
```

---

|                   |  |
|-------------------|--|
| quarterly_flights | <i>Quarterly mean arrival delay times for a set of 402 flights</i> |
|-------------------|--|

---

**Description**

Created from nycflights13::flights

**Usage**

```
quarterly_flights
```

**Format**

A data frame with 1608 rows and 6 variables

**tailnum** a unique identifier created from tailnum, origin, destination and carrier

**carrier** carrier code

**origin** origin code

**dest** destination code

**qu** quarter

**mean\_arr\_delay** average delay on arrival as either on\_time or late

**Source**

```
nycflights13::flights
```

---

|                    |   |
|--------------------|---|
| quarterly_sunspots | <i>Quarterly mean relative sunspots number from 1749-1983</i> |
|--------------------|---|

---

**Description**

Quarterly mean relative sunspots number from 1749-1983

**Usage**

```
quarterly_sunspots
```

**Format**

A data frame with 940 rows and 4 variables

**year**

**qu** quarter

**spots** total number of sunspots

**mean\_spots\_per\_year**

## Source

Andrews, D. F. and Herzberg, A. M. (1985) Data: A Collection of Problems from Many Fields for the Student and Research Worker. New York: Springer-Verlag.

---

|          |  |
|----------|--|
| tidy_imp | <i>tidy up dataframe containing model feature importance</i> |
|----------|--|

---

## Description

returns dataframe with exactly two columns, vars and imp and aggregates dummy encoded variables. Helper function called by all functions that take an imp parameter. Can be called manually if formula for aggregating dummy encoded variables must be modified.

## Usage

```
tidy_imp(imp, df, .f = max)
```

## Arguments

|     |   |
|-----|---|
| imp | dataframe or matrix with feature importance information |
| df  | dataframe, modelling training data                      |
| .f  | window function, Default: max                           |

## Value

dataframe

**vars** character column with feature names

**imp** numerical column, importance values

## Examples

```
# randomforest
df = mtcars2[, ! names(mtcars2) %in% 'ids' ]
m = randomForest::randomForest( disp ~ ., df)
imp = m$importance
tidy_imp(imp, mtcars2)
```

---

|         |                         |
|---------|-------------------------|
| titanic | <i>titanic data set</i> |
|---------|-------------------------|

---

**Description**

titanic data set'

**Usage**

titanic

**Format**

A data frame with 891 rows and 10 variables

**Survived** Survived**Pclass** Pclass**Sex** Sex**Age** Age**SibSp** SibSp**Parch** Parch**Fare** Fare**Cabin** Cabin**Embarked** Embarked**title** title**Source**

datasets

# Index

## \*Topic **datasets**

- mtcars2, [18](#)
  - quarterly\_flights, [27](#)
  - quarterly\_sunspots, [27](#)
  - titanic, [29](#)
- [add\\_imp\\_plot](#), [2](#)
- [add\\_marginal\\_histograms](#), [3](#), [24](#)
- [alluvial\\_long](#), [5](#)
- [alluvial\\_model\\_response](#), [7](#), [10](#)
- [alluvial\\_model\\_response\\_caret](#), [9](#), [10](#)
- [alluvial\\_wide](#), [6](#), [9](#), [11](#), [12](#), [13](#), [15](#)
- [arrangeGrob](#), [3](#), [4](#), [24](#)
- [extractPrediction](#), [11](#)
- [geom\\_flow](#), [6](#), [13](#)
- [geom\\_stratum](#), [6](#), [13](#)
- [get\\_data\\_space](#), [8–11](#), [14](#)
- [get\\_pdp\\_predictions](#), [8](#), [11](#), [15](#)
- [manip\\_bin\\_numerics](#), [6](#), [9](#), [11](#), [13–15](#), [16](#)
- [manip\\_factor\\_2\\_numeric](#), [18](#)
- [mtcars2](#), [18](#)
- [palette\\_filter](#), [19](#)
- [palette\\_increase\\_length](#), [21](#)
- [palette\\_plot\\_intensity](#), [21](#), [22](#)
- [palette\\_plot\\_rgp](#), [22](#), [22](#)
- [palette\\_qualitative](#), [23](#)
- [plot\\_all\\_hists](#), [23](#)
- [plot\\_condensation](#), [24](#)
- [plot\\_hist](#), [25](#)
- [plot\\_imp](#), [3](#), [26](#)
- [progress\\_bar](#), [16](#)
- [quarterly\\_flights](#), [27](#)
- [quarterly\\_sunspots](#), [27](#)
- [quosure](#), [25](#)
- [RColorBrewer](#), [23](#), [25](#)
- [reexports](#), [25](#)
- [str\\_detect](#), [18](#)
- [tidy\\_imp](#), [28](#)
- [titanic](#), [29](#)
- [varImp](#), [11](#)