Package ‘lindia’

May 10, 2017

Type Package
Title Automated Linear Regression Diagnostic
Version 0.9
Description Provides a set of streamlined functions that allow
easy generation of linear regression diagnostic plots necessarily
for checking linear model assumptions.
This package is meant for easy scheming of linear
regression diagnostics, while preserving merits of
``The Grammar of Graphics`` as implemented in 'ggplot2'.
See the 'ggplot2' website for more information regarding the
specific capability of graphics.

Depends R (>= 3.2.2)
License MIT + file LICENSE
Encoding UTF-8
LazyData true
RoxygenNote 6.0.1
Imports MASS, ggplot2, gridExtra
URL https://github.com/yeukyu/lindia
BugReports https://github.com/yeukyu/lindia/issues
NeedsCompilation no
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Repository CRAN
Date/Publication 2017-05-10 02:29:20 UTC

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gg_boxcox

Plot boxcox graph in ggplot with suggested lambda transformation

Description

Plot boxcox graph in ggplot with suggested lambda transformation

Usage

```
gg_boxcox(fitted.lm, showlambda = TRUE, lambdaSF = 3, scale.factor = 0.5)
```

Arguments

- **fitted.lm**: a fitted linear model (i.e. lm, glm) that contains fitted regression
- **showlambda**: logical; controls whether lambda value should be displayed on graph. Defaults to TRUE
- **lambdaSF**: numeric; controls to how many significant figure is lambda rounded to. Defaults to 3.
- **scale.factor**: numeric; scales the point size and linewidth to allow customized viewing. Defaults to 0.5.

Value

A ggplot object that contains boxcox graph

Examples

```
library(MASS)
data(Cars93)
cars_lm <- lm(Price ~ Passengers + Length + RPM, data = Cars93)
gg_boxcox(cars_lm)
```
**gg_cooksd**

*Plot cook’s distance graph*

**Description**

Plot cook’s distance graph

**Usage**

```r
gg_cooksd(fitted.lm, label = TRUE, show.threshold = TRUE,
threshold = "convention", scale.factor = 0.5)
```

**Arguments**

- `fitted.lm`: a fitted linear model (i.e. lm, glm) that contains fitted regression
- `label`: logical; whether or not to label observation number larger than threshold. Default to TRUE.
- `show.threshold`: logical; determine whether or not threshold line is to be shown. Default to TRUE.
- `threshold`: string; determining the cut off label of cook’s distance. Choices are "baseR" (0.5 and 1), "matlab" (mean(cooksd)*3), and "convention" (4/n and 1). Default to "convention".
- `scale.factor`: numeric; scales the point size and linewidth to allow customized viewing. Defaults to 0.5.

**Value**

A ggplot object that contains a cook’s distance plot

**Examples**

```r
library(MASS)
data(Cars93)
cars_lm <- lm(Price ~ Passengers + Length + RPM, data = Cars93)
gg_cooksd(cars_lm)
```
**gg_diagnose**  
Plot all diagnostic plots given fitted linear regression line.

**Description**  
Plot all diagnostic plots given fitted linear regression line.

**Usage**  
```r  
gg_diagnose(fitted_lm, theme = NULL, ncol = NA, plot.all = TRUE,  
scale.factor = 0.5, boxcox = FALSE, max.per.page = NA)  
```

**Arguments**  
- `fitted_lm`: lm object that contains fitted regression  
- `theme`: ggplot graphing style using `ggplot::theme()`. A ggplot graphing style to apply to all plots. Default to null.  
- `ncol`: specify number of columns in resulting plot per page. Default to make a square matrix of the output.  
- `plot.all`: logical; determine whether plot will be returned as an arranged grid. When set to false, the function will return a list of diagnostic plots. Parameter defaults to TRUE.  
- `scale.factor`: numeric; scales the point size, linewidth, labels in all diagnostic plots to allow optimal viewing. Defaults to 0.5.  
- `boxcox`: logical; determine whether boxcox plot will be included. Parameter defaults to FALSE.  
- `max.per.page`: numeric; maximum number of plots allowed in one page.

**Value**  
An arranged grid of linear model diagnostics plots in ggplot. If plot.all is set to FALSE, a list of ggplot objects will be returned instead. Name of the plots are set to respective variable names.

**Examples**  
```r  
library(MASS)  
data(Cars93)  
# a regression with categorical variable  
cars_lm <- lm(Price ~ Passengers + Length + RPM + Origin, data = Cars93)  
gg_diagnose(cars_lm)  
# customize which diagnostic plot is included  
plots <- gg_diagnose(cars_lm, plot.all = FALSE)  
names(plots)  
# get name of the plots  
exclude_plots <- plots[-c(1, 3)]  
# exclude certain diagnostics plots  
include_plots <- plots[c(1, 3)]  
# include certain diagnostics plots  
plot_all(exclude_plots)  
# make use of plot_all() in lindia  
plot_all(include_plots)  
```
**gg_qqplot**

Plot quantile-quantile plot (QQPlot) in ggplot with qqline shown.

**Description**

Plot quantile-quantile plot (QQPlot) in ggplot with qqline shown.

**Usage**

```r
gg_qqplot(fittedNlm, scaleNfactor = 1)
```

**Arguments**

- `fittedNlm`: a fitted linear model (i.e. lm, glm) that contains fitted regression
- `scaleNfactor`: numeric; scales the point size and linewidth to allow customized viewing. Defaults to 1.

**Value**

A qqplot with fitted qqline

**Examples**

```r
library(MASS)
data(Cars93)
cars_lm <- lm(Price ~ Passengers + Length + RPM, data = Cars93)
gg_qqplot(cars_lm)
```

---

**gg_resfitted**

Generate residual plot of residuals against fitted value

**Description**

Generate residual plot of residuals against fitted value

**Usage**

```r
gg_resfitted(fittedNlm, scaleNfactor = 1)
```

**Arguments**

- `fittedNlm`: a fitted linear model (i.e. lm, glm) that contains fitted regression
- `scaleNfactor`: numeric; scales the point size and linewidth to allow customized viewing. Defaults to 1.
gg_reshist

Generate histogram of residuals in ggplot.

Description

Generate histogram of residuals in ggplot.

Usage

gg_reshist(fitted.lm, bins = NULL)

Arguments

fitted.lm       a fitted linear model (i.e. lm, glm) that contains fitted regression
bins            bin size for histogram

Value

A ggplot object

Examples

library(MASS)
data(Cars93)
cars_lm <- lm(Price ~ Passengers + Length + RPM, data = Cars93)
gg_resfitted(cars_lm)

# specify number of bins
gg_reshist(cars_lm, bins = 20)
**gg_resleverage**

*Plot residual versus leverage plot in ggplot.*

**Description**

Plot residual versus leverage plot in ggplot.

**Usage**

```r
gg_resleverage(fitted_lm, method = "loess", se = FALSE, scale.factor = 1)
```

**Arguments**

- `fitted_lm`: A fitted linear model (i.e. lm, glm) that contains fitted regression
- `se`: Logical; determines whether se belt should be plotted on plot
- `scale.factor`: Numeric; scales the point size and linewidth to allow customized viewing. Defaults to 1.

**Value**

A ggplot object that contains residual vs. leverage graph

**Examples**

```r
library(MASS)
data(Cars93)
cars_lm <- lm(Price ~ Passengers + Length + RPM, data = Cars93)
gg_resleverage(cars_lm)
```

---

**gg_resx**

*Generate residual plot of residuals against predictors*

**Description**

Generate residual plot of residuals against predictors

**Usage**

```r
gg_resx(fitted_lm, plot.all = TRUE, scale.factor = 0.5, max.per.page = NA, ncol = NA)
```
Arguments

fitted.lm: a fitted linear model (i.e. lm, glm) that contains fitted regression.

plot.all: boolean value to determine whether plot will be return as a plot arranged using `grid.arrange()`. When set to false, the function would return a list of residual plots. Parameter defaults to TRUE.

scale.factor: numeric; scales the point size and linewidth to allow customized viewing. Defaults to 0.5.

max.per.page: numeric; maximum number of plots allowed in one page. Parameter defaults to fit all plots on one page.

col: specify number of columns in resulting plot per page. Default to make a square matrix of the output.

Value

An arranged grid of residuals against predictor values plots in ggplot. If plotall is set to FALSE, a list of ggplot objects will be returned instead. Name of the plots are set to respective variable names.

Examples

library(MASS)
data(Cars93)
# a regression with categorical variable
cars_lm <- lm(Price ~ Passengers + Length + RPM + Origin, data = Cars93)
gg_resX(cars_lm)
# customize which diagnostic plot is included by have gg_resX to return a list of plots
plots <- gg_resX(cars_lm, plot.all = FALSE)
names(plots)  # get name of the plots
exclude_plots <- plots[-1]  # exclude certain residual plots
include_plots <- plots[1]  # include certain residual plots
plot_all(exclude_plots)  # make use of plot_all() in lindia
plot_all(include_plots)

---

`gg_scalelocation`  
*Plot scale-location (also called spread-location plot) in ggplot.*

Description

Plot scale-location (also called spread-location plot) in ggplot.

Usage

`gg_scalelocation(fitted.lm, method = "loess", scale.factor = 1, se = FALSE)`
plot_all

Arguments

- **fitted.lm**: a fitted linear model (i.e. lm, glm) that contains fitted regression.
- **scale.factor**: numeric; scales the point size and linewidth to allow customized viewing. Defaults to 1.
- **se**: logical; determines whether se belt should be plotted on plot.

Value

A ggplot object that contains scale-location graph.

Examples

```r
library(MASS)
data(Cars93)
cars_lm <- lm(Price ~ Passengers + Length + RPM, data = Cars93)
gg_scalelocation(cars_lm)
```

plot_all

Plot all given plots in a square matrix form.

Description

Plot all given plots in a square matrix form.

Usage

```r
plot_all(plots, ncol = NA, max.per.page = NA)
```

Arguments

- **plots**: a list of plots
- **ncol**: numeric; the number of column that the arranged grid need to be. defaults to fitting all plots in square matrix
- **max.per.page**: numeric; maximum number of plots allowed in one page.

Value

plots in a given list arranged using gridExtra.
Examples

library(MASS)
data(Cars93)
# a regression with categorical variable
cars_lm <- lm(Price ~ Passengers + Length + RPM + Origin, data = Cars93)
plots <- gg_diagnose(cars_lm, plot.all = FALSE)
names(plots)
selected.plots <- plots[-c(2, 5)]
plot_all(selected.plots)
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