

Package ‘distWorkshop’

November 4, 2019

Title Distributional analyses of linguistic data in the GAMM framework
Version 1.0
Description Data sets and code for distributional analyses of linguistic data in the GAMM framework.
Depends R (>= 3.5.0), survival, mgcv, qgam, pammtools, RColorBrewer
Imports survival, mgcv, qgam, pammtools, RColorBrewer
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ld	<i>Lexical decision data</i>
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Description

Lexical decision data from the British Lexicon Project (Keuleers et al., 2012)

Usage

ld

Format

An object of class `data.frame` with 25401 rows and 6 columns.

Source

Keuleers, E., Lacey, P., Rastle, K., & Brysbaert, M. (2012). The British Lexicon Project: Lexical decision data for 28,730 monosyllabic and disyllabic English words. *Behavior Research Methods*, 44(1), 287-304.

nam	<i>Word naming data</i>
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Description

Word naming data from the English Lexicon Project (Balota et al., 2007)

Usage

nam

Format

An object of class `data.frame` with 37107 rows and 6 columns.

Source

Balota, D. A., Yap, M. J., Hutchison, K. A., Cortese, M. J., Kessler, B., Loftis, B., ... & Treiman, R. (2007). The English lexicon project. *Behavior Research Methods*, 39(3), 445-459.

plotPAM	<i>Plot PAM</i>
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Description

Plot the results of a PAM model (Bender & Scheipl, 2018)

Usage

```
plotPAM(model, data, predictor = "logFrequency", response = "RT",
  se = 2, area = FALSE, num_grid = 100,
  pallet = colorRampPalette(rev(brewer.pal(n = 7, name =
    "RdYlBu")))(500), levs = NA, rugx = TRUE, rugy = TRUE, main = NA,
  xlab = NA, ylab = NA, ...)
```

Arguments

model	A PAM model.
data	The data the PAM model was fit to. Needs to include the response variable in the task, as well as all predictors in these models. Note: this is the data frame in its raw format, not the data frame converted to the piece-wise exponential data format.
predictor	The predictor to be plotted. This predictor needs to be present in the fitted model, as well as in data.

response	The name of the response variable in data.
se	The number of standard errors that is used for the significance test. Default: 2 (i.e., 95% confidence intervals)
area	Should the significance of the effect at different predictor values be plotted. Default: FALSE.
pallet	A vector of color names that will be used for the contour plot.
levs	A vector of values at which the contour lines will be plotted. By default, these values are selected automatically
rugx	Should a rug be plotted for the x-axis? Default: TRUE
rugy	Should a rug be plotted for the y-axis? Default: TRUE

References

Bender, A. and Scheipl, F. (2018). pammtools: Piece-wise exponential additive mixed modeling tools. arXiv:1806.01042

Examples

```
# Remove outliers
ld = removeOutliers(ld, c("logFrequency", "Length", "logOLD20", "SND20"))
ld = na.omit(ld)

# Prepare data in exponential data format
ld$status = 1
cut_points = as.numeric(quantile(ld$RT[which(ld$RT <= 1085 & ld$RT >= 500)], seq(0, 1, by=0.02)))
ped = split_data(Surv(RT, status)~., data = ld, id = "id", cut=cut_points)

Run PAM (warning: computationally heavy!)
pam_ld = gam(ped_status ~ s(tend) +
             s(logFrequency, k=4) + ti(tend, logFrequency, k=c(4, 4)) +
             s(Length, k=4) + ti(tend, Length, k=c(4, 4)) +
             s(logOLD20, k=4) + ti(tend, logOLD20, k=c(4, 4)) +
             s(SND20, k=4) + ti(tend, SND20, k=c(4, 4)),
             data = ped, offset = offset, family = poisson())

# Plot frequency effect
plotPAM(model = pam_ld, data = ld, predictor="logFrequency")
```

plotQGAMs

Plot quantiles

Description

Plot the results of a series of QGAM models (Fasiolo et al., 2017)

Usage

```
plotQGAMs(models, predictor, data, cols = c("#000080", "#1A1A9A",
      "#3333B3", "#4D4DCD", "#6666E6"), se = 2, xlab = NA, ylab = NA,
      main = NA, ylim = NA, ...)
```

Arguments

models	A list of QGAM models as generated by the <code>mqqam()</code> function in the <code>qgam</code> package.
predictor	The predictor to be plotted. This predictor needs to be present in the fitted models, as well as in data.
data	The data the QGAM models were fit to. Needs to include the response variable, as well as all predictors in these models.
cols	A vector of colors. The lines corresponding to the quantiles will be plotted in these colors.
se	The number of standard errors for the confidence intervals. Default: 2 (i.e., 95% confidence intervals)

References

- Fasiolo M., Goude Y., Nedellec R. and Wood S. N. (2017). Fast calibrated additive quantile regression. URL: <https://arxiv.org/abs/1707.03307>.
- Keuleers, E., Lacey, P., Rastle, K., & Brysbaert, M. (2012). The British Lexicon Project: Lexical decision data for 28,730 monosyllabic and disyllabic English words. *Behavior Research Methods*, 44(1), 287-304.

Examples

```
# Remove outliers from the ld data set, which contains lexical decision latencies from the British Lexicon Project
ld = removeOutliers(ld, c("logFrequency", "Length", "logOLD20", "SND20"))
ld = na.omit(ld)

# Tune learning rate for median
tune = tuneLearnFast(RT ~ s(logFrequency) + s(Length) + s(logOLD20) + s(SND20), data = ld, qu = 0.5)
sigpar = tune$lsig

# Define quantiles
quants = c(0.10, 0.25, 0.50, 0.75, 0.90)

# Run qgam models
qgams = mqqam(RT ~ s(logFrequency) + s(Length) + s(logOLD20) + s(SND20), data = ld,
              qu = quants, lsig = sigpar)

# Plot effect of frequency at quantiles
plotQGAMs(qgams, "logFrequency", ld)
```

pn

Picture naming data

Description

Picture naming data (Balota et al., 2007)

Usage

pn

Format

An object of class `data.frame` with 484 rows and 6 columns.

Source

Székely, A., D'amico, S., Devescovi, A., Federmeier, K., Herron, D., Iyer, G., ... & Bates, E. (2003). Timed picture naming: Extended norms and validation against previous studies. *Behavior Research Methods, Instruments, & Computers*, 35(4), 621-633.

<code>removeOutliers</code>	<i>Remove outliers</i>
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Description

Remove outliers from a data frame

Usage

```
removeOutliers(data, predictors, sd = 3)
```

Arguments

<code>data</code>	A data frame.
<code>predictors</code>	A vector of the column names in data corresponding to the predictors that outliers should be removed for <code>sd</code> The number of standard deviations. Predictor values further than <code>sd</code> standard deviations from the predictor mean are removed. Default: 3.
<code>model</code>	A PAM model.

Examples

```
# Load data for the lexical decision latencies in the British Lexicon Project (Keuleers et al, 2012)
data(ld)

# Remove outliers
ld = removeOutliers.fnc(ld, c("logFrequency", "Length", "logOLD20", "SND20"))
ld = na.omit(ld)
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