

Package: libdr (via r-universe)

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Type Package

Title Support Functions used by the LIBDR LCMM Analysis

Version 1.0.1

Description This package provides support functions frequently used by Constantine et al. for their paper, ``Large-scale clustering of longitudinal faecal calprotectin and C-reactive protein profiles in inflammatory bowel disease''. These functions are primarily used to manipulate data and visualise findings.

License GPL (>= 3)

Depends R (>= 4.1.0), splines, patchwork, magrittr, dplyr

Imports ComplexHeatmap, doParallel, forcats, foreach, ggplot2, knitr, lcmm, nnet, plyr, pracma, scales, tibble, tidyr, viridis

Suggests magick

Encoding UTF-8

LazyData true

RoxygenNote 7.3.2

Config/pak/sysreqs libicu-dev libpng-dev perl

Repository <https://vallejosgroup.r-universe.dev>

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| | |
|---------|--|
| buildDT | <i>Build DT::datatable objects from matrix of fit statistics</i> |
|---------|--|

Description

Build DT::datatable objects from matrix of fit statistics

Usage

```
buildDT(hlme.metrics)
```

Arguments

| | |
|--------------|--|
| hlme.metrics | A data frame or matrix of model fit metrics for different number of assumed clusters (G) |
|--------------|--|

| | |
|-------------------|--|
| compareClustering | <i>Create co-clustering matrix for FCAL and CRP models</i> |
|-------------------|--|

Description

Create co-clustering matrix for FCAL and CRP models

Usage

```
compareClustering(G, models.fcal, models.crp, cutoff = FALSE, threshold = 0.8)
```

Arguments

| | |
|-------------|---|
| G | Number of clusters assumed by both models |
| models.fcal | List holding all hlme objects created from FCAL data |
| models.crp | List holding all hlme objects created from CRP data |
| cutoff | Logical, should only subjects assigned posterior cluster membership probabilities above a given threshold for both models be included? |
| threshold | Numeric. The posterior probability of cluster membership cutoff required for a subject to be included in the plot. Only used if cutoff = TRUE |

| | |
|--------------|--|
| describe_cat | <i>Produce descriptive analysis of categorical variables</i> |
|--------------|--|

Description

Produce descriptive analysis of categorical variables

Usage

```
describe_cat(vars, data)
```

Arguments

| | |
|------|--|
| vars | Character vector giving the names of categorical variables |
| data | Data frame (or tibble) holding the data of interest |

| | |
|-------------|---|
| lcmmHeatmap | <i>Produce a heatmap of LCMM cluster assignments across multiple lcmm::hlme fit objects</i> |
|-------------|---|

Description

Produce a heatmap of LCMM cluster assignments across multiple lcmm::hlme fit objects

Usage

```
lcmmHeatmap(
  models,
  cores = NULL,
  png = TRUE,
  pdf = FALSE,
  file.name = "heatmap",
  return.data = FALSE
)
```

Arguments

| | |
|-------------|--|
| models | list containing objects generated by <code>lcmm::hlme</code> . |
| cores | Numeric. Number of CPU cores to use. Defaults to maximum available. |
| png | Logical. If TRUE, the heatmap will be saved to file as a PNG. |
| pdf | Logical. If TRUE, the heatmap will be saved to file as a PDF. |
| file.name | Character. File name (without extension) for saved heatmap files. Defaults to "heatmap". Not used if png and pdf are both FALSE. |
| return.data | Logical. If TRUE, the averaged co-cluster matrix will be returned. |

| | |
|-------------|--|
| makeMetrics | <i>Produce table of model fit metrics (AIC, BIC, Log-likelihood) for LCMMs</i> |
|-------------|--|

Description

Produce table of model fit metrics (AIC, BIC, Log-likelihood) for LCMMs

Usage

```
makeMetrics(Gs, models)
```

Arguments

| | |
|--------|---|
| Gs | Vector indicating which values of G should metrics be calculated for. |
| models | List containing LCMM model fits |

| | |
|---------|---|
| mlrPlot | <i>Forest plot of multinomial logistic regression model</i> |
|---------|---|

Description

Forest plot of multinomial logistic regression model

Usage

```
mlrPlot(
  dat,
  var,
  class = "class_combined",
  prob = "probmax",
  minprob = 0.5,
  extern = NULL,
  uni = FALSE
)
```

Arguments

| | |
|-------|---|
| dat | Data frame holding covariate and cluster assignment data. |
| var | Character. The name of the covariate(s) of interest. If given as a character vector then a multivariate model is fitted using the specified covariates. |
| class | Character. The name of the class assignment variable. Assumed to be "class_combined" if not manually specified. |
| prob | Character. The name of the variable which gives posterior probabilities for cluster membership. Assumed to be "probmax" if not manually specified. |

| | |
|---------|--|
| minprob | Numeric. The minimum posterior probability for cluster membership required for a subject to be included in the analysis. Assumed to be 0.5 if not manually specified |
| extern | Optional data frame containing multinomial logistic regression results obtained from an external dataset. If not given then it is assumed that no external data is required. |
| uni | Logical. Should only a univariate model be considered? Defaults to FALSE (multivariate modelling). |

plotCat *Percentage bar plots for categorical data*

Description

Percentage bar plots for categorical data

Usage

```
plotCat(dat, var, class = "class_combined")
```

Arguments

| | |
|-------|--|
| dat | Data frame holding categorical and cluster assignment data. |
| var | Character. The name of the categorical variable of interest. |
| class | Character. The name of the class assignment variable. Assumed to be "class_combined" if not manually specified |

Value

A [patchwork](#) object

rankCumulative *Rank clusters by the area under their mean trajectories*

Description

Rank clusters by the area under their mean trajectories

Usage

```
rankCumulative(model, tmax = 7, var.time = "calpro_time")
```

Arguments

| | |
|----------|--|
| model | An <code>hlme</code> object |
| tmax | Numeric. Maximum observation period. Defaults to 10 |
| var.time | Character. Name of variable used for time. Either "calpro_time" or "crp_time" Also used to determine if the LCMM has been fitted for FCAL or CRP. |

Value

A data frame with columns for the original cluster number (Original), the new rank (New), and the area calculated via the trapezoidal rule (Area).

| | |
|---------|--|
| reLabel | <i>relabel alluvial class labels ensuring consistency.</i> |
|---------|--|

Description

Relabel class labels in an alluvial data frame to ensure class labels are consistent with the class labels used models assuming fewer classes

Usage

```
reLabel(new.G, alluvial.df)
```

Arguments

| | |
|-------------|--|
| new.G | The number of classes assumed by the LCMM which is now subject to class relabelling. |
| alluvial.df | Data frame containing class assignments for subjects for differing G |

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| spaghettiPlot | <i>Spaghetti plots of each class</i> |
|---------------|--------------------------------------|

Description

Spaghetti plots of each class

Usage

```
spaghettiPlot(
  data,
  models,
  G,
  log = TRUE,
  indi = FALSE,
  multi = TRUE,
  tmax = 10,
  ylim = NULL,
  column = FALSE,
  pprob.cutoff = NA,
  sizes = FALSE,
  mapping = NULL,
  save = FALSE,
  knots = FALSE,
  knot.type = "quantiles",
  n.knots = 3,
  grbf = FALSE,
  l = 1,
  color = NULL,
  clusters = FALSE,
  external = NULL,
  var.time = "calpro_time"
)
```

Arguments

| | |
|---------------------------|--|
| <code>data</code> | Data frame used to fit the LCMM(s). |
| <code>models</code> | A list containing <code>hlme{lcmm}</code> S3 objects |
| <code>G</code> | Numeric. How many classes does the model assume? |
| <code>log</code> | Logical. Should plots be on log scale? Defaults to TRUE. |
| <code>indi</code> | Logical. Should separate plots for each class be generated? Defaults to FALSE. |
| <code>multi</code> | Logical. Should sub-plots for each class be plotted alongside each other? Defaults to TRUE. |
| <code>tmax</code> | Numeric. Maximum observation period. Defaults to 10 |
| <code>ylim</code> | Character. What should the y-axis of the plots be scaled to fit? Either NULL (default), "data", "pred", or "conf". The default uses pre-determined values for FCAL and CRP |
| <code>column</code> | Logical. Should all sub-plots be in a single column? Defaults to FALSE (two columns) |
| <code>pprob.cutoff</code> | Posterior probability cut-off for subjects to be included as trajectories |
| <code>sizes</code> | Logical. Should class sizes be given as plot titles? |
| <code>mapping</code> | Numeric vector Giving the new ordering of sub-plots. One must take into account plots are generated by column - not row. If not specified then the default class numbers will be used. |

| | |
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| save | Logical. Should sub-figure labels be generated? |
| knots | Logical. If TRUE, knot locations will be plotted as vertical lines. Defaults to FALSE |
| knot.type | Character. How are knots placed? Either "quantiles" (default) or "equal" (equally spaced). Not used if knots = FALSE. |
| n.knots | Numeric integer giving the number of knots used. Defaults to 3. Not used if knots = FALSE. |
| grbf | Logical. If TRUE, then the model is assumed to have been fitted using two Gaussian Radial basis functions. Defaults to FALSE (using natural cubic splines instead). |
| l | Numeric. Length scale constant for the Gaussian radial basis functions (not used if GRBF = FALSE) |
| color | Character. Name of variable in data to use to colour lines and points corresponding to subjects. If NULL then lines and points will be grey. |
| clusters | Logical. Are clusters given via a "class" column in data? Otherwise clusters are found from the hlme object in models[[G]]. Defaults to FALSE. |
| external | Optional data frame providing mean cluster estimates from <code>predictY{lcmm}</code> . Intended to be used with outputs from models applied to an external cohort. Columns should be "time", "Ypred", "CI1", and "CI2". |
| var.time | Character. Name of variable used for time. Either "calpro_time" or "crp_time" Also used to determine if the LCMM has been fitted for FCAL or CRP. |

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