Package ‘mixpack’

January 27, 2017

Encoding UTF-8
Title Tools to Work with Mixture Components
Version 0.3.6
Date 2015-01-26
URL http://mcomas.net/software/mixpack
Description A collection of tools implemented to facilitate the analysis of the components of a finite mixture distributions. The package has some functions to generate random samples coming from a finite mixture. The package provides a C++ implementation for the construction of a hierarchy over the components of a given finite mixture.
Depends R (>= 3.0.2)
Imports Rcpp (>= 0.11.5), mvtnorm, methods, stats
LinkingTo Rcpp, RcppArmadillo
Suggests mclust, Rmixmod, knitr, dplyr, ggplot2
License GPL
LazyData true
NeedsCompilation yes
RoxygenNote 5.0.1
VignetteBuilder knitr
Author Marc Comas-Cufí [aut, cre], Josep Antoni Martín-Fernández [aut], Glòria Mateu-Figueras [aut]
Maintainer Marc Comas-Cufí <mcomas@imae.udg.edu>
Repository CRAN
Date/Publication 2017-01-27 10:18:30

R topics documented:

  clr_coordinates ......................................................... 2
  clr_mixnorm ............................................................. 2
clr_coordinates

Description
clr coordinates of compositional data

Usage
clr_coordinates(X)

Arguments
X compositional sample

clr_mixnorm
CLR evaluated on gaussian mixture model posteriors of X

Description
CLR evaluated on gaussian mixture model posteriors of X

Usage
clr_mixnorm(X, Pi, Mu, Sigma)
cluster_partition

Arguments
X dataframe where density function is evaluated  
Pi a vector indicating the mixing proportions  
Mu a two dimensional array where second component indicates the mean of each gaussian component  
Sigma a three dimensional array where third component indicates the variance of each gaussian component

classifier_partition Create a cluster from a partition

Description
Given a matrix of tau and a partition decide in which part is classified each observation

Usage
cluster_partition(tau, partition)

Arguments
tau matrix of posterioris  
partition list of vectors containing the partition

dmixnorm Density function of specified gaussian mixture model.

Description
Density function of specified gaussian mixture model.

Usage
dmixnorm(x, Pi, Mu, S, part = 1:length(Pi), closure = TRUE)

Arguments
x vector/matrix where density function is evaluated  
Pi a vector indicating the mixing proportions  
Mu a two dimensional array where second component indicates the mean of each gaussian component  
S a three dimensional array where third component indicates the variance of each gaussian component  
part subcomposition where x shoud be evaluated. Take into an account that if x has dimensions K, K components must be selected by part  
closure are probabilities Pi summing up to 1 (default TRUE)
**get_hierarchical_partition**

*Build a hierchical partition from posterior probabilities*

**Description**

This function applies the methodology described in [citar article] to build a hierarchy of classes using the weights or probabilities that an element belongs to each class.

**Usage**

```r
get_hierarchical_partition(post, omega, lambda, f_omega = NULL, f_lambda = NULL)
```

**Arguments**

- `post` : data frame of probabilities/weights (tau must be strictly positive)
- `omega` : String giving the function name used to build the hierarchy. Available functions are: entr, prop, dich
- `lambda` : String giving the function name used to build the hierarchy. Available functions are: entr, demp, demp.mod, coda, coda.norm, prop

**Examples**

```r
require(mclust)
mod1 = Mclust(iris[,1:4])
get_hierarchical_partition(post, omega, lambda, f_omega = NULL, f_lambda = NULL)
```
get_random_hierarchical_partition

Build a hierarchical partition randomly from given K

Description
This function return a hierachical partition contructed randonmly.

Usage
get_random_hierarchical_partition(K)

Arguments
K  number of initial groups

ilr_basis  Orthonormal basis for the Simplex space

Description
Basis from the simplex space with $D$ components

Usage
ilr_basis(D)

Arguments
D  number of components
ilr_coordinates  Coordinates for an orthonormal basis

Description

Coordinates respect basis ilr_basis

Usage

ilr_coordinates(X)

Arguments

X  compositional sample

merge_components  Build a hierachical partition randomly from given K

Description

This function returns a hierarchical partition constructed randomly.

Usage

merge_components(post, a, b)

Arguments

post  posterior probability matrix
a  first component to merge
b  second component to merge

Value

A matrix of posterior probabilities where components a and b are merged
### Description

Merging components step

### Usage

```r
merge_step(post, omega, lambda, f_omega = NULL, f_lambda = NULL)
```

### Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>post</td>
<td>Matrix with the posterior probabilities</td>
</tr>
<tr>
<td>omega</td>
<td>String giving the function name used to build the hierarchy. Available functions are: entr, prop, dich</td>
</tr>
<tr>
<td>lambda</td>
<td>String giving the function name used to build the hierarchy. Available functions are: entr, demp, demp.mod, coda, coda.norm, prop</td>
</tr>
<tr>
<td>f_omega</td>
<td>function with two parameters (v_t, a). Parameter v_t is a vector of probabilities, parameter a is the a selected class. omega(v_t, a) gives the representativeness of element with probabilities v_t to class a</td>
</tr>
<tr>
<td>f_lambda</td>
<td>function with three parameters (v_t, a, b). Parameter v_t is a vector of probabilities, parameters a and b are classes to be combined</td>
</tr>
</tbody>
</table>

### Value

`partition` returns a matrix with all values for all possible mergings using functions ‘omega’ and ‘lambda’

### Description

`mixpack`
Random sample generated from an specified gaussian mixture model.

Usage

rmixnorm(n, pi[, mu, s[, labels = FALSE]])

Arguments

n Sample size
Pi A vector indicating the mixing proportions
mu A two dimensional array where second component indicates the mean of each
gaussian component
s A three dimensional array where third component indicates the variance of each
gaussian component
labels A logical indicating whether or not a label should be returned indicating the
component from where observation has been generated (default FALSE)

Value

A matrix with n row and columns given by the dimension of mu and s. If labels = T another
column is included indicating the component from where the observation was generated.

Examples

Pi = c(0.5, 0.3, 0.2)
mu = array(c(## Mu first component
5, 5,
## Mu second component
1, 1,
## Mu third component
0, 0), dim = c(2,3))
s = array(c(## Sigma first component
1, 0,
0, 1,
## Sigma second component
0.2, 0,
0, 0.2,
## Sigma third component
0.05, 0,
0, 0.05), dim = c(2, 2, 3))
X = rmixnorm(100, Pi = Pi, Mu = mu, S = s, labels = TRUE)
plot(X[,1:2], col=X[,3])
**rmixnorm_solution**

Random sample generated from a specified Gaussian mixture model.

**Description**

The parameters are defined from the parameters obtained using other packages (``mclust``, ``rmixmod``).

**Usage**

```r
rmixnorm_solution(n, solution, ...)  
```

**Arguments**

- `n` sample size
- `solution` solution coming from packages `mclust` or `rmixmod`
- `...` arguments passed to function `rmixnorm`

**Examples**

```r
require(mclust)
mod1 = Mclust(iris[,1:4])
rmixnorm_solution(10, mod1)
```
Index

clr_coordinates, 2
clr_mixnorm, 2
cluster_partition, 3

dmixnorm, 3, 4
dmixnorm_solution, 4

get_hierarchical_partition, 4
get_random_hierarchical_partition, 5

ilr_basis, 5, 6
ilr_coordinates, 6

merge_components, 6
merge_step, 7
mixpack, 7
mixpack-package (mixpack), 7

rmixnorm, 8, 9
rmixnorm_solution, 9