Package 'SAGMM'

October 12, 2022

Type Package

Title Clustering via Stochastic Approximation and Gaussian Mixture Models

Version 0.2.4

Date 2019-06-29

Author Andrew T. Jones, Hien D. Nguyen

Maintainer Andrew T. Jones <andrewthomasjones@gmail.com>

Description
Computes clustering by fitting Gaussian mixture models (GMM) via stochastic approximation following the methods of Nguyen and Jones (2018) <doi:10.1201/9780429446177>. It also provides some test data generation and plotting functionality to assist with this process.

License GPL-3

Encoding UTF-8

Imports Rcpp (>= 0.12.13), MixSim, mclust, stats, lowmemtkmeans

LinkingTo Rcpp, RcppArmadillo

RoxygenNote 6.1.1

Suggests testthat, ggplot2

NeedsCompilation yes

Repository CRAN

Date/Publication 2019-06-29 05:50:12 UTC

R topics documented:

`gainFactors` *Return Gamma, a sequence of gain factors*

Description

Generate a series of gain factors.

Usage

```
gainFactors(Number, Burnin)
```

Arguments

`Number`	Number of values required.
`Burnin`	Number of 'Burnin' values at the beginning of sequence.

Value

Gamma, a vector of gain factors.

Examples

```
g<-gainFactors(10^4, 2*10^3)
```

`generateSimData` *Generate data for simulations to test the SAGMM package..*

Description

This function is primarily a convienence wrapper for MixSim.

Usage

```
generateSimData(ngroups = 5, Dimensions = 5, Number = 10^4)
```

Arguments

`ngroups`	Number of mixture components. Default 5.
`Dimensions`	number of Dimensions. Default 5.
`Number`	number of samples. Default 10^4.

Value

List of results: X, Y, simobject.

Examples

```
sims<-generateSimData(ngroups=10, Dimensions=10, Number=10^4)
sims<-generateSimData()
```

SAGMM *SAGMM: A package for Clustering via Stochastic Approximation and Gaussian Mixture Models.*

Description

The SAGMM package allows for computation of gaussian mixture models using stochastic approximation to increase efficiency with large data sets. The primary function `SAGMMFit` allows this to be performed in a relative flexible manner.

Author(s)

Andrew T. Jones and Hien D. Nguyen

References

Nguyen & Jones (2018). Big Data-Appropriate Clustering via Stochastic Approximation and Gaussian Mixture Models. In Data Analytics (pp. 79-96). CRC Press.

SAGMMFit *Clustering via Stochastic Approximation and Gaussian Mixture Models (GMM)*

Description

Fit a GMM via Stochastic Approximation. See Reference.

Usage

```
SAGMMFit(X, Y = NULL, Burnin = 5, ngroups = 5, kstart = 10,
  plot = FALSE)
```

Arguments

`X`	numeric matrix of the data.
`Y`	Group membership (if known). Where groups are integers in 1:ngroups. If provided ngroups can
`Burnin`	Ratio of observations to use as a burn in before algorithm begins.
`ngroups`	Number of mixture components. If Y is provided, and groups is not then is overridden by Y.
`kstart`	number of kmeans starts to initialise.
`plot`	If TRUE generates a plot of the clustering.

Value

A list containing

`Cluster`	The clustering of each observation.
`plot`	A plot of the clustering (if requested).
`l2`	Estimate of Lambda^2
`ARI1`	Adjusted Rand Index 1 - using k-means
`ARI2`	Adjusted Rand Index 2 - using GMM Clusters
`ARI3`	Adjusted Rand Index 3 - using intialiation k-means
`KM`	Initial K-means clustering of the data.
`pi`	The cluster proportions (vector of length ngroups)
`tau`	tau matrix of conditional probabilities.
`fit`	Full output details from inner C++ loop.

Author(s)

Andrew T. Jones and Hien D. Nguyen

References

Nguyen & Jones (2018). Big Data-Appropriate Clustering via Stochastic Approximation and Gaussian Mixture Models. In Data Analytics (pp. 79-96). CRC Press.

Examples

```
sims<-generateSimData(ngroups=10, Dimensions=10, Number=10^4)
res1<-SAGMMFit(sims$X, sims$Y)
res2<-SAGMMFit(sims$X, ngroups=5)
```

Index