Package 'bpgmm'

May 8, 2026

Type Package

Title Bayesian Model Selection Approach for Parsimonious Gaussian Mixture Models

Version 1.1.1

Date 2025-10-30

Depends R(>= 3.1.0)

Imports methods (>= 3.5.1), mcmcse (>= 1.3-2), pgmm (>= 1.2.3), mvtnorm (>= 1.0-10), MASS (>= 7.3-51.1), Rcpp (>= 1.0.1), gtools (>= 3.8.1), label.switching (>= 1.8), fabMix (>= 5.0), mclust (>= 5.4.3)

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Description Model-based clustering using Bayesian parsimonious Gaussian mixture models. MCMC (Markov chain Monte Carlo) are used for parameter estimation. The RJMCMC (Reversible-jump Markov chain Monte Carlo) is used for model selection. GREEN et al. (1995) <doi:10.1093/biomet/82.4.711>.

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Encoding UTF-8

RoxygenNote 7.3.2

Suggests testthat

LinkingTo Rcpp, RcppArmadillo

NeedsCompilation yes

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Repository CRAN

Date/Publication 2025-10-30 15:40:02 UTC

Contents

`CalculateProposalLambda` *CalculateProposalLambda*

Description

CalculateProposalLambda

Usage

```
CalculateProposalLambda(hparam, thetaYList, CxyList, constraint, m, p, qVec)
```

Arguments

`hparam`	hparam
`thetaYList`	thetaYList
`CxyList`	CxyList
`constraint`	constraint
`m`	the number of clusters
`p`	the number of features
`qVec`	the vector of the number of factors in each clusters

`CalculateProposalPsy` *CalculateProposalPsy*

Description

CalculateProposalPsy

Usage

```
CalculateProposalPsy(hparam, thetaYList, CxyList, constraint, m, p, qVec)
```

Arguments

`hparam`	hparam
`thetaYList`	thetaYList
`CxyList`	CxyList
`constraint`	constraint
`m`	the number of clusters
`p`	the number of features
`qVec`	the vector of the number of factors in each clusters

`EvaluateProposalLambda` *EvaluateProposalLambda*

Description

EvaluateProposalLambda

Usage

```
EvaluateProposalLambda(
  hparam,
  thetaYList,
  CxyList,
  constraint,
  newlambda,
  m,
  qVec,
  p
)
```

Arguments

hparam	hparam
thetaYList	thetaYList
CxyList	CxyList
constraint	constraint
newlambda	newlambda
m	the number of clusters
qVec	the vector of the number of factors in each clusters
p	the number of features

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generatePriorLambda *generatePriorLambda*

Description

evaluate prior value for parameter Lambda

Usage

```
generatePriorLambda(p, m, alpha2, qVec, psy, constraint)
```

Arguments

p	the number of features
m	the number of clusters
alpha2	hyper parameter
qVec	parameter
psy	parameter
constraint	parameter

generatePriorPsi *generatePriorPsi*

Description

generate prior value for parameter Psi

Usage

```
generatePriorPsi(p, m, delta, bbeta, constraint)
```

Arguments

p	the number of features
m	the number of clusters
delta	hyperparameters
bbeta	hyperparameters
constraint	the pgmm constraint, a vector of length three with binary entry. For example, c(1,1,1) means the fully constraint model

generatePriorThetaY *PriorThetaY list*

Description

generate prior value for parameter Theta and Y.

Usage

```
generatePriorThetaY(m, n, p, muBar, hparam, qVec, ZOneDim, constraint)
```

Arguments

m	the number of cluster
n	sample size
p	number of covariates
muBar	parameter
hparam	hyperparameters
qVec	the vector of the number of factors in each clusters
ZOneDim	ZOneDim
constraint	constraint

Hparam-class *An S4 class to represent a Hyper parameter.*

Description

An S4 class to represent a Hyper parameter.

Slots

`alpha1` A numeric value

`alpha2` A numeric value

`delta` A numeric value

`ggamma` A numeric value

`bbeta` A numeric value

pgmmRJMCMC *bpgmm Model-Based Clustering Using Baysian PGMM Carries out model-based clustering using parsimonious Gaussian mixture models. MCMC are used for parameter estimation. The RJMCMC is used for model selection.*

Description

bpgmm Model-Based Clustering Using Baysian PGMM Carries out model-based clustering using parsimonious Gaussian mixture models. MCMC are used for parameter estimation. The RJMCMC is used for model selection.

Usage

```
pgmmRJMCMC(
  X,
  mInit,
  mVec,
  qnew,
  delta = 2,
  ggamma = 2,
  burn = 20,
  niter = 1000,
  constraint = C(0, 0, 0),
  dVec = c(1, 1, 1),
  sVec = c(1, 1, 1),
  Mstep = 0,
  Vstep = 0,
  SCind = 0
)
```

Arguments

X	the observation matrix with size p * m
mInit	the number of initial clusters
mVec	the range of the number of clusters
qnew	the number of factor for a new cluster
delta	scaler hyperparameters
ggamma	scaler hyperparameters
burn	the number of burn in iterations
niter	the number of iterations
constraint	the pgmm initial constraint, a vector of length three with binary entry. For example, c(1,1,1) means the fully constraint model
dVec	a vector of hyperparameters with length three, shape parameters for alpha1, alpha2 and bbeta respectively
sVec	sVec a vector of hyperparameters with length three, rate parameters for alpha1, alpha2 and bbeta respectively
Mstep	the indicator of whether do model selection on the number of clusters
Vstep	the indicator of whether do model selection on variance structures
SCind	the indicator of whether use split/combine step in Mstep

---

`stayMCMCupdate` *stayMCMCupdate*

Description

stayMCMCupdate

Usage

```
stayMCMCupdate(
  X,
  thetaYList,
  ZOneDim,
  hparam,
  qVec,
  qnew,
  dVec,
  sVec,
  constraint,
  clusInd
)
```

Arguments

X	X
thetaYList	thetaYList
ZOneDim	ZOneDim
hparam	hparam
qVec	qVec
qnew	qnew
dVec	dVec
sVec	sVec
constraint	constraint
clusInd	clusInd

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summerizePgmmRJMCMC *summerizePgmmRJMCMC*

Description

summerizePgmmRJMCMC

Usage

```
summerizePgmmRJMCMC(pgmmResList, trueCluster = NULL)
```

Arguments

pgmmResList	result list from pgmmRJMCMC
trueCluster	true cluster allocation

ThetaYList *ThetaYList-class*

Description

Definiton of ThetaYList parameter sets

Slots

tao A numeric vector

psy A list value

M A list value

lambda A list value

Y A list value

`toEthetaYlist` *Title*

Description

Title

Usage

```
toEthetaYlist(NEthetaYList, NEZOneDim, qnew, clusInd)
```

Arguments

`NEthetaYList`	NEthetaYList
`NEZOneDim`	NEZOneDim
`qnew`	qnew
`clusInd`	clusInd

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