Package ‘mcfa’

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Type Package
Title Fits mixture of common factor analyzers to a given data set.
Version 1.2
Date 2015-04-09
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Description Mixtures of factor analyzers enable model-based density estimation to be undertaken for high-dimensional data, where the number of observations is not very large relative to their dimension. The use of common component-factor loadings further reduces the number of parameters required to estimate. Moreover, it allows the data to be displayed in low-dimensional plots
License GPL

R topics documented:

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mcfa-package Mixture of Common Factor Analyzers

Description

Fits a mixture of common factor analyzers model to a data set

Details

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mcfa(Y, g, q)

Author(s)
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References

mcfa

Mixture of Common Factor Analyzers

Description
Fits a mixture of common factor analyzers model to a data set

Usage
mcfa(Y, g, q, ...)  
## Default S3 method:  
mcfa(Y, g, q, itmax=50, nkmeans=20, nrandom=20, tol=1.e-5,  
    initClust=NULL, initMethod='eigenA', convMeas='diff',  
    errorMsg=FALSE, ...)  
## S3 method for class 'mcfa'  
print(x, ...)  
## S3 method for class 'mcfa'  
summary(object, ...)  
## S3 method for class 'mcfa'  
plot(x, ...)  
## S3 method for class 'mcfa'  
predict(object, x, ...)

Arguments
Y    data.frame or a matrix of data matrix (samples in rows)
x, object An object of class "mcfa", an object returned from mcfa function.
g    number of components
q    number of factors
itmax maximum number of EM iterations
nkmeans  number of k-means starts
nrandom  number of random starts
tol      EM steps terminates if the measure of convergence falls below this value
initClust Option to provide initial clustering of the samples
initMethod determine how the initial parameter values are computed. See Details.
convMeas  If 'ratio', then the convergence of the EM steps are measured using the
          \(|L^{(k+1)} - L^{(k)}/L^{(k+1)}|\). The default 'diff' stops the EM iterations if
          \(|L^{(k+1)} - L^{(k)}| < tol\)
errorMsg Returns error messages.
...  not used.

Details
The default is 'eigenA' which initialize the columns of the loading vector A as the first q eigen
vectors of the \(Y^T Y\). Use initMethod = "randA" for the procedure used by Baek et al. (2010).

Value
pivec    component probabilities
A        factor loading matrix
xi       matrix of factor mean vectors
omega    array of factor covariance matrices
D        matrix of error covariance matrix
U        array of estimated u_ij vectors for all components
UC       matrix of estimated u_ij vectors according to cluster labels
Fmat     matrix of estimated factor score vectors
clust    cluster label determined by MCFA
tau      posterior probabilities
logL     log-likelihood
BIC      Bayesian Information Criteria
ERRMSG   Error Message

References
Factor Loadings: Applications to the Clustering and Visualisation of High-Dimensional Data. IEEE
Transactions on Pattern Analysis and Machine Intelligence, 32, 1298-1309.

the clustering and visualisation of high-dimensional data. Technical Report NI08018-SCH, Preprint
Examples

```r
require(MASS)
mu1 <- c(0,0,0)
sig1 <- rbind(c(4,1.8,0.8), c(-1.8, 2, 0.9), c(-1, 0.9,2))
mu2 <- c(2,2,6)
sig2 <- rbind(c(4,1.8,0.8), c(1.8, 2, 0.5), c(0.8, 0.5, 2))
Y1 <- mvrnorm(100, mu1, sig1)
Y2 <- mvrnorm(100, mu2, sig2)
Y <- rbind(Y1,Y2)
mcfa.fit<-mcfa(Y, g=2, q=2, itmax=250, nkmeans=5, nrandom=5, tol=1.e-3)
plot(mcfa.fit)
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