Package 'PLFD'

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Type Package

Title Portmanteau Local Feature Discrimination for Matrix-Variate Data

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Description The portmanteau local feature discriminant approach first identifies
the local discriminant features and their differential structures,
then constructs the discriminant rule by pooling the identified local
features together. This method is applicable to high-dimensional
matrix-variate data.

Depends R (>= 3.5.0)

Imports Rcpp (>= 1.0.2), mathjaxr

LinkingTo Rcpp (>= 1.0.2), RcppArmadillo (>= 0.9.800)

URL https://gitee.com/xu-zc/PLFD

BugReports https://gitee.com/xu-zc/PLFD/issues

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Suggests knitr, rmarkdown, markdown

RdMacros mathjaxr

VignetteBuilder knitr

R topics documented:

plfd	*PLFD*

Description

A portmanteau local feature discrimination (PLFD) approach to the classification with high-dimensional matrix-variate data.

Usage

```
plfd(x1, x2, r0, c0, blockList, blockMode = NULL, permNum = 100, alpha = 0)
```

Arguments

x1	Array of $r \times c \times n_1$, samples from group 1.
x2	Array of $r \times c \times n_2$, samples from group 2.
r0, c0	Row and column size of blocks. See details.
blockList	List including the index set of pre-specified blocks. See details.
blockMode	How the differential structure of M1-M2 are detected. The default (blockMode=NULL) does NOT detect the structure of feature blocks. If blockMode="fd"(or "forward"), a forward stepwise procedure is conducted to detect the nonzero positions of feature blocks, wherein BIC serves as the stopping rule.
permNum	Round of permutation.
alpha	The upper-α quantile of the permutation statistic.

Details

There are two ways to specify the blocks under consideration. In the case that the matrix-variate is partition into non-overlapping blocks that share the common row size and column size, these sizes can be specified by r0 and c0. Otherwise, the blocks can be flexibly specified by parameter blockList, which should be a list in which each element includes rIdx and cIdx corresponding to the row and column index set of a block. See examples.

Value

List,

- paras List of the parameters of feature blocks.
- y Self-predicted results for training data. It is a matrix of $(n_1 + n_2) \times 2$, the first column is the scores and the second column is the predicted labels.
- mcr The self-predicted misclassification rate for training samples.
- ytest.hat The predicted result for xtest if it is provided. It is a matrix where the first column is scores and the second column is predicted group.
- mcr.test The misclassification rate for xtest if ytest is provided.

References

Z. Xu, S. Luo and Z. Chen. (2021). A Portmanteau Local Feature Discrimination Approach to the Classification with High-dimensional Matrix-variate Data. Sankhya A. doi: 10.1007/s13171021-002552

Examples

```
set.seed(2020)
rDim <- 20
cDim <- 20

n1 <- n2 <- 50
x1 <- array(rnorm(rDim*cDim*n1, mean=0.0), dim=c(rDim, cDim, n1))
x2 <- array(rnorm(rDim*cDim*n2, mean=1.0), dim=c(rDim, cDim, n2))

ntest <- 50
xtest <- array(rnorm(rDim*cDim*ntest, mean=1.0), dim=c(rDim, cDim, ntest))
ytest <- rep(2, ntest)

## Uniform partition
print( plfd(x1, x2, r0=5, c0=5) )

## Pre-specify feature blocks
blockList <- list(list(rIdx=1:5, cIdx=1:5),
                  list(rIdx=6:10, cIdx=1:5),
                  list(rIdx=3:9, cIdx=2:8))
print( plfd.model <- plfd(x1, x2, blockList=blockList) )

## Predict
predict(plfd.model, xtest, ytest)
```

---

predict.plfd   *Predict Method for* `plfd`

Description

Predict Method for `plfd`

Usage

```
## S3 method for class 'plfd'
predict(object, x, y, ...)
```

Arguments

object	plfd object.
x	The samples to be predicted.
y	Vector (optional). Labels of x with value 1 or 2.
...	Ignored currently.

Value

list(W,y.hat,mcr), wherein W refers to the discriminant scores, y.hat refers to the predicted labels and mcr is the misclassification rate when y is available.

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print.plfd *Print Method for* plfd

Description

Print Method for plfd

Usage

```
## S3 method for class 'plfd'
print(x, ...)
```

Arguments

x   plfd object.

...   Ignored currently.

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