Package 'RobPC'

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Type Package

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Title Robust Panel Clustering Algorithm

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Description Performs both classical and robust panel clustering by applying Principal Component Analysis (PCA) for dimensionality reduction and clustering via standard K-Means or Trimmed K-Means. The method is designed to ensure stable and reliable clustering, even in the presence of outliers. Suitable for analyzing panel data in domains such as economic research, financial time-series, healthcare analytics, and social sciences. The package allows users to choose between classical K-Means for standard clustering and Trimmed K-Means for robust clustering, making it a flexible tool for various applications. For this package, we have benefited from the studies Rencher (2003), Wang and Lu (2021) <DOI:10.25236/AJBM.2021.031018>, Cuesta-Albertos et al. (1997) <https://www.jstor.org/stable/2242558?seq=1>.

License GPL-2

Depends R (>= 4.0)

Imports stats, trimcluster

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NeedsCompilation no

Repository CRAN

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RobPC *Robust Panel Clustering Algorithm*

Description

Robust Panel Clustering Algorithm

Usage

```
RobPC(data, k, robclust = FALSE, trim = 0.25)
```

Arguments

data	the panel data. It must be array.
k	the number of clusters.
robclust	a logical arguments. If robclust=TRUE, the function implements the robust panel clustering analysis. Otherwise, it implements the traditional panel clustering analysis. The default value is robclust=TRUE.
trim	numeric between 0 and 1. Proportion of points to be trimmed. The default value is 0.25.

Details

RobPC function implements the traditional or robust panel clustering analysis without being affected by outliers in the panel data.

Value

a list with 2 elements:

clusters	integer vector coding cluster membership. If robclust=TRUE, this vector includes codes as k+1 to define outliers clusters.
clustering_method	The used clustering method which is "Robust Panel Clustering" or "Panel Clustering".

Author(s)

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References

Bulut et al. (Unpublished). A Robust Clustering Algorithms for Panel Data.

Wang, W., & Lu, Y. (2021). Application of clustering analysis of panel data in economic and social research based on R software. Acad. J. Bus. Manag, 3, 98-104.

Cuesta-Albertos, J. A., Gordaliza, A., & Matrán, C. (1997). Trimmed k-means: an attempt to robustify quantizers. The Annals of Statistics, 25(2), 553-576.

Examples

```
set.seed(123)
n_obs <- 10  # Number of observations (N)
n_time <- 5   # Number of time periods (T)
n_vars <- 3   # Number of variables (D)

data <- array(rnorm(n_obs * n_time * n_vars), dim = c(n_obs, n_time, n_vars))

# Apply the Classical Panel Clustering

   result_classic <- RobPC(data,k=3,robclust = FALSE)
   result_classic

# Apply the Robust Panel Clustering

   result_robust<- RobPC(data,k=3,robclust = TRUE,trim=0.2)
   result_robust
```

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