

Package ‘PPSFS’

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Type Package

Title Partial Profile Score Feature Selection in High-Dimensional
Generalized Linear Interaction Models

Version 0.1.3

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Description This is an implementation of the partial profile score feature selection (PPSFS) approach to generalized linear (interaction) models. The PPSFS is highly scalable even for ultra-high-dimensional feature space. See the paper by Xu, Luo and Chen (2022) <doi:10.4310/21-SII706>.

URL <https://github.com/paradoxical-rhapsody/PPSFS>

BugReports <https://github.com/paradoxical-rhapsody/PPSFS/issues>

Imports Rcpp, brglm2, stats

LinkingTo Rcpp, RcppArmadillo

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Repository CRAN

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Description

ppsfs: PPSFS for **main-effects**.

ppsfsi: PPSFS for **interaction effects**.

Usage

```
ppsfs(
  x,
  y,
  family,
  keep = NULL,
  I0 = NULL,
  ...,
  ebicFlag = 1,
  maxK = min(NROW(x) - 1, NCOL(x) + length(I0)),
  verbose = FALSE
)
```

```
ppsfsi(
  x,
  y,
  family,
  keep = NULL,
  ...,
  ebicFlag = 1,
  maxK = min(NROW(x) - 1, choose(NCOL(x), 2)),
  verbose = FALSE
)
```

Arguments

x	Matrix.
y	Vector.
family	See glm and family .
keep	Initial set of features that are included in model fitting.
I0	Index set of interaction effects to be identified.
...	Additional parameters for glm.fit .
ebicFlag	The procedure stops when the EBIC increases after ebicFlag times.
maxK	Maximum number of identified features.
verbose	Print the procedure path?

Details

That `ppsfs(x, y, family="gaussian")` is an implementation to *sequential lasso* method proposed by Luo and Chen(2014) [doi:10.1080/01621459.2013.877275](https://doi.org/10.1080/01621459.2013.877275).

Value

Index set of identified features.

References

Z. Xu, S. Luo and Z. Chen (2022). Partial profile score feature selection in high-dimensional generalized linear interaction models. *Statistics and Its Interface*. [doi:10.4310/21-SII706](https://doi.org/10.4310/21-SII706)

Examples

```
## *****
## Identify main-effect features
## *****
set.seed(2022)
n <- 300
p <- 1000
x <- matrix(rnorm(n*p), n)
eta <- drop( x[, 1:3] %*% runif(3, 1.0, 1.5) )
y <- eta + rnorm(n, sd=sd(eta)/5)
print( A <- ppsfs(x, y, 'gaussian', verbose=TRUE) )

## *****
## Identify interaction effects
## *****
set.seed(2022)
n <- 300
p <- 150
x <- matrix(rnorm(n*p), n)
eta <- drop( cbind(x[, 1:3], x[, 4:6]*x[, 7:9]) %*% runif(6, 1.0, 1.5) )
y <- eta + rnorm(n, sd=sd(eta)/5)
print( group <- ppsfsi(x, y, 'gaussian', verbose=TRUE) )
print( A <- ppsfs(x, y, "gaussian", I0=group, verbose=TRUE) )

print( A <- ppsfs(x, y, "gaussian", keep=c(1, "5:8"),
                 I0=group, verbose=TRUE) )
```

Description

This is a simplified but more stable implementation for main-effects selection compared to [ppsfs](#). It removes the standardization, but adds the weights in the partial profile score.

Usage

```
ppsfs.fit(
  x,
  y,
  family,
  fitFun = glm.fit,
  ...,
  keep = NULL,
  maxK = NULL,
  verbose = FALSE
)
```

Arguments

x	Matrix.
y	Vector.
family	See glm and family .
fitFun	Fitting function, by default glm.fit .
...	Additional parameters for glm.fit .
keep	Initial index set of features that are included in model fitting.
maxK	Maximum number of identified features.
verbose	Print the feature path?

Details

That `ppsfs(x, y, family="gaussian")` is an implementation to sequential lasso method proposed by Luo and Chen(2014) [doi:10.1080/01621459.2013.877275](https://doi.org/10.1080/01621459.2013.877275).

References

Z. Xu, S. Luo and Z. Chen (2022). Partial profile score feature selection in high-dimensional generalized linear interaction models. *Statistics and Its Interface*. [doi:10.4310/21-SII706](https://doi.org/10.4310/21-SII706)

Examples

```
set.seed(2025)
n <- 300
p <- 1000
x <- matrix(rnorm(n*p), n)
eta <- drop( x[, 1:3] %*% runif(3, 1.0, 1.5) )
y <- eta + rnorm(n, sd=sd(eta)/5)
print( A <- ppsfs.fit(x, y, 'gaussian', verbose=TRUE) )
```

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