Package: visaOTR (via r-universe)

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Title Valid Improved Sparsity A-Learning for Optimal Treatment Decision

Version 0.1.0

Type Package

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Description Valid Improved Sparsity A-Learning (VISA) provides a new method for selecting important variables involved in optimal treatment regime from a multiply robust perspective. The VISA estimator achieves its success by borrowing the strengths of both model averaging (ARM, Yuhong Yang, 2001) <doi:10.1198/016214501753168262> and variable selection (PAL, Chengchun Shi, Ailin Fan, Rui Song and Wenbin Lu, 2018) <doi:10.1214/17-AOS1570>. The package is an implementation of Zishu Zhan and Jingxiao Zhang. (2022+).

License GPL-3

Encoding UTF-8

RoxygenNote 7.2.0

Imports Rglpk, e1071, kernlab, Matrix, mboost, randomForest, stats, xgboost

Depends R (>= 3.5.0)

LazyData true

NeedsCompilation no

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Contents

visa.est *Valid Improved Sparsity A-Learning for Optimal Treatment Decision*

Description

Valid Improved Sparsity A-Learning for Optimal Treatment Decision

Usage

```
visa.est(
  y,
  x,
  a,
  IC = c("BIC", "CIC", "VIC"),
  kap = NULL,
  lambda.list = exp(seq(-3.5, 2, 0.1)),
  refit = TRUE
)
```

Arguments

y	Vector of response (the larger the better)
x	Matrix of model covariates.
a	Vector of treatment received. It is a 0/1 index vector representing the subject is in control/treatment group. For details see Example section.
IC	Information criterion used in determining the regularization parameter. Users can choose among BIC, CIC and VIC.
kap	The model complexity penalty used in the information criteria. By default, kappa = 1 if BIC or CIC is used and kap = 4 if VIC is used.
lambda.list	A list of regularization parameter values. Default is exp(seq(-3.5, 2, 0.1))
refit	logical. If TRUE, the coefficients should be refitted using A-learning estimating equation. Default is TRUE.

Details

See the paper provided in Reference section.

Value

an object of class "visa" is a list containing at least the following components:

beta.est	A vector of coefficients of optimal treatment regime.
pi.est	A vector of estimated propensity score.
h.est	A vector of estimated baseline function.

References

Shi, C., Fan, A., Song, R. and Lu, W. (2018) High-Dimensional A-Learing for Optimal Dynamic Treatment Regimes. *Annals of Statistics,* **46:** 925-957. DOI:10.1214/17-AOS1570

Shi, C.,Song, R. and Lu, W. (2018) Concordance and Value Information Criteria for Optimal Treatment Decision. *Annals of Statistics,* **49:** 49-75. DOI:10.1214/19-AOS1908

Zhan, Z. and Zhang, J. (2022+) Valid Improved Sparsity A-learning for Optimal Treatment Decision. Under review.

Examples

```
data(visa_SimuData)
y = visa_SimuData$y
a = visa_SimuData$a
x = visa_SimuData$x
# estimation
result <- visa.est(y, x, a, IC = "BIC", lambda.list = c(0.1, 0.5))
result$beta.est
result$pi.est
result$h.est
```

`visa_SimuData` *visa_SimuData*

Description

An Example of Simulated Data for visa

Usage

```
visa_SimuData
```

Format

The dataset visa_SimuData contains n = 50 samples with p = 10 covariates and treatment variable

y the response

x the covariates

a the treatment received

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