Package 'clogitboost'

October 12, 2022

Type Package

Title Boosting Conditional Logit Model

Version 1.1

Date 2015-12-09

Author Haolun Shi and Guosheng Yin

Maintainer Haolun Shi <shl2003@connect.hku.hk>

Description A set of functions to fit a boosting conditional logit model.

License GPL (>= 2)

Imports Rcpp (>= 0.11.6)

LinkingTo Rcpp

LazyData True

NeedsCompilation yes

Repository CRAN

Date/Publication 2015-12-21 08:54:58

R topics documented:

clogitboost *Boosting conditional logit model*

Description

Fit a boosting conditional logit model using componentwise smoothing spline.

Usage

```
clogitboost(y, x, strata, iter, rho)
```

Arguments

y	vector of binary outcomes.
x	matrix or data frame with each column being a covariate.
strata	vector of group membership, i.e., items in the same group have the same value.
iter	number of iterations.
rho	learning rate parameter in the boosting algorithm.

Value

The function clogitboost returns the following list of values:

call	original function call.
func	list of fitted spline functions.
index	list of indices indicating which covariate is used as input for the smoothing spline.
theta	list of fitted coefficients in the conditional logit models.
loglike	sequence of fitted values of log-likelihood.
infscore	relative influence score for each covariate.
rho	learning rate parameter, which typically takes a value of 0.05 or 0.1.
xmax	maximal element of each covariate.
xmin	minimal element of each covariate.

Author(s)

Haolun Shi <shl2003@connect.hku.hk>

Guosheng Yin <gyin@hku.hk>

See Also

plot.clogitboost

predict.clogitboost

Examples

```
data(travel)
train <- 1:504
y <- travel$MODE[train]
x <- travel[train, 3:6]
strata <- travel$Group[train]
fit <- clogitboost(y = y, x = x, strata = strata, iter = 10, rho = 0.05)
```

`marginal` *Marginal utility for clogitboost objects*

Description

`marginal` function for the `clogitboost` objects, which produces the marginal utility values of a covariate.

Usage

```
marginal(x, grid, d)
```

Arguments

`x`	output object from the `clogitboost` function.
`d`	integer indicating which covariate is used.
`grid`	grid of values for predicting the marginal utilities.

Value

The method `marginal` returns a vector of predicted marginal utilities based on the grid input.

Author(s)

Haolun Shi <shl2003@connect.hku.hk>

Guosheng Yin <gyin@hku.hk>

See Also

`clogitboost`

Examples

```
data(travel)
train <- 1:504
y <- travel$MODE[train]
x <- travel[train, 3:6]
strata <- travel$Group[train]
fit <- clogitboost(y = y, x = x, strata = strata, iter = 10, rho = 0.05)
marginal(fit, grid = seq(0, 10, by = 1), d = 1)
```

`plot.clogitboost` *Plotting after fitting a boosting conditional logit model*

Description

`plot` methods for the `clogitboost` objects, which produce marginal plots of the covariate effects.

Usage

```
## S3 method for class 'clogitboost'
plot(x, d, grid = NULL, ...)
```

Arguments

`x`	output object from the `clogitboost` function.
`d`	integer indicating which covariate is used.
`grid`	grid of values for plotting. If it is not specified, the minimal and maximal elements of the covariate are used as the two endpoints of the grid.
`...`	other options for plotting.

Author(s)

Haolun Shi <shl2003@connect.hku.hk>

Guosheng Yin <gyin@hku.hk>

See Also

`clogitboost`

Examples

```
data(travel)
train <- 1:504
y <- travel$MODE[train]
x <- travel[train, 3:6]
strata <- travel$Group[train]
fit <- clogitboost(y = y, x = x, strata = strata, iter = 10, rho = 0.05)
plot(fit, d = 1, xlab = "x", ylab = "f(x)", main = "TTIME", type = "l")
```

predict.clogitboost *Predicting after fitting a boosting conditional logit model*

Description

predict methods for the clogitboost objects, which produce marginal predictions of the covariate effects.

Usage

```
## S3 method for class 'clogitboost'
predict(object, x, strata, ...)
```

Arguments

object	output object from the clogitboost function.
x	new matrix or data frame with each column being a covariate.
strata	new vector of group memberships, i.e., items in the same group have the same value.
...	not currently used.

Value

The method predict returns the following list of values:

prob	probability of the outcome equal to 1.
utility	predicted utility.
prediction	0-1 prediction of the outcome variable.

Author(s)

Haolun Shi <shl2003@connect.hku.hk>

Guosheng Yin <gyin@hku.hk>

See Also

clogitboost

Examples

```
data(travel)
train <- 1:504
y <- travel$MODE[train]
x <- travel[train, 3:6]
strata <- travel$Group[train]
fit <- clogitboost(y = y, x = x, strata = strata, iter = 10, rho = 0.05)
predict(fit, x = travel[-train, 3:6], strata = travel$Group[-train])
```

summary.clogitboost *Summary after fitting a boosting conditional logit model*

Description

summary methods for the clogitboost objects.

Usage

```
## S3 method for class 'clogitboost'
summary(object, ...)
```

Arguments

object	output object from the clogitboost function.
...	not currently used.

Value

The function clogitboost() returns the following list of values:

call	original function call.
infscore	relative influence score for each covariate.
loglike	sequence of the fitted values of log-likelihood.

Author(s)

Haolun Shi <shl2003@connect.hku.hk>

Guosheng Yin <gyin@hku.hk>

See Also

clogitboost

Examples

```
data(travel)
train <- 1:504
y <- travel$MODE[train]
x <- travel[train, 3:6]
strata <- travel$Group[train]
fit <- clogitboost(y = y, x = x, strata = strata, iter = 10, rho = 0.05)
summary(fit)
```

`travel` *Australian travel mode choice data*

Description

The dataset is a survey result of 210 individuals' choices of travel mode between Sydney, Melbourne and New South Wales. There are four alternative choices, along with four choice-specific covaraites for each choice.

Usage

```
data("travel")
```

Format

A data frame with 840 observations on the following 6 variables.

`Group` index of the group membership.

`MODE` binary outcome of whether the item is chosen.

`TTME` terminal time.

`INVC` in-vehicle cost.

`INVT` amount of time spent traveling.

`GC` genearlized cost of travel.

Source

Greene W (2008). *Econometric Analysis, 6th edition*. Prentice Hall.

Index