

Package ‘cjbart’

May 25, 2021

Title Heterogeneous Effects Analysis of Conjoint Experiments

Version 0.1.0

Description A tool for analyzing conjoint experiments using Bayesian Additive Regression Trees (‘BART’), a machine learning method developed by Chipman, George and McCulloch (2010) <doi:10.1214/09-AOAS285>. This tool focuses specifically on estimating and visualizing the heterogeneity within marginal component effects, at the observation- and individual-level.

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Encoding UTF-8

LazyData false

RoxygenNote 7.1.1

Depends R (>= 3.6.0), BART

Imports stats, rlang, tidyr, ggplot2

Suggests testthat, knitr, cregg, rmarkdown

VignetteBuilder knitr

URL <https://github.com/tsrobinson/cjbart>

BugReports <https://github.com/tsrobinson/cjbart/issues>

NeedsCompilation no

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cjbart	<i>Generate Conjoint Model Using BART</i>
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Description

A wrapper for the [BART::pbart\(\)](#) function.

Usage

```
cjbart(data, Y, id = NULL, round = NULL, use_round = TRUE, cores = 1, ...)
```

Arguments

data	A data.frame, containing all attributes, controls, the outcome and id variables to analyze.
Y	Character string – the outcome variable
id	Character string – variable identifying individual respondents (optional)
round	Character string – variable identifying rounds of the conjoint experiment
use_round	Boolean – whether to include the round indicator column when training the BART model (default = TRUE)
cores	Integer – number of CPU cores used in model training
...	Other arguments passed to BART::pbart()

Details

Please note, cjbart currently only works for a binary outcome.

Value

A trained [BART::pbart\(\)](#) model that can be passed to [IMCE\(\)](#)

See Also

[BART::pbart\(\)](#)

Examples

```

subjects <- 5
rounds <- 2
profiles <- 2
obs <- subjects*rounds*profiles

fake_data <- data.frame(A = sample(c("a1","a2"), obs, replace = TRUE),
                       B = sample(c("b1","b2"), obs, replace = TRUE),
                       id1 = rep(1:subjects, each=rounds),
                       stringsAsFactors = TRUE)

fake_data$Y <- sample(c(0,1), obs, replace = TRUE)

cj_model <- cjbart(data = fake_data,
                  Y = "Y",
                  id = "id1")

```

IMCE

Heterogeneous Effects Analysis of Conjoint Results

Description

IMCE calculates the individual-level marginal component effects from a BART-estimated conjoint model.

Usage

```

IMCE(
  data,
  model,
  attribs,
  ref_levels,
  method = "bayes",
  alpha = 0.05,
  keep_omce = FALSE,
  cores = 1,
  skip_checks = FALSE
)

```

Arguments

<code>data</code>	A data.frame, containing all attributes, covariates, the outcome and id variables to analyze.
<code>model</code>	A model object, the result of running <code>cjbart()</code>
<code>attribs</code>	Vector of attribute names
<code>ref_levels</code>	Vector of reference levels, used to calculate marginal effects


```

        stringsAsFactors = TRUE)

fake_data$Y <- sample(c(0,1), obs, replace = TRUE)

cj_model <- cjbart(data = fake_data,
                  Y = "Y",
                  id = "id1")

## Skip if not Unix due to longer CPU time
if (.Platform$OS.type=='unix') {

  het_effects <- IMCE(data = fake_data,
                     model = cj_model,
                     attribs = c("A", "B"),
                     ref_levels = c("a1", "b1"),
                     cores = 1)

  summary(het_effects)
}

```

plot.cjbart

Plot Marginal Component Effects of a cjbart Object

Description

Plots observation-level or individual-level marginal component effects (OMCE and IMCE respectively). By default, all attribute-levels in the model are plotted.

Usage

```

## S3 method for class 'cjbart'
plot(x, covar = NULL, plot_levels = NULL, se = TRUE, ...)

```

Arguments

x	Object of class <code>cjbart</code> , the result of running <code>IMCE()</code>
covar	Character string detailing the covariate over which to analyze heterogeneous effects
plot_levels	Optional vector of conjoint attribute names to plot. If not supplied, all attributes within the conjoint model will be plotted.
se	Boolean determining whether to show an estimated 95% confidence interval
...	Additional arguments for plotting the marginal component effects (see below).

Value

Plot of marginal component effects.

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