Package ‘tbm’

October 14, 2022

Title  Transformation Boosting Machines
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Description  Boosting the likelihood of conditional and shift transformation models as introduced in doi{10.1007/s11222-019-09870-4}.
Depends  mlt (>= 1.0-6), mboost (>= 2.8-2)
Imports  variables, basefun, sandwich, coneproj, methods
Suggests  TH.data (>= 1.0-9), tram (>= 0.2-3), survival, partykit, lattice, latticeExtra, knitr, colorspace, gamlss.data, trtf
VignetteBuilder  knitr
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**Description**

Employs maximisation of the likelihood for estimation of conditional transformation models.

**Usage**

```r
ctmboost(model, formula, data = list(), weights = NULL, method = quote(mboost::mboost), ...)
```

**Arguments**

- `model`: an object of class `mlt` as returned by `mlt[mlt]`.
- `formula`: a model formula describing how the parameters of `model` depend on explanatory variables, see `mboost`.
- `data`: an optional data frame of observations.
- `weights`: an optional vector of weights.
- `method`: a call to `mboost`, `gamboost`, or `blackboost`.
- `...`: additional arguments to `method`.

**Details**

The parameters of `model` depend on explanatory variables in a possibly structured additive way (see Hothorn, 2020). The number of boosting iterations is a hyperparameter which needs careful tuning.

**Value**

An object of class `ctmboost` with `predict` and `logLik` methods.

**References**


**Examples**

```r
if (require("TH.data") && require("tram")) {
  data("bodyfat", package = "TH.data")

  ### estimate unconditional model
  m_mlt <- BoxCox(DEXfat ~ 1, data = bodyfat, prob = c(.1, .99))
  ### get corresponding in-sample log-likelihood
  logLik(m_mlt)
```
### estimate conditional transformation model

```r
bm <- ctmboost(m_mlt, formula = DEXfat ~ ., data = bodyfat,  
    method = quote(mboost::mboost))
```

### in-sample log-likelihood (NEEDS TUNING OF mstop!)

```r
logLik(bm)
```

### evaluate conditional densities for two observations

```r
predict(bm, newdata = bodyfat[1:2,], type = "density")
```

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**stmboost**  
*Likelihood Boosting for Shift Transformation Models*

**Description**

Employs maximisation of the likelihood for estimation of shift transformation models

**Usage**

```r
stmboost(model, formula, data = list(), weights = NULL,  
    method = quote(mboost::mboost), mltargs = list(), ...)
```

**Arguments**

- `model`: an object of class `mlt` as returned by `mlt[mlt]`.
- `formula`: a model formula describing how the parameters of `model` depend on explanatory variables, see `mboost`.
- `data`: an optional data frame of observations.
- `weights`: an optional vector of weights.
- `method`: a call to `mboost`, `gamboost`, or `blackboost`.
- `mltargs`: a list with arguments to be passed to `mlt`.
- `...`: additional arguments to `method`.

**Details**

The parameters of `model` depend on explanatory variables in a possibly structured additive way (see Hothorn, 2020). The number of boosting iterations is a hyperparameter which needs careful tuning.

**Value**

An object of class `stmboost` with `predict` and `logLik` methods.

**References**

Examples

if (require("TH.data") & require("tram")) {
  data("bodyfat", package = "TH.data")

  ### estimate unconditional model
  m_mlt <- BoxCox(DEXfat ~ 1, data = bodyfat, prob = c(.1, .99))
  ### get corresponding in-sample log-likelihood
  logLik(m_mlt)

  ### estimate conditional transformation model
  bm <- stmboost(m_mlt, formula = DEXfat ~ ., data = bodyfat,
                 method = quote(mboost::mboost))
  ### in-sample log-likelihood (NEEDS TUNING OF mstop!)
  logLik(bm)

  ### evaluate conditional densities for two observations
  predict(bm, newdata = bodyfat[1:2,], type = "density")
}
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