Package 'lwqs'

October 13, 2022

Type Package

Title Lagged Weighted Quantile Sum Regression

Version 0.5.0

License GPL (>= 2)

Encoding UTF-8

LazyData true

RoxygenNote 7.1.1

Imports data.table, ggplot2, plyr, gridExtra, gWQS, gamm4

Suggests knitr, rmarkdown

VignetteBuilder knitr

NeedsCompilation no

Author Paul Curtin [aut, cre],
   Stefano Renzetti [aut],
   Chris Gennings [aut]

Maintainer Paul Curtin <paul.curtin@mssm.edu>

Depends R (>= 3.5.0)

Repository CRAN

R topics documented:

---

extract_mixture	*Function to extract time-varying mixture (wqs) index from lWQS object*

Description

Function to extract time-varying mixture (wqs) index from lWQS object

Usage

```
extract_mixture(lobj)
```

Arguments

lobj   An object returned from lWQS function

Value

Data frame containing the time index, wqs index estimated at each repeated measure, subject ID, and the outcome variable.

Examples

```
# identify predictor variables used in mixture
mixvars=names(lwqs_data)[5:9]

# run model. Note for example run-time only 1 bootstrap (b=1) is used. Set b to be >50
model=lwqs(data=lwqs_data,
           timevar="time",
           wqs_parms=list(formula=out ~ wqs,
               data = lwqs_data,
               mix_name=mixvars,
               b1_constr = TRUE,
               b1_pos=FALSE,
               b = 5,
               q = 5,
               validation = 0,
               family = "gaussian",
               seed = 1),
               outcome="out",
               ID="ID")

# use extract_mixture to access time-varying wqs index
mixtime=extract_mixture(model)
```

---

extract_weights *Function to extract time-varying weights from lWQS object*

Description

Function to extract time-varying weights from lWQS object

Usage

```
extract_weights(lobj)
```

Arguments

lobj   An object returned from lWQS function

Value

A (long-form) data frame containing the time index and corresponding variable weights estimated in an lWQS

Examples

```
# identify predictor variables used in mixture
mixvars=names(lwqs_data)[5:9]

# run model
model=lwqs(data=lwqs_data,
           timevar="time",
           wqs_parms=list(formula=out ~ wqs,
               data = lwqs_data,
               mix_name=mixvars,
               b1_constr = TRUE,
               b1_pos=TRUE,
               b = 5,
               q = 5,
               validation = 0,
               family = "gaussian",
               seed = 1),
               outcome="out",
               ID="ID")

# use extract_weights to access time-varying predictor weights
timeweights=extract_weights(model)
```

---

lwqs   *Wrapper function for the implementaion of lagged WQS.*

Description

Wrapper function for the implementaion of lagged WQS.

Usage

```
lwqs(
  data,
  timevar,
  wqs_parms,
  outcome,
  ID,
  rDLM_parms = list(formula = wqs ~ s(time, by = y, bs = "cr"), random = ~(1 | id))
)
```

Arguments

data	Data frame containing observations in long format.
timevar	Enquoted variable name identifying the repeated measure / time variable
wqs_parms	A list containing parameters to be passed to the WQS algorithm. See gWQS package for details.
outcome	An enquoted variable name identifying the outcome measure
ID	An enquoted variable name identifying the subject identifier
rDLM_parms	(optional). A list containing parameters to be passed to the GAM algorithm. See gamm4 package for details. Parameters wqs, time, by, and id (see above) are created by the lwqs function and passed to the gamm4 function automatically.

Value

The lwqs function returns a list containing final model output and time-specific model parameters.

parameters	This list contains several objects summarizing different stages of the lagged ensemble model. The first object, res, contains output from the gWQS algorithm applied to each discreet repeated measure in the overall model; see package gWQS for details. The second output, wqstime, provides the mixture index, identified as "wqs", estimated for each subject at each discrete time point. The third item, weightstime, provides the weights estimated for each predictor at each discrete time point.
plot	This list contains two plots (as grobs) which summarize output of the lwqs algorithm.

Examples

```
  # identify predictor variables used in mixture
mixvars=names(lwqs_data)[5:9]

model=lwqs(data=lwqs_data,
           timevar="time",
           wqs_parms=list(formula=out ~ wqs,
             data = lwqs_data,
             mix_name=mixvars,
             b1_constr = TRUE,
             b1_pos=TRUE,
             b = 5,
             q = 5,
             validation = 0,
             family = "gaussian",
             seed = 1),
           outcome="out",
           ID="ID")
```

---

lwqs_data   *Simulated dataset for accompanying vignette*

Description

Simulated dataset for accompanying vignette

Usage

```
data(lwqs_data)
```

Value

A data frame containing simulated data to explore the lwqs algorithm. Variables included are as follows:

ID	Variable identifying each simulated subject. Data reflect 30 successive measures per subject.
Sex	A simulated binary covariate, either 1 or 0.
time	Variable identifying the successive timing of each repeated measure
out	Simulated outcome on standardized scale
pred1	First simulated time-varying predictor. This has a large positive association with "out" from times 11-20.
pred2	Second simulated time-varying predictor. This has a moderate positive association with "out" from times 11-20.
pred3	Third simulated time-varying predictor. This has a moderate negative association with "out" from times 1-10.

pred4   Fourth simulated time-varying predictor. This has a strong negative association
                 with "out" from times 1-10.

pred5   Fifth simulated time-varying predictor. This has no significant association with
                 "out".

Index