Package ‘lwqs’

March 4, 2021

Type Package
Title Lagged Weighted Quantile Sum Regression
Version 0.5.0
Description Wrapper functions for the implementation of lagged weighted quantile sum regression, as per 'Gennings et al' (2020) <doi:10.1016/j.envres.2020.109529>.
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
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Depends R (>= 3.5.0)
Repository CRAN
Date/Publication 2021-03-04 10:00:02 UTC

R topics documented:

  extract_mixture ........................................ 2
  extract_weights ........................................ 3
  lwqs ..................................................... 4
  lwqs_data ............................................... 5

Index 7
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)
Function to extract time-varying weights from IWQS object

Description

Function to extract time-varying weights from IWQS object

Usage

extract_weights(lobj)

Arguments

lobj

An object returned from IWQS function

Value

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

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 \hspace{1cm} \textit{Wrapper function for the implementation of lagged WQS.}

\section*{Description}

Wrapper function for the implementation of lagged WQS.

\section*{Usage}

\begin{verbatim}
lwqs(
  data,
  timevar,
  wqs_parms,
  outcome,
  ID,
  rDLM_parms = list(formula = wqs ~ s(time, by = y, bs = "cr"), random = ~(1 | id))
)
\end{verbatim}

\section*{Arguments}

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

\section*{Value}

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

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

```r
# 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:

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

extract_mixture, 2
extract_weights, 3

lwqs, 4
lwqs_data, 5