Package ‘MatchIt’

April 18, 2017

Version 3.0.1
Date 2017-04-18
Title Nonparametric Preprocessing for Parametric Casual Inference
Description Selects matched samples of the original treated and control groups with similar covariate distributions -- can be used to match exactly on covariates, to match on propensity scores, or perform a variety of other matching procedures. The package also implements a series of recommendations offered in Ho, Imai, King, and Stuart (2007) <DOI:10.1093/pan/mpl013>.
Maintainer Kosuke Imai <kimai@Princeton.Edu>
Depends R (>= 2.6)
Imports MASS, Matching, rgenoud
Suggests cem, nnet, optmatch, rpart, mgcv, WhatIf, R.rsp, testthat
VignetteBuilder R.rsp
LazyLoad yes
LazyData yes
License GPL (>= 2)
URL http://gking.harvard.edu/matchit
RoxygenNote 5.0.1
NeedsCompilation no
Author Daniel Ho [aut], Kosuke Imai [aut, cre], Gary King [aut], Elizabeth Stuart [aut], Alex Whitworth [ctb]
Repository CRAN
Date/Publication 2017-04-18 13:04:21 UTC
**get_matches**

**R topics documented:**

- get_matches ................................................................. 2
- help.matchit ................................................................. 3
- is.matchit ................................................................. 3
- lalonde ................................................................. 4
- match.data ................................................................. 4
- matchit ................................................................. 5
- user.prompt ................................................................. 8

Index

---

**get_matches**

*Get matches from matchit object*

**Description**

Get the resulting matches from a matchit model object. This function allows the user to extract the matches from the original dataset used in model building or from a new dataset that has a matching set of key column(s) (id_cols).

**Usage**

```r
get_matches(object, model_frame, id_cols = NULL, newdata = NULL)
```

**Arguments**

- **object**
  - The 'matchit' class model object
- **model_frame**
  - The 'data.frame' class object used in creation of object.
- **id_cols**
  - A string indicating the ID for the dataset used in the call to `matchit`. This can be used in combination with `newdata` to return the base dataset. Defaults to NULL.
- **newdata**
  - A new `data.frame` object to extract matched observations from. Used in conjunction with `id_cols`. Defaults to NULL.

**Value**

If `newdata` is NULL, a subset of `model_frame` containing the rows corresponding to the matched treatment and control observations with weights appended. If `newdata` is not NULL, an equivalent subset of `newdata` is returned.
**help.matchit**  

**Description**  
The `help.matchit` command launches html help for Matchit commands and supported methods. The full manual is available online at [http://gking.harvard.edu/matchit](http://gking.harvard.edu/matchit).

**Usage**  

```r  
help.matchit(object)  
```

**Arguments**  

- `object` a character string representing a Matchit command or model. `help.matchit("command")` will take you to an index of Matchit commands and `help.matchit("method")` will take you to a list of matching methods. The following inputs are currently available: exact, nearest, subclass, full, optimal.

**Author(s)**  
Daniel Ho <<daniel.ho@yale.edu>>; Kosuke Imai <<kimai@princeton.edu>>; Gary King <<king@harvard.edu>>; Elizabeth Stuart <<estuart@jhsph.edu>>

**See Also**  
The complete document is available online at [http://gking.harvard.edu/matchit](http://gking.harvard.edu/matchit).

---

**is.matchit**  

**Checks matchit Class**

**Description**  
Function that checks if the target object is a `matchit` object.

**Usage**  

```r  
is.matchit(object)  
```

**Arguments**  

- `object` any R object

**Value**  
Returns TRUE if its argument has class "matchit" among its classes and FALSE otherwise.
lalonde  

*Data from National Supported Work Demonstration and PSID, as analyzed by Dehejia and Wahba (1999).*

**Description**

This is a subsample of the data from the treated group in the National Supported Work Demonstration (NSW) and the comparison sample from the Current Population Survey (CPS). This data was previously analyzed extensively by Lalonde (1986) and Dehejia and Wahba (1999).

**Usage**

```r
data(lalonde)
```

**Format**

A data frame with 313 observations (185 treated, 429 control). There are 10 variables measured for each individual. "treat" is the treatment assignment (1=treated, 0=control). "age" is age in years. "educ" is education in number of years of schooling. "black" is an indicator for African-American (1=African-American, 0=not). "hispan" is an indicator for being of Hispanic origin (1=Hispanic, 0=not). "married" is an indicator for married (1=married, 0=not married). "nodegree" is an indicator for whether the individual has a high school degree (1=no degree, 0=degree). "re74" is income in 1974, in U.S. dollars. "re75" is income in 1975, in U.S. dollars. "re78" is income in 1978, in U.S. dollars.

**References**


---

**match.data**

*Output Matched Data Sets*

**Description**

`match.data` outputs matched data sets from `matchit()`.

**Usage**

```r
match.data(object, group="all", distance = "distance", weights = "weights", subclass = "subclass")
```
### Arguments

- **object**: The output object from `matchit()`. This is a required input.
- **group**: This argument specifies for which matched group the user wants to extract the data. Available options are "all" (all matched units), "treat" (matched units in the treatment group), and "control" (matched units in the control group). The default is "all".
- **distance**: This argument specifies the variable name used to store the distance measure. The default is "distance".
- **weights**: This argument specifies the variable name used to store the resulting weights from matching. The default is "weights".
- **subclass**: This argument specifies the variable name used to store the subclass indicator. The default is "subclass".

### Value

Returns a subset of the original data set sent to `matchit()`, with just the matched units. The data set also contains the additional variables `distance`, `weights`, and `subclass`. The variable `distance` gives the estimated distance measure, and `weights` gives the weights for each unit, generated in the matching procedure. The variable `subclass` gives the subclass index for each unit (if applicable). See the [http://gking.harvard.edu/matchit/](http://gking.harvard.edu/matchit/) for the complete documentation and type `demo(match.data)` at the R prompt to see a demonstration of the code.

### Author(s)

Daniel Ho <daniel.ho@yale.edu>; Kosuke Imai <kimai@princeton.edu>; Gary King <king@harvard.edu>; Elizabeth Stuart <estuart@jhsph.edu>

### See Also

Please use `help.matchit` to access the `matchit` reference manual. The complete document is available online at [http://gking.harvard.edu/matchit/](http://gking.harvard.edu/matchit/).

---

**matchit**

*MatchIt: Matching Software for Causal Inference*

### Description

`matchit` is the main command of the package *MatchIt*, which enables parametric models for causal inference to work better by selecting well-matched subsets of the original treated and control groups. MatchIt implements the suggestions of Ho, Imai, King, and Stuart (2004) for improving parametric statistical models by preprocessing data with nonparametric matching methods. MatchIt implements a wide range of sophisticated matching methods, making it possible to greatly reduce the dependence of causal inferences on hard-to-justify, but commonly made, statistical modeling assumptions. The software also easily fits into existing research practices since, after preprocessing with MatchIt, researchers can use whatever parametric model they would have used without MatchIt, but produce inferences with substantially more robustness and less sensitivity.
to modeling assumptions. Matched data sets created by MatchIt can be entered easily in Zelig (http://gking.harvard.edu/zelig) for subsequent parametric analyses. Full documentation is available online at http://gking.harvard.edu/matchit, and help for specific commands is available through help.matchit.

Usage

matchit(formula, data, method = "nearest", distance = "logit",
        distance.options = list(), discard = "none",
        reestimate = FALSE, ...)

Arguments

formula This argument takes the usual syntax of R formula, \( \text{treat} \sim x_1 + x_2 \), where \( \text{treat} \) is a binary treatment indicator and \( x_1 \) and \( x_2 \) are the pre-treatment covariates. Both the treatment indicator and pre-treatment covariates must be contained in the same data frame, which is specified as data (see below). All of the usual R syntax for formula works. For example, \( x_1 \times x_2 \) represents the first order interaction term between \( x_1 \) and \( x_2 \), and \( I(x_1^2) \) represents the square term of \( x_1 \). See help(formula) for details.

data This argument specifies the data frame containing the variables called in formula.

method This argument specifies a matching method. Currently, "exact" (exact matching), "full" (full matching), "genetic" (genetic matching), "nearest" (nearest neighbor matching), "optimal" (optimal matching), and "subclass" (subclassification) are available. The default is "nearest". Note that within each of these matching methods, MatchIt offers a variety of options.

distance This argument specifies the method used to estimate the distance measure. The default is logistic regression, "logit". A variety of other methods are available.

distance.options This optional argument specifies the optional arguments that are passed to the model for estimating the distance measure. The input to this argument should be a list.

discard This argument specifies whether to discard units that fall outside some measure of support of the distance score before matching, and not allow them to be used at all in the matching procedure. Note that discarding units may change the quantity of interest being estimated. The options are: "none" (default), which discards no units before matching, "both", which discards all units (treated and control) that are outside the support of the distance measure, "control", which discards only control units outside the support of the distance measure of the treated units, and "treat", which discards only treated units outside the support of the distance measure of the control units.

reestimate This argument specifies whether the model for distance measure should be reestimated after units are discarded. The input must be a logical value. The default is FALSE.

... Additional arguments to be passed to a variety of matching methods.
Details

The matching is done using the `matchit(treat ~ X, ...)` command, where `treat` is the vector of treatment assignments and `X` are the covariates to be used in the matching. There are a number of matching options, detailed below. The full syntax is `matchit(formula, data=NULL, discard=0, exact=FALSE, replace=FALSE, ratio=1, model="logit", reestimate=FALSE, nearest=true, ... calclosest=false, mahvars=NULL, subclass=PL, subNby="treat", counter=true, full=false, fullNoptions=list(IL NNNI
A summary of the results can be seen graphically using `plot(matchitobject)`, or numerically using `summary(matchitobject)`. `print(matchitobject)` also prints out the output.

Value

call
The original `matchit` call.

formula
The formula used to specify the model for estimating the distance measure.

model
The output of the model used to estimate the distance measure. `summary(m.out$model)` will give the summary of the model where `m.out` is the output object from `matchit`.

match.matrix
An $n_1$ by ratio matrix where the row names, which can be obtained through `row.names(match.matrix)`, represent the names of the treatment units, which come from the data frame specified in `data`. Each column stores the name(s) of the control unit(s) matched to the treatment unit of that row. For example, when the ratio input for nearest neighbor or optimal matching is specified as 3, the three columns of `match.matrix` represent the three control units matched to one treatment unit). NA indicates that the treatment unit was not matched.

discarded
A vector of length $n$ that displays whether the units were ineligible for matching due to common support restrictions. It equals TRUE if unit $i$ was discarded, and it is set to FALSE otherwise.

distance
A vector of length $n$ with the estimated distance measure for each unit.

weights
A vector of length $n$ that provides the weights assigned to each unit in the matching process. Unmatched units have weights equal to 0. Matched treated units have weight 1. Each matched control unit has weight proportional to the number of treatment units to which it was matched, and the sum of the control weights is equal to the number of uniquely matched control units.

subclass
The subclass index in an ordinal scale from 1 to the total number of subclasses as specified in `subclass` (or the total number of subclasses from full or exact matching). Unmatched units have NA.

q.cut
The subclass cut-points that classify the distance measure.

treat
The treatment indicator from `data` (the left-hand side of `formula`).

X
The covariates used for estimating the distance measure (the right-hand side of `formula`).

nn
A basic summary table of matched data (e.g., the number of matched units)

Author(s)

Daniel Ho <daniel.ho@yale.edu>; Kosuke Imai <kimai@princeton.edu>; Gary King <king@harvard.edu>; Elizabeth Stuart<estuart@jhsph.edu>
References


See Also

Please use help.matchit to access the matchit reference manual. The complete document is available online at http://gking.harvard.edu/matchit.

Description

Use user.prompt while writing demo files to force users to hit return before continuing.

Usage

user.prompt()

Author(s)

Olivia Lau <olau@fas.harvard.edu>

See Also

readline

Examples

## Not run:
user.prompt()

## End(Not run)
Index

*Topic datasets
  lalonde, 4

*Topic documentation
  help.matchit, 3

*Topic environment
  matchit, 5

*Topic file
  user.prompt, 8

*Topic methods
  match.data, 4

  get_matches, 2

  help.matchit, 3

  is.matchit, 3

  lalonde, 4

  match.data, 4
  MatchIt (matchit), 5
  Matchit (matchit), 5
  matchit, 2, 5

  user.prompt, 8