Package ‘reshape’

October 23, 2018

Version  0.8.8
Title    Flexibly Reshape Data
Description Flexibly restructure and aggregate data using
just two functions: melt and cast.
URL      http://had.co.nz/reshape
Depends  R (>= 2.6.1)
Imports  plyr
License  MIT + file LICENSE
LazyData true
NeedsCompilation yes
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Repository CRAN
Date/Publication 2018-10-23 18:50:03 UTC

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Cast function

Description

Cast a molten data frame into the reshaped or aggregated form you want.

Usage

```r
cast(data, formula = ... ~ variable, fun.aggregate=NULL, ...,
margins=FALSE, subset=TRUE, df=FALSE, fill=NULL, add.missing=FALSE,
value = guess_value(data))
```

Arguments

- `data`: molten data frame, see `melt`
- `formula`: casting formula, see details for specifics
- `fun.aggregate`: aggregation function
- `add.missing`: fill in missing combinations?
- `value`: name of value column
- `...`: further arguments are passed to aggregating function
- `margins`: vector of variable names (can include "grand\_col" and "grand\_row") to compute margins for, or TRUE to computer all margins
- `subset`: logical vector to subset data set with before reshaping
- `df`: argument used internally
- `fill`: value with which to fill in structural missings, defaults to value from applying `fun.aggregate` to 0 length vector
Details

Along with melt and recast, this is the only function you should ever need to use. Once you have melted your data, cast will arrange it into the form you desire based on the specification given by formula.

The cast formula has the following format: $x_{\text{variable}} + x_{\text{2}} \sim y_{\text{variable}} + y_{\text{2}} \sim z_{\text{variable}} \sim \ldots \mid \text{list}_{\text{variable}} + N$. The order of the variables makes a difference. The first varies slowest, and the last fastest. There are a couple of special variables: "..." represents all other variables not used in the formula and "." represents no variable, so you can do formula=var1 ~ .

Creating high-D arrays is simple, and allows a class of transformations that are hard without apply and sweep.

If the combination of variables you supply does not uniquely identify one row in the original data set, you will need to supply an aggregating function, fun.aggregate. This function should take a vector of numbers and return a summary statistic(s). It must return the same number of arguments regardless of the length of the input vector. If it returns multiple value you can use "result_variable" to control where they appear. By default they will appear as the last column variable.

The margins argument should be passed a vector of variable names, eg. c("month","day"). It will silently drop any variables that can not be margined over. You can also use "grand\_col" and "grand\_row" to get grand row and column margins respectively.

Subset takes a logical vector that will be evaluated in the context of data, so you can do something like subset = variable="length"

All the actual reshaping is done by reshape1, see its documentation for details of the implementation.

Author(s)

Hadley Wickham <h.wickham@gmail.com>

See Also

reshape1, http://had.co.nz/reshape/

Examples

# Air quality example
names(airquality) <- tolower(names(airquality))
aqm <- melt(airquality, id=c("month", "day"), na.rm=TRUE)

cast(aqm, day ~ month ~ variable)
cast(aqm, month ~ variable, mean)
cast(aqm, month ~ . | variable, mean)
cast(aqm, month ~ variable, mean, margins=c("grand\_row", "grand\_col"))
cast(aqm, day ~ month, mean, subset=variable="ozone")
cast(aqm, month ~ variable, range)
cast(aqm, month ~ variable + result_variable, range)
cast(aqm, variable ~ month ~ result_variable, range)

# Chick weight example
names(ChickWeight) <- tolower(names(ChickWeight))
chick_m <- melt(ChickWeight, id=2:4, na.rm=TRUE)

cast(chick_m, time ~ variable, mean) # average effect of time
cast(chick_m, diet ~ variable, mean) # average effect of diet
cast(chick_m, diet ~ time ~ variable, mean) # average effect of diet & time

# How many chicks at each time? - checking for balance
cast(chick_m, time ~ diet, length)
cast(chick_m, chick ~ time, mean)
cast(chick_m, chick ~ time, mean, subset=time < 10 & chick < 20)

cast(chick_m, diet + chick ~ time)
cast(chick_m, chick ~ time ~ diet)
cast(chick_m, diet + chick ~ time, mean, margins="diet")

#Tips example
cast(melt(tips), sex ~ smoker, mean, subset=variable="total_bill")
cast(melt(tips), sex ~ smoker | variable, mean)

ff_d <- melt(french_fries, id=1:4, na.rm=TRUE)
cast(ff_d, subject ~ time, length)
cast(ff_d, subject ~ time, length, fill=0)
cast(ff_d, subject ~ time, function(x) 30 - length(x))
cast(ff_d, subject ~ time, function(x) 30 - length(x), fill=30)
cast(ff_d, variable ~ ., c(min, max))
cast(ff_d, variable ~ ., function(x) quantile(x,c(0.25,0.5)))
cast(ff_d, treatment ~ variable, mean, margins=c("grand_col", "grand_row"))
cast(ff_d, treatment + subject ~ variable, mean, margins="treatment")

---

colsplit

Split a vector into multiple columns

Description
This function can be used to split up a column that has been pasted together.

Usage
colsplit(x, split="", names)

Arguments
x character vector or factor to split up
split regular expression to split on
names names for output columns

Author(s)
Hadley Wickham <h.wickham@gmail.com>
**combine_factor**

Combine factor levels

**Description**

Convenience function to make it easy to combine multiple levels

**Usage**

```r
combine_factor(fac, variable=levels(fac), other.label="Other")
```

**Arguments**

- `fac`: factor variable
- `variable`: either a vector of . See examples for more details.
- `other.label`: label for other level

**Author(s)**

Hadley Wickham <h.wickham@gmail.com>

**Examples**

```r
df <- data.frame(a = LETTERS[sample(5, 15, replace=TRUE)], y = rnorm(15))
combine_factor(df$a, c(1,2,2,1,2))
combine_factor(df$a, c(1:4, 1))
(f <- reorder(df$a, df$y))
percent <- tapply(abs(df$y), df$a, sum)
combine_factor(f, c(order(percent)[1:3]))
```

---

**condense_df**

Condense a data frame

**Description**

Condense

**Usage**

```r
condense_df(data, variables, fun, ...)
```

**Arguments**

- `data`: data frame
- `variables`: character vector of variables to condense over
- `fun`: function to condense with
- `...`: arguments passed to condensing function
expand.grid.df  Expand grid

Description

Expand grid of data frames

Usage

expand.grid.df(..., unique=TRUE)

Arguments

...  list of data frames (first varies fastest)
unique only use unique rows?

Details

Creates new data frame containing all combination of rows from data.frames in ...

Author(s)

Hadley Wickham <h.wickham@gmail.com>

Examples

expand.grid.df(data.frame(a=1,b=1:2))
expand.grid.df(data.frame(a=1,b=1:2), data.frame())
expand.grid.df(data.frame(a=1,b=1:2), data.frame(c=1:2, d=1:2))
expand.grid.df(data.frame(a=1,b=1:2), data.frame(c=1:2, d=1:2), data.frame(e=c("a","b")))
French fries

Sensory data from a french fries experiment

Description

This data was collected from a sensory experiment conducted at Iowa State University in 2004. The investigators were interested in the effect of using three different fryer oils had on the taste of the fries.

Variables:

- time in weeks from start of study.
- treatment (type of oil),
- subject,
- replicate,
- potato-y flavour,
- buttery flavour,
- grassy flavour,
- rancid flavour,
- painty flavour

Usage

data(french_fries)

Format

A data frame with 696 rows and 9 variables

funstofun

Aggregate multiple functions into a single function

Description

Combine multiple functions to a single function returning a named vector of outputs

Usage

funstofun(...)

Arguments

... functions to combine
Details

Each function should produce a single number as output

Author(s)

Hadley Wickham <h.wickham@gmail.com>

Examples

funstofun(min, max)(1:10)
funstofun(length, mean, var)(rnorm(100))

melt

Description

Melt an object into a form suitable for easy casting.

Usage

melt(data, ...)

Arguments

data

Data set to melt

...

Other arguments passed to the specific melt method

Details

This the generic melt function. See the following functions for specific details for different data structures:

- melt.data.frame for data.frames
- melt.array for arrays, matrices and tables
- melt.list for lists

Author(s)

Hadley Wickham <h.wickham@gmail.com>
Description

This function melts a high-dimensional array into a form that you can use cast with.

Usage

```r
### S3 method for class 'array'
melt(data, varnames = names(dimnames(data)), ...)
```

Arguments

data array to melt
varnames variable names to use in molten data.frame
other arguments ignored

Details

This code is conceptually similar to as.data.frame.table

Author(s)

Hadley Wickham <h.wickham@gmail.com>

Examples

```r
a <- array(1:24, c(2,3,4))
melt(a)
melt(a, varnames=c("X","Y","Z"))
dimnames(a) <- lapply(dim(a), function(x) LETTERS[1:x])
melt(a)
melt(a, varnames=c("X","Y","Z"))
dimnames(a)[1] <- list(NULL)
melt(a)
```
**melt.data.frame**

**Melt a data frame**

**Description**

Melt a data frame into form suitable for easy casting.

**Usage**

```r
## S3 method for class 'data.frame'
melt(data, id.vars, measure.vars,
     variable_name = "variable", na.rm = !preserve.na, preserve.na = TRUE, ...)
```

**Arguments**

- `data` Data set to melt
- `id.vars` Id variables. If blank, will use all non measure.vars variables. Can be integer (variable position) or string (variable name)
- `measure.vars` Measured variables. If blank, will use all non id.vars variables. Can be integer (variable position) or string (variable name)
- `variable_name` Name of the variable that will store the names of the original variables
- `na.rm` Should NA values be removed from the data set?
- `preserve.na` Old argument name, now deprecated
- `...` other arguments ignored

**Details**

You need to tell melt which of your variables are id variables, and which are measured variables. If you only supply one of `id.vars` and `measure.vars`, melt will assume the remainder of the variables in the data set belong to the other. If you supply neither, melt will assume factor and character variables are id variables, and all others are measured.

**Value**

molten data

**Author(s)**

Hadley Wickham <h.wickham@gmail.com>

**See Also**

[http://had.co.nz/reshape/](http://had.co.nz/reshape/)
merge_all

**Examples**

```r
head(melt(tips))
names(airquality) <- tolower(names(airquality))
melt(airquality, id=c("month", "day"))
names(ChickWeight) <- tolower(names(ChickWeight))
melt(ChickWeight, id=2:4)
```

---

**merge_all**  
*Merge all*

---

**Description**

Merge together a series of data.frames

**Usage**

```r
merge_all(dfs, ...)
```

**Arguments**

- `dfs`  
  list of data frames to merge
- `...`  
  other arguments passed on to merge

**Details**

Order of data frames should be from most complete to least complete

**Author(s)**

Hadley Wickham <h.wickham@gmail.com>

**See Also**

`merge_recurse`
namerows

**Description**

Add variable to data frame containing rownames

**Usage**

namerows(df, col.name = "id")

**Arguments**

df: data frame

col.name: name of new column containing rownames

**Details**

This is useful when the thing that you want to melt by is the rownames of the data frame, not an explicit variable

**Author(s)**

Hadley Wickham <h.wickham@gmail.com>

---

recast

**Description**

 *melt* and *cast* data in a single step

**Usage**

recast(data, formula, ..., id.var, measure.var)

**Arguments**

data: Data set to melt

formula: Casting formula, see *cast* for specifics

...: Other arguments passed to *cast*

id.var: Identifying variables. If blank, will use all non measure.var variables

measure.var: Measured variables. If blank, will use all non id.var variables
rename

Details

This conveniently wraps melting and casting a data frame into one step.

Author(s)

Hadley Wickham <h.wickham@gmail.com>

See Also

http://had.co.nz/reshape/

Examples

recast(french_fries, time ~ variable, id.var=1:4)

rename

<table>
<thead>
<tr>
<th>Rename</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rename</td>
</tr>
</tbody>
</table>

Description

Rename an object

Usage

rename(x, replace)

Arguments

x

object to be renamed

replace

named vector specifying new names

Details

The rename function provide an easy way to rename the columns of a data.frame or the items in a list.

Author(s)

Hadley Wickham <h.wickham@gmail.com>
Examples

```r
rename(mtcars, c(wt = "weight", cyl = "cylinders"))
a <- list(a = 1, b = 2, c = 3)
rename(a, c(b = "a", c = "b", a="c"))
```

```r
# Example supplied by Timothy Bates
names <- c("john", "tim", "andy")
ages <- c(50, 46, 25)
mydata <- data.frame(names, ages)
names(mydata) #-> "name", "ages"
```

```r
# lets change "ages" to singular.
# nb: The operation is not done in place, so you need to set your
# data to that returned from rename

mydata <- rename(mydata, c(ages="age"))
names(mydata) #-> "name", "age"
```

---

### Description

Convenient methods for rescaling data

### Usage

```r
rescaler(x, type="sd", ...)
```

### Arguments

- `x`  
  object to rescale
- `type`  
  type of rescaling to use (see description for details)
- `...`  
  other options (only passed to `rank`)

### Details

Provides methods for vectors, matrices and data.frames

Currently, five rescaling options are implemented:

- `I`: do nothing
- `range`: scale to \([0, 1]\)
- `rank`: convert values to ranks
- `robust`: robust version of sd, substract median and divide by median absolute deviation
- `sd`: subtract mean and divide by standard deviation
Author(s)
Hadley Wickham <h.wickham@gmail.com>

See Also
rescaler.default

Smiths

Demo data describing the Smiths

Description
A small demo dataset describing John and Mary Smith. Used in the introductory vignette.

Usage
data(smiths)

Format
A data frame with 2 rows and 5 variables

sort_df

Sort data frame

Description
Convenience method for sorting a data frame using the given variables.

Usage
sort_df(data, vars=names(data))

Arguments
  data       data frame to sort
  vars       variables to use for sorting

Details
Simple wrapper around order

Author(s)
Hadley Wickham <h.wickham@gmail.com>
Function `sparseby` is a modified version of `by` for `tapply` applied to data frames. It always returns a new data frame rather than a multi-way array.

`sparseby` is much faster and more memory efficient than `by` or `tapply` in the situation where the combinations of `indices` present in the data form a sparse subset of all possible combinations.

A data frame or matrix is split by row into data frames or matrices respectively subsetted by the values of one or more factors, and function `FUN` is applied to each subset in turn.

A data frame or matrix containing the results of `FUN` applied to each subgroup of the matrix. The result depends on what is returned from `FUN`:

- If `FUN` returns NULL on any subsets, those are dropped.
- If it returns a single value or a vector of values, the length must be consistent across all subgroups. These will be returned as values in rows of the resulting data frame or matrix.
- If it returns data frames or matrices, they must all have the same number of columns, and they will be bound with `rbind` into a single data frame or matrix.

Names for the columns will be taken from the names in the list of `indices` or from the results of `FUN`, as appropriate.

Duncan Murdoch
See Also
tapply, by

Examples

```r
x <- data.frame(index=c(rep(1,4),rep(2,3)),value=c(1:7))
x
sparseby(x,x$index,nrow)

# The version below works entirely in matrices
x <- as.matrix(x)
sparseby(x,list(group = x[,"index"]), function(subset) c(mean=mean(subset[,2])))
```

Description

Stamp is like reshape but the "stamping" function is passed the entire data frame, instead of just a few variables.

Usage

```r
stamp(data, formula = ~ ., fun.aggregate, ..., margins=NULL, subset=TRUE, add.missing=FALSE)
```

Arguments

data data.frame (no molten)
formula formula that describes arrangement of result, columns ~ rows, see reshape for more information
fun.aggregate aggregation function to use, should take a data frame as the first argument
... arguments passed to the aggregation function
margins margins to compute (character vector, or TRUE for all margins), can contain grand_row or grand_col to inclue grand row or column margins respectively.
subset logical vector by which to subset the data frame, evaluated in the context of the data frame so you can
add.missing fill in missing combinations?

Details

It is very similar to the by function except in the form of the output which is arranged using the formula as in reshape

Note that it’s very easy to create objects that R can’t print with this function. You will probably want to save the results to a variable and then use extract the results. See the examples.
Author(s)

Hadley Wickham <h.wickham@gmail.com>

---

Tips  Tipping data

---

Description

One waiter recorded information about each tip he received over a period of a few months working in one restaurant. He collected several variables:

- tip in dollars,
- bill in dollars,
- sex of the bill payer,
- whether there were smokers in the party,
- day of the week,
- time of day,
- size of the party.

In all he recorded 244 tips. The data was reported in a collection of case studies for business statistics (Bryant & Smith 1995).

Usage

data(tips)

Format

A data frame with 244 rows and 7 variables

References

**Unique default**

**Description**
Convenience function for setting default if not unique

**Usage**
uniquedefault(values, default)

**Arguments**
- **values**: vector of values
- **default**: default to use if values not unique

**Details**
Used by ggplot2

**Author(s)**
Hadley Wickham <h.wickham@gmail.com>

---

**Unstable**

**Description**
Inverse of table

**Usage**
unstable(df, num)

**Arguments**
- **df**: matrix or data.frame to untable
- **num**: vector of counts (of same length as df)

**Details**
Given a tabulated dataset (or matrix) this will untabulate it by repeating each row by the number of times it was repeated

**Author(s)**
Hadley Wickham <h.wickham@gmail.com>
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