

SWI-Prolog interface to R

Nicos Angelopoulos

August 15, 2008

Abstract

This article documents the package R, a library to talk to R system for Statistical Computing.

1 R.pl – R session

author Nicos Angelopoulos

version 0:0:1

See also `examples/R/r_demo.pl`, <http://www.r-project.org/>

copyright Nicos Angelopoulos

license YAP: Artistic

To be done Fix starting the R process on Windows.

This library facilitates interaction with an R session. On the Yap system it depends on `library(System)` and on SWI on `library(process)`- part of the `clib` package. Currently it only works on Linux systems. It assumes an R executable in `$PATH` or can be given a location to a functioning R executable. R is run as a slave with Prolog writing and reading on/off the associated streams.

Multiple session can be managed simultaneously. Each has 3 main components: a name or alias, a term structure holding the communicating streams and a number of associated data items.

The library attempts to ease the translation between prolog terms and R inputs. Thus, Prolog term `x <- c(1, 2, 3)` is translated to atomic `'x <- c(1, 2, 3)'` which is then passed on to R. That is, `<-` is a defined/recognised operator. `X <- c(1, 2, 3)`, where X is a variable, instantiates X to the list `[1, 2, 3]`. Currently only vectors can be translated in this fashion.

r_open

Open a new R session. Same as `r_open([])`.

r_open(+Opts)

Open a new R session with optional list of arguments. *Opts* should be a list of the following

alias(Alias)

Name for the session. If absent or a variable an opaque term is generated.

assert(A)

Assert token. By default session opened last is the default session (see `default_r_session/1`). Using `A = z` will push the session to the bottom of the pile.

at_r_halt(*RHAction*)

R slaves often halt when they encounter an error. This option provides a handle to changing the behaviour of the session when this happens. *RHAction* should be one of `abort`, `fail`, `call/1`, `call_ground/1`, `reinstate` or `restart`. Default is `fail`. When *RHAction* is `reinstate`, the history of the session is used to roll-back all the commands sent so far. At 'restart' the session is restarted with same name and options, but history is not replayed.

copy(*CopyTo*, *CopyWhat*)

Records interaction with R to a file/stream. *CopyTo* should be one of `null`, `stream(Stream)`, `OpenStream`, `AtomicFile`, `once(File)` or `many(File)`. In the case of `many(File)`, file is opened and closed at each write operation. *CopyWhat* should be one of `both`, `in`, `out` or `none`. In all cases apart from when *CopyTo* is `null`, error stream is copied to *CopyTo*. Default is no recording (*CopyTo* = `null`).

ssh(*Host*)**ssh(*Host*, *Dir*)**

Run R on *Host* with start directory *Dir*. *Dir* defaults to `/tmp`.

rbin(*Rbin*)

R executable location. Default is 'R'.

with(*With*)

With is in `[environ,restore,save]`. The default behaviour is to start the R executable is started with flags `--no-environ --no-restore --no-save`. For each *With* value found in *Opts* the corresponding `--no-` flag is removed.

r_close

Close the default R session.

r_close(+*R*)

Close the named *R* session.

r_in(+*Rcmd*)

Push *Rcmd* to the default R session. Output and Errors will be printed to the terminal.

r_in(+*R*, +*Rcmd*)

As `r_in/1` but for session *R*.

r_push(+*Rcmd*)

As `r_in/1` but does not consume error or output streams.

r_push(+*R*, +*Rcmd*)

As `r_push/1` but for named session.

r_out(+*Rcmd*, -*Lines*)

Push *Rcmd* to default R session and grab output lines *Lines* as a list of code lists.

r_out(+*R*, +*Rcmd*, -*Lines*)

As `r_out/2` but for named session *R*.

r_err(+Rcmd, -Lines, -ErrLines)

Push *Rcmd* to default R session and grab output lines *Lines* as a list of code lists. Error lines are in *ErrLines*.

r_err(+R, +Rcmd, -Lines, -ErrLines)

As `r_err/3` but for named session *R*.

r_print(+X)

A shortcut for `r_in(print(X))`.

r_print(+R, +X)

As `r_print/1` but for named session *R*.

r_lines_print(+Lines)

Print a list of code lists (*Lines*) to the `user_output`. *Lines* would normally be read of an R stream.

r_lines_print(+Lines, +Type)

As `r_lines_print/1` but *Type* declares whether to treat lines as output or error response. In the latter case they are written on `user_error` and prefixed with '!'.

r_lines_print(+Lines, +Type, +Stream)

As `r_lines_print/3` but *Lines* are written on *Stream*.

r_lib(+L)

A shortcut for `r_in(library(X))`.

r_lib(+R, +L)

As `r_lib/1` but for named session *R*.

r_flush

Flush default R's output and error on to the terminal.

r_flush(+R)

As `r_flush/0` but for session *R*.

r_flush_onto(+Saliases, -Onto)

Flush stream aliases to code lists *Onto*. *Saliases* should be one of, or a list of, [output,error].

r_flush_onto(+R, +Saliases, -Onto)

As `r_flush_onto/2` for specified session *R*.

current_r_session(?R)

True if *R* is the name of current *R* session. Can be used to enumerate all open sessions.

current_r_session(?R, ?S, ?D)

True if *R* is an open session with streams *S* and data *D* (see introduction to the library).

default_r_session(?R)

True if *R* is the default session.

r_streams_data(+*SId*, +*Streams*, -*S*)

True if *Streams* is an R session streams structure and *S* is its stream corresponding to identifier *SId*, which should be one of [input,output,error].

r_session_data(+*Did*, +*Data*, -*Datum*)

True if *Data* is a structure representing R session associated data and *Datum* is its data item corresponding to data identifier *Did*. *Did* should be in [copy_to,copy_this,at_r_halt,opts].

r_history

Print on user_output the history of the default session.

r_history(-*H*)

H unifies to the history list of the Rcmds fed into the default session. Most recent command appears at the head of the list.

r_history(?*R*, -*H*)

As `r_history/1` but for named session *R*. It can be used to enumerate all histories. It fails when no session is open.

r_session_version(-*Version*)

Installed version. *Version* is of the form Major:Minor:Fix, where all three are integers.

Index

current_r_session/1, 3

current_r_session/3, 3

default_r_session/1, 3

r_close/0, 2

r_close/1, 2

r_err/3, 3

r_err/4, 3

r_flush/0, 3

r_flush/1, 3

r_flush_onto/2, 3

r_flush_onto/3, 3

r_history/0, 4

r_history/1, 4

r_history/2, 4

r_in/1, 2

r_in/2, 2

r_lib/1, 3

r_lib/2, 3

r_lines_print/1, 3

r_lines_print/2, 3

r_lines_print/3, 3

r_open/0, 1

r_open/1, 1

r_out/2, 2

r_out/3, 2

r_print/1, 3

r_print/2, 3

r_push/1, 2

r_push/2, 2

r_session_data/3, 4

r_session_version/1, 4

r_streams_data/3, 4