Package ‘fastverse’

June 1, 2022

Title  A Suite of High-Performance Packages for Statistics and Data Manipulation

Version  0.2.4

Description  Easy installation, loading and management, of a complementary set of high-performance packages for statistical computing and data manipulation. The core ‘fastverse’ consists of 6 packages: ‘data.table’, ‘collapse’, ‘matrixStats’, ‘kit’, ‘magrittr’ and ‘fst’, that jointly only depend on ‘Rcpp’. These packages are attached and harmonized through the ‘fastverse’. In addition, the ‘fastverse’ can be freely and permanently extended with additional packages, both globally or for individual projects. Entirely separate package verses can also be created. Selected fast and low-dependency packages are suggested for various topics such as time series, dates and times, strings, spatial data, statistics and data serialization (see GitHub / website).

License  GPL-3

Encoding  UTF-8

Imports  data.table, collapse, matrixStats, kit, magrittr, fst

Suggests  xts, roll, fasttime, lubridate, dygraphs, stringi, stringfish, Rfast, Rfast2, coop, rapplyly, geos, qs, tidyfast, maditr, knitr, markdown

URL  https://fastverse.github.io/fastverse/,
     https://github.com/fastverse/fastverse

BugReports  https://github.com/fastverse/fastverse/issues

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Author  Sebastian Krantz [aut, cre],
        Hadley Wickham [ctb]

Maintainer  Sebastian Krantz <sebastian.krantz@graduateinstitute.ch>

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**Description**

The `fastverse` is an extensible suite of R packages, developed independently by various people, that jointly contribute to the objectives of:

1. Speeding up R through heavy use of compiled code (C, C++, Fortran)
2. Enabling more complex statistical and data manipulation operations in R
3. Reducing the number of dependencies required for advanced computing in R

Inspired by the `tidyverse` package, the `fastverse` package is a flexible package loader and manager that allows users to put together their own ‘verses’ of packages and load them with `library(fastverse)`.

The `fastverse` installs 6 core packages (`data.table`, `collapse`, `matrixStats`, `kit`, `magrittr` and `fst`) that provide native C/C++ code of proven quality, work well together, and enable complex statistical computing and data manipulation - with only `Rcpp` as an additional dependency. The package also harmonizes functionality among some of these core packages (see below).

The `fastverse` further allows users to freely (and permanently) extend or reduce the number of packages in the `fastverse`. A selection of suggested high-performing packages for various topics is provided in `fastverse_extend` (and with more details in the README). Other functions help to determine joint dependencies, sort out namespace conflicts among attached packages, and update packages.
Functions in the fastverse Package

Functions to extend or reduce the number of packages in the fastverse - either for the session or permanently - and to restore defaults.

- `fastverse_extend()
- `fastverse_detach()
- `fastverse_reset()

Function to display conflicts for fastverse packages (or any other attached packages)

- `fastverse_conflicts()

Function to update fastverse packages (and dependencies) and install (missing) packages

- `fastverse_update()
- `fastverse_install()

Utilities to retrieve the names of fastverse packages (and dependencies), their update status and produce a situation report.

- `fastverse_packages()
- `fastverse_deps()
- `fastverse_sitrep()

Function to create a new extensible verse of packages like the fastverse

- `fastverse_child()

fastverse Options

- `options(fastverse.quiet = TRUE) will disable all automatic messages (including conflict reporting) when calling library(fastvser), fastverse_extend, fastverse_update(install = TRUE) and fastverse_install.
- `options(fastverse.styling = FALSE) will disable all styling applied to text printed to the console.
- `options(fastverse.extend = c(...)) can be set before calling library(fastvser) to extend the fastverse with some packages for the session. The same can be done with the fastverse_extend function after library(fastvser), which will also populate options("fastverse.extend").
- `options(fastverse.install = TRUE) can be set before library(fastverse) to install any missing packages beforehand. See also fastverse_install.

fastverse Harmonisations

- There are 2 internal clashes between collapse::funique and kit::funique, and between matrixStats::count and kit::count. The collapse and matrixStats versions take precedence over the kit versions. For a comparison of functionality see the details section of fastverse_conflicts.
- Quite a number of functions in the matrixStats package do not (by default) preserve the attributes of objects passed to them, resulting in inconsistent behavior of different functions. The GitHub version of the fastverse alters most of the functions where this is the case, listed in a global variable .matrixStats_replaced, bestowing them with capabilities to preserve matrix dimension names and other attributes (for functions returning a matrix). This is done using very efficient R and C code, so that performance does not suffer. When the fastverse
is attached, these altered function are replaced in the \texttt{matrixStats} namespace. Since CRAN does not allow namespace modifications in other packages, this feature is only available in the GitHub version, installable using \texttt{remotes::install_github("fastverse/fastverse")}. Development of CRAN and GitHub version will continue synchronous until \texttt{matrixStats} has evolved so that consistent attribute handling (\texttt{useNames = TRUE}) becomes the default.

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**fastverse_child**

Create a new (descendant) verse of packages

### Description

Creates and installs a fully customizable descendant verse of packages that is itself extensible and inherits 90\% of the functionality of the \texttt{fastverse} package.

### Usage

```r
fastverse_child(
  name,  
  title,  
  pkg,  
  maintainer,  
  version = "0.1.0",  
  dir = ".",  
  theme = c("fastverse", "tidyverse"),  
  install = TRUE,  
  keep.dir = TRUE,  
  ...  
)
```

### Arguments

- **name** character. The name of the child-verse e.g. 'myMLverse'.
- **title** character. The title of the child-verse e.g. 'My Machine Learning Verse'.
- **pkg** character. A vector of core packages for the new verse.
- **maintainer** character. A quoted \texttt{person} statement giving the package maintainer. If you do not intend to substantially modify the code of the resulting source package, \texttt{role = "cre"} is appropriate. See Examples.
- **version** character. A quoted version number for the new package.
- **dir** character. The directory in which a source directory \texttt{dir/name} for the package will be created.
- **theme** character. Set the colour-theme for text printed to the console. The options are "fastverse" or "tidyverse".
- **install** logical. \texttt{TRUE} installs the package using \texttt{install.packages(dir/name, repos = NULL, type = "source", ...)}.
- **keep.dir** logical. \texttt{FALSE} will remove the source directory \texttt{(dir/name)} again after installation.
- **...** further arguments to \texttt{install.packages}. 
Details

This function creates and installs a source package according to the users specification. For that it downloads the 'child' branch of the GitHub repository, which was specifically set up to produce a new verse, unzips it into a source directory, and substitutes the user inputs into the files. The package is then installed from source, and (optionally) the source directory is removed again.

*fastverse* children inherit 90% of the functionality of the *fastverse* package: they are not permanently globally extensible and can not bear children themselves, but can be configured for projects (using a .name config file) and extended in the session. Use of this function requires an internet connection but no additional R packages (like devtools, remotes or roxygen2).

Value

`fastverse_child` returns NULL invisibly.

See Also

`fastverse_extend, fastverse`

Examples

```r
## Not run:
fastverse_child(
  name = "tsverse",
  title = "Time Series Package Verse",
  pkg = c("xts", "roll", "zoo", "tsbox", "urca", "tseries", "tsutils", "forecast"),
  maintainer = 'person("GivenName", "FamilyName", role = "cre", email = "your@email.com"),
  dir = "C:/Users/.../Documents",
  theme = "tidyverse")
## End(Not run)
```

`fastverse_conflicts`  
Conflicts between the *fastverse* and other packages

Description

This function lists all the conflicts among *fastverse* packages and between *fastverse* packages and other attached packages. It can also be used to check conflicts for any other attached packages.

Usage

`fastverse_conflicts(pkg = fastverse_packages())`

Arguments

pkg character. A vector of packages to check conflicts for. The default is all *fastverse* packages.
Details

There are 2 internal conflict in the core `fastverse` which are not displayed by `fastverse_conflicts()`:

- `collapse::funique` masks `kit::funique`. If both packages are detached, `collapse` is attached after `kit`. In general, the `collapse` version is often faster on data frames and supports unique rows on selected columns. An option `sort = TRUE` lets `collapse::funique` return sorted unique values. The `kit` version is often faster for vectors and also supports matrices.
- `matrixStats::count` masks `kit::count`. The `matrixStats` version is more flexible, supporting restricted search and missing value removal. The `kit` version is nearly twice as fast.

Value

An object of class `'fastverse_conflicts'`: A named list of character vectors where the names are the conflicted objects, and the content are the names of the package namespaces containing the object, in the order they appear on the `search` path.

See Also

`fastverse`

Examples

```r
# Check conflicts between fastverse packages and all attached packages
fastverse_conflicts()

# Check conflicts among all attached packages
fastverse_conflicts(rm_stub(search()[-1], "package:"))
```

---

`fastverse_deps`  List all `fastverse` dependencies

Description

Lists all `fastverse` dependencies and the local and CRAN versions of packages and dependencies.

Usage

```r
fastverse_deps(
  pkg = fastverse_packages(),
  recursive = FALSE,
  repos = getOption("repos"),
  include.self = FALSE,
  check.deps = TRUE
)
```
Arguments

pkg  character vector of packages to check dependencies and versions of. The default is all fastverse packages.

recursive  logical. TRUE recursively determines all packages required to operate these packages. FALSE will only list the packages and their direct dependencies.

repos  the repositories to use to check for updates. Defaults to getOptions("repos").

include.self  logical. TRUE also includes the fastverse package and checks against the CRAN version.

check.deps  logical. FALSE will not determine dependencies but only display the update status of packages in pkg.

Value

A data frame giving the package names, the CRAN and local version, and a logical variable stating whether the local version is behind the CRAN version.

See Also

class, parse_version, fastverse

fastverse_detach  Detach fastverse packages

Description

Detaches fastverse packages, removing them from the search path.

Usage

fastverse_detach(
  ..., 
  unload = FALSE,
  force = FALSE,
  include.self = TRUE,
  session = FALSE,
  permanent = FALSE
)

Arguments

...  comma-separated package names, quoted or unquoted, or vectors of package names. If left empty, all packages returned by fastverse_packages are detached.

unload  logical. TRUE also unloads the packages using detach(name, unload = TRUE).
force logical. should a fastverse package be detached / unloaded even though other attached packages depend on it?
include.self logical. TRUE also includes the fastverse package - only applicable if ... is left empty.
session logical. TRUE also removes the packages from options("fastverse.extend"), so they will not be attached again with library(fastverse) in the current session. If ... is left empty and include.self = TRUE, this will clear all fastverse options set for the session.
permanent logical. if ... are used to detach certain packages, permanent = TRUE will disable them being loaded the next time the fastverse is loaded. This is implemented via a config file saved to the package directory. Core fastverse packages can also be detached in this way. To add a package again use extend_fastverse(..., permanent = TRUE). The config file can be removed with fastverse_reset.

Value

fastverse_detach returns NULL invisibly.

See Also

fastverse_extend, fastverse

Description

Loads additional packages as part of the fastverse. By default only for the session, but extensions can be saved up to reinstallation/updating of the fastverse package.

Usage

fastverse_extend(
  ...,
  topics = NULL,
  install = FALSE,
  permanent = FALSE,
  check.conflicts = !isTRUE(getOption("fastverse.quiet"))
)

Arguments

... comma-separated package names, quoted or unquoted, or vectors of package names.

topics integer or character. Short-keys to attach groups of related and packages suggested as extensions to the fastverse (not case sensitive if character). Unavailable packages are skipped unless install = TRUE.
5. "SP": Spatial. Attaches sf, geos, stars and terra.
7. "TV": Tidyverse-Like. Attaches tidytable, tidyfast, tidyfst, tidyft and maditr.

install logical. Install packages not available?
permanent logical. Should packages be saved and included when library(fastverse) is called next time? Implemented via a config file saved to the package directory. The file will be removed if the fastverse is reinstalled, and can be removed without reinstallation using fastverse_reset. Packages can be removed from the config file using fastverse_detach(..., permanent = TRUE).
check.conflicts logical. Should conflicts between extension packages and attached packages be checked?

Details

The fastverse can be extended using a free choice of packages, packages listed under topics, or a combination of both. If install = FALSE, only packages among the topics groups that are available are considered, others are disregarded.

When the fastverse is extended calling fastverse_extend(...), the packages that are not attached are attached, but conflicts are checked for all specified packages. If permanent = FALSE, an options("fastverse.extend") is set which stores these extension packages, regardless of whether they were already attached or not. When calling fastverse_packages, fastverse_deps, fastverse_conflicts, fastverse_update, fastverse_sitrep or fastverse_detach, these packages are included as part of the fastverse. This is also the case if permanent = TRUE, with the only difference that instead of populating the option, a file is saved to the package directory such that the packages are also loaded (as part of the core fastverse) when calling library(fastverse) in the next session. To extend the fastverse for the current session when it is not yet loaded, users can also set options(fastverse.extend = c(...)), where c(...) is a character vector of package names, before calling library(fastverse).

Value

fastverse_extend returns NULL invisibly.

See Also

fastverse_detach, fastverse
Examples

```r
ex <- getOption("fastverse.extend")
fastverse_extend(xts, stringi)
fastverse_extend(fasttime, topics = "VI")

# Undoing this again
fastverse_detach(setdiff(getOption("fastverse.extend"), ex), session = TRUE)
rm(ex)
```

---

**fastverse_install**  
*Install (missing) fastverse packages*

**Description**
This function (by default) checks if any *fastverse* package is missing and installs the missing packages.

**Usage**

```r
fastverse_install(..., only.missing = TRUE, install = TRUE)
```

**Arguments**

- `...` comma-separated package names, quoted or unquoted, or vectors of package names. If left empty, all packages returned by `fastverse_packages` are checked.
- `only.missing` logical. TRUE only installs packages that are unavailable. FALSE installs all packages, even if they are available.
- `install` logical. TRUE will proceed to install packages, whereas FALSE (recommended) will print the installation command asking you to run it in a clean R session.

**Value**

`fastverse_install` returns NULL invisibly.

**Note**

There is also the possibility to set `options(fastverse.install = TRUE)` before `library(fastverse)`, which will call `fastverse_install()` before loading any packages to make sure all packages are available. If you are using a .fastverse configuration file inside a project (see vignette), you can also place `_opt_fastverse.install = TRUE` before the list of packages in that file.

**See Also**

`fastverse_update`, `fastverse`
fastverse_packages

List all packages in the fastverse

Description
Core packages are first fetched from a project-level configuration file (if found), else from a global configuration file (if found), otherwise the standard set of core packages is returned. In addition, if extensions = TRUE, any packages used to extend the fastverse for the current session are also returned.

Usage
fastverse_packages(extensions = TRUE, include.self = TRUE)

Arguments
extensions logical. TRUE appends the set of core packages with all packages found in options("fastverse.extend").
include.self logical. Include the fastverse package in the list?

Value
A character vector of package names.

See Also
fastverse_extend, fastverse

Examples
fastverse_packages()

fastverse_reset
Reset the fastverse to defaults

Description
Calling this function will remove global configuration files and (default) clear all package options. Attached packages will not be detached, and configuration files for projects (as discussed in the vignette) will not be removed.

Usage
fastverse_reset(options = TRUE)
Arguments

options logical. TRUE also clears all fastverse options.

Value

fastverse_reset returns NULL invisibly.

See Also

fastverse_extend, fastverse

Description

This function gives a quick overview of the version of R and all fastverse packages (including availabilty updates for packages) and indicates whether any global or project-level configuration files are used (as described in more detail the vignette).

Usage

fastverse_sitrep(...)
**fastverse_update**  
*Update fastverse packages*

**Description**

This will check all `fastverse` packages (and their dependencies) for updates and (optionally) install those updates.

**Usage**

`fastverse_update(..., install = FALSE)`

**Arguments**

- `...` arguments passed to `fastverse_deps`.
- `install` logical. `TRUE` will proceed to install outdated packages, whereas `FALSE` (recommended) will print the installation command asking you to run it in a clean R session.

**Value**

`fastverse_update` returns `NULL` invisibly.

**See Also**

`fastverse_deps, fastverse`

---

**is_attached**  
*Utilities*

**Description**

Checks if packages are installed or attached.

**Usage**

```r
is_attached(x)
```

```r
is_installed(x)
```

**Arguments**

- `x` character. A vector of package names.

**Value**

A named logical vector.
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