Package ‘fastverse’

September 2, 2021

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

Version 0.2.1

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).

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Encoding UTF-8

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

Suggests xts, roll, fasttime, lubridate, dygraphs, stringi,
  stringfish, stringdist, Rfast, Rfast2, parallelDist, coop, qs,
  tidyfast, maditr, knitr, rmarkdown

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

BugReports https://github.com/SebKrantz/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(fastvers), 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(fastvers)` to extend the fastverse with some packages for the session. The same can be done with the `fastverse_extend` function after `library(fastvers)`, which will also populate `options("fastverse.extend").`  

**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 `matrixStats` namespace. Since CRAN does not allow namespace modifications in other packages, this feature is only available in the GitHub version, installable using `remotes::install_github("SebKrantz/fastverse")`. 
Development of CRAN and GitHub version will continue synchronous until matrixStats has evolved so that consistent attribute handling (useNames = TRUE) becomes the default.

---

**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 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 person statement giving the package maintainer. If you do not intend to substantially modify the code of the resulting source package, 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 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. TRUE installs the package using install.packages(dir/name,repos = NULL,type = "source",...).
- **keep.dir**: logical. FALSE will remove the source directory (dir/name) again after installation.
- **...**: further arguments to 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, but only preserves the first-match appearance order of character data (unique values for numeric columns are determined using a sort-based method). An option sort = TRUE lets collapse::funique return sorted unique values (for both character and numeric data). The kit version is generally faster for vectors and sometimes for data frames, and also supports matrices. It is a full hash-table based implementation that always preserves the first-match appearance order of data.

- 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:"))
```

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
)
```
**fastverse_detach**

**Arguments**

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>pkg</td>
<td>character vector of packages to check dependencies and versions of. The default is all <code>fastverse</code> packages.</td>
</tr>
<tr>
<td>recursive</td>
<td>logical. TRUE recursively determines all packages required to operate these packages. FALSE will only list the packages and their direct dependencies.</td>
</tr>
<tr>
<td>repos</td>
<td>the repositories to use to check for updates. Defaults to <code>getOptions(&quot;repos&quot;)</code>.</td>
</tr>
<tr>
<td>include.self</td>
<td>logical. TRUE also includes the <code>fastverse</code> package and checks against the CRAN version.</td>
</tr>
<tr>
<td>check.deps</td>
<td>logical. FALSE will not determine dependencies but only display the update status of packages in <code>pkg</code>.</td>
</tr>
</tbody>
</table>

**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**

`fastverse_sitrep, fastverse`

---

**Description**

Detaches `fastverse` packages, removing them from the search path.

**Usage**

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

**Arguments**

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>...</td>
<td>comma-separated package names, quoted or unquoted, or vectors of package names. If left empty, all packages returned by <code>fastverse_packages</code> are detached.</td>
</tr>
<tr>
<td>unload</td>
<td>logical. TRUE also unloads the packages using <code>detach(name, unload = TRUE)</code>.</td>
</tr>
</tbody>
</table>
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**

```r
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, stars and terra.
7. "TV": Tidyverse-Like. Attaches tidytable, tidyfast, tidyfst, tidyft and mitr.

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)
```

Description

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

Usage

`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.

Details

This function is useful to call before `library(fastverse)`, especially in a project when a .fastverse configuration file is used to load a custom set of packages not natively installed by the fastverse package (see vignette). The idea behind this is that you may customize the fastverse for the project, then revisit the project after a long while, and some packages listed in your config file may be missing. You can guard against missing packages by running `fastverse::fastverse_install()` before `library(fastverse)`, to ensure that all fastverse packages are available before loading the fastverse and executing any code.

Value

`fastverse_install` returns NULL invisibly.

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**

```r
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**

```r
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**

```r
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 availability 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**

```r
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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