

Package ‘instantiate’

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Title Pre-Compiled 'CmdStan' Models in R Packages

Description Similar to 'rstantools' for 'rstan', the 'instantiate' package builds pre-compiled 'CmdStan' models into CRAN-ready statistical modeling R packages. The models compile once during installation, the executables live inside the file systems of their respective packages, and users have the full power and convenience of 'cmdstanr' without any additional compilation. This approach saves time, allows R package developers to migrate from 'rstan' to the more modern 'cmdstanr', and fits well with centrally maintained R installations where users have trouble installing their own packages, diagnosing compilation errors, and setting environment variables. Packages 'rstantools', 'cmdstanr', 'stannis', and 'stanapi' are similar Stan clients with different objectives.

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URL <https://wlandau.github.io/instantiate/>,
<https://github.com/wlandau/instantiate>

BugReports <https://github.com/wlandau/instantiate/issues>

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Author William Michael Landau [aut, cre]
 (<<https://orcid.org/0000-0003-1878-3253>>),
 Eli Lilly and Company [cph, fnd]

Maintainer William Michael Landau <will.landau@gmail.com>

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instantiate-package *instantiate: pre-compiled CmdStan models in R packages*

Description

Similar to `rstantools` for `rstan`, the `instantiate` package builds pre-compiled `CmdStan` models into CRAN-ready statistical modeling R packages. The models compile once during installation, the executables live inside the file systems of their respective packages, and users have the full power and convenience of `CmdStanR` without any additional compilation. This approach saves time, allows R package developers to migrate from `rstan` to the more modern `CmdStanR`, and fits well with centrally maintained R installations where users may have trouble installing their own packages, diagnosing compilation errors, and setting environment variables.

stan_cmdstan_exists *Check if instantiate can find CmdStan.*

Description

Check if instantiate can find CmdStan.

Usage

```
stan_cmdstan_exists(cmdstan_install = Sys.getenv("CMDSTAN_INSTALL"))
```

Arguments

cmdstan_install

Character of length 1, how CmdStan was installed. The installation method determines how instantiate looks up CmdStan. Set the default value with the CMDSTAN_INSTALL environment variable. Choices:

1. "internal": Use the copy of CmdStan installed internally inside the instantiate package file system. Before using this option, CmdStan must be installed in the package file system. To do this, set the CMDSTAN_INSTALL environment variable to "internal" before installing instantiate.
2. "fixed": Use the copy of CmdStan that was located at the value contained in Sys.getenv("CMDSTAN") at the time instantiate was installed. In this case, the path to CmdStan is not inside instantiate itself, but it is fixed at installation time and does not depend on the current value of Sys.getenv("CMDSTAN") at runtime.
3. "cmdstanr": Let the cmdstanr::cmdstan_path() decide where to look for CmdStan. The cmdstanr package must be installed. If it is not installed, the function returns the empty string "".
4. "" (default): Try all 3 options in the order above to find a valid installed copy of CmdStan.

Value

TRUE if instantiate can find CmdStan, FALSE otherwise.

See Also

Other cmdstan: [stan_cmdstan_version\(\)](#)

Examples

```
stan_cmdstan_exists()
```

stan_cmdstan_path	<i>Path to CmdStan for instantiate</i>
-------------------	--

Description

Return the directory path to CmdStan that the `instantiate` package uses.

Usage

```
stan_cmdstan_path(cmdstan_install = Sys.getenv("CMDSTAN_INSTALL"))
```

Arguments

`cmdstan_install`

Character of length 1, how CmdStan was installed. The installation method determines how `instantiate` looks up CmdStan. Set the default value with the `CMDSTAN_INSTALL` environment variable. Choices:

1. `"internal"`: Use the copy of CmdStan installed internally inside the `instantiate` package file system. Before using this option, CmdStan must be installed in the package file system. To do this, set the `CMDSTAN_INSTALL` environment variable to `"internal"` before installing `instantiate`.
2. `"fixed"`: Use the copy of CmdStan that was located at the value contained in `Sys.getenv("CMDSTAN")` at the time `instantiate` was installed. In this case, the path to CmdStan is not inside `instantiate` itself, but it is fixed at installation time and does not depend on the current value of `Sys.getenv("CMDSTAN")` at runtime.
3. `"cmdstanr"`: Let the `cmdstanr::cmdstan_path()` decide where to look for CmdStan. The `cmdstanr` package must be installed. If it is not installed, the function returns the empty string `""`.
4. `""` (default): Try all 3 options in the order above to find a valid installed copy of CmdStan.

Value

Character of length 1, directory path to CmdStan. The path may or may not exist. Returns the empty string `""` if the path cannot be determined.

See Also

Other packages: [stan_package_clean\(\)](#), [stan_package_compile\(\)](#), [stan_package_configure\(\)](#), [stan_package_model_files\(\)](#)

Examples

```
stan_cmdstan_path()
```

stan_cmdstan_version *Version of CmdStan that instantiate uses.*

Description

Return the version of CmdStan that the instantiate package uses.

Usage

```
stan_cmdstan_version(  
  cmdstan_install = Sys.getenv("CMDSTAN_INSTALL"),  
  error_on_NA = TRUE  
)
```

Arguments

cmdstan_install

Character of length 1, how CmdStan was installed. The installation method determines how instantiate looks up CmdStan. Set the default value with the CMDSTAN_INSTALL environment variable. Choices:

1. "internal": Use the copy of CmdStan installed internally inside the instantiate package file system. Before using this option, CmdStan must be installed in the package file system. To do this, set the CMDSTAN_INSTALL environment variable to "internal" before installing instantiate.
2. "fixed": Use the copy of CmdStan that was located at the value contained in Sys.getenv("CMDSTAN") at the time instantiate was installed. In this case, the path to CmdStan is not inside instantiate itself, but it is fixed at installation time and does not depend on the current value of Sys.getenv("CMDSTAN") at runtime.
3. "cmdstanr": Let the cmdstanr::cmdstan_path() decide where to look for CmdStan. The cmdstanr package must be installed. If it is not installed, the function returns the empty string "".
4. "" (default): Try all 3 options in the order above to find a valid installed copy of CmdStan.

error_on_NA (logical) Should an error be thrown if CmdStan is not found. The default is TRUE. If FALSE, cmdstan_version() returns NULL.

Value

Character of length 1, version of CmdStan that the instantiate package uses. If CmdStan is not found, then the return value depends on the error_on_NA argument.

See Also

Other cmdstan: [stan_cmdstan_exists\(\)](#)

Examples

```
if (stan_cmdstan_exists()) {
  message(stan_cmdstan_version())
}
```

stan_package_clean *Remove one or more compiled Stan models in an R package.*

Description

Remove one or more compiled Stan models from the file system of an R package.

Usage

```
stan_package_clean(models = instantiate::stan_package_model_files())
```

Arguments

models Character vector of file paths to Stan model source code files. Defaults to the Stan files in `./inst/stan/` because all the Stan model files must live in the `inst/stan/` folder for an R package built with `instantiate`.

Value

NULL (invisibly). Called for its side effects.

See Also

Other packages: [stan_cmdstan_path\(\)](#), [stan_package_compile\(\)](#), [stan_package_configure\(\)](#), [stan_package_model_files\(\)](#)

Examples

```
if (identical(Sys.getenv("INstantiate_EXAMPLES"), "true")) {
  path <- tempfile()
  stan_package_create(path = path)
  stan_package_configure(path = path)
  models <- stan_package_model_files(path)
  list.files(file.path(path, "inst", "stan"))
  stan_package_compile(models)
  list.files(file.path(path, "inst", "stan"))
  # Clean up the compiled Stan model files:
  stan_package_clean(models = models)
  list.files(file.path(path, "inst", "stan"))
}
```

stan_package_compile *Compile the Stan models in an R package.*

Description

Compile all Stan models in a directory, usually in a package.

Usage

```
stan_package_compile(  
  models = instantiate::stan_package_model_files(),  
  cmdstan_install = Sys.getenv("CMDSTAN_INSTALL"),  
  verbose = TRUE,  
  quiet = FALSE,  
  pedantic = FALSE,  
  include_paths = NULL,  
  user_header = NULL,  
  cpp_options = list(),  
  stanc_options = list(),  
  force_recompile = getOption("cmdstanr_force_recompile", default = FALSE),  
  compile_model_methods = FALSE,  
  compile_hessian_method = FALSE,  
  compile_standalone = FALSE,  
  threads = FALSE  
)
```

Arguments

- | | |
|-----------------|---|
| models | Character vector of file paths to Stan model source code files. Defaults to the Stan files in <code>./inst/stan/</code> because all the Stan model files must live in the <code>inst/stan/</code> folder for an R package built with <code>instantiate</code> . |
| cmdstan_install | Character of length 1, how CmdStan was installed. The installation method determines how <code>instantiate</code> looks up CmdStan. Set the default value with the <code>CMDSTAN_INSTALL</code> environment variable. Choices: <ol style="list-style-type: none">1. <code>"internal"</code>: Use the copy of CmdStan installed internally inside the <code>instantiate</code> package file system. Before using this option, CmdStan must be installed in the package file system. To do this, set the <code>CMDSTAN_INSTALL</code> environment variable to <code>"internal"</code> before installing <code>instantiate</code>.2. <code>"fixed"</code>: Use the copy of CmdStan that was located at the value contained in <code>Sys.getenv("CMDSTAN")</code> at the time <code>instantiate</code> was installed. In this case, the path to CmdStan is not inside <code>instantiate</code> itself, but it is fixed at installation time and does not depend on the current value of <code>Sys.getenv("CMDSTAN")</code> at runtime.3. <code>"cmdstanr"</code>: Let the <code>cmdstanr::cmdstan_path()</code> decide where to look for CmdStan. The <code>cmdstanr</code> package must be installed. If it is not installed, the function returns the empty string <code>""</code>. |

	4. "" (default): Try all 3 options in the order above to find a valid installed copy of CmdStan.
verbose	Logical of length 1, whether to set the <code>cmdstanr_verbose</code> global option to print more compiler messages than usual.
quiet	Argument to <code>cmdstanr::cmdstan_model()</code> to control compilation.
pedantic	Logical of length 1, whether to activate pedantic mode when compiling the Stan models. See the <code>cmdstanr</code> documentation for details.
include_paths	Argument to <code>cmdstanr::cmdstan_model()</code> to control model compilation.
user_header	Argument to <code>cmdstanr::cmdstan_model()</code> to control model compilation.
cpp_options	Argument to <code>cmdstanr::cmdstan_model()</code> to control model compilation.
stanc_options	Argument to <code>cmdstanr::cmdstan_model()</code> to model control compilation.
force_recompile	Argument to <code>cmdstanr::cmdstan_model()</code> to model control compilation.
compile_model_methods	Argument to <code>cmdstanr::cmdstan_model()</code> to model control compilation.
compile_hessian_method	Argument to <code>cmdstanr::cmdstan_model()</code> to model control compilation.
compile_standalone	Argument to <code>cmdstanr::cmdstan_model()</code> to model control compilation.
threads	Argument to <code>cmdstanr::cmdstan_model()</code> to model control compilation.

Details

If building a package using `instantiate`, all Stan model files must live in a folder called `inst/stan/` in the package source directory.

Value

NULL (invisibly). Called for its side effects.

See Also

Other packages: [stan_cmdstan_path\(\)](#), [stan_package_clean\(\)](#), [stan_package_configure\(\)](#), [stan_package_model_files\(\)](#)

Examples

```
if (identical(Sys.getenv("INSTANTIATE_EXAMPLES"), "true")) {
  path <- tempfile()
  stan_package_create(path = path)
  stan_package_configure(path = path)
  models <- stan_package_model_files(path)
  list.files(file.path(path, "inst", "stan"))
  stan_package_compile(models)
  list.files(file.path(path, "inst", "stan"))
}
```

`stan_package_configure`*Configure an R package with built-in Stan models.*

Description

Write configuration files in an R package which compile all the Stan models in `inst/stan/` when the package installs.

Usage

```
stan_package_configure(path = getwd(), overwrite = FALSE)
```

Arguments

<code>path</code>	Character of length 1, file path to the package which will contain Stan models in <code>inst/stan/</code> at installation time.
<code>overwrite</code>	Logical of length 1, whether to overwrite any existing configuration files.

Details

Writes configuration scripts `configure` and `configure.win` in the directory specified by the `path` argument.

Value

NULL (invisibly). Called for its side effects.

See Also

Other packages: [stan_cmdstan_path\(\)](#), [stan_package_clean\(\)](#), [stan_package_compile\(\)](#), [stan_package_model_files\(\)](#)

Examples

```
if (identical(Sys.getenv("INSTANTIATE_EXAMPLES"), "true")) {  
  path <- tempfile()  
  stan_package_create(path = path)  
  list.files(path)  
  stan_package_configure(path = path)  
  list.files(path)  
}
```

`stan_package_create` *Create example package with a built-in Stan model.*

Description

Create an example package with a Stan model inside.

Usage

```
stan_package_create(path = tempfile())
```

Arguments

`path` Path to write the package. Must not already exist.

Details

After creating the package, the next step is to configure it with `stan_package_configure()`. After that, install it as an ordinary R package to automatically compile the models.

Value

NULL (invisibly). Called for its side effects.

Examples

```
if (identical(Sys.getenv("INSTANTIATE_EXAMPLES"), "true")) {
  path <- tempfile()
  stan_package_create(path = path)
  list.files(path)
}
```

`stan_package_model` *Get a pre-compiled Stan model built into an R package.*

Description

Get the `cmdstanr` model object for a pre-compiled Stan model inside a package.

Usage

```
stan_package_model(
  name,
  package,
  library = NULL,
  cmdstan_install = Sys.getenv("CMDSTAN_INSTALL")
)
```

Arguments

name	Character of length 1, base name of the Stan model file (without the containing directory or .stan file extension).
package	Character of length 1, name of the R package to look for the built-in Stan model.
library	Character of length 1 or NULL, library path to look for the package with the built-in Stan model. Passed to the <code>lib.loc</code> argument of <code>system.file()</code> .
cmdstan_install	Character of length 1, how CmdStan was installed. The installation method determines how <code>instantiate</code> looks up CmdStan. Set the default value with the <code>CMDSTAN_INSTALL</code> environment variable. Choices: <ol style="list-style-type: none"> 1. "internal": Use the copy of CmdStan installed internally inside the <code>instantiate</code> package file system. Before using this option, CmdStan must be installed in the package file system. To do this, set the <code>CMDSTAN_INSTALL</code> environment variable to "internal" before installing <code>instantiate</code>. 2. "fixed": Use the copy of CmdStan that was located at the value contained in <code>Sys.getenv("CMDSTAN")</code> at the time <code>instantiate</code> was installed. In this case, the path to CmdStan is not inside <code>instantiate</code> itself, but it is fixed at installation time and does not depend on the current value of <code>Sys.getenv("CMDSTAN")</code> at runtime. 3. "cmdstanr": Let the <code>cmdstanr::cmdstan_path()</code> decide where to look for CmdStan. The <code>cmdstanr</code> package must be installed. If it is not installed, the function returns the empty string "". 4. "" (default): Try all 3 options in the order above to find a valid installed copy of CmdStan.

Details

Packages configured with `instantiate` compile their Stan models on installation. Then the `stan_package_model()` function retrieves the `cmdstanr::cmdstan_model()` object without needing to re-compile the model. Please see the documentation website of the `instantiate` package for examples.

Value

An R6 Stan model object from the `cmdstanr` package. Please visit the documentation website at <https://mc-stan.org/cmdstanr/> for detailed information on the composition of this model object and how to use it to conduct Bayesian inference.

Examples

```
# Please see the documentation website of the {instantiate} package
# for examples.
```

`stan_package_model_files`*List Stan model file paths.*

Description

List all the paths to the Stan model files in a package.

Usage

```
stan_package_model_files(path = getwd())
```

Arguments

<code>path</code>	Character of length 1, path to the root directory of the R package with the Stan models.
-------------------	--

Details

All Stan models must live in the `inst/stan/` directory in the package file system.

Value

Character vector of paths to Stan model files in the package.

See Also

Other packages: [stan_cmdstan_path\(\)](#), [stan_package_clean\(\)](#), [stan_package_compile\(\)](#), [stan_package_configure\(\)](#)

Examples

```
path <- tempfile()
stan_package_create(path = path)
stan_package_model_files(path)
```

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