

Package: flexstanr (via r-universe)

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Title Portable Backend Layer for 'Stan' Models

Version 0.1.0

Description Gives a 'Stan'-based R package one interface for fitting its models through either 'rstan' or (optionally) 'cmdstanr'. Collects and validates sampler options, guarding against mixing one backend's argument vocabulary into the other, dispatches the fit to the chosen backend, and exposes backend-agnostic accessors for reading posterior draws, extracting parameters, and running generated quantities. The host package supplies its own compiled models; flexstanr resolves them from the calling package at run time, so the same code works whichever backend is installed.

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Suggests cmdstanr, desc, knitr, posterior, rmarkdown, spelling, testthat (>= 3.0.0), withr

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<https://github.com/ACCIDDA/flexstanr>

BugReports <https://github.com/ACCIDDA/flexstanr/issues>

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backend_draws_array	<i>Posterior draws of a fit as an iterations x chains x parameters array</i>
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Description

Posterior draws of a fit as an iterations x chains x parameters array

Usage

backend_draws_array(raw_fit)

Arguments

raw_fit a backend-native fit object (an rstan stanfit or a cmdstanr CmdStanMCMC).

Value

a 3-D array, dimensions iterations x chains x parameters.

Examples

```
## Not run:
draws <- backend_draws_array(fit)
dim(draws) # iterations x chains x parameters

## End(Not run)
```

backend_extract	<i>Extract named parameters from a fit as a list of arrays</i>
-----------------	--

Description

Matches the shape returned by `rstan::extract()`.

Usage

```
backend_extract(raw_fit, pars, ...)
```

Arguments

<code>raw_fit</code>	a backend-native fit object (an <code>rstan stanfit</code> or a <code>cmdstanr CmdStanMCMC</code>).
<code>pars</code>	character vector of parameter names to extract.
<code>...</code>	forwarded to the backend's extractor.

Value

a named list of draw arrays, one per parameter.

Examples

```
## Not run:
post <- backend_extract(fit, pars = c("beta", "sigma"))

## End(Not run)
```

backend_generate_quantities	<i>Run generated quantities against a fit and return a parameter matrix</i>
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Description

Run generated quantities against a fit and return a parameter matrix

Usage

```
backend_generate_quantities(
  raw_fit,
  data,
  draws_mat,
  pars,
  model_name = NULL,
  package = NULL
)
```

Arguments

<code>raw_fit</code>	a backend-native fit object (an <code>rstan stanfit</code> or a <code>cmdstanr CmdStanMCMC</code>).
<code>data</code>	the Stan data list for the generated-quantities run.
<code>draws_mat</code>	a draws matrix (rows = draws, columns = parameters). Used by the <code>rstan</code> backend; the <code>cmdstanr</code> backend runs generated quantities against the fit's own draws and ignores this argument.
<code>pars</code>	name of the generated parameter to return.
<code>model_name</code>	name of the model whose generated-quantities block to run. Required by the <code>cmdstanr</code> backend, which recompiles the model to run it; ignored by <code>rstan</code> , which reuses the model carried on <code>raw_fit</code> .
<code>package</code>	the host package the model belongs to; defaults to the calling package (see fit_model()). Only used by the <code>cmdstanr</code> backend.

Value

a matrix of the requested generated parameter (rows = draws).

Examples

```
## Not run:
gen <- backend_generate_quantities(fit, data = data_list,
                                  draws_mat = as.matrix(fit), pars = "y_rep")

## End(Not run)
```

backend_has_draws	<i>Does a fit object carry usable posterior draws?</i>
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Description

Detect the degenerate "no draws" case after a fit, so a caller can fail loudly instead of returning an empty fit. This is backend-aware: `rstan` returns a mode-2 `stanfit` with an empty `@sim` when the sampler fails to initialize (rather than erroring), while `cmdstanr` exposes its draws through `$draws()`. Unrecognized objects (e.g. test mocks) are treated as having draws so they pass through untouched.

Usage

```
backend_has_draws(raw_fit)
```

Arguments

<code>raw_fit</code>	a backend-native fit object (an <code>rstan stanfit</code> or a <code>cmdstanr CmdStanMCMC</code>).
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Value

logical; TRUE if the fit carries usable draws.

Examples

```
# Unrecognized objects are treated as carrying draws (pass-through).
backend_has_draws(list())
```

fit_model	<i>Fit a Stan model through the chosen backend</i>
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Description

Dispatches a fit to the backend recorded on `stan_opts` (from [stan_options\(\)](#)). The compiled model is resolved by `model_name` from the calling package: for "rstan", `package::stanmodels[[model_name]]`; for "cmdstanr", `inst/stan/<model_name>.stan` under package. The calling package is detected automatically and can be overridden with `package`.

Usage

```
fit_model(
  model_name,
  dat_stan,
  init,
  stan_opts,
  drop_pars = NULL,
  package = NULL
)
```

Arguments

model_name	name of the Stan model; used to look up the compiled model in the calling package's <code>stanmodels</code> (rstan) and to locate the <code>.stan</code> source file under its <code>inst/stan/</code> (cmdstanr).
dat_stan	the Stan data list.
init	the init list, sized to the chain count.
stan_opts	the validated stan_options() list (carrying a backend element).
drop_pars	character vector of parameter names to exclude from the saved draws, or NULL to keep everything. Honored by rstan; cmdstanr cannot drop parameters and warns if any are requested.
package	name of the host package whose model is being fit. Defaults to the package that called <code>fit_model()</code> , which is correct for the usual case of a host package fitting one of its own models.

Value

the backend's fit object (a `stanfit` or `CmdStanMCMC`).

Examples

```
## Not run:
# From inside a host package that ships a compiled `coverage` model:
opts <- stan_options(chains = 2, iter = 500, seed = 1)
fit <- fit_model("coverage", dat_stan = data_list, init = init_list,
                 stan_opts = opts)

## End(Not run)
```

stan_options

Stan Sampler Options

Description

Collects and validates sampler arguments for the chosen backend, forwarding them **verbatim** so calls feel native to that backend. Use the backend's own argument names; mixing one backend's vocabulary into the other errors with a hint. The model object is supplied separately (via `fit_model()`), while data and init are constructed internally, so none of these may be set here. chains defaults to 4 so downstream code can always size per-chain structures from it.

Usage

```
stan_options(..., chains = 4L, backend = "rstan")
```

Arguments

...	sampler arguments forwarded verbatim to the chosen backend's sampler. Use the backend's own names: for "rstan", the <code>rstan::sampling()</code> arguments (<code>iter</code> , <code>cores</code> , <code>seed</code>); for "cmdstanr", the <code>\$sample()</code> arguments (<code>iter_warmup</code> , <code>iter_sampling</code> , <code>parallel_chains</code> , ...).
chains	A positive integer specifying the number of Markov chains. The default is 4.
backend	which Stan interface to target, one of "rstan" (default) or "cmdstanr". Determines which argument vocabulary is accepted and which sampler <code>fit_model()</code> calls. Selecting "cmdstanr" errors if the cmdstanr package is not installed.

Value

a named list of validated sampler arguments, carrying a backend element recording the backend it was built for

Examples

```
stan_options()
stan_options(chains = 2, iter = 500)
if (requireNamespace("cmdstanr", quietly = TRUE)) {
  stan_options(backend = "cmdstanr", parallel_chains = 4, iter_warmup = 500)
}
```

use_flexstanr

Wire flexstanr into a host package

Description

A one-time setup helper, in the spirit of `usethis`'s `use_*` functions, that declares `flexstanr` as a dependency of the host package you run it from. It adds `flexstanr` (and `rstan`, the default backend) to the host's `Imports` and, until `flexstanr` is on CRAN, an interim `Remotes` entry so `remotes / pak` can install it from GitHub.

No further wiring is needed: the host calls `fit_model()` and the `backend_*` accessors directly, and `flexstanr` resolves the host's own compiled models automatically from the calling package.

Usage

```
use_flexstanr(path = ".", remote = "ACCIDDA/flexstanr", on_cran = FALSE)
```

Arguments

<code>path</code>	path to the host package's root (the directory containing its <code>DESCRIPTION</code>). Defaults to the working directory.
<code>remote</code>	the GitHub owner/repo used for the interim <code>Remotes</code> entry while <code>flexstanr</code> is pre-CRAN.
<code>on_cran</code>	set <code>TRUE</code> once <code>flexstanr</code> is on CRAN to skip the interim <code>Remotes</code> entry; a plain <code>Imports</code> dependency is then enough.

Value

the host package path, invisibly.

Examples

```
## Not run:
# from the root of your Stan package:
flexstanr::use_flexstanr()

## End(Not run)
```

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