Package 'novelforestSG'

October 13, 2022

Title Dataset from the Novel Forests of Singapore

Version 2.0.0

Description The raw dataset and model used in Lai et al. (2021) Decoupled responses of native and exotic tree diversities to distance from old-growth forest and soil phosphorous in novel secondary forests. Applied Vegetation Science, 24, e12548.

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URL https://hrlai.github.io/novelforestSG/, https://github.com/hrlai/novelforestSG, https://doi.org/10.1111/avsc.12548

BugReports https://github.com/hrlai/novelforestSG/issues

Encoding UTF-8

LazyData true

RoxygenNote 7.1.2

Depends R (>= 2.10)

Suggests brms (>= 2.10.0), testthat

NeedsCompilation no

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R topics documented:

`backtransform` *Backtransform Scaled Predictors*

Description

Backtransform scaled predictors in the input data (obtained via `download_model()`) to their original scales. This is done by first back-scaling to the log-scale, and then backtranformed to the original scale (the predictors were log-transformed as described in Lai et al. 2021).

Usage

```
backtransform(data)
```

Arguments

`data`	Defaults to the data object in `download_model()` (see Examples), but could also be another `data.frame` with the same predictor names, should you wish to (back)scale and (back)center using the same means and standard deviations for any reason.

Value

A backtransformed `data.frame` with predictors at their original scales.

References

Lai, H.R., Tan, G.S.Y., Neo, L., Kee, C.Y., Yee, A.T.K., Tan, H.T.W. and Chong, K.Y. (2021) Decoupled responses of native and exotic tree diversities to distance from old-growth forest and soil phosphorous in novel secondary forests. *Applied Vegetation Science*, 24, e12548. doi:10.1111/avsc.12548

Examples

```
# download the model object containing input data
novelforest_model <- download_model()

dat <- backtransform(novelforest_model$data)
head(dat)
```

`download_model` *Download Model Fitted to* `novelforest_data`

Description

Download the `brms` model fitted to `novelforest_data` (Lai et al. 2021). The model object is too large (16.5 MB) to be included with the package, so this function downloads the model from the developmental GitHub website. The generalised linear mixed-effect model was fitted via `brms::brm` so this package is recommended to make full use of the model object.

Usage

```
download_model(save_to = NULL)
```

Arguments

`save_to`	Path and name of the file where the R object is saved to. Defaults to NULL, which does not save the model object locally.

Value

A `brms` model output of class `brmsfit`, which is a list containing the input `data` and other slots that store the model components.

Notably, the `data` slot contains a `data.frame` with the following response variables:

SD_N_0 first-order native taxonomic diversity, i.e., species richness

SD_N_2 second-order native taxonomic diversity, i.e., inverse Simpson index

SD_E_0 first-order exotic taxonomic diversity

SD_E_2 second-order exotic taxonomic diversity

FD_N_0 first-order native functional diversity

FD_N_2 second-order native functional diversity

FD_E_0 first-order exotic functional diversity

FD_E_2 second-order exotic functional diversity,

and the following explanatory variables (and measurement units if you backtransform them using `backtransform`):

dist Distance to old-growth forests (m)

size Patch area (km^2)

nitrogen Total soil nitrogen (mg/kg)

phosphorous Total extractable soil phosphorous (mg/kg)

potassium Total extractable soil potassium (mg/kg)

patch Forest patch ID

#' Note that all explanatory variables were log-transformed and standardised to zero mean and unit standard deviations. Use `backtransform` to obtain the variables in their original scales. See Lai et al. (2021) for more details on model building and data collection.

References

Lai, H.R., Tan, G.S.Y., Neo, L., Kee, C.Y., Yee, A.T.K., Tan, H.T.W. and Chong, K.Y. (2021) Decoupled responses of native and exotic tree diversities to distance from old-growth forest and soil phosphorous in novel secondary forests. *Applied Vegetation Science*, 24, e12548. doi:10.1111/avsc.12548

See Also

backtransform, brms::brmsfit, brms::brm

Examples

```
novelforest_model <- download_model()

# library(brms)  # recommended
summary(novelforest_model)

# to obtain input data
novelforest_model$data
```

`novelforestSG` *novelforestSG*

Description

Forest community data used in Lai et al. (2021); also comprised part of the raw data used in Neo et al. (2017).

Details

The main component of `novelforestSG` is the dataset, which can be accessed with `novelforest_data`. See `?novelforest_data` for more details.

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References

Lai, H.R., Tan, G.S.Y., Neo, L., Kee, C.Y., Yee, A.T.K., Tan, H.T.W. and Chong, K.Y. (2021) Decoupled responses of native and exotic tree diversities to distance from old-growth forest and soil phosphorous in novel secondary forests. *Applied Vegetation Science*, 24, e12548. doi:10.1111/avsc.12548

Neo, L., Yee, A. T. K., Chong, K. Y., Kee, C. Y. and Tan, H. T. W. (2017). Vascular plant species richness and composition in two types of post-cultivation tropical secondary forest. *Applied Vegetation Science*, 20, 692-701. doi:10.1111/avsc.12322

`novelforest_data` *Novel Forest Raw Dataset*

Description

The raw data used in Lai et al. (2021), also comprised part of the data in Neo et al. (2017).

Usage

```
novelforest_data
```

Format

A `data.frame` containing the following variables:

patch Name of forest patch

plot Name of forest plot within patch

UID Unique stem identifier

species Species name following Chong et al. (2011)

stem Indicator column denoting whether a stem is the main trunk (=1) of an individual tree, or otherwise (=0)

dbh_2011 Diameter-at-breast-height (cm) measured in year 2011.

See Lai et al. (2021) for more details on data collection.

References

Chong, K. Y., Tan, H. T. W. and Corlett, R. T. (2011). A summary of the total vascular plant flora of Singapore. *Gardens' Bulletin Singapore*, 63, 197-204.

Lai, H.R., Tan, G.S.Y., Neo, L., Kee, C.Y., Yee, A.T.K., Tan, H.T.W. and Chong, K.Y. (2021) Decoupled responses of native and exotic tree diversities to distance from old-growth forest and soil phosphorous in novel secondary forests. *Applied Vegetation Science*, 24, e12548. doi:10.1111/avsc.12548

Neo, L., Yee, A. T. K., Chong, K. Y., Kee, C. Y. and Tan, H. T. W. (2017). Vascular plant species richness and composition in two types of post-cultivation tropical secondary forest. *Applied Vegetation Science*, 20, 692-701. doi:10.1111/avsc.12322

Examples

```
# To access the dataset
head(novelforest_data)
```

Index