Package 'trending'

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Title Model Temporal Trends

Version 0.0.3

Description Provides a coherent interface to multiple modelling tools for fitting trends along with a standardised approach for generating confidence and prediction intervals.

URL https://github.com/reconhub/trending

BugReports https://github.com/reconhub/trending/issues

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Encoding UTF-8

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Imports MASS, stats, utils, tibble, vctrs, ciTools,

Suggests brms, covr, ggplot2, knitr, outbreaks, patchwork, rmarkdown, dplyr, testthat

VignetteBuilder knitr

NeedsCompilation no

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fit *Fitting for trending_model objects*

Description

fit() fits a model using the given data to obtain an object of type trending_model_fit or trending_model_fit_list.

Usage

```
fit(x, data, ...)

## S3 method for class 'trending_model'
fit(x, data, ...)

## S3 method for class 'list'
fit(x, data, ...)
```

Arguments

x	The output of functions lm_model, glm_model, glm_nb_model, or brms_model or a list of these objects.
data	A data.frame to be used to train the model.
...	Additional arguments passed to underlying models.

Examples

```
x = rnorm(100, mean = 0)
y = rpois(n = 100, lambda = exp(1.5 + 0.5*x))
dat <- data.frame(x = x, y = y)

poisson_model <- glm_model(y ~ x , family = "poisson")
negbin_model <- glm_nb_model(y ~ x)

fit(poisson_model, dat)
fit(list(poisson_model, negbin_model), dat)
```

trending_model *Modeling interface*

Description

These functions wrappers around various modelling tools to ensure a consistent input for *trending* functions. See details for available model interfaces.

Usage

```
glm_model(formula, family, ...)

glm_nb_model(formula, ...)

lm_model(formula, ...)

brms_model(formula, family, ...)
```

Arguments

formula	The formula of the model, with the response variable on the left of a tilde symbol, and predictors on the right hand-side; variable names used in the formula will need to be matched by columns in the data input to other functions.
family	The model family to be used for the response variable.
...	Further arguments passed underlying models: lm for lm_model(), glm for glm_model(), MASS::glm.nb() for glm_nb_model, brms::brm() for brms_model. Not used for print and format.

Details

The following interfaces are available:

- lm_model: interface for linear models implemented in stats::lm().
- glm_model: interface for generalised linear models (GLMs) implemented in stats::glm().
- glm_nb_model: interface for negative binomial generalied linear models implemented in MASS::glm.nb.
- brms_model: interface for Bayesian regression models implemented in brms::brm.

Value

A trending_model object (S3 class inheriting list), containing items which can be accessed by various accessors - see ?trending_model-accessors.

Author(s)

Dirk Schumacher

Examples

```
x = rnorm(100, mean = 0)
y = rpois(n = 100, lambda = exp(1.5 + 0.5*x))

poisson_model <- glm_model(y ~ x , family = "poisson")
negbin_model <- glm_nb_model(y ~ x)
```

trending_model_accessors

Accessors for trending_model objects

Description

These functions can be used to access information stored in `trending_model` objects. See details.

Usage

```
get_formula(x, ...)

## S3 method for class 'trending_model'
get_formula(x, ...)

get_response(x, ...)

## S3 method for class 'trending_model'
get_response(x, ...)
```

Arguments

x	Object of class `trending_model_fit` (i.e. the output from fitting a `trending_model`).
...	Not currently used by any methods.

Details

The following accessors are available:

- `get_formula()`: get the formula used to model temporal trends;
- `get_response()`: get the name of the response variable.

trending_model_fit-prediction

Predict methods

Description

These functions can be used to generated estimated values and associated confidence/prediction intervals for trending_model_fit objects.

Usage

```
## S3 method for class 'trending_model_fit'
predict(
  object,
  new_data,
  alpha = 0.05,
  add_pi = TRUE,
  simulate_pi = TRUE,
  uncertain = TRUE,
  ...
)

## S3 method for class 'trending_model_fit_list'
predict(
  object,
  new_data,
  alpha = 0.05,
  add_pi = TRUE,
  simulate_pi = TRUE,
  uncertain = TRUE,
  ...
)
```

Arguments

object	A trending_model_fit or trending_model_fit_list object.
new_data	A data.frame containing data for which predictions are to be derived.
alpha	The alpha threshold to be used for prediction intervals, defaulting to 0.05, i.e. 95% prediction intervals are derived.
add_pi	Add a prediction interval to the output. Default TRUE.
simulate_pi	Should the ciTools package be used to simulate prediction intervals for glm models. Default TRUE.
uncertain	Only used for glm models. Default TRUE. If FALSE uncertainty in the fitted paramaters is ignored when generating the prediction intervals.
...	Not currently used.
	x = rnorm(100, mean = 0) y = rpois(n = 100, lambda = exp(1.5 + 0.5*x)) dat <- data.frame(x = x, y = y)
	poisson_model <- glm_model(y ~ x , family = "poisson") negbin_model <- glm_nb_model(y ~ x)
	fitted_poisson <- fit(poisson_model, dat) fitted_list <- fit(list(poisson_model, negbin_model), dat)
	predict(fitted_poisson) predict(fitted_list)

`trending_model_fit_accessors`
Accessors for trending_model_fit objects

Description

These functions can be used to access information stored in `trending_model_fit` objects. See details.

Usage

```
get_model(x, ...)

## S3 method for class 'trending_model_fit'
get_model(x, ...)

get_data(x, ...)

## S3 method for class 'trending_model_fit'
get_data(x, ...)
```

Arguments

x	Object of class `trending_model` (i.e. the output of functions `lm_model()`, `glm_model()`, `glm_nb_model()`, or `brms_model()`).
...	Not currently used

Details

The following accessors are available:

- `get_model()`: get the fitted model stored in the object

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