Package ‘fable.prophet’

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Title Prophet Modelling Interface for 'fable'

Description
Allows prophet models from the 'prophet' package to be used in a tidy workflow with the modelling interface of 'fabletools'. This extends 'prophet' to provide enhanced model specification and management, performance evaluation methods, and model combination tools.

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Contents

fable.prophet-package 2
components.fbl_prophet 3
fitted.fbl_prophet 4
forecast.fbl_prophet 4
glance.fbl_prophet 5
prophet 6
residuals.fbl_prophet 8
tidy.fbl_prophet 8

Index **10**

`fable.prophet-package` *fable.prophet: Prophet Modelling Interface for 'fable'*

Description

Allows prophet models from the 'prophet' package to be used in a tidy workflow with the modelling interface of 'fabletools'. This extends 'prophet' to provide enhanced model specification and management, performance evaluation methods, and model combination tools.

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See Also

Useful links:

- https://pkg.mitchelloharawild.com/fable.prophet/
- Report bugs at https://github.com/mitchelloharawild/fable.prophet/issues

`components.fbl_prophet` *Extract meaningful components*

Description

A prophet model consists of terms which are additively or multiplicatively included in the model. Multiplicative terms are scaled proportionally to the estimated trend, while additive terms are not.

Usage

```
## S3 method for class 'fbl_prophet'
components(object, ...)
```

Arguments

`object`	An estimated model.
`...`	Unused.

Details

Extracting a prophet model's components using this function allows you to visualise the components in a similar way to `prophet::prophet_plot_components()`.

Value

A `fabletools::dable()` containing estimated states.

Examples

```
if (requireNamespace("tsibbledata")) {
library(tsibble)
beer_components <- tsibbledata::aus_production %>%
  model(
    prophet = prophet(Beer ~ season("year", 4, type = "multiplicative"))
  ) %>%
  components()

beer_components

autoplot(beer_components)

library(ggplot2)
library(lubridate)
beer_components %>%
  ggplot(aes(x = quarter(Quarter), y = year, group = year(Quarter))) +
  geom_line()
}
```

fitted.fbl_prophet *Extract fitted values*

Description

Extracts the fitted values from an estimated Prophet model.

Usage

```
## S3 method for class 'fbl_prophet'
fitted(object, ...)
```

Arguments

object	A model for which forecasts are required.
...	Other arguments passed to methods

Value

A vector of fitted values.

forecast.fbl_prophet *Produce forecasts from the prophet model*

Description

If additional future information is required (such as exogenous variables or carrying capacities) by the model, then they should be included as variables of the new_data argument.

Usage

```
## S3 method for class 'fbl_prophet'
forecast(object, new_data, specials = NULL, times = 1000, ...)
```

Arguments

object	A model for which forecasts are required.
new_data	A tsibble containing the time points and exogenous regressors to produce forecasts for.
specials	(passed by fabletools::forecast.mdl_df()).
times	The number of sample paths to use in estimating the forecast distribution when bootstrap = TRUE.
...	Additional arguments passed to prophet::predict.prophet().

Value

A list of forecasts.

See Also

prophet::predict.prophet()

Examples

```
if (requireNamespace("tsibbledata")) {
library(tsibble)
tsibbledata::aus_production %>%
  model(
    prophet = prophet(Beer ~ season("year", 4, type = "multiplicative"))
  ) %>%
  forecast()
}
```

---

glance.fbl_prophet *Glance a prophet model*

Description

A glance of a prophet provides the residual's standard deviation (sigma), and a tibble containing the selected changepoints with their trend adjustments.

Usage

```
## S3 method for class 'fbl_prophet'
glance(x, ...)
```

Arguments

x	model or other R object to convert to single-row data frame
...	other arguments passed to methods

Value

A one row tibble summarising the model's fit.

Examples

```
if (requireNamespace("tsibbledata")) {
library(tsibble)
library(dplyr)
fit <- tsibbledata::aus_production %>%
  model(
    prophet = prophet(Beer ~ season("year", 4, type = "multiplicative"))
  )

glance(fit)
}
```

`prophet` *Prophet procedure modelling*

Description

Prepares a prophet model specification for use within the `fable` package.

Usage

```
prophet(formula, ...)
```

Arguments

`formula`	A symbolic description of the model to be fitted of class `formula`.
`...`	Additional arguments passed to the `optimizing` or `sampling` functions in Stan.

Details

The prophet modelling interface uses a `formula` based model specification (`y ~ x`), where the left of the formula specifies the response variable, and the right specifies the model's predictive terms. Like any model in the fable framework, it is possible to specify transformations on the response.

A prophet model supports piecewise linear or exponential growth (trend), additive or multiplicative seasonality, holiday effects and exogenous regressors. These can be specified using the 'specials' functions detailed below. The introduction vignette provides more details on how to model data using this interface to prophet: `vignette("intro", package="fable.prophet")`.

Specials

growth: The `growth` special is used to specify the trend parameters.

```
growth(type = c("linear", "logistic"), capacity = NULL, floor = NULL,
       changepoints = NULL, n_changepoints = 25, changepoint_range = 0.8,
       changepoint_prior_scale = 0.05)
```

type	The type of trend (linear or logistic).
capacity	The carrying capacity for when type is "logistic".
floor	The saturating minimum for when type is "logistic".
changepoints	A vector of dates/times for changepoints. If NULL, changepoints are automatically selected.
n_changepoints	The total number of changepoints to be selected if changepoints is NULL
changepoint_range	Proportion of the start of the time series where changepoints are automatically selected.
changepoint_prior_scale	Controls the flexibility of the trend.

season: The season special is used to specify a seasonal component. This special can be used multiple times for different seasonalities.
Warning: The inputs controlling the seasonal period **is specified is different than** prophet::prophet()**. Numeric inputs are treated as the number of observations in each seasonal period, not the number of days.**

```
season(period = NULL, order = NULL, prior_scale = 10,
       type = c("additive", "multiplicative"), name = NULL)
```

period	The periodic nature of the seasonality. If a number is given, it will specify the number of observations in each
order	The number of terms in the partial Fourier sum. The higher the order, the more flexible the seasonality can b
prior_scale	Used to control the amount of regularisation applied. Reducing this will dampen the seasonal effect.
type	The nature of the seasonality. If "additive", the variability in the seasonal pattern is fixed. If "multiplicative", t
name	The name of the seasonal term (allowing you to name an annual pattern as 'annual' instead of 'year' or 365.2

holiday: The holiday special is used to specify a tsibble containing holidays for the model.

```
holiday(holidays = NULL, prior_scale = 10L)
```

holidays	A tsibble containing a set of holiday events. The event name is given in the 'holiday' column, and the event
prior_scale	Used to control the amount of regularisation applied. Reducing this will dampen the holiday effect.

xreg: The xreg special is used to include exogenous regressors in the model. This special can be used multiple times for different regressors with different arguments. Exogenous regressors can also be used in the formula without explicitly using the xreg() special, which will then use the default arguments.

```
xreg(..., prior_scale = NULL, standardize = "auto", type = NULL)
```

...	A set of bare expressions that are evaluated as exogenous regressors
prior_scale	Used to control the amount of regularisation applied. Reducing this will dampen the regressor effect.
standardize	Should the regressor be standardised before fitting? If "auto", it will standardise if the regressor is not binary.
type	Does the effect of the regressor vary proportionally to the level of the series? If so, "multiplicative" is best. Ot

See Also

- prophet::prophet()
- Prophet homepage
- Prophet R package
- Prophet Python package

Examples

```
library(tsibble)
as_tsibble(USAccDeaths) %>%
  model(
    prophet = prophet(value ~ season("year", 4, type = "multiplicative"))
  )
```

`residuals.fbl_prophet` *Extract model residuals*

Description

Extracts the residuals from an estimated Prophet model.

Usage

```
## S3 method for class 'fbl_prophet'
residuals(object, ...)
```

Arguments

`object`	A model for which forecasts are required.
`...`	Other arguments passed to methods

Value

A vector of residuals.

`tidy.fbl_prophet` *Extract estimated coefficients from a prophet model*

Description

Extract estimated coefficients from a prophet model

Usage

```
## S3 method for class 'fbl_prophet'
tidy(x, ...)
```

Arguments

`x`	An object to be converted into a tidy `tibble::tibble()`.
`...`	Additional arguments to tidying method.

Value

A tibble containing the model's estimated parameters.

Examples

```
if (requireNamespace("tsibbledata")) {
library(tsibble)
library(dplyr)
fit <- tsibbledata::aus_production %>%
  model(
    prophet = prophet(Beer ~ season("year", 4, type = "multiplicative"))
  )

tidy(fit) # coef(fit) or coefficients(fit) can also be used
}
```

Index

∗ **package**
fable.prophet-package, 2

components.fbl_prophet, 3

fable.prophet *(*fable.prophet-package*)*, 2
fable.prophet-package, 2
fabletools::dable(), *3*
fabletools::forecast.mdl_df(), *4*
fitted.fbl_prophet, 4
forecast.fbl_prophet, 4

glance.fbl_prophet, 5

prophet, 6
prophet::predict.prophet(), *4*, *5*
prophet::prophet(), *7*
prophet::prophet_plot_components(), *3*

residuals.fbl_prophet, 8

tibble::tibble(), *8*
tidy.fbl_prophet, 8