Package 'poissonreg'

April 14, 2020

Title Model Wrappers for Poisson Regression

Version 0.0.1

Description Bindings for Poisson regression models for use with the
'parsnip' package. Models include simple generalized linear models,
Bayesian models, and zero-inflated Poisson models (Zeileis, Kleiber, and
Jackman (2008) <doi:10.18637/jss.v027.i08>).

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URL https://github.com/tidymodels/poissonreg

BugReports https://github.com/tidymodels/poissonreg/issues

Depends parsnip (>= 0.1.0), R (>= 2.10)

Imports rlang, tibble, purrr, stats, dplyr, tidyr, glue

Suggests testthat, pscl, covr, spelling

Encoding UTF-8

LazyData true

RoxygenNote 7.1.0.9000

Language en-US

NeedsCompilation no

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Repository CRAN

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R topics documented:

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poisson_reg   *General Interface for Poisson Regression Models*

Description

poisson_reg() is a way to generate a *specification* of a model before fitting and allows the model to be created using different packages in R or Stan. The main arguments for the model are:

- penalty: The total amount of regularization in the model. Note that this must be zero for some engines.
- mixture: The proportion of L1 regularization in the model. Note that this will be ignored for some engines.

These arguments are converted to their specific names at the time that the model is fit. Other options and argument can be set using set_engine(). If left to their defaults here (NULL), the values are taken from the underlying model functions. If parameters need to be modified, update() can be used in lieu of recreating the object from scratch.

Usage

```
poisson_reg(mode = "regression", penalty = NULL, mixture = NULL)

## S3 method for class 'poisson_reg'
update(
  object,
  parameters = NULL,
  penalty = NULL,
  mixture = NULL,
  fresh = FALSE,
  ...
)
```

Arguments

mode	A single character string for the type of model. The only possible value for this model is "regression".
penalty	A non-negative number representing the total amount of regularization (glmnet only).
mixture	A number between zero and one (inclusive) that represents the proportion of regularization that is used for the L2 penalty (i.e. weight decay, or ridge regression) versus L1 (the lasso) (glmnet only).
object	A boosted tree model specification.
parameters	A 1-row tibble or named list with *main* parameters to update. If the individual arguments are used, these will supersede the values in parameters. Also, using engine arguments in this object will result in an error.

fresh	A logical for whether the arguments should be modified in-place of or replaced wholesale.
...	Not used for `update()`.

Details

The data given to the function are not saved and are only used to determine the *mode* of the model. For `poisson_reg()`, the mode will always be "regression".

The model can be created using the `fit()` function using the following *engines*:

- **R**: `"glm"` (the default), `"glmnet"`, `"hurdle"`, or `"zeroinfl"`
- **Stan**: `"stan"`

Value

An updated model specification.

Engine Details

Engines may have pre-set default arguments when executing the model fit call. For this type of model, the template of the fit calls are:

```
poisson_reg() %>%
  set_engine("glm") %>%
  translate()

## Poisson Regression Model Specification (regression)
##
## Computational engine: glm
##
## Model fit template:
## stats::glm(formula = missing_arg(), data = missing_arg(), weights = missing_arg(),
##     family = stats::poisson)

poisson_reg() %>%
  set_engine("zeroinfl") %>%
  translate()

## Poisson Regression Model Specification (regression)
##
## Computational engine: zeroinfl
##
## Model fit template:
## pscl::zeroinfl(formula = missing_arg(), data = missing_arg(),
##     weights = missing_arg())

poisson_reg() %>%
  set_engine("hurdle") %>%
  translate()
```

```
## Poisson Regression Model Specification (regression)
##
## Computational engine: hurdle
##
## Model fit template:
## pscl::hurdle(formula = missing_arg(), data = missing_arg(), weights = missing_arg())

poisson_reg() %>%
  set_engine("glmnet") %>%
  translate()

## Poisson Regression Model Specification (regression)
##
## Computational engine: glmnet
##
## Model fit template:
## glmnet::glmnet(x = missing_arg(), y = missing_arg(), weights = missing_arg(),
##     family = "poisson")

poisson_reg() %>%
  set_engine("stan") %>%
  translate()

## Poisson Regression Model Specification (regression)
##
## Computational engine: stan
##
## Model fit template:
## rstanarm::stan_glm(formula = missing_arg(), data = missing_arg(),
##     weights = missing_arg(), family = stats::poisson)
```

The standardized parameter names in parsnip can be mapped to their original names in each engine
that has main parameters:

parsnip	glmnet
penalty	lambda
mixture	alpha

Examples

```
poisson_reg()

# Model from Agresti (2007) Table 7.6
log_lin_mod <-
  poisson_reg() %>%
  set_engine("glm") %>%
  fit(count ~ (.)^2, data = seniors)
```

```
summary(log_lin_mod$fit)

# -----------------------------------------------------------------------------

library(pscl)

data("bioChemists", package = "pscl")

poisson_reg() %>%
  set_engine("hurdle") %>%
# Extended formula:
  fit(art ~ . | phd, data = bioChemists)

model <- poisson_reg(penalty = 10, mixture = 0.1)
model
update(model, penalty = 1)
update(model, penalty = 1, fresh = TRUE)
```

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seniors	*Alcohol, Cigarette, and Marijuana Use for High School Seniors*

Description

Alcohol, Cigarette, and Marijuana Use for High School Seniors

Details

Data are from Table 7.3 of Agresti (2007). The first three columns make up data from a 3-way contingency table.

Value

seniors   a tibble

Source

Agresti, A (2007). *An Introduction to Categorical Data Analysis*.

Examples

```
data(seniors)
str(seniors)
```

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