

Package ‘poissonreg’

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Title Model Wrappers for Poisson Regression

Version 0.1.0

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>,
<https://poissonreg.tidymodels.org/>

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

Depends parsnip (>= 0.1.3.9000), R (>= 2.10)

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

Suggests testthat, pscl, covr, spelling

Encoding UTF-8

LazyData true

RoxygenNote 7.1.1.9000

Language en-US

NeedsCompilation no

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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 mixture amounts of different types of regularization (see below). 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

<code>mode</code>	A single character string for the type of model. The only possible value for this model is "regression".
<code>penalty</code>	A non-negative number representing the total amount of regularization (glmnet only).
<code>mixture</code>	A number between zero and one (inclusive) that is the proportion of L1 regularization (i.e. lasso) in the model. When <code>mixture = 1</code> , it is a pure lasso model while <code>mixture = 0</code> indicates that ridge regression is being used. (glmnet and spark only).
<code>object</code>	A boosted tree model specification.
<code>parameters</code>	A 1-row tibble or named list with <i>main</i> parameters to update. If the individual arguments are used, these will supersede the values in <code>parameters</code> . Also, using engine arguments in this object will result in an error.

fresh	A logical for whether the arguments should be modified in-place 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)

```

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)
```

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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