Package ‘shinymodels’

November 17, 2021

Title  Interactive Assessments of Models
Version  0.1.0
Description  Launch a ‘shiny’ application for ‘tidymodels’ results. For classification or regression models, the app can be used to determine if there is lack of fit or poorly predicted points.
License  MIT + file LICENSE
URL  https://shinymodels.tidymodels.org,
https://github.com/tidymodels/shinymodels
BugReports  https://github.com/tidymodels/shinymodels/issues
Depends  ggplot2, R (>= 2.10)
Imports  dplyr, DT, generics (>= 0.1.0), glue, htmltools, magrittr, parsnip, plotly, purrr, rlang, scales, shiny, shinydashboard, stats, tidyselect, tune, yardstick
Suggests  covr, knitr, markdown, modeldata, rmarkdown, shinytest, spelling, testthat (>= 3.0.0)
Config/Needs/website  tidyverse/tidytemplate
Config/testthat/edition  3
Encoding  UTF-8
Language  en-US
LazyData  false
ROxygenNote  7.1.2
NeedsCompilation  no
Author  Max Kuhn [aut, cre] (< https://orcid.org/0000-0003-2402-136X >),
Shisham Adhikari [aut],
Julia Silge [aut] (< https://orcid.org/0000-0002-3671-836X >),
RStudio [cph]
Maintainer  Max Kuhn <max@rstudio.com>
Repository  CRAN
Date/Publication  2021-11-17 21:00:02 UTC
**R topics documented:**

ames_mlp_itr .................................................... 2  
cars_bag_vfld .................................................... 3  
cell_race .......................................................... 4  
explore.default ................................................... 5  
scat_fda_bt ....................................................... 7  
two_class_final .................................................... 8  

---

**Index**

<table>
<thead>
<tr>
<th>ames_mlp_itr</th>
<th>Iterative optimization of neural network</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Description**

This object has the results when a neural network was tuned using Bayesian optimization and a validation set.

**Details**

The code used to produce this object:

```r
data(ames)

ames <-
  ames %>%
  select(Sale_Price, Neighborhood, Longitude, Latitude, Year_Built) %>%
  mutate(Sale_Price = log10(ames$Sale_Price))

set.seed(1)
ames_rs <- validation_split(ames)
ames_rec <-
  recipe(Sale_Price ~ ., data = ames) %>%
  step_dummy(all_nominal_predictors()) %>%
  step_zv(all_predictors()) %>%
  step_normalize(all_predictors())

mlp_spec <-
  mlp(hidden_units = tune(),
       penalty = tune(),
       epochs = tune()) %>%
  set_mode("regression")

set.seed(1)
ames_mlp_itr <-
  mlp_spec %>%
```
```r
tune_bayes(
  ames_rec,
  resamples = ames_rs,
  initial = 5,
  iter = 4,
  control = control_bayes(save_pred = TRUE)
)
```

Value

An object with primary class `iteration_results`.

---

cars_bag_vfld  
Resampled bagged tree results

Description

This object has the results when a bagged regression tree was resampled using 10-fold cross-validation.

Details

The code used to produce this object:

```r
library(tidymodels)
library(baguette)
tidymodels_prefer()

# ------------------------------------------------------------------------------
ctrl_rs <- control_resamples(save_pred = TRUE)
# ------------------------------------------------------------------------------

set.seed(1)
cars_rs <- vfold_cv(mtcars)
cars_bag_vfld <-
  bag_tree() %>%
  set_engine("rpart", times = 5) %>%
  set_mode("regression") %>%
  fit_resamples(
    mpg ~ .,
    resamples = cars_rs,
    control = ctrl_rs
  )
```

**Value**

An object with primary class resample_results.

---

**cell_race**

*A CART classification tree tuned via racing*

**Description**

This object has the results when a CART classification tree model was tuned over the cost-complexity parameter using racing.

**Details**

To reduce the object size, a smaller subset of the data were used.

The code used to produce this object:

```r
library(tidymodels)
library(finetune)
tidymodels_prefer()

ctrl_rc <- control_race(save_pred = TRUE)

# ------------------------------------------------------------------------------
data(cells)
set.seed(1)
cells <-
cells %>%
  select(-case) %>%
sample_n(200)

# ------------------------------------------------------------------------------
set.seed(2)
cell_rs <- vfold_cv(cells)

# ------------------------------------------------------------------------------
set.seed(3)
cell_race <-
decision_tree(cost_complexity = tune()) %>%
  set_mode("classification") %>%
tune_race_anova(
    class ~ .,
    resamples = cell_rs,
```
```r
grid = tibble(cost_complexity = 10^seq(-2, -1, by = 0.2)),
        control = ctrl_rc
    )

Value
An object with primary class tune_race.

Description
explore() launches a Shiny application to interact with results from some tidymodels functions.

To investigate model fit(s), explore() can be used on objects produced by

- `tune::fit_resamples()`
- `tune::tune_grid()`
- `tune::tune_bayes()`
- `finetune::tune_sim_anneal()`
- `finetune::tune_race_anova()`
- `finetune::tune_race_win_loss()`
- `tune::last_fit()`

The application starts in a new window and allows users to see how predicted values align with the true, observed data. There are 2-3 tabs in the application (depending on the object):

- **Tuning Parameters** enables users to choose a specific set of tuning parameters. These results are shown in the **Plots** tab. The default configuration is based on the **optimal value** of the first performance metric used during the creation of the object.

- **Plots** shows various panels that can visualize how well the model fits. Specific points can be highlighted by clicking on them (as long as the `hover_only = FALSE` option was used). To reset the highlighted points, double on the graph background.

- **About** gives information on the application as well as links to get help or file bug reports/feature requests.

To quit the Shiny application, use the **Esc** key.

Usage
```r
## Default S3 method:
explore(x, ...)

## S3 method for class 'tune_results'
explore(x, hover_cols = NULL, hover_only = FALSE, ...)
```
Arguments

x  
An object with class tune_results.

...  
Other parameters not currently used.

hover_cols  
The columns to display while hovering in the Shiny app. This argument can be:
- A dplyr selector (such as `dplyr::starts_with()`) or a set of selector if they are enclosed with `c()`.
- A character vector.

hover_only  
A logical to determine if interactive highlighting of points is enabled (the default) or not. This can be helpful for very large data sets.

Details

For resampling methods that produce more than one hold-out prediction per row (e.g. the bootstrap, repeated V-fold cross-validation), the predicted values shown in the plots are averages of the predictions for that specific row.

The ggplot2 theme used in the Shiny application corresponds to the current theme in the R session. Run `ggplot2::theme_set()` to change the theme for the plots in the Shiny application.

For classification models, there is a toggle on the bottom left of the application to choose between "Unscaled (i.e. linear)" and "Logit scaled" probability scaling. The first option plots the raw probabilities while the logit scaling uses `scales::logit_trans()` to rescale the axis. This can be helpful when a model with a linear predictor is used (e.g. logistic or multinomial regression) since it can show linear effects from a feature more easily.

When using the application, there may be warnings printed in the console about "event tied a source ID ... not registered". These can be ignored.

When racing results are explored, the shiny application will only allow tuning parameter combinations that were fully resampled. As a result, parameter combinations that were discarded during the race will now be able to be selected.

Value

A shiny application.

Examples

```r
data(ames_mlp_itr)

if (interactive()) {
  explore(ames_mlp_itr, hover_cols = dplyr::contains("tude"))
}
```
**Tuned flexible discriminant analysis results**

**Description**

This object has the results when a flexible discriminant analysis model was tuned over the interaction degree parameters.

**Details**

To reduce the object size, five bootstraps were used for resampling and missing data were removed.

The code used to produce this object:

```r
library(tidymodels)
library(discrim)
tidymodels_prefer()

# Control grid
ctrl_gr <- control_grid(save_pred = TRUE)

# Data
data(scat)
scat <- scat[complete.cases(scat),]

# Set seed and bootstraps
set.seed(1)
scat_rs <- bootstraps(scat, times = 5)

scat_fda_bt <-
  discrim_flexible(prod_degree = tune()) %>%
  tune_grid(
    Species ~ .,
    resamples = scat_rs,
    control = ctrl_gr
  )
```

**Value**

An object with primary class `tune_results`. 
two_class_final

Test set results for logistic regression

Description

This object has the results when a logistic regression model is fit to the training set and is evaluated on the test set.

Details

The code used to produce this object:

```r
library(tidymodels)
tidymodels_prefer()

# set.seed(1)
data(two_class_dat)

two_class_split <- initial_split(two_class_dat)

glm_spec <- logistic_reg()
two_class_final <-
glm_spec %>%
last_fit(
  Class ~ .,
split = two_class_split
)
```

Value

An object with primary class `last_fit`.
Index

* datasets
  ames_mlp_itr, 2
  cars_bag_vfld, 3
  cell_race, 4
  scat_fda_bt, 7
  two_class_final, 8

ames_mlp_itr, 2

cars_bag_vfld, 3

cell_race, 4

dplyr::starts_with(), 6

explore.default, 5
explore.tune_results(explore.default), 5

finetune::tune_race_anova(), 5
finetune::tune_race_win_loss(), 5
finetune::tune_sim_anneal(), 5

ggplot2::theme_set(), 6

scales::logit_trans(), 6
scat_fda_bt, 7

tune::fit_resamples(), 5
tune::last_fit(), 5
tune::tune_bayes(), 5
tune::tune_grid(), 5
two_class_final, 8