

Package ‘recorder’

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Title Toolkit to Validate New Data for a Predictive Model

Version 0.8.2

Description A lightweight toolkit to validate new observations when computing their predictions with a predictive model. The validation process consists of two steps: (1) record relevant statistics and meta data of the variables in the original training data for the predictive model and (2) use these data to run a set of basic validation tests on the new set of observations.

URL <https://github.com/smaakage85/recorder>

Depends R (>= 3.4.0)

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Imports data.table, crayon

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compress_detailed_tests
<i>Compress Results of Detailed Tests</i>

Description

Subsets results of the tests, where at least one row failed.

Usage

compress_detailed_tests(dt)

Arguments

dt list results of detailed tests.

Value

list with test failures.

concatenate_test_failures

Concatenate Validation Test Failures Descriptions

Description

Concatenates validation test failures descriptions to a single character vector.

Usage

```
concatenate_test_failures(test_failures)
```

Arguments

`test_failures` data.frame with test results as columns.

Value

character concatenated descriptions of test failures with one string pr. row.

create_tests_meta_data

Create Meta Data of Validation Tests

Description

Creates meta data of available validation tests as a list. The list has as many elements as the number of available validation test - one for each test. Entries are named after the different tests.

Usage

```
create_tests_meta_data()
```

Details

The meta data of a validation test consists of:

evaluate_level is the test evaluated on column level ('col') or on row level ('row')?

evaluate_class what classes of variables are being tested with this specific test?

description a short description of what a test failure means for the given test

Value

list meta data of validation tests.

Examples

```
create_tests_meta_data()
```

`create_test_results_df`*Create Data Frame with Test Results*

Description

Create Data Frame with Test Results

Usage

```
create_test_results_df(x)
```

Arguments

`x` list results of tests.

Value

`data.table` with test results as columns.

`get_clean_rows`*Get Clean Rows*

Description

Get Clean Rows

Usage

```
get_clean_rows(playback, ignore_tests = NULL, ignore_cols = NULL,  
  ignore_combinations = NULL)
```

Arguments

`playback` `data.playback` to extract failed tests from.
`ignore_tests` character ignore test results from tests with these names.
`ignore_cols` character ignore test results from tests of columns with these names.
`ignore_combinations` list ignore test results from specific tests of specific columns.

Details

Look up the descriptions and other meta data of the available validation tests with [get_tests_meta_data](#).

Value

logical with the same length as the number of rows in new data. The value is TRUE, if the row passed all tests, otherwise FALSE.

Examples

```
# record tape from `iris`.
tape <- record(iris)
# load data.
data(iris_newdata)
# validate new data by playing new tape on it.
playback <- play(tape, iris_newdata)

get_clean_rows(playback)
get_clean_rows(playback, ignore_tests = "outside_range")
get_clean_rows(playback, ignore_cols = "junk")
get_clean_rows(playback, ignore_combinations = list(outside_range = "Sepal.Width"))
```

get_failed_tests	<i>Get Failed Tests</i>
------------------	-------------------------

Description

Get Failed Tests

Usage

```
get_failed_tests(playback, ignore_tests = NULL, ignore_cols = NULL,
  ignore_combinations = NULL)
```

Arguments

playback	data.playback to extract failed tests from.
ignore_tests	character ignore test results from tests with these names.
ignore_cols	character ignore test results from tests of columns with these names.
ignore_combinations	list ignore test results from specific tests of specific columns.

Value

data.table with test results as logicals for all of the tests with at least one failure. A failed test for any given row is equivalent to a value of TRUE. If all tests passed, the function will simply return a data.table with one column, 'any_failures', that is always FALSE, to ensure that the output is (type) stable and consistent.

Examples

```
# record tape from `iris`.
tape <- record(iris)
# load data.
data(iris_newdata)
# validate new data by playing new tape on it.
playback <- play(tape, iris_newdata)

get_failed_tests(playback)
get_failed_tests(playback, ignore_tests = "outside_range")
get_failed_tests(playback, ignore_cols = "junk")
get_failed_tests(playback, ignore_combinations = list(outside_range = "Sepal.Width"))
```

```
get_failed_tests_string
```

Get Failed Tests as a String

Description

Concatenates information of the tests that failed into one single character vector.

Usage

```
get_failed_tests_string(playback, ignore_tests = NULL,
  ignore_cols = NULL, ignore_combinations = NULL)
```

Arguments

playback	data.playback to extract failed tests from.
ignore_tests	character ignore test results from tests with these names.
ignore_cols	character ignore test results from tests of columns with these names.
ignore_combinations	list ignore test results from specific tests of specific columns.

Details

Look up the descriptions and other meta data of the available validation tests with [get_tests_meta_data](#).

Value

character with one entry for each row in new data. Each entry concatenates information of the tests, that did NOT pass for the corresponding row in new data.

Examples

```
# record tape from `iris`.
tape <- record(iris)
# load data.
data(iris_newdata)
# validate new data by playing new tape on it.
playback <- play(tape, iris_newdata)

get_failed_tests_string(playback)
get_failed_tests_string(playback, ignore_tests = "outside_range")
get_failed_tests_string(playback, ignore_cols = "junk")
get_failed_tests_string(playback, ignore_combinations = list(outside_range = "Sepal.Width"))
```

get_tests_meta_data	<i>Get Meta Data of Validation Tests in a Data Frame</i>
---------------------	--

Description

Gets meta data of available validation tests as a data.frame.

Usage

```
get_tests_meta_data()
```

Details

The meta data of a validation test consists of:

test_name name of the test

evaluate_level is the test evaluated on column level ('col') or on row level ('row')?

evaluate_class what classes of variables are being tested with this specific test?

description a short description of what a test failure means for the given test

Value

data.frame meta data of validation tests.

Examples

```
get_tests_meta_data()
```

ignore	<i>Ignore Certain Test Results</i>
--------	------------------------------------

Description

Ignores certain test results in accordance with user inputs.

Usage

```
ignore(tests, variables_newdata, ignore_tests = NULL,
       ignore_cols = NULL, ignore_combinations = NULL)
```

Arguments

- tests list test results.
- variables_newdata character names of variables in new data.
- ignore_tests character ignore test results from tests with these names.
- ignore_cols character ignore test results from tests of columns with these names.
- ignore_combinations list ignore test results from specific tests of specific columns.

Details

Look up the descriptions and other meta data of the available validation tests with [get_tests_meta_data](#).

Value

list only the relevant test results.

ignore_cols	<i>Ignore Test Results from Tests of Specific Columns</i>
-------------	---

Description

Ignore Test Results from Tests of Specific Columns

Usage

```
ignore_cols(tests, col_names, variables_newdata)
```

Arguments

- tests list test results.
- col_names character names of columns for which test results should be ignored.
- variables_newdata character names of variables in new data.

Value

list results after removing tests.

ignore_combinations	<i>Ignore Test Results from Specific Tests of Specific Columns</i>
---------------------	--

Description

Ignore Test Results from Specific Tests of Specific Columns

Usage

```
ignore_combinations(tests, combinations, variables_newdata)
```

Arguments

tests	list test results.
combinations	list combinations of tests and columns from which test results should be ignored.
variables_newdata	character names of variables in new data.

Value

list test results after removals.

ignore_tests	<i>Ignore Results from Specific Tests</i>
--------------	---

Description

Ignore Results from Specific Tests

Usage

```
ignore_tests(tests, test_names = NULL)
```

Arguments

tests	list test results.
test_names	character names of tests to be ignored.

Value

list results after removing specific tests.

iris_newdata	<i>Simulated Iris New Data</i>
--------------	--------------------------------

Description

A mutated version of the famous ‘iris’ data set.

Usage

iris_newdata

Format

A data.frame with 150 rows and 5 columns.

Source

Script attached.

order_by_tests	<i>Order Test Results by Test Names</i>
----------------	---

Description

Order Test Results by Test Names

Usage

order_by_tests(dt)

Arguments

dt list test results.

Value

list test results ordered by test names.

play	<i>Validate New Data by Playing a Data Tape on It</i>
------	---

Description

Runs a set of validation tests on new data to be predicted with an existing predictive model. These tests are based on statistics and meta data of the variables in the training data - recorded with [record](#).

Usage

```
play(tape, newdata, verbose = TRUE)
```

Arguments

tape	data.tape statistics and meta data recorded from training data.
newdata	data.frame new data to be predicted with an existing predictive model.
verbose	logical should messages be printed?

Details

Look up the descriptions and other meta data of the available validation tests with [get_tests_meta_data](#).

Value

data.playback results from validation tests.

Examples

```
# record tape from `iris`.
tape <- record(iris)
# load data.
data(iris_newdata)
# validate new data by playing new tape on it.
play(tape, iris_newdata)
```

print.data.playback	<i>Print Data Playback</i>
---------------------	----------------------------

Description

Print Data Playback

Usage

```
## S3 method for class 'data.playback'
print(x, ...)
```

Arguments

`x` A ‘data.playback’ object.
`...` further arguments passed to or from other methods.

Value

The original object (invisibly)

Examples

```
# record tape from `iris`.
tape <- record(iris)
# load data.
data(iris_newdata)
# validate new data by playing new tape on it.
playback <- play(tape, iris_newdata)
# print it.
print(playback)
```

record

Record Statistics and Meta Data of Variables in Training Data

Description

Records statistics and meta data of variables in the training data for a predictive model. The recorded data can then be used to compute a set of validation tests on new data with [play](#).

Usage

```
record(x, ...)
```

Arguments

`x` training data (or just a single variable from the training data) to record the statistics and other relevant meta data of.
`...` further arguments passed to or from other methods.

Value

list recorded statistics and meta data. The list will inherit from the `data.tape` class when the function is invoked with a `data.frame`.

Examples

```
record(iris)
```

record.character	<i>Record Statistics and Meta Data of a Character</i>
------------------	---

Description

Records statistics and meta data of a character.

Usage

```
## S3 method for class 'character'  
record(x, ...)
```

Arguments

x	character
...	all further arguments.

Value

list recorded statistics and meta data.

Examples

```
record(letters)
```

record.data.frame	<i>Record Statistics and Meta Data of a Data Frame</i>
-------------------	--

Description

Records Statistics and meta data of a data.frame.

Usage

```
## S3 method for class 'data.frame'  
record(x, verbose = TRUE, ...)
```

Arguments

x	data.frame training data for predictive model.
verbose	logical should messages be printed?
...	all further arguments.

Value

list recorded statistics and meta data.

Examples

```
record(iris)
```

record.default	<i>Record Statistics and Meta Data</i>
----------------	--

Description

Records statistics and meta data.

Usage

```
## Default S3 method:
record(x, ...)
```

Arguments

x	anything.
...	all further arguments.

Value

list recorded statistics and meta data.

Examples

```
some_junk_letters <- letters[1:10]
class(some_junk_letters) <- "junk"
record(some_junk_letters)
```

record.factor	<i>Record Statistics and Meta Data of a Factor</i>
---------------	--

Description

Records statistics and meta data of a factor.

Usage

```
## S3 method for class 'factor'
record(x, ...)
```

Arguments

x	factor
...	all further arguments.

Value

list recorded statistics and meta data.

Examples

```
record(iris$Species)
```

record.integer	<i>Record Statistics and Meta Data of an Integer</i>
----------------	--

Description

Records statistics and meta data of an integer.

Usage

```
## S3 method for class 'integer'
record(x, ...)
```

Arguments

x	integer
...	all further arguments.

Value

list recorded statistics and meta data.

Examples

```
record(c(1:10, NA_integer_))
```

record.numeric	<i>Record Statistics and Meta Data of a Numeric</i>
----------------	---

Description

Records statistics and meta data of a numeric.

Usage

```
## S3 method for class 'numeric'
record(x, ...)
```

Arguments

x	numeric
...	all further arguments.

Value

list recorded statistics and meta data.

Examples

```
record(iris$Sepal.Length)
```

run_validation_tests	<i>Run Validation Tests on Variable in New Data</i>
----------------------	---

Description

Runs a set of validation tests on a variable in new data. These tests are based on statistics and meta data of the same variable recorded (with [record](#)) from the training data.

Usage

```
run_validation_tests(x, parameters, ...)
```

Arguments

x	variable in new data.
parameters	list statistics and meta data of the same variable recorded from training data (with record).
...	further arguments passed to or from other methods. Not used at the moment.

Details

Look up the descriptions and other meta data of the available validation tests with [get_tests_meta_data](#).

Value

list results from validation tests.

`run_validation_tests.character`*Run Validation Tests on Character*

Description

Runs a set of validation tests on a character in new data. These tests are based on statistics and meta data of the same variable recorded (with [record](#)) from the training data.

Usage

```
## S3 method for class 'character'  
run_validation_tests(x, parameters, ...)
```

Arguments

<code>x</code>	character in new data.
<code>parameters</code>	list statistics and meta data of the same variable recorded from training data (with record).
<code>...</code>	further arguments passed to or from other methods. Not used at the moment.

Value

list results from validation tests.

`run_validation_tests.default`*Run Validation Tests on Variable*

Description

Runs a set of validation tests on variable in new data. These tests are based on statistics and meta data of the same variable recorded (with [record](#)) from the training data.

Usage

```
## Default S3 method:  
run_validation_tests(x, parameters, ...)
```

Arguments

<code>x</code>	anything.
<code>parameters</code>	list statistics and meta data of the same variable recorded from training data (with record).
<code>...</code>	further arguments passed to or from other methods. Not used at the moment.

Value

list results from validation tests.

```
run_validation_tests.factor
```

Run Validation Tests on Factor

Description

Runs a set of validation tests on a factor in new data. These tests are based on statistics and meta data of the same variable recorded (with [record](#)) from the training data.

Usage

```
## S3 method for class 'factor'
run_validation_tests(x, parameters, ...)
```

Arguments

x	factor in new data.
parameters	list statistics and meta data of the same variable recorded from training data (with record).
...	further arguments passed to or from other methods. Not used at the moment.

Value

list results from validation tests.

```
run_validation_tests.integer
```

Run Validation Tests on Integer

Description

Runs a set of validation tests on a integer in new data. These tests are based on statistics and meta data of the same variable recorded (with [record](#)) from the training data.

Usage

```
## S3 method for class 'integer'
run_validation_tests(x, parameters, ...)
```

Arguments

x	integer in new data.
parameters	list statistics and meta data of the same variable recorded from training data (with record).
...	further arguments passed to or from other methods. Not used at the moment.

Value

list results from validation tests.

`run_validation_tests.numeric`*Run Validation Tests on a Numeric*

Description

Runs a set of validation tests on a numeric in new data. These tests are based on statistics and meta data of the same variable recorded (with [record](#)) from the training data.

Usage

```
## S3 method for class 'numeric'  
run_validation_tests(x, parameters, ...)
```

Arguments

x	numeric in new data.
parameters	list statistics and meta data of the same variable recorded from training data (with record).
...	further arguments passed to or from other methods. Not used at the moment.

Value

list results from validation tests.

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