

Package ‘AutoModel’

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Type Package

Title Automated Hierarchical Multiple Regression with Assumptions
Checking

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Description A set of functions that automates the process and produces reasonable output for hierarchical multiple regression models. It allows you to specify predictor blocks, from which it generates all of the linear models, and checks the assumptions of the model, producing the requisite plots and statistics to allow you to judge the suitability of the model.

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LazyData TRUE

Depends R (>= 3.1.3),

Imports lmtest, car, MASS, broom, rowr, ROCR, dplyr, BaylorEdPsych,
aod, gtools

URL <https://github.com/alishinski/AutoModel>

Suggests knitr, xtable, testthat

VignetteBuilder knitr

NeedsCompilation no

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assumptions_check	<i>Multiple Regression Assumption Checking</i>
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Description

Multiple Regression Assumption Checking

Usage

```
assumptions_check(model)
```

Arguments

model	A lm model object. run_model automatically calls this function for the model with all blocks of predictors included.
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Details

Creates objects related to multiple regression assumption checking. These objects are used by model_output to produce readable output.

Examples

```
freeny_model_formulas <- create_formula_objects("y", c("lag.quarterly.revenue")
, c("price.index"))
freeny_models <- create_model_objects(freeny_model_formulas,
dataset = freeny)
freeny_model <- freeny_models[[length(freeny_models)]]
assumptions_check(freeny_model)
```

classification_table *Binary Logistic Regression: Classification Table*

Description

Binary Logistic Regression: Classification Table

Usage

```
classification_table(model, response)
```

Arguments

model	A binary logistic regression model object.
response	The dependent variable in model.

Details

Creates classification table for binary logistic regression model using optimal cut point for accuracy.

Examples

```
formulas <- create_formula_objects("am", c("hp", "mpg"), c("disp"),
c("drat"))
mtcars_models <- create_model_objects(formulas, data=mtcars,
type="binomial")
last_model <- mtcars_models[[length(mtcars_models)]]
classification_table(last_model, last_model$model[,1])
```

create_formula_objects

Hierarchical Formula Generation

Description

Hierarchical Formula Generation

Usage

```
create_formula_objects(outcome, block1, ...)
```

Arguments

outcome	The dependent variable of the hierarchical model
block1	A character vector, with names of variables. The first block of independent variables.
...	A character vector, with names of variables. Subsequent blocks of independent variables.

Value

A list of lm formulas

Examples

```
create_formula_objects("y", c("lag.quarterly.revenue"), c("price.index"))
create_formula_objects("y", c("lag.quarterly.revenue"), c("price.index",
"income.level"))
```

create_model_objects *Hierarchical Regression Model Generation*

Description

Hierarchical Regression Model Generation

Usage

```
create_model_objects(formulas, dataset, type = "gaussian")
```

Arguments

formulas	A set of lm formulas, created with create_formula_objects
dataset	A data frame containing variables referred to in formulas, passed to data argument of lm
type	Family argument to pass to glm. Specify "binomial" for binary logistic regression models.

Value

A list of lm model objects

Examples

```
create_model_objects(create_formula_objects("y", c("lag.quarterly.revenue")
, c("price.index")), dataset = freeny)
freeny_model_formulas <- create_formula_objects("y", c("lag.quarterly.revenue")
, c("price.index"))
create_model_objects(freeny_model_formulas, dataset = freeny)
```

modelCompareMod	<i>Modified modelCompare function from lmSupport package. Modified to suppress print output.</i>
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Description

Modified modelCompare function from lmSupport package. Modified to suppress print output.

Usage

```
modelCompareMod(ModelC, ModelA, printOutput = T)
```

Arguments

ModelC	A model lm object.
ModelA	A model lm object.
printOutput	Boolean parameter, if TRUE, print output is suppressed from modelCompare function.

Details

This is a modification of the modelCompare function that allows print output to be suppressed.

model_coefficient_table	<i>Hierarchical regression: Coefficient table output</i>
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Description

Hierarchical regression: Coefficient table output

Usage

```
model_coefficient_table(models)
```

Arguments

models	A list of lm model objects. A set of model objects created by create_model_object.
--------	--

Details

Creates table output to summarize model coefficients for all models in a hierarchical regression analysis.

Examples

```
freeny_model_formulas <- create_formula_objects("y", c("lag.quarterly.revenue")
, c("price.index"))
freeny_models <- create_model_objects(freeny_model_formulas,
dataset = freeny)
model_coefficient_table(freeny_models)
```

```
model_coefficient_table_binomial
```

Binary Logistic Regression: Coefficient Table Output

Description

Binary Logistic Regression: Coefficient Table Output

Usage

```
model_coefficient_table_binomial(models)
```

Arguments

`models` A list of `lm` model objects. A set of model objects created by `create_model_object`.

Details

Creates table output to summarize model coefficients for all models in a hierarchical binary logistic regression analysis.

Examples

```
formulas <- create_formula_objects("am", c("hp", "mpg"), c("disp"),
c("drat"))
mtcars_models <- create_model_objects(formulas, data=mtcars,
type="binomial")
## Not run: model_summary_table_binomial(mtcars_models)
```

```
model_output
```

Multiple Regression Output

Description

Multiple Regression Output

Usage

```
model_output(models, data, checkList = NULL, formulas, outliers)
```

Arguments

models	A list of lm model objects. A set of model objects created by create_model_object.
data	The dataframe from which the model was built.
checkList	a list object created by assumptions_check used to create output.
formulas	Formula list produced by create_formula_objects, used for summary table.
outliers	Outlier option, select the number of observations to examine for outliers.

Details

Creates plots and text output to summarize models and check assumptions via objects created by assumptions_check. Uses full model with all predictors.

Examples

```
freeny_model_formulas <- create_formula_objects("y",
c("lag.quarterly.revenue"), c("price.index"))
freeny_models <- create_model_objects(freeny_model_formulas,
dataset = freeny)
freeny_model <- freeny_models[[length(freeny_models)]]
checks <- assumptions_check(freeny_model)
model_output(freeny_models, freeny, checks, freeny_model_formulas,
outliers = "significant")
```

model_output_binomial *Binary Logistic Regression: Model Output*

Description

Binary Logistic Regression: Model Output

Usage

```
model_output_binomial(models, formulas)
```

Arguments

models	A list of lm model objects. A set of model objects created by create_model_object.
formulas	A list of model formulas, generated by create_formula_objects.

Details

Creates output for results of hierarchical binary logistic regression models.

Examples

```
formulas <- create_formula_objects("am", c("hp", "mpg"), c("disp"),
  c("drat"))
mtcars_models <- create_model_objects(formulas, data=mtcars,
  type="binomial")
model_output_binomial(mtcars_models, formulas)
```

model_summary_table *Hierarchical regression: model summary output*

Description

Hierarchical regression: model summary output

Usage

```
model_summary_table(models, formulas)
```

Arguments

models A list of lm model objects. A set of model objects created by create_model_object.
formulas Formula list produced by create_formula_objects.

Details

Creates table output to summarize model statistics for all models in a hierarchical regression analysis.

Examples

```
freeny_model_formulas <- create_formula_objects("y",
  c("lag.quarterly.revenue"), c("price.index"))
freeny_models <- create_model_objects(freeny_model_formulas,
  dataset = freeny)
model_summary_table(freeny_models, freeny_model_formulas)
```

`model_summary_table_binomial`*Binary Logistic Regression: Model Summary Output*

Description

Binary Logistic Regression: Model Summary Output

Usage

```
model_summary_table_binomial(models)
```

Arguments

`models` A list of lm model objects. A set of model objects created by `create_model_object`.

Details

Creates summary table with pseudo R² values for the binary logistic regression model objects

Examples

```
formulas <- create_formula_objects("am", c("hp", "mpg"), c("disp"),  
c("drat"))  
mtcars_models <- create_model_objects(formulas, data=mtcars,  
type="binomial")  
last_model <- mtcars_models[[length(mtcars_models)]]
```

`run_model`*Automated Multiple Regression Modelling*

Description

Automated Multiple Regression Modelling

Usage

```
run_model(outcome, block1, ..., dataset, type = "gaussian",  
assumptions.check = T, outliers.check = "significant",  
transform.outcome = F)
```

Arguments

<code>outcome</code>	The dependent variable of the hierarchical model
<code>block1</code>	A character vector, with names of variables. The first block of independent variables.
<code>...</code>	A character vector, with names of variables. Subsequent blocks of independent variables.
<code>dataset</code>	A data frame containing variables referred to in formulas, passed to data argument of <code>lm</code>
<code>type</code>	Family argument to pass to <code>glm</code> . Specify "binomial" for binary logistic regression models.
<code>assumptions.check</code>	Boolean, if TRUE, then assumption checks are run and output is produced. If FALSE, only model summary and coefficient tables are produced.
<code>outliers.check</code>	Determines how many observations to display for outliers check. Default is significant observations. "All" shows all residual and Cook's D values.
<code>transform.outcome</code>	A boolean. If TRUE, a variable transformation of the outcome is substituted in the final model if outcome is non-normal. NOT IMPLEMENTED YET.

Details

Calls other functions to generate model objects and test them, given specified model parameters and other options. Formatted output is produced via `model_output`

Examples

```
run_model("y", c("lag.quarterly.revenue"), c("price.index", "income.level"),  
dataset=freeny)
```

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