Package `mverse`

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**Type** Package

**Title** Tidy Multiverse Analysis Made Simple

**Version** 0.1.0

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**Description** Extends 'multiverse' package

(Sarma A., Kale A., Moon M., Taback N., Chevalier F., Hullman J., Kay M., 2021) <doi:10.31219/osf.io/yfbwm>, which allows users perform to create explorable multiverse analysis in R. This extension provides an additional level of abstraction to the 'multiverse' package with the aim of creating user friendly syntax to researchers, educators, and students in statistics. The 'mverse' syntax is designed to allow piping and takes hints from the 'tidyverse' grammar. The package allows users to define and inspect multiverse analysis using familiar syntax in R.

**License** GPL (>= 3)

**Encoding** UTF-8

**LazyData** true

**Depends** R (>= 3.6), multiverse

**Imports** magrittr (>= 1.5), dplyr, tidyr, tidyselect, stringr, stats, broom, grDevices, igraph, ggraph, ggplot2, cowplot

**Suggests** tidyverse, scales, MASS, testthat (>= 2.1.0), pkgdown (>= 1.5.1), covr, knitr, rmarkdown, kableExtra

**RoxygenNote** 7.1.2

**VignetteBuilder** knitr

**URL** https://github.com/mverseanalysis/mverse/, https://mverseanalysis.github.io/mverse/

**NeedsCompilation** no

**Author** Michael Jongho Moon [aut, cre], Haoda Li [aut], Mingwei Xu [aut], Nathan Taback [aut], Fanny Chevalier [aut], Alison Gibbs [ctb]
Add branch conditions to a `mverse` object.

This method adds one or more branch conditions to an existing `mverse` object. Branch conditions are used to specify an option in one branch dependent on an option in another branch.

```r
add_branch_condition(.mverse, ...)
```

```r
# S3 method for class 'mverse'
add_branch_condition(.mverse, ...)
```
**add_family_branch**

Add family branches to a `mverse` object.

**Description**

This method adds one or more family branches to an existing `mverse` object. Family branches are used to define options for the analysis distributions when using `glm_mverse()`.

**Usage**

```r
add_family_branch(.mverse, ...)  
```

# S3 method for class 'mverse'
add_family_branch(.mverse, ...)
Arguments

.mverse a mverse object.
...
... family_branch objects.

Value

The resulting mverse object.

See Also

Other family branch functions: family_branch()

Examples

# Define a family branch.
model_distributions <- family_branch(
  gaussian, poisson(link = "log")
)
# Create a mverse and add the branch.
mv <- create_multiverse(hurricane) %>%
  add_family_branch(model_distributions)

---

add_filter_branch  Add filter branches to a mverse object.

Description

This method adds one or more filter branches to an existing mverse object. Filter branches are used to define options for conditions for selecting subsets of data rows.

Usage

add_filter_branch(.mverse, ...)

## S3 method for class 'mverse'
add_filter_branch(.mverse, ...)

Arguments

.mverse a mverse object.
...
... filter_branch objects.

Value

The resulting mverse object.
**add_formula_branch**

*Description*

This method adds one or more formula branches to an existing mverse object. Formula branches are used to specify model structure options for the analysis.

*Usage*

```r
add_formula_branch(.mverse, ...)  
```

## S3 method for class 'mverse'
add_formula_branch(.mverse, ...)

*Arguments*

- `.mverse` a mverse object.
- `...` formula_branch objects.

*Value*

The resulting mverse object.

*See Also*

Other formula branch functions: `formula_branch()`

---

**Examples**

# Define a filter branch.
```
~hurricane_outliers <- filter_branch(~  
  !Name %in% c("Katrina", "Audrey", "Andrew"),  
  !Name %in% c("Katrina"),  
  !Name %in% c("Katrina"),  
  TRUE # include all
~)
```  
# Create a mverse and add the branch.
```
mv <- create_multiverse(hurricane) %>%  
  add_filter_branch(hurricane_outliers)
```
Examples

# Define a formula branch.
model_specifications <- formula_branch(
  y ~ femininity,
  y ~ femininity + hurricane_strength,
  y ~ femininity * hurricane_strength
)
# Create a mverse, add the branch.
mv <- create_multiverse(hurricane) %>%
  add_formula_branch(model_specifications)

---

add_mutate_branch Add mutate branches to a mverse object.

Description

This method adds one or more mutate branches to an existing mverse object. Mutate branches are used to define options for adding a new column to the analysis dataset.

Usage

add_mutate_branch(.mverse, ...)

## S3 method for class 'mverse'
add_mutate_branch(.mverse, ...)

Arguments

.mverse a mverse object.
...

Value

The resulting mverse object.

See Also

Other mutate branch functions: mutate_branch()

Examples

# Define mutate branches.
hurricane_strength <- mutate_branch(
  # damage vs. wind speed vs.pressure
  NDAM,
  HighestWindSpeed,
  Minpressure_Updated_2014,
  # Standardized versions
)
AIC

scale(NDAM),
scale(HighestWindSpeed),
-scale(Minpressure_Updated_2014),
)
y <- mutate_branch(
  alldeaths, log(alldeaths + 1)
)
# Create a multiverse and add the branches.
mv <- create_multiverse(hurricane) %>%
  add_mutate_branch(hurricane_strength) %>%
  add_mutate_branch(y)
# You can also add multiple branches with a single call.
mv <- create_multiverse(hurricane) %>%
  add_mutate_branch(hurricane_strength, y)

---

**AIC**

Display the AIC and BIC score of the fitted models across the multiverse

AIC
BIC

**Description**
Display the AIC and BIC score of glm regression results across the multiverse.

**Usage**

```r
## S3 method for class 'glm_mverse'
AIC(object, ..., k = 2)
```

```r
## S3 method for class 'glm_mverse'
BIC(object, ...)
```

**Arguments**

- `object` a glm_mverse object.
- `...` ignored. for compatibility only.
- `k` ignored. for compatibility only.

**Value**

a multiverse table as a tibble
Create a new branch condition.

Description

A branch condition conditions option x to depend on option y. When the branch condition is added to a mverse object, option x is executed only when y is. Use reject = TRUE, to negate the condition.

Usage

branch_condition(x, y, reject = FALSE)

Arguments

x  
option 1

y  
option 2

reject  
if TRUE, the condition rejects universes with option 1 and option 2

Value

A branch_condition object.

See Also

Other branch condition functions: add_branch_condition()

Examples

# Example branches.
y <- mutate_branch(alldeaths, log(alldeaths + 1))
model <- formula_branch(y ~ femininity * strength, y ~ femininity + strength)
# Define a new branch condition.
match_poisson <- branch_condition(alldeaths, poisson)
# Define a branch condition that reject an option dependent on another.
match_log_lin <- branch_condition(log(alldeaths + 1), poisson, reject = TRUE)
execute_multiverse

Execute the entire multiverse.

Description

This method executes the analysis steps defined in the mverse objected across the entire multiverse.

Usage

execute_multiverse(.mverse)

## S3 method for class 'mverse'
execute_multiverse(.mverse)

Arguments

.mverse a mverse object.

Value

The resulting mverse object.

Examples

# Define a mutate branch.
hurricane_strength <- mutate_branch(
  # damage vs. wind speed vs.pressure
  NDAM,
  HighestWindSpeed,
  Minpressure_Updated_2014,
  # Standardized versions
  scale(NDAM),
  scale(HighestWindSpeed),
  -scale(Minpressure_Updated_2014),
)
# Create a mverse and add the branch.
mv <- create_multiverse(hurricane) %>%
  add_mutate_branch(hurricane_strength)
# The branched variables are not populated across the multiverse yet.
# Execute the multiverse; the variables are populated after the execution.
exeecute_multiverse(mv)
extract  

Extract branched values.

Description

extract returns a tibble of selected values across the multiverse in a long format.

Usage

extract(...)  

## S3 method for class 'mverse'
extract(  
  .mverse,  
  columns = NULL,  
  nuni = NULL,  
  frow = NULL,  
  include_branch_options = TRUE,  
  ...  
)

Arguments

...  
Ignored.

.mverse  
a mverse object.

columns  
a character vector of column names to extract.

nuni  
a positive integer for the number of universes to extract.

frow  
proportion of rows to extract from each universe.

include_branch_options  
when TRUE (default), include the mutate statements used to specified the options for each branched columns

Details

This method extracts data values across the multiverse. You can specify a subset of data to extract using columns, universe, nuni, and frow.

You can specify the columns to extract from each universe by passing the column names as a character vector to columns. The default values is NULL extracting all columns with branches.

Use universe to specify a set of universes by their integer ids. Use nuni to specify the number of universes to extract data from. The method then selects the subset randomly. Specifying universe manually will override nuni value. By default, they are both set to NULL and the method returns data from all universes.

Use frow to randomly extract a fraction of data from each universe. The default value is NULL and all rows are returned as they are. Note if you select 1 the method will return shuffle rows in each universe before returning them. If frow is greater than 1, the method randomly samples rows with replacement.
family_branch

Value

a tibble containing the selected columns across the multiverse.

Examples

# Define mutate branches.
hurricane_strength <- mutate_branch(
    # damage vs. wind speed vs.pressure
    NDAM,
    HighestWindSpeed,
    Minpressure_Updated_2014,
    # Standardized versions
    scale(NDAM),
    scale(HighestWindSpeed),
    -scale(Minpressure_Updated_2014),
    )
y <- mutate_branch(
    alldeaths, log(alldeaths + 1)
    )

# Create a mverse and add the branches.
mv <- create_multiverse(hurricane) %>%
    add_mutate_branch(hurricane_strength, y)
execute_multiverse(mv)

# Extract all branched columns from all universes
extract(mv)
# Specify the columns to extract from each universe using columns
# You can select both branched and non-branched columns
extract(mv, columns = c("hurricane_strength", "NDAM"))
# Specify the universe to extract from using universe
extract(mv, universe = 1)
# Specify the number of universes to extract from using nuni
# The universes are randomly selected
extract(mv, nuni = 3)
# Specify the proportion of data to extract from each universe using
# frow. The rows are randomly selected
extract(mv, frow = 0.7)

family_branch

Create a new family branch.

Description

Create a new family branch.

Usage

family_branch(..., name = NULL)
Arguments

... branch definition expressions.
name Name for the new family.

Value

a family_branch object.

See Also

Other family branch functions: add_family_branch()

Examples

# Define a family branch.
model_distributions <- family_branch(
  gaussian, poisson(link = "log")
)
# Create a mverse and add the branch.
mv <- create_multiverse(hurricane) %>%
  add_family_branch(model_distributions)

filter_branch

Create a new filter branch.

Description

Create a new filter branch.

Usage

filter_branch(..., name = NULL)

Arguments

... branch definition expressions.
name Name for the new filter.

Value

a filter_branch object.

See Also

Other filter branch functions: add_filter_branch()
Examples

# Define a filter branch.
hurricane_outliers <- filter_branch(
  !Name %in% c("Katrina", "Audrey", "Andrew"),
  !Name %in% c("Katrina"),
  !Name %in% c("Katrina"),
  TRUE # include all
)
# Create a mverse and add the branch.
mv <- create_multiverse(hurricane) %>%
  add_filter_branch(hurricane_outliers)

---

formula_branch Create a new formula branch.

Description
Create a new formula branch.

Usage
formula_branch(..., name = NULL)

Arguments
... branch definition expressions.
name Name for the new formula.

Value
a formula_branch object.

See Also
Other formula branch functions: add_formula_branch()

Examples

# Define a formula branch.
model_specifications <- formula_branch(
  y ~ femininity,
  y ~ femininity + hurricane_strength,
  y ~ femininity * hurricane_strength
)
# Create a mverse, add the branch.
mv <- create_multiverse(hurricane) %>%
  add_formula_branch(model_specifications)
glm.nb_mverse  

Fit negative binomial regression models across the multiverse

Description

glm.nb_mverse fits MASS::glm.nb across the multiverse according to model specifications provided by formula_branch. At least one formula_branch must have been added.

Usage

glm.nb_mverse(.mverse)

Arguments

.mverse a mverse object.

Value

A mverse object with glm.nb fitted.

See Also

Other model fitting functions: glm_mverse(), lm_mverse()

Examples

# Fitting \code{glm.nb} models across a multiverse.
hurricane_strength <- mutate_branch(
  NDAM,
  HighestWindSpeed,
  Minpressure_Updated_2014
)
hurricane_outliers <- filter_branch(
  !Name %in% c("Katrina", "Audrey", "Andrew"),
  TRUE # include all
)
model_specifications <- formula_branch(
  alldeaths ~ femininity,
  alldeaths ~ femininity + hurricane_strength
)
mv <- create_multiverse(hurricane) %>%
  add_filter_branch(hurricane_outliers) %>%
  add_mutate_branch(hurricane_strength) %>%
  add_formula_branch(model_specifications) %>%
  glm.nb_mverse()
**glm_mverse**

Fit generalized linear regression models across the multiverse.

**Description**

`glm_mverse` fits `glm` across the multiverse according to model specifications provided by `formula_branch`. At least one `formula_branch` must have been added. You can also specify the underlying error distribution and the link function by adding a `family_branch`. If no `family_branch` has been provided, it follows the default behaviour of `glm` using the Gaussian distribution with an identity link.

**Usage**

`glm_mverse(.mverse)`

**Arguments**

- `.mverse` a `mverse` object.

**Value**

A `mverse` object with `glm` fitted.

**See Also**

Other model fitting functions: `glm.nb_mverse()`, `lm_mverse()`

**Examples**

```r
# Fitting \code{glm} models across a multiverse.
hurricane_strength <- mutate_branch(
  NDAM,
  HighestWindSpeed,
  Minpressure_Updated_2014
)
hurricane_outliers <- filter_branch(
  !Name %in% c("Katrina", "Audrey", "Andrew"),
  TRUE # include all
)
model_specifications <- formula_branch(
  alldeaths ~ femininity,
  alldeaths ~ femininity + hurricane_strength
)
model_distributions <- family_branch(poisson)
mv <- create_multiverse(hurricane) %>%
  add_filter_branch(hurricane_outliers) %>%
  add_mutate_branch(hurricane_strength)
```
```r
add_formula_branch(model_specifications) %>%
add_family_branch(model_distributions) %>%
glm_mverse()
```

<table>
<thead>
<tr>
<th>hurricane</th>
<th>Data on Atlantic hurricanes in the U.S. between 1950 and 2012.</th>
</tr>
</thead>
</table>

**Description**

A dataset for the study conducted by Jung et al. (2014) in [doi: 10.1073/pnas.1402786111](https://doi.org/10.1073/pnas.1402786111). Female hurricanes are deadlier than male hurricanes.

**Usage**

hurricane

**Format**

A data frame with 94 rows and 12 variables:

- **Year** Year in which the hurricane landed on U.S.
- **Name** Name of the hurricane.
- **MasFem** Femininity index of the hurricane name collected by Jung et al. (1 - very masculine; 11 - very feminine).
- **MinPressure_before** Minimum pressure of the hurricane at the time of landfall in the U.S. (original).
- **Minpressure_Updated_2014** Minimum pressure of the hurricane at the time of landfall in the U.S. (updated).
- **Gender_MF** Gender indicator for the hurricane name based on MasFem index (1 - MasFem > 6; 0 otherwise).
- **Category** Hurricane category on a scale of 1 to 5, with 5 being the most severe.
- **alldeaths** Number of fatalities.
- **NDAM** Normalized damage in 2013 U.S. million dollars.
- **Elapsed.Yrs** Time since hurricane.
- **Source** Source from where the data was gathered.
- **HighestWindSpeed** Maximum wind speed.
- **MasFem_MTUrk** Femininity index of the hurricane name collected by Simonsohn et al.
- **NDAM15** Normalized damage in 2015 U.S. million dollars.
Details

The dataset was collected by Jung et al. in their study *Female hurricanes are deadlier than male hurricanes*. Their study didn’t include hurricanes Katrina and Audrey which were deemed as outliers. Simonsohn et al. collected the extra data for doi: 10.1038/s415620200912zSpecification curve analysis including an additional femininity index based on an MTUrk survey and updated normalized damage amount in 2015 U.S. dollars.

This dataset includes data prepared by Jung et al. (2014) as well as those prepared by Simonsohn et al. (2020). Specifically, all data on Katrina and Audrey are from Simonsohn et al. (2020) except minimum pressure updated in 2014. They were retrieved from Continental United States Hurricane Impacts/Landfalls 1851-2021 table maintained by U.S. National Oceanic and Atmospheric Administration. Maximum wind speed, femininity index from MTUrk survey, and 2015 damage amounts are also from Simonsohn et al. (2020).

Source


**lm_mverse**

*Fit linear regression models across the multiverse.*

**Description**

`lm_mverse` fits `lm` across the multiverse according to model specifications provided by `formula_branch`. At least one `formula_branch` must have been added.

**Usage**

```r
lm_mverse(.mverse)
```

**Arguments**

- `.mverse` — A `mverse` object.

**Value**

A `mverse` object with `lm` fitted.

**See Also**

Other model fitting functions: `glm.nb_mverse()`, `glm_mverse()`
Examples

```r
# Fitting \code{lm} models fitted across a multiverse.
hurricane_strength <- mutate_branch(
  NDAM,
  HighestWindSpeed,
  Minpressure_Updated_2014
)
y <- mutate_branch(
  alldeaths, log(alldeaths + 1)
)
hurricane_outliers <- filter_branch(
  !Name %in% c("Katrina", "Audrey", "Andrew"),
  TRUE # include all
)
model_specifications <- formula_branch(
  y ~ femininity,
  y ~ femininity + hurricane_strength
)
mv <- create_multiverse(hurricane) %>%
  add_filter_branch(hurricane_outliers) %>%
  add_mutate_branch(hurricane_strength, y) %>%
  add_formula_branch(model_specifications) %>%
  lm_mverse()
```

**Description**

A multiverse tree diagram displays the branching combination of all the branches added to the given `mverse` object taking any branch conditions defined. The method also allows zooming into a subset of branches using branches parameter.

**Usage**

```r
multiverse_tree(
  .mverse,
  label = FALSE,
  branches = NULL,
  label_size = NULL,
  label_angle = 0
)
```
multiverse_tree

Arguments

- `.mverse` A `mverse` object.
- `label` A logical. Display options as labels when `TRUE`.
- `branches` A character vector. Display a subset of branches when specified. Display all when `NULL`.
- `label_size` A numeric. Set size of option labels.
- `label_angle` A numeric. Rotate option labels.

Value

A `ggplot` object displaying the multiverse tree.

Examples

```r
# Display a multiverse tree with multiple branches.
outliers <- filter_branch(!Name %in% c("Katrina", "Audrey"), TRUE)
femininity <- mutate_branch(MasFem, Gender_MF)
strength <- mutate_branch(
  NDAM, HighestWindSpeed, Minpressure_Updated_2014, log(NDAM)
)
y <- mutate_branch(alldeaths, log(alldeaths + 1))
model <- formula_branch(y ~ femininity * strength, y ~ femininity + strength)
distribution <- family_branch(poisson, gaussian)
mv <- mverse(hurricane) %>%
  add_filter_branch(outliers) %>%
  add_mutate_branch(femininity, strength, y) %>%
  add_formula_branch(model) %>%
  add_family_branch(distribution)
multiverse_tree(mv)

# Display a multiverse tree with branch conditions.
match_poisson <- branch_condition(alldeaths, poisson)
match_log_lin <- branch_condition(log(alldeaths + 1), gaussian)
add_branch_condition(mv, match_poisson)
add_branch_condition(mv, match_log_lin)
multiverse_tree(mv)

# Display a multiverse tree for a subset of branches
# with label for each option.
multiverse_tree(mv, branches = c("y", "distribution"), label = TRUE)
# adjusting size and orientation of the labels
multiverse_tree(mv, branches = c("y", "distribution"),
  label = TRUE, label_size = 4, label_angle = 45)
```
mutate_branch  

Create a new mutate branch.

Description

Create a new mutate branch.

Usage

mutate_branch(..., name = NULL)

Arguments

...  
branch definition expressions.

name  
Name for the new variable.

Value

a mutate_branch object.

See Also

Other mutate branch functions: add_mutate_branch()

Examples

# Define mutate branches.
hurricane_strength <- mutate_branch(
  # damage vs. wind speed vs.pressure
  NDAM,
  HighestWindSpeed,
  Minpressure_Updated_2014,
  # Standardized versions
  scale(NDAM),
  scale(HighestWindSpeed),
  -scale(Minpressure_Updated_2014),
)

# Create a mverse and add the branch.
mv <- create_multiverse(hurricane) %>%
  add mutate_branch(hurricane_strength)
Create a new mverse object

Description

Constructs a new mverse object which extends multiverse::multiverse object.

Usage

mverse(data)
create_multiverse(data)

Arguments

data source dataframe.

Value

A mverse object with the source dataframe attached.

Examples

# Create a mverse object.
mv <- mverse(hurricane)
# create_multiverse() is an alias of mverse().
mv <- create_multiverse(hurricane)

Print method for _branch objects.

Description

Print method for _branch objects.

Usage

## S3 method for class 'branch'
print(x, ...)

Arguments

x a branch object.

... ignored. for compatibility only.

Value

No return value, called for printing only.
Description

A dataset containing card counts between 2,053 soccer players playing in the first male divisions of England, Germany, France, and Spain in the 2012-2013 season and 3,147 referees that these players played under in professional matches. The dataset contains other covariates including 2 independent skin tone ratings per player. Each line represents a player-referee pair.

Usage

soccer

Format

A data frame with 146,028 rows and 26 variables:

- `playerShort` short player ID
- `player` player name
- `club` player club
- `leagueCountry` country of player club (England, Germany, France, and Spain)
- `birthday` player birthday
- `height` player height (in cm)
- `weight` player weight (in kg)
- `position` detailed player position
- `games` number of games in the player-referee dyad
- `victories` victories in the player-referee dyad
- `ties` ties in the player-referee dyad
- `defeats` losses in the player-referee dyad
- `goals` goals scored by a player in the player-referee dyad
- `yellowCards` number of yellow cards player received from referee
- `yellowReds` number of yellow-red cards player received from referee
- `redCards` number of red cards player received from referee
- `rater1` skin rating of photo by rater 1 (5-point scale ranging from “very light skin” to “very dark skin”)
- `rater2` skin rating of photo by rater 2 (5-point scale ranging from “very light skin” to “very dark skin”)
- `refNum` unique referee ID number (referee name removed for anonymizing purposes)
- `refCountry` unique referee country ID number (country name removed for anonymizing purposes)
meanIAT  mean implicit bias score (using the race IAT) for referee country, higher values correspond to faster white | good, black | bad associations
nIAT  sample size for race IAT in that particular country
seIAT  standard error for mean estimate of race IAT
meanExp  mean explicit bias score (using a racial thermometer task) for referee country, higher values correspond to greater feelings of warmth toward whites versus blacks
nExp  sample size for explicit bias in that particular country
seExp  standard error for mean estimate of explicit bias measure

Details
The skin colour of each player was rated by two independent raters, rater1 and rater2, and the 5-point scale values were scaled to 0 to 1 - i.e., 0, 0.25, 0.5, 0.75, 1.

Source

Description
spec_curve returns the specification curve as proposed by Simonsohn, Simmons, and Nelson (2020) <doi:10.1038/s41562-020-0912-z>. spec_curve are available for mverse objects fitted with lm_mverse(), glm_mverse(), and glm.nb_mverse(). Notice that the order of universes may not correspond to the order in the summary table.

Usage
spec_curve(.object, var, ...)

## S3 method for class 'lm_mverse'
spec_curve(
  .object,
  var,
  conf.int = TRUE,
  conf.level = 0.95,
  option = names(multiverse::parameters(.object)),
  universe_order = FALSE,
  color_order = FALSE,
  color = NULL,
  branch_order = NULL,
  point_size = 0.25,
grid_size = 2,
point_alpha = 1,
brewer_palette = "Set2",
yaxis_text_size = 8,
...)

## S3 method for class 'glm_mverse'
spec_curve(
  .object,
  var,
  conf.int = TRUE,
  conf.level = 0.95,
  option = names(multiverse::parameters(.object)),
  universe_order = FALSE,
  color_order = FALSE,
  color = NULL,
  branch_order = NULL,
  point_size = 0.25,
  grid_size = 2,
  point_alpha = 1,
  brewer_palette = "Set2",
  yaxis_text_size = 8,
  ...
)

## S3 method for class 'glm.nb_mverse'
spec_curve(
  .object,
  var,
  conf.int = TRUE,
  conf.level = 0.95,
  option = names(multiverse::parameters(.object)),
  universe_order = FALSE,
  color_order = FALSE,
  color = NULL,
  branch_order = NULL,
  point_size = 0.25,
  grid_size = 2,
  point_alpha = 1,
  brewer_palette = "Set2",
  yaxis_text_size = 8,
  ...
)

Arguments

.object a glm.nb_mverse object.
spec_curve

var name for the variable to show.
...
conf.int when TRUE (default), the estimate output includes the confidence intervals.
conf.level the confidence level of the confidence interval returned using conf.int = TRUE. Default value is 0.95.
option a vector of branches to show the options included.
universe_order when TRUE, order the universes according to the order in the summary table.
color_order when TRUE, the estimated value will be ordered according to the color.
color an expression to indicate how colors are assigned to markers. By default, colors are assigned based on 'p.value <= 0.05'.
branch_order name for the branch to order.
point_size size of points on the top plot.
grid_size size of points on the bottom plot.
point_alpha alpha level of points and point ranges.
brewer_palette name of colorbrewer palette for the plot.
yaxis_text_size text size of y-axis label

Value

a specification curve plot for the estimates

Source


Examples

# Display a specification curve for \code{lm} models # fitted across the multiverse.
femininity <- mutate_branch(
  MasFem > 6, MasFem > mean(MasFem)
)
model <- formula_branch(
  alldeaths ~ femininity,
  alldeaths ~ femininity + HighestWindSpeed
)
mv <- mverse(hurricane) %>%
  add_mutate_branch(femininity) %>%
  add_formula_branch(model) %>%
  lm_mverse()
spec_curve(mv, var = "femininityTRUE")
# plot based on 90% confidence interval
spec_curve(mv, var = "femininityTRUE", color = p.value < .1)
# Display a specification curve for \code(glm) models
# fitted across the multiverse.

femininity <- mutate_branch(
  MasFem > 6, MasFem > mean(MasFem)
)

model <- formula_branch(
  alldeaths ~ femininity,
  alldeaths ~ femininity + HighestWindSpeed
)

fam <- family_branch(gaussian)

mv <- mverse(hurricane) %>%
  add_mutate_branch(femininity) %>%
  add_formula_branch(model) %>%
  add_family_branch(fam) %>%
  glm_mverse()

spec_curve(mv, var = "femininityTRUE")
# plot based on 90% confidence interval
spec_curve(mv, var = "femininityTRUE", color = p.value < .1)


# Display a specification curve for \code(glm.nb) models
# fitted across the multiverse.

femininity <- mutate_branch(
  MasFem > 6, MasFem > mean(MasFem)
)

model <- formula_branch(
  alldeaths ~ femininity,
  alldeaths ~ femininity + HighestWindSpeed
)

mv <- mverse(hurricane) %>%
  add_mutate_branch(femininity) %>%
  add_formula_branch(model) %>%
  add_family_branch(fam) %>%
  glm.nb_mverse()

spec_curve(mv, var = "femininityTRUE")
# plot based on 90% confidence interval
spec_curve(mv, var = "femininityTRUE", color = p.value < .1)


summary

Display the multiverse table with results.

Description

This method returns the multiverse table displaying all universes defined by the multiverse. Each row corresponds to a universe and each column represents a branch.
Usage

## S3 method for class 'mverse'
summary(object, ...)

## S3 method for class 'lm_mverse'
summary(object, conf.int = TRUE, conf.level = 0.95, output = "estimates", ...)

## S3 method for class 'glm_mverse'
summary(object, conf.int = TRUE, conf.level = 0.95, output = "estimates", ...)

## S3 method for class 'glm.nb_mverse'
summary(object, conf.int = TRUE, conf.level = 0.95, output = "estimates", ...)

Arguments

object  a glm.nb_mverse object.
...     Ignored.
conf.int When TRUE (default), the estimate output includes the confidence intervals.
conf.level The confidence level of the confidence interval returned using conf.int = TRUE. Default value is 0.95.
output  The output of interest. The possible values are "estimates" ("e"), "df", "deviance" ("de"), and "aic" ("bic"). Alternatively, the first letters may be used. Default value is "estimates".

Details

When you pass a mverse objected fitted with model, the summary table includes results of the fitted models across the multiverse.

Value

a multiverse table as a tibble.

Examples

# Displaying the multiverse table without any fitted values.
hurricane_strength <- mutate_branch(
  NDAM,
  HighestWindSpeed,
  Minpressure_Updated_2014
)
mv <- create_multiverse(hurricane) %>%
  add_mutate_branch(hurricane_strength)
summary(mv)

# Displaying after adding a a filter branch.
hurricane_outliers <- filter_branch(
  !Name %in% c("Katrina", "Audrey", "Andrew"),

mv <- add_filter_branch(mv, hurricane_outliers)
summary(mv)

# Displaying the multiverse table with \code{lm} models fitted.

hurricane_strength <- mutate_branch(NDAM, HighestWindSpeed, Minpressure Updated 2014)
y <- mutate_branch(alldeaths, log(alldeaths + 1))
hurricane_outliers <- filter_branch(!Name %in% c("Katrina", "Audrey", "Andrew"), TRUE # include all)
model_specifications <- formula_branch(y ~ femininity, y ~ femininity + hurricane_strength)
mv <- create_multiverse(hurricane) %>% add_filter_branch(hurricane_outliers) %>% add_mutate_branch(hurricane_strength, y) %>% add_formula_branch(model_specifications) %>% lm_mverse()
summary(mv)

# Displaying the multiverse table with \code{glm} models fitted.

hurricane_strength <- mutate_branch(NDAM, HighestWindSpeed, Minpressure Updated 2014)
hurricane_outliers <- filter_branch(!Name %in% c("Katrina", "Audrey", "Andrew"), TRUE # include all)
model_specifications <- formula_branch(alldeaths ~ femininity, alldeaths ~ femininity + hurricane_strength)
model_distributions <- family_branch(poisson)
mv <- create_multiverse(hurricane) %>% add_filter_branch(hurricane_outliers) %>% add_mutate_branch(hurricane_strength) %>%
ttest

Performs one or two sample t-tests on data columns.

Description

ttest_mverse performs t-tests across the multiverse. If x or y is specified, then performs one and two sample t-tests on specified columns of the data. If both x and y are NULL, then performs t.test based on the formula branches.

Usage

ttest_mverse(
  .mverse,
  x = NULL,
  y = NULL,
  alternative = "two.sided",
  mu = 0,
  paired = FALSE,
  var.equal = FALSE,
  conf.level = 0.95
)

# Displaying the multiverse table with \code(glm.nb) models fitted.
hurricane_strength <- mutate_branch(
  NDAM,
  HighestWindSpeed,
  Minpressure_Updated_2014
)
hurricane_outliers <- filter_branch(
  !Name %in% c("Katrina", "Audrey", "Andrew"),
  TRUE # include all
)
model_specifications <- formula_branch(
  alldeaths ~ femininity,
  alldeaths ~ femininity + hurricane_strength
)
mv <- create_multiverse(hurricane) %>%
  add_filter_branch(hurricane_outliers) %>%
  add_mutate_branch(hurricane_strength) %>%
  add_formula_branch(model_specifications) %>%
  glm.nb_mverse()
summary(mv)
Arguments

.mverse a mverse object.
x (optional) column name of data within mverse object
y (optional) column name of data within mverse object
alternative a character string specifying the alternative hypothesis, must be one of "two.sided" (default), "greater" or "less". You can specify just the initial letter.
mu a number indicating the true value of the mean (or difference in means if you are performing a two sample test).
paired a logical indicating whether you want a paired t-test.
var.equal a logical variable indicating whether to treat the two variances as being equal.
conf.level confidence level of the interval.

Value

A ttest_mverse object.

Examples

# Performing a unpaired two sample t-test.
mv <- mverse(soccer)
x <- mutate_branch(
  ((rater1 + rater2) / 2) > mean((rater1 + rater2) / 2),
  elseifelse(rater1 > rater2, rater1, rater2) >
    mean(ifelse(rater1 > rater2, rater1, rater2))
)
y <- mutate_branch(
  redCards, yellowCards, yellowReds
)
two_sample_form <- formula_branch(y ~ x)
mv <- mv %>%
  add_mutate_branch(x, y) %>%
  add_formula_branch(two_sample_form)
ttest_mverse(mv)
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