Package 'attrib'

May 7, 2026

Title Attributable Burden of Disease

Version 2021.1.2

Description Provides functions for estimating the attributable burden of disease due to risk factors. The posterior simulation is performed using arm::sim as described in Gelman, Hill (2012) <doi:10.1017/CBO9780511790942> and the attributable burden method is based on Nielsen, Krause, Molbak <doi:10.1111/irv.12564>.

Depends R (>= 3.5.0)

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Encoding UTF-8

LazyData true

Imports data.table, magrittr, glue, pbs, dlnm, lubridate, mvmeta, tsModel, stats, lme4, arm, tibble, stringr, ggplot2, utils, progress

Suggests testthat, knitr, rmarkdown

RoxygenNote 7.1.1

VignetteBuilder knitr

NeedsCompilation no

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Repository CRAN

Date/Publication 2021-03-30 09:10:02 UTC

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`data_fake_county` *Fake data for mortality in Norway*

Description

Fake data for mortality in Norway

Usage

```
data_fake_county
```

Format

location_code Location code of the Norwegian municipalities

week Week

season Season used for influenza like illnesses

yrwk Year and week

x Number of weeks from the start of the season

pop Population size

pr100_ili Per hundred ILI, percentage of consultations diagnosed as influenza like illnesses

pr100_ili_lag_1 pr100_ili_lag_1

temperature temperature

temperature_high temperature_high

deaths deaths

`data_fake_nation` *Fake data for mortality in Norway nationally*

Description

Fake data for mortality in Norway nationally

Usage

```
data_fake_nation
```

Format

location_code Location code

week Week

season Season used for influenza like illnesses

yrwk Year and week

x Number of weeks from the start of the season

pop Population size

pr100_ili Per hundred ILI, percentage of consultations diagnosed as influenza like illnesses

pr100_ili_lag_1 pr100_ili_lag_1

temperature temperature

temperature_high temperature_high

deaths deaths

`est_attrib` *Estimates simulations of expected responses*

Description

For each exposure the dataset is copied and the original value replaced by the reference value. Then the sim function is used to generate 500 simulations of expected responses for each row. Finally the dataset is transformed to obtain expected response for original and reference values of the given exposures for each original row of the dataset.

Usage

```
est_attrib(fit, data, exposures, n_sim = 500)
```

Arguments

`fit`	A model fit constructed by fit_attrib
`data`	The observed data
`exposures`	The exposures that will get reference expected mortalities
`n_sim`	Number of simulations
	For more details see the help vignette: `vignette("intro", package="attrib")`

Details

The burden method is based on Nielsen, Krause, Molbak <doi:10.1111/irv.12564>.

For more details see the help vignette: `vignette("intro", package="attrib")`

Value

Dataset with expected responses for all simulations including expected responses given the exposure reference values

Examples

```
response <- "deaths"
fixef <- "pr100_ili_lag_1 + sin(2 * pi * (week - 1) / 52) + cos(2 * pi * (week - 1) / 52)"
ranef <- " (pr100_ili_lag_1| season)"
offset <- "log(pop)"

data <- attrib::data_fake_nation

fit <- fit_attrib(data = data, response = response, fixef = fixef, ranef = ranef, offset = offset)
exposures <- c(pr100_ili_lag_1 = 0)
n_sim <- 5
new_data <- est_attrib(fit, data, exposures, n_sim)
new_data[]
```

`fit_attrib` *Data fit*

Description

Data fit using glmer from lme4 with family poisson to fit the dataset with the given formula.

Usage

```
fit_attrib(data, response, fixef, ranef, offset = NULL)
```

Arguments

`data`	The observed data to be fitted.
`response`	The response
`fixef`	The fixed effects
`ranef`	The random effects
`offset`	The offsets.

Value

The model fit of the data with additional attributes offset, response and fit_fix. Offset and response are the same as in the input and fit_fix is the linear model of the fix effects.

For more details see the help vignette: `vignette("intro", package="attrib")`

Examples

```
response <- "deaths"

fixef <- "pr100_ili_lag_1 + sin(2 * pi * (week - 1) / 52) + cos(2 * pi * (week - 1) / 52)"
ranef <- " (pr100_ili_lag_1| season)"
offset <- "log(pop)"

data <- attrib::data_fake_nation


fit_attrib(data = data, response = response, fixef = fixef, ranef = ranef, offset = offset)
```

`sim` *Generates simulations of expected mortality by simulating the model coefficients.*

Description

With the given fit from fit_attrib the function sim, from package arm as described in Gelman, Hill (2012) <doi:10.1017/CBO9780511790942>, is used to generate 500 simulations of all the coefficients, from there respective posterior distributions. This is then used to compute the expected response for all simulations and rows in the input dataset.

Usage

```
sim(fit, data, n_sim)
```

Arguments

`fit`	A model fit created by fit_attrib
`data`	The data with either observed values or reference values.
`n_sim`	Number of simulations

Details

```
vignette("intro", package="attrib")
```

Value

A dataset with 500 simulations of the expected response for each row in the original dataset.

Examples

```
response <- "deaths"
fixef <- "pr100_ili_lag_1 + sin(2 * pi * (week - 1) / 52) + cos(2 * pi * (week - 1) / 52)"
ranef <- " (pr100_ili_lag_1| season)"
offset <- "log(pop)"

data <- attrib::data_fake_nation

fit <- fit_attrib(data = data, response = response, fixef = fixef, ranef = ranef, offset = offset)

n_sim <- 5
sim(fit, data, n_sim)
```

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