

Package ‘statwitness’

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Type Package

Title Model-Aware Validation and Audit Certificates for Statistical Analyses

Version 0.1.0

Description Provides model-aware behavioral validation and audit certificates for statistical analyses. Controlled transformations and model-specific diagnostic checks are organized across five domains: computational integrity, numerical stability, design adequacy, assumption screening, and influence stability. Supported workflows include linear models, generalized linear models, classical and repeated-measures analyses of variance, mixed-effects models fitted using 'lme4' or 'glmmTMB', and survival models fitted using 'survival'. Checks are selected according to registered applicability conditions for each model class. The resulting certificates describe computational behavior and selected diagnostic findings; they do not establish causal validity, model correctness, or scientific appropriateness.

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Encoding UTF-8

Depends R (>= 4.1.0)

Imports graphics, reformulas, stats, tools

Suggests afex, glmmTMB, knitr, lme4, rmarkdown, survival, testthat (>= 3.0.0)

VignetteBuilder knitr

Config/testthat/edition 3

URL <https://github.com/George33cy/statwitness>

BugReports <https://github.com/George33cy/statwitness/issues>

Config/roxygen2/version 8.0.0

NeedsCompilation no

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statwitness-package	<i>Model-Aware Validation and Audit Certificates for Statistical Analyses</i>
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Description

Model-aware computational validation for regression, ANOVA, repeated-measures, mixed-effects, and survival workflows.

Details

The package applies registered transformations with known expected behavior. Certificates do not establish causal validity or scientific appropriateness.

audit_plan	<i>Preview an Automatic Audit Plan</i>
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Description

Fits the requested model and reports which registered audits are applicable.

Usage

```
audit_plan(  
  formula,  
  data,  
  focus = NULL,  
  family = NULL,  
  weights = NULL,  
  method = "auto",  
  engine = NULL,  
  control = NULL,  
  audit_level = c("standard", "core", "thorough")  
)
```

Arguments

formula	A model formula.
data	A data frame.
focus	An optional coefficient, variable, or omnibus term.
family	An optional model family.
weights	Optional analysis weights.
method	Requested fitting method.
engine	Optional custom fitting function.
control	Optional model-specific control object.
audit_level	Audit breadth used to construct the plan.

Value

A data frame of selected and skipped tests with reasons.

statwitness	<i>Generate a Behavioral Validation Certificate</i>
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Description

Fits a supported model, chooses mathematically applicable behavioral tests, applies controlled transformations, and checks whether the analysis responds as expected.

Usage

```
statwitness(  
  formula,  
  data,  
  focus = NULL,  
  family = NULL,  
  weights = NULL,  
  method = "auto",  
  engine = NULL,  
  control = NULL,  
  conf_level = 0.95,  
  tolerance = 1e-07,  
  seed = 20260712,  
  include = NULL,  
  exclude = NULL,  
  audit_level = c("standard", "core", "thorough")  
)
```

Arguments

formula	A model formula. Random-effect terms using and survival responses using Surv() are supported when their suggested packages are installed.
data	A data frame containing all analysis variables.
focus	An optional coefficient, predictor, or omnibus term such as "criterion:model".
family	An optional GLM or GLMM family.
weights	Optional analysis weights or the name of a weight column.
method	One of "auto", "lm", "aov", "glm", "lmer", "glmer", "glmmTMB", "coxph", or "survreg".
engine	An optional custom fitting function.
control	An optional model-specific control object.
conf_level	Confidence level for coefficient intervals.
tolerance	Relative numerical tolerance.
seed	Seed for deterministic perturbations.
include	Optional test identifiers to retain.
exclude	Optional test identifiers to omit.
audit_level	Audit breadth: "core", "standard", or "thorough".

Value

An object of class statwitness_audit.

Examples

```
dat <- transform(mtcars, transmission = factor(am))
audit <- statwitness(mpg ~ transmission + wt, data = dat, focus = "transmission")
print(audit)
```

statwitness_repeated *Audit a Repeated-Measures ANOVA*

Description

Fits a repeated-measures ANOVA using `afex::aov_ez()` and checks design integrity, sphericity handling, row-order and participant-label invariance, outcome transformations, residual screening, and feasible participant-deletion influence checks.

Usage

```
statwitness_repeated(  
  data,  
  outcome,  
  id,  
  within,  
  between = NULL,  
  focus = NULL,  
  type = 3,  
  correction = "GG",  
  tolerance = 1e-07,  
  seed = 20260712,  
  audit_level = c("standard", "core", "thorough")  
)
```

Arguments

data	A long-format data frame.
outcome	Name of the numeric outcome column.
id	Name of the participant identifier column.
within	Character vector of within-subject factor names.
between	Optional between-subject factor names.
focus	Optional omnibus effect name.
type	Sums-of-squares type passed to <code>afex::aov_ez()</code> .
correction	Sphericity correction, usually "GG".
tolerance	Relative numerical tolerance.
seed	Seed for row-order testing.
audit_level	Audit breadth: "core", "standard", or "thorough".

Value

An object of class `statwitness_audit`.

witness_registry	<i>List Registered Behavioral Audit Tests</i>
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Description

Returns the built-in `statwitness` audit registry.

Usage

```
witness_registry()
```

Value

A data frame describing registered tests, supported model families, and purposes.

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