

Package ‘statsapps’

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Title Interactive 'Shiny' Apps for Building Statistical Intuition

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Description Provides interactive 'Shiny' applications for building intuition in statistics and data science. The apps run locally and use visualization, simulation, and repeated sampling to illustrate topics such as probability distributions, permutation tests, analysis of variance, linear regression, and sums of squares.

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RoxygenNote 8.0.0

Imports dplyr (>= 1.1.0), ggplot2 (>= 3.4.0), purrr (>= 1.0.0), shiny (>= 1.7.0), tibble (>= 3.0.0)

Depends R (>= 4.1.0)

URL <https://github.com/vbaliga/statsapps>,
<https://vbaliga.github.io/statsapps/>

BugReports <https://github.com/vbaliga/statsapps/issues>

Suggests testthat (>= 3.2.0)

Config/testthat/edition 3

NeedsCompilation no

Author Vikram B. Baliga [aut, cre, cph] (ORCID:
<<https://orcid.org/0000-0002-9367-8974>>)

Maintainer Vikram B. Baliga <vikram.baliga@ubc.ca>

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run_anova_app	<i>Launch the one-way ANOVA simulator</i>
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Description

Opens an interactive Shiny app for exploring how group means, within-group variation, and sample size affect a one-way ANOVA.

Usage

```
run_anova_app(...)
```

Arguments

... Optional arguments passed to [shiny::runApp\(\)](#). By default, statsapps opens apps in the system default web browser using `launch.browser = TRUE`. Use `launch.browser = FALSE` to disable this behavior.

Details

All data are simulated in R via `rnorm()`.

Value

`run_anova_app()` opens the Shiny app locally.

Examples

```
run_anova_app()
```

run_distributions_app *Launch the probability distributions app*

Description

Opens an interactive Shiny app for exploring common probability distributions used in BIOL 300.

Usage

```
run_distributions_app(...)
```

Arguments

... Optional arguments passed to `shiny::runApp()`. By default, statsapps opens apps in the system default web browser using `launch.browser = TRUE`. Use `launch.browser = FALSE` to disable this behavior.

Details

All data were simulated and don't come from a specific study.

Value

`run_distributions_app()` opens the Shiny app locally.

Examples

```
run_distributions_app()
```

run_linear_reg_app *Launch the simple linear regression app*

Description

Opens an interactive Shiny app for exploring how the slope and intercept of a linear model affect fitted values and residuals.

Usage

```
run_linear_reg_app(...)
```

Arguments

... Optional arguments passed to `shiny::runApp()`. By default, statsapps opens apps in the system default web browser using `launch.browser = TRUE`. Use `launch.browser = FALSE` to disable this behavior.

Details

All data were simulated and don't come from a specific study.

Value

run_linear_reg_app() opens the Shiny app locally.

Examples

```
run_linear_reg_app()
```

run_permutation_app	<i>Launch the permutation test app</i>
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Description

run_permutation_app() opens an interactive Shiny app that demonstrates how repeated random reassignment of observations can be used to build a null distribution for a two-sample permutation test.

Usage

```
run_permutation_app(...)
```

Arguments

... Optional arguments passed to `shiny::runApp()`. By default, statsapps opens apps in the system default web browser using `launch.browser = TRUE`. Use `launch.browser = FALSE` to disable this behavior.

Details

The app uses data on time to mating in female sagebrush crickets from Johnson et al. (1999), as presented in *The Analysis of Biological Data* by Whitlock and Schluter.

Value

run_permutation_app() opens the Shiny app locally.

References

Johnson, J. C., T. M. Ivy, and S. K. Sakaluk. 1999. Female remating propensity contingent on sexual cannibalism in sagebrush crickets, *Cyphoderris strepitans*: a mechanism of cryptic female choice. *Behavioral Ecology* 10: 227-233.

Whitlock, M. C., and D. Schluter. 2020. *The Analysis of Biological Data*. 3rd ed. W. H. Freeman and Company.

Examples

```
run_permutation_app()
```

```
run_power_precision_app
```

Launch the power and precision app

Description

Opens an interactive Shiny app for exploring how sample size, explanatory variables, interactions, and repeated measurements affect statistical power and confidence intervals for a known, fictional caffeine effect.

Usage

```
run_power_precision_app(...)
```

Arguments

... Optional arguments passed to `shiny::runApp()`. By default, statsapps opens apps in the system default web browser using `launch.browser = TRUE`. Use `launch.browser = FALSE` to disable this behavior.

Details

All data are simulated. Sample size ranges from 12 to 180 people in steps of 6, with 42 people by default. Equal numbers are assigned to each combination of drink and age group. The true caffeine-minus-decaf effect is fixed at -25 milliseconds.

Optional repeated measurements provide 1 to 5 observations per person. When person identity is accounted for, a random-intercept model is fitted by restricted maximum likelihood (REML). Predictors are constant within each person. Mixed-model confidence intervals and power are approximate. This is not a general-purpose mixed-model fitter.

Power is calculated from the known simulation parameters, not from estimates fitted to the displayed outcomes. Confidence intervals describe the caffeine-minus-decaf effect estimated from the displayed sample. When the drink-by-sleep interaction is included, this contrast is evaluated at 7 hours of sleep.

Value

`run_power_precision_app()` opens the Shiny app locally.

Examples

```
run_power_precision_app()
```

run_sums_squares_app	<i>Launch the sums of squares app</i>
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Description

Opens an interactive Shiny app for exploring how total variation can be partitioned into group-level and within-group components in one-way ANOVA.

Usage

```
run_sums_squares_app(...)
```

Arguments

...	Optional arguments passed to <code>shiny::runApp()</code> . By default, statsapps opens apps in the system default web browser using <code>launch.browser = TRUE</code> . Use <code>launch.browser = FALSE</code> to disable this behavior.
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Value

`run_sums_squares_app()` opens the Shiny app locally.

Examples

```
run_sums_squares_app()
```

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