Package ‘tidydice’

April 19, 2021

Type Package
Title Simulates Dice Rolls and Coin Flips
Version 0.1.1
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Description Utils for basic statistical experiments, that can be used for teaching introductory statistics. Each experiment generates a tibble. Dice rolls and coin flips are simulated using sample(). The properties of the dice can be changed, like the number of sides. A coin flip is simulated using a two sided dice. Experiments can be combined with the pipe-operator.
License GPL-3
Encoding UTF-8
URL https://github.com/rolkra/tidydice/
Imports assertthat, dplyr, ggplot2, magrittr, purrr, stats, tibble
RoxygenNote 7.1.1
Suggests explore, knitr, rmarkdown, testthat
VignetteBuilder knitr
NeedsCompilation no
Repository CRAN
Date/Publication 2021-04-19 17:30:03 UTC

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binom

**Binomial distribution as table.**

**Description**
Generates a tibble containing the binomial distribution using dbinom().

**Usage**
```
binom(times, prob_success)
```

**Arguments**
- `times`: number of trials
- `prob_success`: probability of success (number between 0 and 1)

**Value**
Binomial distribution as a tibble

**Examples**
```
binom(times = 10, prob_success = 1/10)
```

binom_coin

**Binomial distribution of flipping a coin.**

**Description**
Generates a tibble containing the binomial distribution of flipping a coin using dbinom().

**Usage**
```
binom_coin(times, sides = 2, success = 2)
```
**binom_dice**

**Arguments**

- **times**: how many times a coin is flipped (or how many coins are flipped at the same time)
- **sides**: number of sides of the coin (default = 2)
- **success**: which result is a success (default = 2)

**Value**

binomial distribution as a tibble

**Examples**

```
binom_coin(times = 10)
```

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**Description**

Generates a tibble containing the binomial distribution of rolling the dice using dbinom().

**Usage**

```
binom_dice(times, sides = 6, success = 6)
```

**Arguments**

- **times**: How many times a dice is rolled (or how many dice are rolled at the same time)
- **sides**: Number of sides of the dice (default = 6)
- **success**: Which result is a success (default = 6)

**Value**

Binomial distribution as a tibble

**Examples**

```
binom_dice(times = 10)
```
circle_points  Helper function to draw a circle

Description
Helper function to draw a circle

Usage
circle_points(center = c(0, 0), diameter = 1, npoints = 61)

Arguments
- center: Vector with x and y coordinate of center
- diameter: Diameter of circle
- npoints: Number of points used for drawing a circle

Value
Dataframe with x and y coordinates to draw a circle

data = NULL,
times = 1,
rounds = 1,
success = c(2),
agg = FALSE,
sides = 2,
prob = NULL,
seed = NULL
)

flip_coin  Simulating flipping a coin.

Description
Flipping a coin is simulated using sample(). The default coin has 2 sides and is fair. The properties of the coin can be changed. The result is returned as a tibble.
force_coin

Arguments

- **data**: Data from a previous experiment
- **times**: How many times coin is flipped (or how many coins are flipped at the same time)
- **rounds**: Number of rounds
- **success**: Which result is a success (default = 2)
- **agg**: If TRUE, the result is aggregated (by experiment, rounds)
- **sides**: Number of sides of the coin (default = 2)
- **prob**: Vector of probabilities for each side of the coin
- **seed**: Seed to produce reproducible results

Value

Result of experiment as a tibble

Examples

```r
# flipping a coin
flip_coin()

# flipping a coin 10 times
flip_coin(times = 10)

# aggregate result
flip_coin(times = 10, agg = TRUE)

# rounds
flip_coin(times = 10, rounds = 3, agg = TRUE)

# experiments
library(dplyr)
flip_coin(times = 10, rounds = 3, agg = TRUE) %>%
  flip_coin(times = 12, rounds = 3, agg = TRUE)
```

---

force_coin

**Force a coin flipping result.**

Description

The forced result is returned as a tibble.

Usage

```r
force_coin(data = NULL, result = 6, round = 1, experiment = 1, success = 2)
```
Arguments

- **data**: Data from a previous experiment
- **result**: Vector of flipping coin results
- **round**: Round of flipping coin
- **experiment**: Experiment Number
- **success**: Which result is a success (default = 6)

Value

Result of experiment as a tibble

Examples

- `force_coin(6)`
- `force_coin(1:6)`

---

**force_dice**

*Force a dice rolling result.*

Description

The forced result is returned as a tibble.

Usage

```
force_dice(data = NULL, result = 6, round = 1, experiment = 1, success = 6)
```

Arguments

- **data**: Data from a previous experiment
- **result**: Vector of rolling dice results
- **round**: Round of rolling dice
- **experiment**: Experiment Number
- **success**: Which result is a success (default = 6)

Value

Result of experiment as a tibble

Examples

- `force_dice(6)`
- `force_dice(1:6)`
Plot a binomial distribution generated with `dice_binom()` or `coin_binom()`.

**Usage**

```r
plot_binom(
  data,
  title = "Binomial distribution",
  color = "darkgrey",
  color_highlight = "red",
  label = NULL,
  label_size = 3,
  min_pct = 0.05,
  highlight = NULL
)
```

**Arguments**

- `data`: data containing values for binomial distribution
- `title`: title of the plot
- `color`: color of bars
- `color_highlight`: color of highlighted bars
- `label`: add labels to plot?
- `label_size`: size of label
- `min_pct`: suppress values < min_pct
- `highlight`: vector of values to be highlighted

**Value**

`ggplot` object

**Examples**

```r
plot_binom(data = binom_dice(times = 10))
```
plot_dice

Plot result of roll_dice()

Description

Plot result of roll_dice()

Usage

plot_dice(
  data,
  detailed = FALSE,
  fill = "white",
  fill_success = fill,
  point_color = "black",
  line_color = "black",
  line_size = 0.8
)

Arguments

data  result of roll_dice()
detailed  If TRUE, the dice is plotted with more details
fill  Fill color
fill_success  Fill color if result is a success
point_color  Color of Points
line_color  Color of Lines
line_size  Size of Lines

Value

ggplot-Object

Examples

library(magrittr)
plot_dice()
roll_dice(times = 3, rounds = 3) %>% plot_dice()
roll_dice(times = 3, rounds = 3) %>% plot_dice(fill_success = "red")
**plot_single_dice**

*Draw a single dice*

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**Description**

Draw a single dice

**Usage**

```r
plot_single_dice(
  ggplot = NULL,
  result = 6,
  x = 0,
  y = 0,
  width = 0.9,
  fill = "white",
  detailed = FALSE,
  rounding = dice_width/5,
  line_size = 0.8,
  line_color = "black",
  point_size = width/6,
  point_color = "black"
)
```

**Arguments**

- `ggplot`: ggplot-Object. If passed, the dice will be added to plot
- `result`: Result of dice rolling (0..6)
- `x`: X-coordinate of dice (center)
- `y`: y-coordinate of dice (center)
- `width`: Width of dice
- `fill`: Fill color
- `detailed`: If TRUE, the dice is plotted with more details
- `rounding`: Rounding of dice (only used if detailed == TRUE)
- `line_size`: Size of Lines
- `line_color`: Color of Lines
- `point_size`: Size of Points
- `point_color`: Color of Points

**Value**

ggplot-Object
roll_dice

Simulating rolling a dice.

Description

Rolling a dice is simulated using sample(). The default dice has 6 sides and is fair. The properties of the dice can be changed. The result is returned as a tibble.

Usage

roll_dice(
  data = NULL,
  times = 1,
  rounds = 1,
  success = c(6),
  agg = FALSE,
  sides = 6,
  prob = NULL,
  seed = NULL
)

Arguments

data          Data from a previous experiment
times         How many times a dice is rolled (or how many dice are rolled at the same time)
rounds        Number of rounds
success       Which result is a success (default = 6)
agg           If TRUE, the result is aggregated (by experiment, rounds)
sides         Number of sides of the dice (default = 6)
prob          Vector of probabilities for each side of the dice
seed          Seed to produce reproducible results

Value

Result of experiment as a tibble

Examples

# rolling a dice once
roll_dice()

# rolling a dice 10 times
roll_dice(times = 10)

# aggregate result
roll_dice(times = 10, agg = TRUE)
# rounds
roll_dice(times = 10, rounds = 3, agg = TRUE)

# experiments
library(dplyr)
roll_dice(times = 10, rounds = 3, agg = TRUE) %>%
  roll_dice(times = 12, rounds = 3, agg = TRUE)
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