Package 'EntropicStatistics'

May 29, 2023

Type Package

Title Functions Based on Entropic Statistics

Version 0.1.0

Maintainer Jialin Zhang (JZ) <jzhang@math.msstate.edu>

Description

Contains methods for data analysis in entropic perspective. These entropic perspective methods are nonparametric, and perform better on non-ordinal data. Currently, the package has a function HeatMap() for visualizing distributional characteristics among multiple populations (groups).

License GPL-3

Encoding UTF-8

Imports ggplot2, ggrepel, hrbrthemes, tidyverse, dplyr, tidyr, tibble

NeedsCompilation no

RoxygenNote 7.2.3

Suggests testthat (>= 3.0.0)

Config/testthat/edition 3

Author Jialin Zhang (JZ) [aut, cph, cre]

Repository CRAN

Date/Publication 2023-05-29 17:40:02 UTC

R topics documented:

HeatMap 2

Index **5**

HeatMap *HeatMap for Distribution Visualization*

Description

Returns a heatmap to display characteristic information from selected groups.

Usage

```
HeatMap(
  data_frequency_list,
  orders = seq(0.50, 3, by = 0.01),
  selection = 1:length(data_frequency_list),
  plot_order = selection,
  RowNames = names(data_frequency_list)[plot_order],
  title = "HeatMap",
  x_ticks = round(stats::quantile(orders, c(0,0.25, 0.5, 0.75, 1)), 2),
  plot_margin = margin(0.5,0.2,0.2,1, "cm"),
  text_face = 1,
  fill_colors = c("blue4", "white", "red3"),
  title_text_size = 25,
  label_text_size = 25
)
```

Arguments

`data_frequency_list`	A list contains the frequency of data. Each sublist herein is a frequency counts of a group.
`orders`	Orders of Generalized Shannon's Entropy used in the heatmap.
`selection`	Indexes of sublist in `data_frequency_list` that one wishes to include in the heatmap.
`plot_order`	The order of selected groups in the heatmap, from bottom to top.
`RowNames`	The display names of the selected groups in the heatmap.
`title`	The title of the heatmap.
`x_ticks`	The location of x-axis ticks on the heatmap.
`plot_margin`	The plot margins of the final heatmap.
`text_face`	The text style in the heatmap. `1` = "plain", `2` = "italic", `3` = "bold", and `4` = "bold. italic".
`fill_colors`	Three colors in the heatmap that represent lower, medium, and upper values.
`title_text_size`	Title text size in the heatmap.
`label_text_size`	Labels text size in the heatmap.

Details

This is a preliminary tool to identify distributional information from multiple groups simultaneuously without any parametric assumptions.

Value

A heatmap plot made with `ggplot2`.

Author(s)

Jialin Zhang (JZ) at jzhang at math.msstate.edu.

Examples

```
## Creating data
binom_n <- 10
sample_size <- 1000
sample_1 <- table(stats::rbinom(size=binom_n, n=sample_size, 0.1))
sample_2 <- table(stats::rbinom(size=binom_n, n=sample_size, 0.2))
sample_3 <- table(stats::rbinom(size=binom_n, n=sample_size, 0.3))
sample_4 <- table(stats::rbinom(size=binom_n, n=sample_size, 0.4))
sample_5 <- table(stats::rbinom(size=binom_n, n=sample_size, 0.5))
sample_6 <- table(stats::rbinom(size=binom_n, n=sample_size, 0.6))
sample_7 <- table(stats::rbinom(size=binom_n, n=sample_size, 0.7))
sample_8 <- table(stats::rbinom(size=binom_n, n=sample_size, 0.8))
sample_9 <- table(stats::rbinom(size=binom_n, n=sample_size, 0.9))
sample_poisson_1 <- stats::rpois(sample_size, 1)
sample_poisson_2 <- stats::rpois(sample_size, 2)
sample_poisson_3 <- stats::rpois(sample_size, 3)
sample_poisson_4 <- stats::rpois(sample_size, 4)
sample_poisson_5 <- stats::rpois(sample_size, 5)
sample_poisson_6 <- stats::rpois(sample_size, 6)
sample_poisson_7 <- stats::rpois(sample_size, 7)
sample_poisson_8 <- stats::rpois(sample_size, 8)
sample_poisson_9 <- stats::rpois(sample_size, 9)
data_samples <- list(binom_0.1 = sample_1, binom_0.2 = sample_2, binom_0.3 = sample_3,
binom_0.4 = sample_4, binom_0.5 = sample_5, binom_0.6 = sample_6, binom_0.7 = sample_7,
binom_0.8 = sample_8, binom_0.9 = sample_9, Poisson_1 = sample_poisson_1,
Poisson_2 = sample_poisson_2, Poisson_3 = sample_poisson_3, Poisson_4 = sample_poisson_4,
Poisson_5 = sample_poisson_5, Poisson_6 = sample_poisson_6, Poisson_7 = sample_poisson_7,
Poisson_8 = sample_poisson_8, Poisson_9 = sample_poisson_9)

## Obtain the heatmap for all sublists in the data.
HeatMap(data_samples)

## Obtain the heatmap for six random sublists in the data.
HeatMap(data_samples, selection = c(sample(1:length(data_samples), 6)))

## Obtain the heatmap for the binomial sublists in the data.
HeatMap(data_samples, selection = 1:9)

## Obtain the heatmap for the first 4 poisson sublists in the data.
```

```
HeatMap(data_samples, selection = 10:13)

## Obtain the heatmap for the last 5 poisson sublists in the data.
HeatMap(data_samples, selection = 14:18)
```

Index

∗ **Entropic Statistics**
HeatMap, 2
∗ **gse**
HeatMap, 2
∗ **heatmap**
HeatMap, 2

HeatMap, 2