Package 'AHPGaussian'

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Type Package

Title New Multicriteria Method: AHPGaussian

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URL https://cidedson.github.io/ahpgaussian/

BugReports https://github.com/cidedson/ahpgaussian/issues

Depends R (>= 4.0.0)

Imports dplyr, tidyr, ggplot2, magrittr

Description Implements the Analytic Hierarchy Process (AHP) method using Gaussian normalization (AHPGaussian)
to derive the relative weights of the criteria and alternatives. It also includes functions for visualizing
the results and generating graphical outputs. Method as described in:
dos Santos, Marcos (2021) <doi:10.13033/ijahp.v13i1.833>.

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Encoding UTF-8

LazyData true

RoxygenNote 7.3.3

Suggests spelling, testthat (>= 3.0.0)

Language en-US

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NeedsCompilation no

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Repository CRAN

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Contents

`ahpgaussian` *Analytic Hierarchy Process with Gaussian adaptation*

Description

Generic S3 function to apply the AHP-Gaussian method to different input types. Currently implemented for data frames.

Usage

```
ahpgaussian(x)
```

Arguments

`x`	Input object (e.g., a data.frame).

Value

An object of class `ahpgaussian`.

`ahpgaussian.default` *Default method for ahpgaussian*

Description

Apply the AHP-Gaussian method to a data frame.

Usage

```
## Default S3 method:
ahpgaussian(x)
```

Arguments

`x`	A data frame with criteria, alternatives and a column `min_max`.

Value

An object of class ahpgaussian.

`cellphones` *Decision Matrix*

Description

An example data.frame about cellphone model characteristics

Usage

```
data(cellphones)
```

Format

The format is:

```
'data.frame': 5 obs. of  5 variables:
$ criteria: chr  "Price" "Camera" "Storage" "Battery Life" ...
$ Xiaomi  : int  1500 12 64 24 94
$ Samsung : int  1800 12 128 18 120
$ iPhone  : int  5000 20 128 10 117
$ min_max : chr  "min" "max" "max" "max" ...
# Description
#
criteria: Statement of the goal, decision criteria and alternatives.
Xiaomi: Xiaomi model;
Samsung: Samsung model; or
iPhone: iPhone model.
min_max: Weights of criteria and alternatives.
```

Examples

```
data(cellphones)
cellphones
```

plot *Plot Method for ahpgaussian objects*

Description

These are methods for objects of class ahpgaussian.

Usage

```
  ## S3 method for class 'ahpgaussian'
plot(x, ...)
```

Arguments

x	A given object of the class ahpgaussian
...	Other graphical parameters may also be passed as arguments to these functions.

Author(s)

Cid Edson Povoas (<cidedson@gmail.com>)

References

dos Santos, M, Costa, I. P. de A., & Gomes, C. F. S. (2021) Multicriteria decision-making in the selection of warships: a new approach to the ahp method. *International Journal of the Analytic Hierarchy Process*, 13(1). <doi:10.13033/ijahp.v13i1.833>

See Also

ahpgaussian

Examples

```
##
## Example 1
## ahpgaussian
##
# ahpgaussian
cp <- ahpgaussian(cellphones)
plot(cp)
```

print.summary.ahpgaussian *Print method for summary.ahpgaussian*

Description

Compact print method for summaries of AHP Gaussian results.

Usage

```
## S3 method for class 'summary.ahpgaussian'
print(x, ...)
```

Arguments

x	An object of class summary.ahpgaussian.
...	Additional arguments (ignored).

summary.ahpgaussian *Summary Method for ahpgaussian objects*

Description

Returns (and prints) a summary list for ahpgaussian) objects.

Usage

```
  ## S3 method for class 'ahpgaussian'
summary(object,
        presentation=FALSE, ...)
```

Arguments

object	A given object of the class ahpgaussian
presentation	Logic. If TRUE the summary of the class ahpgaussian is showed well formated in the screen, else, return a list. The default is FALSE.
...	Potential further arguments (require by generic).

Author(s)

Cid Edson Povoas (<cidedson@gmail.com>)

References

dos Santos, M, Costa, I. P. de A., & Gomes, C. F. S. (2021) Multicriteria decision-making in the selection of warships: a new approach to the ahp method. *International Journal of the Analytic Hierarchy Process*, 13(1). <doi:10.13033/ijahp.v13i1.833>

See Also

ahpgaussian

Examples

```
##
## Example 1
## ahpgaussian
##
# ahpgaussian
cp <- ahpgaussian(cellphones)
summary(cp, TRUE)
```

`warships` *Decision Matrix*

Description

A data.frame Decision Matrix of the data used Santos (2021), the first column lists the criteria, while the next three columns represent the alternatives and the last column represents the objective choice between minimum and maximum for a given criterion. Each model corresponds to an alternative of ship, classified according to its respective criteria.

Usage

```
data(warships)
```

Format

The format is:

```
'data.frame': 9 obs. of  5 variables:
criteria: chr  "Action Radius" "Fuel Endurance" "Autonomy" "Primary Cannon" ...
 model_1 : num  4000 11 30 25 1 0 290 592 6
 model_2 : num  9330 26 25 25 2 1 310 633 8
 model_3 : num  10660 30 35 120 2 ...
 min_max : chr  "max" "max" "max" "max" ...
 #
 # Description
 #
 criteria: Statement of the goal, decision criteria and alternatives.
 model_1: Replicate the current Corvette Barroso;
 model_2: Build a slightly modernized ship (2.600 ton corvette); or
```

```
model_3: Build a model with more significant modernizations (3.000 ton corvette).
 min_max: Weights of criteria and alternatives.
```

References

dos Santos, M, Costa, I. P. de A., & Gomes, C. F. S. (2021) Multicriteria decision-making in the selection of warships: a new approach to the ahp method. *International Journal of the Analytic Hierarchy Process*, 13(1). <doi:10.13033/ijahp.v13i1.833>.

Examples

```
data(warships)
warships
```

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