

Package ‘ImportanceIndice’

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Type Package

Title Analyzing Data Through of Percentage of Importance Indice and Its Derivations

Version 0.0.2

Description The Percentage of Importance Indice (Percentage_I.I.) bases in magnitudes, frequencies, and distributions of occurrence of an event (DEMOLIN-LEITE, 2021) <<http://cjas.science.com/index.php/CJAS/article/view/1009/1350>>. This index can detect the key loss sources (L.S) and solution sources (S.S.), classifying them according to their importance in terms of loss or income gain, on the productive system. The Percentage_I.I. = $[(ks1 \times c1 \times ds1) / \text{SUM}(ks1 \times c1 \times ds1) + (ks2 \times c2 \times ds2) + (ksn \times cn \times dsn)] \times 100$. key source (ks) is obtained using simple regression analysis and magnitude (abundance). Constancy (c) is SUM of occurrence of L.S. or S.S. on the samples (absence = 0 or presence = 1), and distribution source (ds) is obtained using chi-square test. This index has derivations: i.e., i) Loss estimates and solutions effectiveness and ii) Attention and non-attention levels (DEMOLIN-LEITE,2024) <[DOI:10.1590/1519-6984.253215](https://doi.org/10.1590/1519-6984.253215)>.

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Author Germano Leao Demolin Leite [aut] (ORCID: <<https://orcid.org/0000-0002-2928-3193>>), Alcinei Mistico Azevedo [aut, cre] (ORCID: <<https://orcid.org/0000-0001-5196-0851>>)

Maintainer Alcinei Mistico Azevedo <alcineimistico@hotmail.com>

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DataLossSource	<i>Loss sources data</i>
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Description

Example with data from loss sources .

Usage

`data(DataLossSource)`

Format

A data frame with four sources of loss, one in each column.

Author(s)

Germano Leao Demolin Leite : <germano.demolin@gmail.com>

Alcinei Místico Azevedo : <alcineimistico@hotmail.com>

References

DEMOLIN-LEITE, G.L., 2021. Importance indice: loss estimates and solution effectiveness on production. Cuban Journal of Agricultural Science, vol. 55, no. 2, pp. 1-7. <<http://scielo.sld.cu/pdf/cjas/v55n2/2079-3480-cjas-55-02-e10.pdf>>

DEMOLIN-LEITE, G.L., 2024. Do arthropods and diseases affect the production of fruits on Caryocar brasiliense Camb. (Malpighiales: Caryocaraceae)? Brazilian Journal of Biology, vol. 84, pp. e253215. <<https://doi.org/10.1590/1519-6984.253215>>

DataNumberSamples *Number samples data*

Description

Example with data of number samples.

Usage

```
data(DataNumberSamples)
```

Format

A data frame with the number of evaluations performed on each individual, the number of months evaluated and the number of evaluations performed per month.

Author(s)

Germano Leao Demolin Leite : <germano.demolin@gmail.com>

Alcinei Místico Azevedo : <alcineimistico@hotmail.com>

References

DEMOLIN-LEITE, G.L., 2021. Importance indice: loss estimates and solution effectiveness on production. Cuban Journal of Agricultural Science, vol. 55, no. 2, pp. 1-7. <<http://scielo.sld.cu/pdf/cjas/v55n2/2079-3480-cjas-55-02-e10.pdf>>

DEMOLIN-LEITE, G.L., 2024. Do arthropods and diseases affect the production of fruits on *Caryocar brasiliense* Camb. (Malpighiales: Caryocaraceae)? Brazilian Journal of Biology, vol. 84, pp. e253215. <<https://doi.org/10.1590/1519-6984.253215>>

DataProduction *Production data*

Description

Example with production data.

Usage

```
data(DataProduction)
```

Format

A data frame with production data.

Author(s)

Germano Leao Demolin Leite : <germano.demolin@gmail.com>

Alcinei Mistico Azevedo : <alcineimistico@hotmail.com>

References

DEMOLIN-LEITE, G.L., 2021. Importance indice: loss estimates and solution effectiveness on production. Cuban Journal of Agricultural Science, vol. 55, no. 2, pp. 1-7. <<http://scielo.sld.cu/pdf/cjas/v55n2/2079-3480-cjas-55-02-e10.pdf>>

DEMOLIN-LEITE, G.L., 2024. Do arthropods and diseases affect the production of fruits on *Caryocar brasiliense* Camb. (Malpighiales: Caryocaraceae)? Brazilian Journal of Biology, vol. 84, pp. e253215. <<https://doi.org/10.1590/1519-6984.253215>>

DataSolutionSource *Solution sources data*

Description

Example with data from solution sources .

Usage

```
data(DataSolutionSource)
```

Format

A data frame with three sources of solution, one in each column.

Author(s)

Germano Leao Demolin Leite : <germano.demolin@gmail.com>

Alcinei Mistico Azevedo : <alcineimistico@hotmail.com>

References

DEMOLIN-LEITE, G.L., 2021. Importance indice: loss estimates and solution effectiveness on production. Cuban Journal of Agricultural Science, vol. 55, no. 2, pp. 1-7. <<http://scielo.sld.cu/pdf/cjas/v55n2/2079-3480-cjas-55-02-e10.pdf>>

DEMOLIN-LEITE, G.L., 2024. Do arthropods and diseases affect the production of fruits on *Caryocar brasiliense* Camb. (Malpighiales: Caryocaraceae)? Brazilian Journal of Biology, vol. 84, pp. e253215. <<https://doi.org/10.1590/1519-6984.253215>>

Distribution_LossSource

Loss source distribution information

Description

Indicates the distribution of sources of loss: aggregate, random or regular.

Usage

```
Distribution_LossSource(DataLoss)
```

Arguments

DataLoss It is an matrix object containing data from loss sources.

Value

Return distribution of sources of loss: aggregate, random or regular.

Author(s)

Germano Leao Demolin-Leite (Instituto de Ciencias Agrarias da UFMG)
Alcinei Místico Azevedo (Instituto de Ciencias Agrarias da UFMG)

See Also

[EffectivenessOfSolution](#) , [NonAttentionLevel](#) , [LossSource](#)

Examples

```
library(ImportanceIndice)
data("DataLossSource")
data("DataSolutionSource")
```

```
Distribution_LossSource(DataLossSource)
Distribution_SolutionSource(DataSolutionSource)
```

Distribution_SolutionSource

Solution source distribution information

Description

Indicates the distribution of sources of solution: aggregate, random or regular.

Usage

```
Distribution_SolutionSource(SolutionData)
```

Arguments

SolutionData It is an matrix object containing data from solution sources.

Value

Return distribution of sources of solution: aggregate, random or regular.

Author(s)

Germano Leao Demolin-Leite (Instituto de Ciencias Agrarias da UFMG)

Alcinei Místico Azevedo (Instituto de Ciencias Agrarias da UFMG)

See Also

[EffectivenessOfSolution](#) , [NonAttentionLevel](#) , [LossSource](#)

Examples

```
library(ImportanceIndice)
data("DataLossSource")
data("DataSolutionSource")
```

```
Distribution_LossSource(DataLossSource)
Distribution_SolutionSource(DataSolutionSource)
```

EffectivenessOfSolution

Function to estimate the effectiveness of solution sources (S.S.) by loss source (Percentage_I.I. > 0.00) in the production system.

Description

This function allows to calculate E.S. of each S.S. by L.S. (significant in the reduction of production) in the productive system. Equation: $E.S. = R2 \times (1 - P)$ when it is of the first degree, or $E.S. = ((R2 \times (1 - P)) \times (B2/B1))$ when it is of the second degree. Where, R2 = determination coefficient and P = significance of ANOVA, B1 = regression coefficient, and B2 = regression coefficient (variable2), of the simple regression equation of the S.S..

Usage

```
EffectivenessOfSolution(DataLossSource,DataSolutionSource,Production, verbose=TRUE)
```

Arguments

DataLossSource	It is an matrix object containing data from loss sources.
DataSolutionSource	It is an matrix object containing data from solution sources.
Production	It is a vector containing the production data.
verbose	Logical value (TRUE/FALSE). TRUE displays the results of the effectiveness of solution

Value

The function returns several indices associated with the source of loss.

Author(s)

Germano Leao Demolin-Leite (Instituto de Ciencias Agrarias da UFMG)
Alcinei Místico Azevedo (Instituto de Ciencias Agrarias da UFMG)

See Also

[LossProduction](#) , [NonAttentionLevel](#)

Examples

```
library(ImportanceIndice)
data("DataLossSource")
data("DataSolutionSource")
data("DataProduction")
data("DataNumberSamples")
```

```

Distribution_LossSource(DataLossSource)
Distribution_SolutionSource(DataSolutionSource)

#####
#####

LS<-LossSource(DataLoss = DataLossSource,DataProd = DataProduction)
LS

LP<-LossProduction(Data=DataLossSource,Prod = DataProduction,
                    Evaluation=DataNumberSamples,
                    SegurityMargen=0.75,MaximumToleranceOfLossFruits=1)
LP

ES<-EffectivenessOfSolution(DataLossSource=DataLossSource,
                             DataSolutionSource=DataSolutionSource,Production=DataProduction)
ES

```

ImportanceIndice package

Analyzing data through of percentage of importance indice and its derivations

Description

The Percentage of Importance Indice (Percentage_I.I.) bases in magnitudes, frequencies, and distributions of occurrence of an event. This index can detect the key loss sources (L.S) and solution sources (S.S.), classifying them according to their importance in terms of loss or income gain, on the productive system. The Percentage_I.I. = $((ks1 \times c1 \times ds1) / \text{SUM}(ks1 \times c1 \times ds1) + (ks2 \times c2 \times ds2) + (ksn \times cn \times dsn)) \times 100$. key source (ks) is obtained using simple regression analysis and magnitude (abundance). Constancy (c) is SUM of occurrence of L.S. or S.S. on the samples (absence = 0 or presence = 1), and distribution source (ds) is obtained using chi-square test. This index has derivations: i.e., i) Loss estimates and solutions effectiveness and ii) Attention and non-attention levels.

Author(s)

Germano Leao Demolin-Leite (Instituto de Ciencias Agrarias da UFMG)
 Alcinei Mistico Azevedo (Instituto de Ciencias Agrarias da UFMG)

References

- DEMOLIN-LEITE, G.L., 2021. Importance indice: loss estimates and solution effectiveness on production. Cuban Journal of Agricultural Science, vol. 55, no. 2, pp. 1-7. <<http://scielo.sld.cu/pdf/cjas/v55n2/2079-3480-cjas-55-02-e10.pdf>>
- DEMOLIN-LEITE, G.L., 2024. Do arthropods and diseases affect the production of fruits on Caryocar brasiliense Camb. (Malpighiales: Caryocaraceae)? Brazilian Journal of Biology, vol. 84, pp. e253215. <<https://doi.org/10.1590/1519-6984.253215>>

LossProduction

*Obtaining indices associated with loss of production.***Description**

Allows calculating loss of production per loss source (L.P.L.S.) and its total, maximum estimated production (M.E.P.), percentage of loss of production per loss source (Percentage_L.P.L.S.=P.L.P.L.S.) and its total, n_per_sample, and attention level (A.L.).

Equations:

*L.P.L.S. = total n of the L.S. x R.P. of the L.S. Where R.P. is $R^2 \times (1 - P)$ when it is of the first degree, or $R.P. = ((R^2 \times (1 - P)) \times (B2/B1))$ when it is of the second degree. Where, R^2 = determination coefficient and P = significance of ANOVA, $B1$ = regression coefficient, and $B2$ = regression coefficient (variable2), of the simple regression equation of the L.S.

*M.E.P. = Total production (P) + SUM L.P.L.S.1 +L.P.L.S.n.

*Percentage_L.P.L.S. = (L.P.L.S./M.E.P.) x 100.

* n_per_sample is n per sample

*A.L. = (n of the L.S. per sample x 0.75)/Percentage_L.P.L.S..

Where, n of the L.S. per sample = n/(number of trees/evaluation frequency/years/number of plant parts evaluated). In this case, the number of trees = 20; evaluation frequency = 12 months per year for leaves, trunks, and branches, two months for bunches of flowers per year, and three months for bunches of fruits per year; years = three; and the number of plant parts evaluated = 12 leaves, 12 bunches of flowers and/or fruits, and one trunk per tree/evaluation. And, 0.75 = 1 percent of loss fruits x 0.75 (safety margin).

Usage

```
LossProduction(DataLossSource,Prod,Evaluation,SecurityMargen=0.75,
MaximumToleranceOfLossFruits=1)
```

Arguments

DataLossSource It is an matrix object containing data from loss sources.

Prod Matrix with a column containing the production data.

Evaluation Matrix containing three lines with the number of evaluations performed on each individual, the number of months evaluated and the number of evaluations performed per month. Must have a column for each source of loss.

SecurityMargen Security margin (default=0.75)

MaximumToleranceOfLossFruits

Maximum tolerance in percentage (default=1)

Value

The function returns several indices associated with the production loss.

Author(s)

Germano Leao Demolin-Leite (Instituto de Ciencias Agrarias da UFMG)
 Alcinei Místico Azevedo (Instituto de Ciencias Agrarias da UFMG)

See Also

[EffectivenessOfSolution](#) , [NonAttentionLevel](#) , [LossSource](#)

Examples

```
library(ImportanceIndice)
data("DataLossSource")
data("DataSolutionSource")
data("DataProduction")
data("DataNumberSamples")

Distribution_LossSource(DataLossSource)
Distribution_SolutionSource(DataSolutionSource)

#####
#####

LS<-LossSource(DataLoss = DataLossSource,DataProd = DataProduction)
LS

LP<-LossProduction(Data=DataLossSource,Prod = DataProduction,
                  Evaluation=DataNumberSamples,
                  SecurityMargen=0.75,MaximumToleranceOfLossFruits=1)
LP

ES<-EffectivenessOfSolution(DataLossSource=DataLossSource,
                           DataSolutionSource=DataSolutionSource,Production=DataProduction)
ES
```

LossSource

Obtaining indices associated with sources of loss

Description

These functions allow to calculate the total n of the L.S. (n), R.P., ks, c, ds, n.I.I., Sum.n.I.I., and percentage of I.I. (P.I.I.) by each L.S..

Equations: n=total n per sample

k.s.= R.P./n

c = SUM of occurrence of L.S. on the samples, where, absence = 0 or presence = 1.

ds = 1 - P of the chi-square test of L.S. on the samples.

n.I.I.=ks x c x ds

Sum.n.I.I. = sum of all n.I.I.

Percentage of I.I. (P.I.I.)=(n.I.I. of each L.S./sum of all n.I.I.)*100

Usage

```
LossSource(DataLoss,DataProd)
```

Arguments

DataLoss	It is an matrix object containing data from loss sources.
DataProd	Matrix with a column containing the production data.

Value

The function returns several indices associated with the loss source.

Author(s)

Germano Leao Demolin-Leite (Instituto de Ciencias Agrarias da UFMG)
Alcinei Místico Azevedo (Instituto de Ciencias Agrarias da UFMG)

See Also

[EffectivenessOfSolution](#) , [NonAttentionLevel](#)

Examples

```
library(ImportanceIndice)
data("DataLossSource")
data("DataSolutionSource")
data("DataProduction")
data("DataNumberSamples")

Distribution_LossSource(DataLossSource)
Distribution_SolutionSource(DataSolutionSource)

#####
#####

LS=LossSource(DataLoss = DataLossSource,DataProd = DataProduction)
LS

LP=LossProduction(Data=DataLossSource,Prod = DataProduction,
                  Evaluation=DataNumberSamples,
                  SegurityMargen=0.75,MaximumToleranceOfLossFruits=1)
LP

ES=EffectivenessOfSolution(DataLossSource=DataLossSource,
                           DataSolutionSource=DataSolutionSource,Production=DataProduction)
ES
```

NonAttentionLevel *Estimates levels of non-attention.*

Description

Functions to estimate E.S., income gain (I.G.), percentage of I.G.=P.I.G., and non-attention level (N.A.L.) of each S.S. per L.S., and their partial sum of I.G. and P.I.G. of S.S. inside each L.S., and the total of I.G. and P.I.G. on the productive system.

Usage

```
NonAttentionLevel(EffectivenessOfSolution,
LossProduction,
Id,
SafetyMargin=1.25,
Verbose=TRUE)
```

Arguments

EffectivenessOfSolution	Output generated by the function 'EffectivenessOfSolution'
LossProduction	Output generated by the function 'LossProduction'
Id	Logical vector indicating the lines of the 'EffectivenessOfSolution' that are relevant. Output generated by the function SelectEffectivenessOfSolution
SafetyMargin	Safety Margin (Default=1.25)
Verbose	Logical value (TRUE/FALSE). TRUE displays the results of the analysis.

Value

The function returns levels of non-attention.

Author(s)

Germano Leao Demolin-Leite (Instituto de Ciencias Agrarias da UFMG)
Alcinei Místico Azevedo (Instituto de Ciencias Agrarias da UFMG)

See Also

[EffectivenessOfSolution](#), [NonAttentionLevel](#), [LossSource](#)

Examples

```
library(ImportanceIndice)
data("DataLossSource")
data("DataSolutionSource")
data("DataProduction")
data("DataNumberSamples")
```

```

Distribution_LossSource(DataLossSource)
Distribution_SolutionSource(DataSolutionSource)

#####
#####

LS<-LossSource(DataLoss = DataLossSource,DataProd = DataProduction)
LS

LP<-LossProduction(Data=DataLossSource,Prod = DataProduction,
                  Evaluation=DataNumberSamples,
                  SegurityMargen=0.75,MaximumToleranceOfLossFruits=1)
LP

ES<-EffectivenessOfSolution(DataLossSource=DataLossSource,
                           DataSolutionSource=DataSolutionSource,Production =DataProduction)
ES

id<-SelectEffectivenessOfSolution(ES)
id<-c(TRUE , TRUE, TRUE , FALSE, TRUE)

SS<-SolutionSource(SolutionData = DataSolutionSource,
                  EffectivenessOfSolution = ES,Production = DataProduction,Id = id)
SS

NAL<-NonAttentionLevel(EffectivenessOfSolution = ES,LossProduction = LP,Id = id,Verbose=TRUE)
NAL

```

SelectEffectivenessOfSolution

Determine the pair by pair effects that are important for the analysis.

Description

Selects, pair by pair, the effect of S.S. on L.S.

Usage

```
SelectEffectivenessOfSolution(EffectivenessOfSolution)
```

Arguments

EffectivenessOfSolution

Output generated by the function 'EffectivenessOfSolution'

Value

Returns a vector with logical values demonstrating the interactions considered important for the analysis.

Author(s)

Germano Leao Demolin-Leite (Instituto de Ciencias Agrarias da UFMG)

Alcinei Místico Azevedo (Instituto de Ciencias Agrarias da UFMG)

See Also

[EffectivenessOfSolution](#) , [NonAttentionLevel](#) , [LossSource](#)

Examples

```
library(ImportanceIndice)
data("DataLossSource")
data("DataSolutionSource")
data("DataProduction")
data("DataNumberSamples")
```

```
Distribution_LossSource(DataLossSource)
Distribution_SolutionSource(DataSolutionSource)
```

```
#####
#####
```

```
LS<-LossSource(DataLoss = DataLossSource,DataProd = DataProduction)
LS
```

```
LP<-LossProduction(Data=DataLossSource,Prod = DataProduction,
                  Evaluation=DataNumberSamples,
                  SegurityMargen=0.75,MaximumToleranceOfLossFruits=1)
LP
```

```
ES<-EffectivenessOfSolution(DataLossSource=DataLossSource,
                           DataSolutionSource=DataSolutionSource,Production =DataProduction)
ES
```

```
id<-SelectEffectivenessOfSolution(ES)
id<-c(TRUE , TRUE, TRUE , FALSE, TRUE)
```

```

SS<-SolutionSource(SolutionData = DataSolutionSource,
                  EffectivenessOfSolution = ES,Production = DataProduction,Id = id)
SS

NAL<-NonAttentionLevel(EffectivenessOfSolution = ES,LossProduction = LP,Id = id,Verbose=TRUE)
NAL

```

SolutionSource *Obtaining indexes associated with the solution sources.*

Description

Function to estimate the total n of the S.S. (n), E.S., ks, c, ds, n.I.I., Sum.n.I.I., and percentage of I.I. (P.I.I.) by each S.S..

Usage

```
SolutionSource(SolutionData,Production,EffectivenessOfSolution,Id,Verbose=TRUE)
```

Arguments

SolutionData	It is an matrix object containing data from Solution sources.
Production	Matrix with a column containing the production data.
EffectivenessOfSolution	Output generated by the function 'EffectivenessOfSolution'
Id	Logical vector indicating the lines of the 'EffectivenessOfSolution' that are relevant. Output generated by the function SelectEffectivenessOfSolution
Verbose	Logical value (TRUE/FALSE). TRUE displays the results of the analysis.

Value

The function returns indices associated with the source of loss.

Author(s)

Germano Leao Demolin-Leite (Instituto de Ciencias Agrarias da UFMG)
Alcinei Místico Azevedo (Instituto de Ciencias Agrarias da UFMG)

Examples

```

library(ImportanceIndice)
data("DataLossSource")
data("DataSolutionSource")
data("DataProduction")
data("DataNumberSamples")

Distribution_LossSource(DataLossSource)
Distribution_SolutionSource(DataSolutionSource)

#####
#####

LS<-LossSource(DataLoss = DataLossSource,DataProd = DataProduction)
LS

LP<-LossProduction(Data=DataLossSource,Prod = DataProduction,
                  Evaluation=DataNumberSamples,
                  SegurityMargen=0.75,MaximumToleranceOfLossFruits=1)
LP

ES<-EffectivenessOfSolution(DataLossSource=DataLossSource,
                           DataSolutionSource=DataSolutionSource,Production =DataProduction)
ES

id<-SelectEffectivenessOfSolution(ES)
id<-c(TRUE , TRUE,  TRUE , FALSE,  TRUE)

SS<-SolutionSource(SolutionData = DataSolutionSource,
                  EffectivenessOfSolution = ES,Production = DataProduction,Id = id)
SS

NAL<-NonAttentionLevel(EffectivenessOfSolution = ES,LossProduction = LP,Id = id,Verbose=TRUE)
NAL

```

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