Package ‘cccm’

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Type Package

Title Crossed Classification Credibility Model

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Description Calculates the credit debt for the next period based on the available data using the cross-classification credibility model.

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Encoding UTF-8

LazyData true

Imports dplyr, rlang

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NeedsCompilation no

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Depends R (>= 3.5.0)

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R topics documented:

calculate_generalMean *General Mean*

Description

General Mean

Usage

```
calculate_generalMean(
  raw_data,
  categorical_columns,
  weights_column,
  debt_column
)
```

Arguments

raw_data	a data set of credibility.
categorical_columns	categorical column of data set.
weights_column	weights column of data set.
debt_column	credit dept column of data set.

Value

general mean

Examples

```
raw_data <- debt

categorical_columns <- c(1,2)

weights_column <- 3

debt_column <- 4

calculate_generalMean(raw_data, categorical_columns, weights_column, debt_column)
```

calculate_group_averages_matrix

Group Averages Matrix

Description

Group Averages Matrix

Usage

```
calculate_group_averages_matrix(
  raw_data,
  categorical_columns,
  weights_column,
  debt_column
)
```

Arguments

raw_data	a data set of credibility.
categorical_columns	categorical column of data set.
weights_column	weights column of data set.
debt_column	credit dept column of data set.

Value

group averages matrix

Examples

```
raw_data <- debt

categorical_columns <- c(1,2)

weights_column <- 3

debt_column <- 4

calculate_group_averages_matrix(raw_data, categorical_columns, weights_column, debt_column)
```

calculate_obs_and_group_weights

Repeats of observations

Description

Repeats of observations

Usage

```
calculate_obs_and_group_weights(
  raw_data,
  categorical_columns,
  weights_column,
  debt_column
)
```

Arguments

raw_data	a data set of credibility.
categorical_columns	categorical column of data set.
weights_column	weights column of data set.
debt_column	credit dept column of data set.

Value

This function returns categorical group sizes.

Examples

```
raw_data <- debt

categorical_columns <- c(1,2)

weights_column <- 3

debt_column <- 4

calculate_obs_and_group_weights(raw_data, categorical_columns, weights_column, debt_column)
```

calculate_varianceComponents

Variance Components

Description

Variance Components

Usage

```
calculate_varianceComponents(
  raw_data,
  categorical_columns,
  weights_column,
  debt_column
)
```

Arguments

raw_data	a data set of credibility.
categorical_columns	categorical column of data set.
weights_column	weights column of data set.
debt_column	credit dept column of data set.

Value

variance components

Examples

```
raw_data <- debt

categorical_columns <- c(1,2)

weights_column <- 3

debt_column <- 4

calculate_varianceComponents(raw_data, categorical_columns, weights_column, debt_column)
```

calculate_variance_and_std

Variance and Standard Deviation

Description

Variance and Standard Deviation

Usage

```
calculate_variance_and_std(
  raw_data,
  categorical_columns,
  weights_column,
  debt_column
)
```

Arguments

raw_data	a data set of credibility.
categorical_columns	categorical column of data set.
weights_column	weights column of data set.
debt_column	credit dept column of data set.

Value

variance and sd.

Examples

```
raw_data <- debt

categorical_columns <- c(1,2)

weights_column <- 3

debt_column <- 4

calculate_variance_and_std(raw_data, categorical_columns, weights_column, debt_column)
```

calculate_weights_of_obs_matrix

Weights of observation matrix

Description

Weights of observation matrix

Usage

```
calculate_weights_of_obs_matrix(
  raw_data,
  categorical_columns,
  weights_column,
  debt_column
)
```

Arguments

`raw_data`	a data set of credibility.
`categorical_columns`	categorical column of data set.
`weights_column`	weights column of data set.
`debt_column`	credit dept column of data set.

Value

Weights of observation matrix.

Examples

```
raw_data <- debt

categorical_columns <- c(1,2)

weights_column <- 3

debt_column <- 4

calculate_weights_of_obs_matrix(raw_data, categorical_columns, weights_column, debt_column)
```

cccm *Crossed Classification Credibility Model.*

Description

Estimation of premium credibility for Crossed Classification Credibility Model. In this model an insurance portfolio is subdivided by two qualitative risk factors, modeled in symmetrical way. Especially this model presents an alternative way when data is not classifiable in a hierarchical manner and to determine main effects of both risk factors. Also this model more useful to calculate co-effect both risk factors. Dannenburg et al., (1995, ISBN:90-802117-3-7)

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Examples

```
raw_data <- debt

categorical_columns = c(1,2)

weights_column = 3

debt_column = 4

calculate_generalMean(raw_data, categorical_columns, weights_column, debt_column)

calculate_variance_and_std(raw_data, categorical_columns, weights_column, debt_column)

calculate_group_averages_matrix(raw_data, categorical_columns, weights_column, debt_column)

calculate_weights_of_obs_matrix(raw_data, categorical_columns, weights_column, debt_column)

calculate_varianceComponents(raw_data, categorical_columns, weights_column, debt_column)

estimate_credibility(raw_data, categorical_columns, weights_column, debt_column)
```

col_diff_matrix_with_vector *Column Wise Matrix Diff*

Description

This function returns of the column wise difference between the m matrix and the vector v

Usage

```
col_diff_matrix_with_vector(m, vec)
```

Arguments

`m`	is a matrix
`vec`	is a vector

Value

This function returns a `num` matrix.

`control_data` *Data checker*

Description

Throws an error message if at least 2 features is not in categorical format.

Usage

```
control_data(x)
```

Arguments

`x`	a dataset.

Value

This function checks whether `dataset` has at least 2 features in categorical format.

`debt` *Debt Data*

Description

A real data which published by Turkey Banking Regulation and Supervisory Board <https://www.bddk.org.tr/BultenAylik/en>

Usage

```
debt
```

Format

A data frame of 106 rows and 4 columns

bank categorical data of bank type. Bank type includes four subcategory such as State Banks, Deposit Banks, Foreign Banks and Privately Owned Deposit Banks

loan categorical data of dept type. Loan type includes three subcategory such as non-performing vehicle, home, and consumer loan.

weights Numeric values of weights

debt Numeric values of debt

---

div_matrix_cols_with_vector

Column Wise Matrix Division

Description

This function returns of the column wise division of the m matrix and the vector v.

Usage

```
div_matrix_cols_with_vector(m, vec)
```

Arguments

`m`	is a matrix
`vec`	is a vector

Value

This function returns a `num` matrix.

---

div_matrix_rows_with_vector

Row Wise Matrix Division

Description

This function returns of the row wise division of the m matrix and the vector v.

Usage

```
div_matrix_rows_with_vector(m, vec)
```

Arguments

`m`	is a matrix
`vec`	is a vector

Value

This function returns a `num` matrix.

`estimate_credibility` *The Credibility Premium Estimates*

Description

The Credibility Premium Estimates

Usage

```
estimate_credibility(
  raw_data,
  categorical_columns,
  weights_column,
  debt_column
)
```

Arguments

`raw_data`	a data set of credibility.
`categorical_columns`	categorical column of data set.
`weights_column`	weights column of data set.
`debt_column`	credit dept column of data set.

Value

returns premium estimation of credibility.

Examples

```
raw_data <- debt

categorical_columns <- c(1,2)

weights_column <- 3

debt_column <- 4

estimate_credibility(raw_data, categorical_columns, weights_column, debt_column)
```

`mult_matrix_cols_with_vector` *Column Wise Matrix Multiplication*

Description

This function returns of the column wise multiplication of the m matrix and the vector v.

Usage

```
mult_matrix_cols_with_vector(m, vec)
```

Arguments

`m`	is a matrix
`vec`	is a vector

Value

This function returns a `num` matrix.

`row_diff_matrix_with_vector` *Row Wise Matrix Diff*

Description

This function returns of the row wise difference between the m matrix and the vector v

Usage

```
row_diff_matrix_with_vector(m, vec)
```

Arguments

`m`	is a matrix
`vec`	is a vector

Value

This function returns a `num` matrix.

`save_names` *Get names*

Description

Get names

Usage

```
save_names(raw_data, categorical_columns)
```

Arguments

`raw_data`	a data set of credibility.
`categorical_columns`	categorical column of data set.

Value

returns categorical variables' unique values and column names of data set.

Examples

```
raw_data <- debt

categorical_columns <- c(1,2)

save_names(raw_data, categorical_columns)
```

`set_data` *Data prep*

Description

Data prep

Usage

```
set_data(raw_data, categorical_columns, weights_column, debt_column)
```

Arguments

`raw_data`	a data set of credibility.
`categorical_columns`	categorical column of data set.
`weights_column`	weights column of data set.
`debt_column`	credit debt column of data set.

Value

This function returns a tibble as prepared_data by using raw_data. Adds new columns to raw data as weighted_obs, group_average_weights, variance_column.

Examples

```
raw_data <- debt

categorical_columns <- c(1,2)

weights_column <- 3

debt_column <- 4

prepared_data <- set_data(raw_data, categorical_columns, weights_column, debt_column)
```

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