## Package ‘Cluster.OBeu’

**Type** Package  
**Title** Cluster Analysis 'OpenBudgets.eu'  
**Version** 1.2.3  
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**Description** Estimate and return the needed parameters for visualisations designed for 'OpenBudgets' [http://openbudgets.eu/](http://openbudgets.eu/) data. Calculate cluster analysis measures in Budget data of municipalities across Europe, according to the 'OpenBudgets' data model. It involves a set of techniques and algorithms used to find and divide the data into groups of similar observations. Also, can be used generally to extract visualisation parameters convert them to 'JSON' format and use them as input in a different graphical interface.

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**URL** [https://github.com/okgreece/Cluster.OBeu](https://github.com/okgreece/Cluster.OBeu)  
**BugReports** [https://github.com/okgreece/Cluster.OBeu/issues](https://github.com/okgreece/Cluster.OBeu/issues)  
**License** GPL-2 | file LICENSE  
**Encoding** UTF-8  
**LazyData** TRUE  
**Imports** car, cluster, clValid, data.tree, dendextend, graphics, jsonlite, mclust, methods, RCurl, reshape, reshape2, stringr, utils  
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**VignetteBuilder** knitr  
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**city_data**

**city data example**

**Description**

This dataset is an example data frame of the budget phase data

- Administrative_Unit
- Approved
- Draft
- Executed
- Revised

**Format**

A data frame with the previous characteristics as columns

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**cl.analysis**

**Cluster analysis**

**Description**

Clustering Analysis for OBEU datasets.

**Usage**

cl.analysis(cl.data, cl_feature = NULL, amount = NULL, cl.aggregate = "sum", cl.meth = NULL, clust.numb = NULL, dist = "euclidean", tojson = FALSE)
cl.analysis

Arguments

- **cl.data** The input data
- **cl.feature** The feature to be clustered (nominal variables)
- **amount** The numeric variables
- **cl.aggregate** Select a different aggregation in case of filtering the input data
- **cl.meth** The clustering method algorithm
- **clust.numb** The number of clusters
- **dist** The distance metric
- **tojson** If TRUE the results are returned in json format, default returns a list

Details

There are different clustering models to be selected through an evaluation process. The user should define the cl.feature, cl.aggregate and amount parameters to form the structure of cluster data. The clustering algorithm, the number of clusters and the distance metric of the clustering model are set to the best selection using internal and stability measures. The end user can also interact with the cluster analysis and these parameters by specifying the cl.meth, cl.numb and cl.dist parameters respectively.

Value

The final returns are the parameters needed for visualizing the cluster data depending on the selected algorithm and the specification parameters, as long as some comparison measure matrices.

- **cluster.method** - Label of the clustering algorithm
- **raw.data** - Input data
- **data.pca** - The principal components to visualize the input data
- **modelparam** - The results of this parameter depend of the selected clustering model
- **compare** - Clustering measures

Author(s)

Kleanthis Koupidis, Jaroslav Kuchar

See Also

- cl.features, clValid, diana, agnes, pam, clara, fanny, Mclust

Examples

cl.analysis(city_data, cl.meth = "pam", clust.numb = 3)
cl.features

Description
Select clustering characteristic to form the clustering data

Usage
cl.features(data, features = NULL, amounts = NULL, aggregate = "sum", tojson = FALSE)

Arguments
data The input data
features The clustering features
amounts The amount measures of the dataset
aggregate The function to aggregate
tojson If TRUE the results are returned in json format, default returns a list

Details
This function adapts the dataset according to the selected dimension of the dataset and the aggregation function.

Value
This function returns the dataset for cluster analysis adapted to the desired features.

Author(s)
Kleanthis Koupidis

See Also
cl.analysis

Examples
cl.features(city_data, features = 'Administrative_Unit')
# works also for other datasets
cl.features(iris, features = 'Species')
**cl.plot**

*Clustering model plotting*

**Description**

cl.plot function plots the clustering model constructed by the `cl.analysis` function.

**Usage**

```r
cl.plot(clustering.model, parameters = list())
```

**Arguments**

- `clustering.model`
  - Object returned by the `cl.analysis` function.

- `parameters`
  - List of parameters to indicate plotting of ellipses or convex hulls. Default values: `list(ellipses=FALSE, convex.hulls=FALSE)`.

**Author(s)**

Jaroslav Kuchar <https://github.com/jaroslav-kuchar>

**See Also**

- `cl.analysis`

**Examples**

```r
inputs.clustering <- cl.analysis(city_data, cl.meth="pam", clust.numb=2)
cl.plot(inputs.clustering, parameters = list(ellipses=TRUE))
```

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**cl.summary**

*Extract the proposed clustering method and the number of clusters from clvalid method*

**Description**

Extract the most frequent

**Usage**

```r
cl.summary(clv)
```

**Arguments**

- `clv`
  - A clValid object
convex.hulls

Details

This function returns the proposed method or number of clusters or both according to the majority clustering indices of a clValid process.

Value

A value that indicates the proposed method and number of clusters.

Author(s)

Kleanthis Koupidis

convex.hulls

Convex hull points

Description

Computes points to plot a convex hull for each cluster of the clustering model.

Usage

convex.hulls(clustering.model, data.pca)

Arguments

  clustering.model
    Object returned by the cl.analysis function.

  data.pca
    data as result of the stats::prcomp(clustering.model$data, scale = T, center = T).

Value

List of vectors with points for each convex hull.
ellipses

**Description**

Computes points to plot an ellipse for each cluster of the clustering model.

**Usage**

```r
ellipses(clustering.model, data.pca)
```

**Arguments**

- `clustering.model`:
  - Object returned by the `cl.analysis` function.
- `data.pca`:
  - Data as result of the `stats::prcomp(clustering.model$data, scale. = T, center = T)`.

**Value**

List of vectors with points for each ellipse.

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`nums`

**Select the numeric columns of a given dataset**

**Description**

Extract and return a data frame with the columns that include only numeric values.

**Usage**

```r
nums(data)
```

**Arguments**

- `data`:
  - The input data frame, matrix

**Value**

This function returns a data frame with the numeric columns of the input dataset.

**Author(s)**

Kleanthis Koupidis

**Examples**

```r
nums(city_data)
```
open_spending.cl  

**Read and Calculate the Basic Information for Cluster Analysis Tasks from Open Spending API**

**Description**

Extract and analyze the input data provided from Open Spending API, using the `cl.analysis` function.

**Usage**

```r
open_spending.cl(json_data, dimensions=NULL, amounts=NULL, measured.dimensions=NULL, cl.aggregate="sum", cl.method=NULL, cl.num=NULL, cl.dist="euclidean")
```

**Arguments**

- `json_data`: The json string, URL or file from Open Spending API
- `dimensions`: The dimensions/feature of the input data
- `amounts`: The measures of the input data
- `measured.dimensions`: The dimensions to which correspond amount/numeric variables
- `cl.aggregate`: Aggregate function of the input data
- `cl.method`: The clustering algorithm
- `cl.num`: The number of clusters
- `cl.dist`: The distance metric

**Details**

This function is used to read data in json format from Open Spending API, in order to implement cluster analysis through `cl.analysis` function.

**Value**

A json string with the resulted parameters of the `cl.analysis` function.

**Author(s)**

Kleanthis Kouridis

**See Also**

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