Package ‘GridOnClusters’

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Type Package

Title Cluster-Preserving Multivariate Joint Grid Discretization

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Description Discretize multivariate continuous data using a grid
that captures the joint distribution via preserving clusters in
the original data (Wang et al. 2020). Joint grid discretization
is applicable as a data transformation step to prepare data for
model-free inference of association, function, or causality.

Imports Rcpp, cluster, fossil, dqrng, Rdpack, plotrix

Suggests Ckmeans.1d.dp, FunChisq, knitr, testthat (>= 2.1.0),
markdown

Depends R (>= 3.0)

RdMacros Rdpack

License LGPL (>= 3)

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NeedsCompilation yes

VignetteBuilder knitr

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**discretize.jointly**

**R topics documented:**

- discretize.jointly ........................................... 2
- plotGOCpatterns .............................................. 3

**Description**

Discretize multivariate continuous data using a grid that captures the joint distribution via preserving clusters in the original data.

**Usage**

```r
discretize.jointly(data, k = c(2:10), cluster_label = NULL, min_level = 2)
```

**Arguments**

- `data` a matrix containing two or more continuous variables. Columns are variables, rows are observations.
- `k` either the number or range of clusters to be found on `data`. The default is 2 to 10 clusters. If a range is specified, an optimal k in the range is chosen to maximize the average silhouette width. If `cluster_label` is specified, k is ignored.
- `cluster_label` a vector of user-specified cluster labels for each observation in `data`. The user is free to choose any clustering. If unspecified, k-means clustering is used by default.
- `min_level` the minimum number of levels along each dimension

**Details**

The function implements algorithms described in (Wang et al. 2020).

**Value**

A list that contains four items:

- `D` a matrix that contains the discretized version of the original data. Discretized values are one(1)-based.
- `grid` a list of vectors containing decision boundaries for each variable/dimension.
- `clabels` a vector containing cluster labels for each observation in `data`.
- `csimilarity` a similarity score between clusters from joint discretization `D` and cluster labels `clabels`. The score is the adjusted Rand index.
plotGOCpatterns

Author(s)

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References


See Also

See Ckmeans.1d.dp for discretizing univariate continuous data.

Examples

# using a specified k
x = rnorm(100)
y = sin(x)
z = cos(x)
data = cbind(x, y, z)
discretized_data = discretize.jointly(data, k=5)

# using a range of k
x = rnorm(1000)
y = log1p(abs(x))
z = tan(x)
data = cbind(x, y, z)
discretized_data = discretize.jointly(data, k=c(3:10))

# using an alternate clustering method to k-means
library(cluster)
x = rnorm(1000)
y = log1p(abs(x))
z = sin(x)
data = cbind(x, y, z)

# pre-cluster the data using partition around medoids (PAM)
cluster_label = pam(x=data, diss = FALSE, metric = "euclidean", k = 5)$clustering
discretized_data = discretize.jointly(data, cluster_label = cluster_label)

plotGOCpatterns

Plotting the continuous data along with cluster-preserving Grid

Description

Plots examples of jointly discretizing continuous data based on grids that preserve clusters in the original data.
plotGOCpatterns

Usage

plotGOCpatterns(data, res)

Arguments

data a matrix containing two or more continuous variables. Columns are variables, rows are observations.
res the result generated by discretize.jointly
Index

Ckmeans.1d.dp, 3

discretize.jointly, 2

plotGOCpatterns, 3