Package 'Rsomoclu'

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Title Somoclu

Imports kohonen

Suggests

Description Somoclu is a massively parallel implementation of self-organizing maps. It exploits multi-core CPUs and it can be accelerated by CUDA. The topology of the map can be planar or toroid and the grid of neurons can be rectangular or hexagonal . Details refer to (Peter Wittek, et al (2017)) <doi:10.18637/jss.v078.i09>.

URL https://peterwittek.github.io/somoclu/

BugReports https://github.com/peterwittek/somoclu/issues

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NeedsCompilation yes

Repository CRAN

SystemRequirements C++11

LinkingTo Rcpp

LazyData true

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R topics documented:

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rgbs   *tiny rgbs data*

Description

tiny rgbs data for testing

Usage

```
rgbs
```

Format

matrix in plain text form

Rsomoclu.kohonen   *convert Somoclu train result to kohonen class for plotting*

Description

A function call to convert Somoclu train result to kohonen class for plotting.

Usage

```
Rsomoclu.kohonen(input_data, result, n.hood = NULL, toroidal = FALSE)
```

Arguments

input_data	input data, matrix format
result	The result returned by Rsomoclu.train
n.hood	Same as in koohonen, the shape of the neighbourhood, either "circular" or "square". The latter is the default for rectangular maps, the former for hexagonal maps.
toroidal	if TRUE, the edges of the map are joined. Note that in a hexagonal toroidal map, the number of rows must be even.

Value

An object of class kohonen for plotting.

See Also

<https://www.r-bloggers.com/2014/02/self-organising-maps-for-customer-segmentation-using-r/>

Examples

```
library('Rsomoclu')
library('kohonen')
data("rgbs", package = "Rsomoclu")
input_data <- rgbs
input_data <- data.matrix(input_data)
nSomX <- 20
nSomY <- 20
nEpoch <- 10
radius0 <- 0
radiusN <- 0
radiusCooling <- "linear"
scale0 <- 0
scaleN <- 0.01
scaleCooling <- "linear"
kernelType <- 0
mapType <- "planar"
gridType <- "rectangular"
compactSupport <- FALSE
codebook <- NULL
neighborhood <- "gaussian"
stdCoeff <- 0.5
res <- Rsomoclu.train(input_data, nEpoch, nSomX, nSomY,
                      radius0, radiusN,
                      radiusCooling, scale0, scaleN,
                      scaleCooling,
                      kernelType, mapType, gridType, compactSupport,
                      neighborhood, stdCoeff, codebook)
## Convert to kohonen object for plotting
sommap = Rsomoclu.kohonen(input_data, res)
## Show 'codebook'
plot(sommap, type="codes", main = "Codes")
## Show 'component planes'
plot(sommap, type = "property", property = sommap$codes[[1]][,1],
     main = colnames(sommap$codes)[1])
## Show 'U-Matrix'
plot(sommap, type="dist.neighbours")
```

Rsomoclu.train   *Train function for Somoclu*

Description

A function call to Somoclu to train the Self Organizing Map.

Usage

```
Rsomoclu.train(input_data, nEpoch, nSomX, nSomY,
                      radius0, radiusN,
```

```
                        radiusCooling, scale0, scaleN,
                        scaleCooling,
                        kernelType, mapType, gridType, compactSupport,
                        neighborhood, stdCoeff, codebook, vectDistance)
```

Arguments

input_data	input data, matrix format
nEpoch	Maximum number of epochs
nSomX	Number of columns in map (size of SOM in direction x)
nSomY	Number of rows in map (size of SOM in direction y)
radius0	Start radius (default: half of the map in direction min(x,y))
radiusN	End radius (default: 1)
radiusCooling	Radius cooling strategy: linear or exponential (default: linear)
scale0	Starting learning rate (default: 1.0)
scaleN	Finishing learning rate (default: 0.01)
scaleCooling	Learning rate cooling strategy: linear or exponential (default: linear)
kernelType	Kernel type 0: Dense CPU 1: Dense GPU 2: Sparse CPU (default: 0)
mapType	Map type: planar or toroid (default: "planar")
gridType	Grid type: square or hexagonal (default: "rectangular")
compactSupport	Compact support for Gaussian neighborhood, (default:TRUE)
neighborhood	Neighborhood function: gaussian or bubble (default: "gaussian")
codebook	initial codebook, (default:NULL)
stdCoeff	The coefficient in the Gaussian neighborhood function exp(-‖x-y‖^2/(2*(coeff*radius)^2)), (default:0.5)
vectDistance	the vector distance function "norm-3", "norm-6", "norm-2"(same as default) "norm-inf", is supported with kerneltype = 0 only , (default:euclidean)

Value

a list including elements

codebook	the codebook
globalBmus	global Best Matching Unit matrix
uMatrix	uMatrix

Author(s)

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References

Peter Wittek, Shi Chao Gao, Ik Soo Lim, Li Zhao (2017). Somoclu: An Efficient Parallel Library for Self-Organizing Maps. Journal of Statistical Software, 78(9), 1-21. doi:10.18637/jss.v078.i09.

Examples

```
library('Rsomoclu')
data("rgbs", package = "Rsomoclu")
input_data <- rgbs
input_data <- data.matrix(input_data)
nSomX <- 10
nSomY <- 10
nEpoch <- 10
radius0 <- 0
radiusN <- 0
radiusCooling <- "linear"
scale0 <- 0
scaleN <- 0.01
scaleCooling <- "linear"
kernelType <- 0
mapType <- "planar"
gridType <- "rectangular"
compactSupport <- FALSE
codebook <- NULL
neighborhood <- "gaussian"
stdCoeff <- 0.5
vectDistance <- "euclidean"
res <- Rsomoclu.train(input_data, nEpoch, nSomX, nSomY,
                      radius0, radiusN,
                      radiusCooling, scale0, scaleN,
                      scaleCooling,
                      kernelType, mapType, gridType, compactSupport, neighborhood,
                      stdCoeff, codebook, vectDistance)
res$codebook
res$globalBmus
res$uMatrix
library('kohonen')
sommap = Rsomoclu.kohonen(input_data, res)
```

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