

# Package ‘leidenAlg’

November 1, 2020

**Type** Package

**Title** Implements the Leiden Algorithm via an R Interface

**Version** 0.1.0

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## Description

An R interface to the Leiden algorithm, an iterative community detection algorithm on networks. The algorithm is designed to converge to a partition in which all subsets of all communities are locally optimally assigned, yielding communities guaranteed to be connected. The implementation proves to be fast, scales well, and can be run on graphs of millions of nodes (as long as they can fit in memory). The original implementation was constructed as a python interface ```leidenalg``` found here: <<https://github.com/vtraag/leidenalg>>. The algorithm was originally described in Traag, V.A., Waltman, L. & van Eck, N.J. ```From Louvain to Leiden: guaranteeing well-connected communities```. Sci Rep 9, 5233 (2019) <doi:10.1038/s41598-019-41695-z>.

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**Encoding** UTF-8

**LazyData** true

**Depends** R (>= 3.5.0), Matrix, igraph

**Imports** graphics, grDevices, Matrix.utils, parallel, Rcpp (>= 1.0.5), sccore, stats

**Suggests** pbapply, testthat

**LinkingTo** Rcpp, RcppArmadillo, RcppEigen

**SystemRequirements** GNU make

**RoxygenNote** 7.1.1

**URL** <https://github.com/kharchenkolab/leidenAlg>

**BugReports** <https://github.com/kharchenkolab/leidenAlg/issues>

**NeedsCompilation** yes

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as.dendrogram.fakeCommunities	
	<i>Returns pre-calculated dendrogram</i>

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**Description**

Returns pre-calculated dendrogram

**Usage**

```
## S3 method for class 'fakeCommunities'
as.dendrogram(object, ...)
```

**Arguments**

object	fakeCommunities object
...	further parameters for generic

**Value**

dendrogram

**Examples**

```
rLeidenComm = suppressWarnings(rleiden.community(exampleGraph, n.cores=1))
as.dendrogram.fakeCommunities(rLeidenComm)
```

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exampleGraph	<i>Conos graph</i>
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**Description**

Conos graph

**Usage**

exampleGraph

**Format**

An object of class igraph of length 10.

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find_partition	<i>Finds the optimal partition using the Leiden algorithm</i>
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**Description**

Finds the optimal partition using the Leiden algorithm

**Usage**

```
find_partition(graph, edge_weights, resolution = 1, niter = 2L)
```

**Arguments**

graph	The igraph graph to define the partition on
edge_weights	Vector of edge weights. In weighted graphs, a real number is assigned to each (directed or undirected) edge. Refer to igraph, weighted graphs.
resolution	Integer resolution parameter controlling communities detected (default=1.0) Higher resolutions lead to more communities, while lower resolutions lead to fewer communities.
niter	Number of iterations that the algorithm should be run for (default=2)

**Value**

A vector of membership values

**Examples**

```
library(igraph)
library(leidenAlg)

g <- make_star(10)
E(g)$weight <- seq(ecount(g))
find_partition(g, E(g)$weight)
```

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leiden.community	<i>Leiden algorithm community detection Detect communities using Leiden algorithm (implementation copied from <a href="https://github.com/vtraag/leidenalg">https://github.com/vtraag/leidenalg</a>)</i>
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**Description**

Leiden algorithm community detection Detect communities using Leiden algorithm (implementation copied from <https://github.com/vtraag/leidenalg>)

**Usage**

```
leiden.community(graph, resolution = 1, n.iterations = 2)
```

**Arguments**

graph	graph on which communities should be detected
resolution	resolution parameter (default=1.0) - higher numbers lead to more communities
n.iterations	number of iterations that the algorithm should be run for (default=2)

**Value**

a fakeCommunities object that returns membership and dendrogram

**Examples**

```
leiden.community(exampleGraph)
```

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```
membership.fakeCommunities
```

*Returns pre-calculated membership factor*

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**Description**

Returns pre-calculated membership factor

**Usage**

```
## S3 method for class 'fakeCommunities'  
membership(object, ...)
```

**Arguments**

object	fakeCommunities object
...	further parameters for generic

**Value**

membership factor

**Examples**

```
leidenComm = leiden.community(exampleGraph)  
membership.fakeCommunities(leidenComm)
```

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rleiden.community	<i>Recursive leiden communities Constructs an n-step recursive clustering, using leiden.community</i>
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## Description

Recursive leiden communities Constructs an n-step recursive clustering, using leiden.community

## Usage

```
rleiden.community(
  graph,
  max.depth = 2,
  n.cores = parallel::detectCores(logical = FALSE),
  min.community.size = 10,
  verbose = FALSE,
  resolution = 1,
  cur.depth = 1,
  hierarchical = TRUE,
  ...
)
```

## Arguments

graph	graph
max.depth	Recursive depth (default=2)
n.cores	integer Number of cores to use (default = parallel::detectCores(logical=FALSE)). If logical=FALSE, uses the number of physical CPUs/cores. If logical=TRUE, uses the logical number of CPUS/cores. See parallel::detectCores()
min.community.size	integer Minimal community size parameter for the walktrap communities—Communities smaller than that will be merged (default=10)
verbose	boolean Whether to output progress messages (default=FALSE)
resolution	resolution parameter passed to leiden.community (either a single value, or a value equivalent to max.depth) (default=1)
cur.depth	integer Current depth of clustering (default=1)
hierarchical	boolean If TRUE, calculate hierarchy on the multilevel clusters (default=TRUE)
...	passed to leiden.community

## Value

a fakeCommunities object that returns membership and dendrogram

## Examples

```
rleiden.community(exampleGraph, n.cores=1)
```

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