Package: BipartiteModularityMaximization (via r-universe)

August 21, 2024

Title Partition Bipartite Network into Non-Overlapping Biclusters by Optimizing Bipartite Modularity

Version 1.23.120.1

Author Tianlong Chen [aut], Weibin Zhang [cre, ctb], Suresh Bhavnani [cph, fnd]

Maintainer Weibin Zhang <wbzhang.ustc@gmail.com>

Description Function bipmod() that partitions a bipartite network into non-overlapping biclusters by maximizing bipartite modularity defined in Barber (2007) <doi:10.1103/PhysRevE.76.066102> using the bipartite version of the algorithm described in Treviño (2015) <doi:10.1088/1742-5468/2015/02/P02003>.

License MIT + file LICENSE

Encoding UTF-8

LazyData true

LinkingTo Rcpp

Imports Rcpp

RoxygenNote 7.1.2

Depends R (>= 2.10)

Suggests testthat

NeedsCompilation yes

Repository https://wzhang40.r-universe.dev

RemoteUrl https://github.com/wzhang40/bipartitemodularitymaximization

RemoteRef HEAD

RemoteSha bfad5a6a597f5819307b0aecfcbd051e2aeea734

Contents

bipmod *Partition bipartite network into non-overlapping biclusters, by optimizing bipartite modularity.*

Description

This function partitions a bipartite network into non-overlapping biclusters by optimizing bipartite modularity defined in Barber (2007) using the bipartite version of the algorithm described in Treviño (2015).

Usage

```
bipmod(incid_mat, ITER = 10)
```

Arguments

incid_mat	Incidence matrix of a bipartite network.
ITER	A positive integer representing the number of iterations used to maximizing modularity, (default=10).

Details

The function takes as input a bipartite network represented as an incidence matrix (using a matrix or a data frame) with non-negative values (the row sums and column sums must be positive, to ensure there are no disconnected nodes). The function partitions the rows and columns into non-overlapping submatrices (biclusters), and outputs the membership of rows and columns to a partition, and modularity (Q) representing the quality of the partitioning.

Value

MODULARITY Modularity value (Q).

ASSIGN Integer labels representing partition of rows followed by columns in same order as incidence matrix.

References

Barber, M. J. (2007). Modularity and community detection in bipartite networks. Physical Review E, 76(6), 066102. <doi:10.1103/PhysRevE.76.066102>

Trevino, S., Nyberg, A., Del Genio, C. I., & Bassler, K. E. (2015). Fast and accurate determination of modularity and its effect size. Journal of Statistical Mechanics: Theory and Experiment, 2015(2), P02003. <doi:10.1088/1742-5468/2015/02/P02003>

Examples

```
data(example_data)
bipmod(example_data)
```

`example_data` *Example dataset of a bipartite network.*

Description

A dataset consisting of anonymized patients (n=798) and symptoms (d=8), where each patient has one or more symptoms.

Usage

```
example_data
```

Format

A data frame with 798 rows and 8 binary variables:

Symptom_1

Symptom_2

Symptom_3

Symptom_4

Symptom_5

Symptom_6

Symptom_7

Symptom_8

Index