Package 'mcPAFit'

June 30, 2017

Type Package

Title Estimating Preferential Attachment from a Single Network Snapshot by Markov Chain Monte Carlo

Version 0.1.4

Date 2017-07-01

Author Thong Pham

Maintainer Thong Pham <thongpham@thongpham.net>

Description A Markov chain Monte Carlo method is provided to estimate the preferential attachment function from a single network snapshot. Conventional methods require the complete information about the appearance order of all nodes and edges in the network. This package incorporates the appearance order into the state space and estimates it together with the preferential attachment function.

License GPL-3

Depends R(>= 2.10.0)

Imports Rcpp (>= 0.11.3) , grDevices, graphics, stats, RColorBrewer, PAFit

LinkingTo Rcpp

LazyData True

NeedsCompilation yes

Repository CRAN

Date/Publication 2017-06-30 01:45:58 UTC

R topics documented:

mcPAFit-package *Estimating Preferential Attachment from a Single Network Snapshot by Markov Chain Monte Carlo*

Description

A Markov chain Monte Carlo method is provided to estimate the preferential attachment function from a single network snapshot. Conventional methods require the complete information about the appearance order of all nodes and edges in the network. This package incorporates the appearance order into the state space and estimates it together with the preferential attachment function.

Details

Package:	mcPAFit
Type:	Package
Version:	0.1.4
Date:	2017-07-01
License:	GPL-3

- create_sim_data: generate simulation data.

Author(s)

Thong Pham, Paul Sheridan, Hidetoshi Shimodaira. Maintainer: Thong Pham <thongpham@thongpham.net>

References

1. Pham, T. and Sheridan, P. and Shimodaira, H. (2015). mcPAFit: Nonparametric Measurement of Preferential Attachment and Fitness from a Single Network Snapshot. Conference on Complex Systems 2015, September 2015, Arizona.

Examples

```
## Not run:
library("mcPAFit")

## End(Not run)
```

estimate_alpha *Estimating the attachment exponent of preferential attachment*

Description

This function estimate the attachment exponent of preferential attachment.

Usage

```
estimate_alpha(net, net_type = "directed")
```

Arguments

net	A three-column matrix containing the network. Each row is an edge.
net_type	String. Indicates the type of the network. Possible values are "directed" or "undirected".

Value

A list containing the estimated attachment exponenet and its standard deviation.

Author(s)

Thong Pham <thongpham@thongpham.net>

References

1. Pham, T. and Sheridan, P. and Shimodaira, H. (2015). mcPAFit: Nonparametric Measurement of Preferential Attachment and Fitness from a Single Network Snapshot. Conference on Complex Systems 2015, September 2015, Arizona.

Examples

```
library("mcPAFit")
data   <- simple_net(100)
result <- estimate_alpha(data)
```

---

get_my_statistics *Gathering summarized statistics from growing networks*

Description

A function to gather sufficient statistics of a growing network.

Usage

```
get_my_statistics(net, net_type = "directed")
```

Arguments

net	A three-column matrix containing the network. Each row is an edge.
net_type	String. Indicates the type of the network. Possible values are "directed" or "undirected".

Value

An object containing the summarized statistics of the network.

Author(s)

Thong Pham <thongpham@thongpham.net>

References

1. Pham, T. and Sheridan, P. and Shimodaira, H. (2015). mcPAFit: Nonparametric Measurement of Preferential Attachment and Fitness from a Single Network Snapshot. Conference on Complex Systems 2015, September 2015, Arizona.

Examples

```
library("mcPAFit")
data  <- simple_net(100)
stats <- get_my_statistics(data)
```

---

simple_net *Generating simulated networks*

Description

This function generates a complex network from the Barabasi-Albert model and a random order to create a random network.

Usage

```
simple_net(time_step,
           num_seed          = 2     ,
           p                 = 0.5   ,
           alpha             = 1     ,
           alpha_out         = 0   )
```

Arguments

time_step	Integer. Indicates the number of time-steps.
num_seed	Integer. Number of nodes in the initial network.
p	Numeric. Proportion of number of nodes.
alpha	Numeric. The attachment exponent for the in-degree.
alpha_out	Numeric. The attachment exponent for the out-degree.

Value

An three-column matrix containing the generated network.

Author(s)

Thong Pham <thongpham@thongpham.net>

References

1. Pham, T. and Sheridan, P. and Shimodaira, H. (2015). mcPAFit: Nonparametric Measurement of Preferential Attachment and Fitness from a Single Network Snapshot. Conference on Complex Systems 2015, September 2015, Arizona.

Examples

```
library("mcPAFit")
data <- simple_net(100) # Time-steps = 100
```

Index