

# Package ‘manet’

September 19, 2017

**Title** Multiple Allocation Model for Actor-Event Networks

**Version** 1.0

**Description** Mixture model with overlapping clusters for binary actor-event data. Parameters are estimated in a Bayesian framework. Model and inference are described in Ranciati, Vinciotti, Wit (2017) Modelling actor-event network data via a mixture model under overlapping clusters. Submitted.

**Depends** R (>= 3.3.3), MCMCpack, combinat, igraph

**License** GPL-2

**Encoding** UTF-8

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 deepsouth

*Deep South Network*


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### Description

This is a data set of 18 women observed over a nine-month period. During that period, various subsets of these women met in a series of 14 informal social events. The data record which women met for which events.

### Usage

```
deepsouth
```

### Format

A data frame with 18 rows and 14 variables

### Source

Davies et al (1941) *Deep South: A sociological anthropological study of caste and class*. University of Chicago Press.

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 manet

*Multiple allocation clustering of actor-event networks*


---

### Description

This function infers K multiple allocation cluster for actor-event network data.

### Usage

```
manet(y, K = 2, maxT = 5000, seed = 1, link = "min", verbose = FALSE)
```

### Arguments

y	A $n \times d$ actor-event adjacency matrix, whereby $y_{ij}$ is 1 if actor $i$ attended event $j - 0$ otherwise.
K	Number of multiple clusters. Default is set to 2.
maxT	Number of MCMC iterations. Default is set to 5000.
seed	Random seed. Default is 1.
link	Method to combine the parameters of the parent clusters into the parameter for the heir cluster. Default is "min". The alternative is "max".
verbose	Set to TRUE if you want to see the steps of the MCMC iterations. Defaults is FALSE.

**Value**

A manet object consisting of a list with five outputs:

- `p.allocation.chain` A  $\text{maxT} \times n \times 2^K$  array with the posterior probabilities of allocation to the heir clusters.
- `p.event.chain` A  $\text{maxT} \times K \times d$  array with the cluster - posterior probabilities of attendance to events.
- `p.community.chain` A  $\text{maxT} \times 2^K$  matrix with the heir cluster proportions.
- `parent.heir.cluster` A  $2^K \times K$  matrix, which indicates the relationship between parent and heir clusters.
- `adj` The original adjacency matrix.
- `proc.time` The computational time.

**Examples**

```
data(deepsouth)
ds<-manet(deepsouth,K=2,maxT=100)
plot(ds)
summary(ds)
```

---

 mixtbern

*Single allocation clustering in networks*


---

**Description**

This function infers  $K$  single allocation cluster for actor-event network data.

**Usage**

```
mixtbern(y, K = 4, maxT = 5000, seed = 1, verbose = FALSE)
```

**Arguments**

<code>y</code>	A $n \times d$ actor-event adjacency matrix, whereby $y_{ij}$ is 1 if actor $i$ attended event $j - 0$ otherwise.
<code>K</code>	Number of single clusters. Default is set to 4.
<code>maxT</code>	Number of MCMC iterations. Default is set to 5000.
<code>seed</code>	Random seed. Default is 1.
<code>verbose</code>	Set to TRUE if you want to see the steps of the MCMC iterations. Defaults is FALSE.

**Value**

A manet object consisting of a list with five outputs:

- `p.allocation.chain` A  $\text{maxT} \times n \times K$  array with the posterior probabilities of allocation to the heir clusters.
- `p.event.chain` A  $\text{maxT} \times K \times d$  array with the cluster - posterior probabilities of attendance to events.
- `p.community.chain` A  $\text{maxT} \times K$  matrix with the heir cluster proportions.
- `adj` The original adjacency matrix.
- `proc.time` The computational time.

**Examples**

```
data(deepsouth)
ds<-mixtbern(deepsouth,K=2,maxT=100)
plot(ds)
summary(ds)
```

---

noordin

*Noordin Top terrorist network*


---

**Description**

The Noordin Top Terrorist Network Data were drawn primarily from "Terrorism in Indonesia: Noordin's Networks," a publication of the International Crisis Group, and include relational data on 79 individuals discussed in that publication. The dataset includes information on these individuals' affiliations with terrorist/insurgent organizations, educational institutions, businesses, and religious institutions.

**Usage**

```
noordin
```

**Format**

A data frame with 79 rows and 45 variables

**Details**

- 45 events attended: eight organizations, five operations (bombings), eleven training events, two financial meetings, seven logistic meetings, twelve general meetings
- 79 terrorists, as documented in Everton (2012) but including also the five "lone wolves" (last five rows)

**Source**

Everton (2012) Disrupting dark networks 34. Cambridge University Press.

---

`plot.manet`*Plotting the output from the multiple allocation clustering.*

---

**Description**

This function plots the output of the manet function.

**Usage**

```
## S3 method for class 'manet'  
plot(x, seed = 1, layout = layout_nicely, ...)
```

**Arguments**

<code>x</code>	A manet object.
<code>seed</code>	Random seed. Default is 1.
<code>layout</code>	Layout of the network from the igraph package. Default is layout_nicely.
<code>...</code>	Additional inputs to the igraph function.

**Value**

An actor-event network with events as round circles and actors as squared circles with the different colours corresponding to the identified communities.

**Examples**

```
data(deepsouth)  
ds<-manet(deepsouth,K=2,maxT=100)  
plot(ds)
```

---

`print.manet`*Printing the output from the multiple allocation clustering*

---

**Description**

This function prints the output of the manet function

**Usage**

```
## S3 method for class 'manet'  
print(x, digits = 3, ...)
```

**Arguments**

x	A manet object.
digits	Number of digits. Default is 3.
...	Additional arguments to the print function.

**Examples**

```
data(deepsouth)
ds<-manet(deepsouth,K=2,maxT=100)
print(ds)
```

---

summary.manet

*Summarising the output from the multiple allocation clustering*

---

**Description**

This function summarises the output of the manet function

**Usage**

```
## S3 method for class 'manet'
summary(object, digits = 3, ...)
```

**Arguments**

object	A manet object.
digits	Number of digits. Default is 3.
...	Additional arguments to the summary function.

**Examples**

```
data(deepsouth)
ds<-manet(deepsouth,K=2,maxT=100)
summary(ds)
```

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