

# Package ‘CollabAssess’

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**Type** Package

**Title** Model For Error-Prone Responses in Network Data to Assess  
Collaboration

**Version** 0.1.0

**Description** This package contains model functions and several simulation examples. (MORE)

**License** GPL-2

**Depends** R (>= 3.2.0), ergm, GGally, ggplot2, gridExtra, sna

**Encoding** UTF-8

**LazyData** true

**RoxygenNote** 6.0.1

**NeedsCompilation** no

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CAgibbs	<i>Gibbs Sampler</i>
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## Description

Gibbs Sampler

## Usage

```
CAgibbs(obs_network, hired, p_prior, q_prior, d = 0.15, burn = 1000,  
        thin = 25, numpostdraws = 1000)
```

**Arguments**

obs_network	The adjacency matrix $A$ of the observed directed network. $A$ is an $n$ by $n$ matrix, where $n$ is the number of nodes. $A_{ij}$ equals 1 if a tie exists between $i$ and $j$ . $A_{ij}$ equals 0 if there is no tie between $i$ and $j$ . $A_{ii}$ equals 0 by default. If fitting collaboration models on multiple time points for the same set of people, $n$ should be the full number of people. Values of obs_network for people who have not been hired by that time will be 0.
hired	An indicator vector of length $n$ indicating whether each person in obs_network had been hired by this point in time.
p_prior	Vector of hyperparameters for the prior Beta distribution of $p$ . Specify both alpha and beta for the Beta(alpha,beta) distribution, e.g. <code>c(2,8)</code> .
q_prior	Vector of hyperparameters for the prior Beta distribution of $q$ . Specify both alpha and beta for the Beta(alpha,beta) distribution, e.g. <code>c(2,8)</code> .
d	The density used for Theta <sub>ij</sub> if $i$ and $j$ both hired by the observed time. If $i$ and/or $j$ not hired, Theta <sub>ij</sub> is zero. Defaults to 0.15, a reasonable network density.
burn	Burn-in period for Gibbs sampler. Defaults to 1000 iterations.
thin	Thinning interval for Gibbs sampler. Defaults to 25 iterations.
numpostdraws	Number of posterior draws to keep. Sampler will run numpostdraws*thin + burn iterations in total, and keep just nonpostdraws. Defaults to 1000 iterations.

**Value**

A list consisting of

p	Matrix (dimension numpostdraws x $n$ ) where each row is vector of $p_i$ 's for a posterior draw.
q	Matrix (dimension numpostdraws x $n$ ) where each row is vector of $q_i$ 's for a posterior draw.
Theta_prop	Proportion of times each tie appears in latent adjacency matrices over all draws. The sum of Theta_all divided by numpostdraws.
Theta_all	List of all latent adjacency matrices.
dens_vec	Vector consisting of the network density for each posterior draw.

**Examples**

```
# This example uses data from Year 1
data(smYr1)
data(smYr1_hire)
year1 <- CAgibbs(smYr1, smYr1_hire, c(2,8), c(2,8), burn=100, thin=5, numpostdraws=100)
# in practice run for longer

colMeans(year1$p_mat) #posterior mean for p (false negative) for each person at time 1
colMeans(year1$q_mat) #posterior mean for q (false positive) for each person at time 1

threshplot(year1$Theta_prop) #latent network only
threshplot(year1$Theta_prop, obs=smYr1) #latent network side by side with observed network
```

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smYr1	<i>Education collaboration ties, year 1.</i>
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**Description**

Adjacency matrix showing education collaboration ties, year 1 (2003-2004 academic year).

**Usage**

```
smYr1
```

**Format**

A matrix with 37 rows and 37 columns

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smYr1_hire	<i>Hire list, year 1.</i>
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**Description**

Indicator vector showing whether or not each person had been hired by year 1 (2003-2004 academic year).

**Usage**

```
smYr1_hire
```

**Format**

A vector with 37 entries.

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threshplot	<i>Threshold plots for posterior latent networks</i>
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**Description**

Threshold plots for posterior latent networks

**Usage**

```
threshplot(w_adj, thresh = 0.1, obs = NULL)
```

**Arguments**

w_adj	Weighted adjacency matrix for latent network (symmetric).
thresh	Threshold (between 0 and 1) for an edge to be plotted. Defaults to 0.1 (i.e., edges appearing in at least 10% of posterior latent networks will be shown).
obs	The adjacency matrix of the observed network on the same vertices as w_adj. Default is NULL. If provided, plots the latent and observed networks side by side.

**Value**

A threshold plot

**Examples**

```
data(smYr1)
data(smYr1_hire)
year1 <- CAgibbs(smYr1, smYr1_hire, c(2,8), c(2,8), burn=100, thin=5, numpostdraws=100)
# in practice run for longer

threshplot(year1$Theta_prop) #latent network only
threshplot(year1$Theta_prop, obs=smYr1) #latent network side by side with observed network
```

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