Package

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Type Package

Title What the Package Does (Title Case)

Version 0.1.0

Author Who wrote it

Maintainer The package maintainer <yourself@somewhere.net>

Description More about what it does (maybe more than one line)
Use four spaces when indenting paragraphs within the Description.

License What license is it under?

Encoding UTF-8

LazyData true

R topics documented:

`ZILGM-package` *A R Package to estimate Local Markov Network for Count data with zero-inflated and overdispersion.*

Description

A R Package to estimate Local Markov Network for Count data with zero-inflated and overdispersion.

Details

Package:	ZILGM
Type:	Package
Version:	1.0
Date:	2019-03-25
License:	GPL-2

Author(s)

Park Beomjin,

Maintainer : Park Beomjin <bbbeomjin@gmail.com>

References

Network analysis for Count data with excess zero

Examples

```
library(devtools)
install_github(bbeomjin/ZILGM)
library(ZILGM)
```

`find_lammax` *Compute the maximum lambda*

Description

Compute the maximum lambda

Usage

```
find_lammax(X)
```

Arguments

`X`	A *n* x *p* data matrix.

Details

Zero-inflated local graphical model

Value

An S3 object with the following slots

`lammax`	a maximum lambda from data matrix

Author(s)

Park Beomjin,

References

Network analysis for Count data with excess zero

Examples

```
Not yet
```

`network_gen` *Generate random graph structure*

Description

Generate random graph structure

Usage

```
generate_network(node, prob)
```

Arguments

`node`	The number of nodes to generate graph.
`prob`	The probability of appearing edges.

Details

For simulated data

Value

`networkmat`	Adjacency matrix for random graph.

Author(s)

Park Beomjin,

References

Network analysis for Count data with excess zeros

See Also

zilgm

Examples

```
require(ZILGM)
```

zilgm *Zero-inflated Local Graphical Model*

Description

Zero-inflated Local Graphical Model

Usage

```
zilgm(X, lambda = NULL, nlambda = 50, family = c("Poisson", "NBI", "NBII"), update_type = c("IRLS", "
           sym = c("AND", "OR"), thresh = 1e-6, weights_mat = NULL, penalty_mat = NULL,
             do_boot = FALSE, boot_num = 10, beta = 0.05, lambda_min_ratio = 1e-4,
                 init_select = FALSE, nCores, ...)
```

Arguments

X	A *n* x *p* data matrix, where *n* is the number of observations and *p* is the number of variables or nodes.
lambda	A sequence of regularization parameter to control a level of *l_1*-penalty.
nlambda	The number of regularization parameter.
family	Types of node-conditional distribution to be assumed among zero-inflated distributions.
update_type	Algorithm for estimating edge coefficients.
sym	Symmetrize the output graphs. If `sym = "AND"`, the edge between node *i* and node *j* is selected only when both node *i* and node *j* are selected as neighbors for each other. If `sym = "OR"`, the edge is selected when either node *i* or node *j* is selected as the neighbor for each other.
thresh	Threshold value for the estimated edge coefficients.
weights_mat	A *n* x *p* matrix containing weights for observations in each node
penalty_mat	A *p* x *p* matrix containing weights for each edge coefficients
do_boot	A logical. Whether to use Stability Apprach to Regularization Selection (StARS).
boot_num	The number of iteration for StARS.
beta	Threshold value on sparsity of the network.
lambda_min_ratio	The smallest value for lambda, as a fraction of the *lambda^max* of the regularization parameter.
init_select	A logical. Whether to use initial selection.
nCores	The number of cores to use for parallel computing.
...	Other arguments that can be passed to neighborhood selection function(`zilgm_poisson, zilgm_negl`

Details

Zero-inflated local graphical model

Value

An S3 object with the following slots

network	a list of p x p matrices of estimated networks along the regularization path.
coef_network	a array of p x p x nlambda of estimated edge coefficients matrix along the regularization path.
lambda	vector used for regularization path.
v	vector of network variability measured for each regularization level.
opt_lambda	The lambda that gives the optimal network.

Author(s)

Park Beomjin,

References

Network analysis for Count data with excess zero

Examples

```
Not yet
```

`zilgm_negbin` *Neiborhood selection under the zero-inflated negative binomial distribution for Zero-inflated Local Graphical Model*

Description

Zero-inflated negative binomial regression with *l_1*-regularization.

Usage

```
zilgm_negbin(y, x, lambda, weights = NULL, update_type = c("IRLS", "MM"), penalty.factor = NULL,
          thresh = 1e-6, EM_tol = 1e-6, EM_iter = 500, tol = 1e-6, maxit = 1e+3, fixed_theta = FALSE)
```

Arguments

y	A response y.
x	A design matrix x.
lambda	A regularization parameter to control a level of *l_1*-penalty.
weights	Weights vector for observations
update_type	Algorithm for estimating coefficients
penalty.factor	Weights vector for coefficients of each variable.
thresh	Threshold value for the estimated coefficients.
EM_tol	Convergence tolerance for EM algorithm.
EM_iter	Maximum number of EM algorithm iterations.
tol	Convergence tolerance for coordinate descent.
maxit	Maximum number of coordinate descent iterations.
fixed_theta	A logical. Whether to estimate dispersion parameter theta.

Details

Zero-inflated local graphical model

Value

An S3 object with the following slots

`beta`	Estimated coefficients vector.
`theta`	Estimated dispersion parameter theta.
`prob`	Estimated probability of structural zero.
`pos_zero`	Indices of zero values.
`iteration`	Iteration numbers until convergence.
`loglik`	*l_1*-penalized negative log-likelihood value.
`call`	The mathced call.

Author(s)

Park Beomjin,

References

Network analysis for Count data with excess zero

`zilgm_negbin2` *Neiborhood selection under the zero-inflated negative binomial II distribution for Zero-inflated Local Graphical Model*

Description

Zero-inflated negative binomial regression with *l_1*-regularization.

Usage

```
zilgm_negbin2(y, x, lambda, weights = NULL, update_type = c("IRLS", "MM"), penalty.factor = NULL,
          thresh = 1e-6, EM_tol = 1e-6, EM_iter = 500, tol = 1e-6, maxit = 1e+3, fixed_sigma = FALSE)
```

Arguments

`y`	A response *y*.
`x`	A design matrix *x*.
`lambda`	A regularization parameter to control a level of *l_1*-penalty.
`weights`	Weights vector for observations
`update_type`	Algorithm for estimating coefficients
`penalty.factor`	Weights vector for coefficients of each variable.
`thresh`	Threshold value for the estimated coefficients.
`EM_tol`	Convergence tolerance for EM algorithm.
`EM_iter`	Maximum number of EM algorithm iterations.
`tol`	Convergence tolerance for coordinate descent.
`maxit`	Maximum number of coordinate descent iterations.
`fixed_sigma`	A logical. Whether to estimate dispersion parameter sigma.

Details

Zero-inflated local graphical model

Value

An S3 object with the following slots

`beta`	Estimated coefficients vector.
`sigma`	Estimated dispersion parameter sigma.
`prob`	Estimated probability of structural zero.
`pos_zero`	Indices of zero values.
`iteration`	Iteration numbers until convergence.
`loglik`	*l_1*-penalized negative log-likelihood value.
`call`	The mathced call.

Author(s)

Park Beomjin,

References

Network analysis for Count data with excess zero

Examples

```
Not yet.
```

`zilgm_poisson` *Neiborhood selection under the zero-inflated Poisson distribution for Zero-inflated Local Graphical Model*

Description

Zero-inflated Poisson regression with *l_1*-regularization.

Usage

```
zilgm_poisson(y, x, lambda, weights = NULL, update_type = c("IRLS", "MM"), penalty.factor = NULL,
              thresh = 1e-6, EM_tol = 1e-6, EM_iter = 500, tol = 1e-6, maxit = 1e+3)
```

Arguments

`y`	A response *y*.
`x`	A design matrix *x*.
`lambda`	A regularization parameter to control a level of *l_1*-penalty.
`weights`	Weights vector for observations
`update_type`	Algorithm for estimating coefficients
`penalty.factor`	Weights vector for coefficients of each variable.

thresh	Threshold value for the estimated coefficients.
EM_tol	Convergence tolerance for EM algorithm.
EM_iter	Maximum number of EM algorithm iterations.
tol	Convergence tolerance for coordinate descent.
maxit	Maximum number of coordinate descent iterations.

Details

Zero-inflated local graphical model

Value

An S3 object with the following slots

beta	Estimated coefficients vector.
prob	Estimated probability of structural zero.
pos_zero	Indices of zero values.
iteration	Iteration numbers until convergence.
loglik	*l_1*-penalized negative log-likelihood value.
z	Estimated latent variable.
call	The mathced call.

Author(s)

Park Beomjin,

References

Network analysis for Count data with excess zero

Examples

```
Not yet
```

`zilgm_sim` *Generate simulation data for zilgm*

Description

Generate simulation data for zilgm

Usage

```
zilgm_sum(A, n, p, zlvs, family = c("poisson", "negbin"),
          signal, theta = NULL, noise, is.symm = TRUE)
```

Arguments

A	p x p adjacency matrix
n	The number of observation to generate simulated data.
p	The number of variables or nodes to generate simulated data.
zlvs	The probability of structural zero for each variable.
family	The distribution to draw samples.
signal	The location parameter for distribution.
theta	The dispersion parameter for negative binomial distribution.
noise	The location parameter for noise distribution.
is.symm	A logical. wheter to generate symmetric matrix.

Details

For simulated data

Value

X	n x p simulated data.

Author(s)

Park Beomjin,

References

Network analysis for Count data with excess zeros

See Also

zilgm

Examples

```
require(ZILGM)
```

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