Package 'GenSynthNetMet'

June 25, 2018

Type Package

Title Utilities to Synthesize Social Networks and Report Metrics

Version 0.1.0

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Description

Utilities include synthesizing social networks based on Myers Briggs Type Indicators (MBTI) and searching for cohorts that produce networks with an realistic set of metrics. A cohort is a collection of MBTI profiles where the number reflects the number of nodes in a real world network. Realistic means that the metrics are closer to the metrics of a real world network than the averaged metrics of 40 randomly generated networks that have the same number of nodes and network density as the real world network. Search functions apply the Monte Carlo (MC) method and a Genetic Algorithm (GA). In both types of search functions, the difference between the averaged metrics of the randomly generated networks and the real world metrics serve as a basis of comparison. Differences between the averaged metrics of 40 MBTI based synthesized and the real world network metrics are calculated and compared to the basis. The MC based synthesizes 40 networks based upon a randomly generated cohort, calculates and averages the metrics and compares the results to the basis. If a cohort is found that beats the basis then that cohort is saved and the process repeats. If another viable cohort is found it is compared to the previously saved cohort. If it performs better then it is save to the list of winning cohorts. The GA search synthesizes populations of cohorts and rank orders the cohorts based upon the number of wins, i.e., metrics where the cohort performed better than the basis of comparison. The two best cohorts provide the starting point for the next generation; which is generated via cross-over methods and mutation. Utility functions support the search functions by generating the networks, calculating the metrics, averaging the metrics, generating comparison tables, and generating reports.

License GPL-2

Encoding UTF-8

LazyData true

RoxygenNote 6.0.1

Imports formattable, igraph

Suggests knitr, rmarkdown

VignetteBuilder knitr

R topics documented:

`avgRandomNetMet` *Average Metrics from Randomly Generated Networks*

Description

Executing this function will randomly generate 40 networks, calculate metrics, store the metrics as columns in a temporary matrix, calculate the means of each row of the matrix, and return the mean metrics.

Usage

```
avgRandomNetMet(n, p)
```

Arguments

n	Number of nodes
p	Probability of link formation for any pair of nodes

Value

A column of mean metrics for 40 randomly generated networks

Examples

```
ravgmet <- avgRandomNetMet(40,0.32)
```

---

avgSynthNetMet *Mean Metrics of Synthesized Social Networks from a matrix of personalities*

Description

Given an assignment of personalities and a compatibility table, this function will synthesize 40 social networks and calculate the mean metrics. This function receives a single column matrix of personalities types and a personality compatibility look up table.

Usage

```
avgSynthNetMet(team, ctbl, netdensity)
```

Arguments

team	A matrix that identifies a set of personality types
ct	A matrix that is a personality compatibility look up table
d	A desired density for the synthesized social networks

Value

A column of mean metrics for 40 synthsized social networks

Examples

```
group <- replicate(10,makeMBTI())
cpat <- read.csv("CustomCompatibilityTable.csv")
savgmet <- avgSynthNetMet(group,cpat,0.32)
```

cachet *Establish an Environment*

Description

Distinguishing mark or seal is one of the definitions of the wor cachet. As an environment within this package, cachet will provide a place to assign global variables within this package's functions.

Usage

```
cachet
```

Format

An object of class `environment` of length 3.

Examples

```
assign("evaluations",lookups, envir=cachet) # Notice the quotes.
assign("rngSeed",.Random.seed,envir=cachet) # Store current random seed
```

calculateMetrics *Calculate Metrics*

Description

Dozens of metrics are available in the igraph package. This function accepts an igraph object and returns a column of metrics for use by the comparison table generator function in this package.

Usage

```
calculateMetrics(socialnetwork)
```

Arguments

`socialnetwork`	An igraph object

Value

A column of metrics

Examples

```
sn <- realnetwork("sociomatrix.txt")   # Read sociomatrix to make a network.
sn.metrics <- calculateMetrics(sn)     # Calculate a set of metrics.
```

compileReport *Compile a Report*

Description

After calculating the metrics of a real world network, means of metrics for a population of randomly generated networks, and means of metrics for a population of personality-based synthesized networks, call this function to compile the results into a report. The data returned by this function can be used by the report table generator in this package.

Usage

```
compileReport(rwmet, mmet1, mmet2)
```

Arguments

rwmet	Real world network metrics
mmet1	Mean metrics of a population of randomly generated networks.
mmet2	Mean metrics for compatibility synthesized network population.

Value

A report suitable for the report table generator.

Examples

```
sn <- realnetwork("sociomatrix.txt")  # Metrics from a real world network
ravgmet <- avgRandomNetMet(40,0.32)   # Mean metrics from random net pop.
savgmet <- socialnetSynthesizer(40,0.32) # Mean metrics
rpt <- compileReport(sn,ravgmet,savgmet)
```

compileSearchComparisonReport *Compile Algorithm Comparison Report*

Description

After generating reports that compare the search algorithms with the randomly generated networks, this function compiles a data.frame that compares the metrics resulting from personality assignments found by the two search algorithms.

Usage

```
compileSearchComparisonReport(fnMC, fnGA, reportTitle)
```

Arguments

fnMC	A file name of a Monte Carlo search results report
fnGA	A file name of a Genetic Algorithm search results report

Value

HTML code that can be written to a file

Examples

```
fnMC <- "../reports/mcRawReport_RobinsBank.txt"
fnGA <- "../reports/gaWeaselRawReport_RobinsBank.txt"
compileSearchComparisonReport(fnMC,fnGA)
```

Dataset_Bernard_Killworth_Office

Bernard_Killworth_Office

Description

A 40x40 symmetric weighted sociomatrix observered by Bernard & Killworth with the help of Sailer.

Usage

```
ds <- as.matrix(read.csv("../data/BernardKillworth_OfficeInteractions.txt", header=FALSE))
```

Format

A plain text tab delimited file with ones and zeros where the ones represent links.

`rows` represent individuals

`columns` represent individuals

Details

This dataset was produced from a file that was downloaded from a repository of data sets maintained by Dr. Linton Freeman.

Source

http://moreno.ss.uci.edu/data.html#bkoff

References

Bernard H. R., Killworth P. and Sailer L. (1980). Informant accuracy in social network data IV. Social Networks, 2, 191-218. Bernard H. R., Killworth P. and Sailer L. (1982). Informant accuracy in social network data V. Social Science Research, 11, 30-66.

Examples

```
ds <- as.matrix(read.csv("../data/BernardKillworth_OfficeInteractions.txt", header=FALSE))
```

`Dataset_Bernard_Killworth_Technical`
Bernard_Killworth_Technical

Description

A 34x34 symmetric weighted sociomatrix observed by Bernard & Killworth with the help of Sailer.

Usage

```
ds <- as.matrix(read.csv("../data/BernardKillworth_Tech_matrix_1.txt", header=FALSE))
```

Format

A plain text tab delimited file with ones and zeros where the ones represent links.

`rows` represent individuals

`columns` represent individuals

Details

Data file was downloaded from a repository of data sets maintained by Dr. Linton Freeman.

Source

http://moreno.ss.uci.edu/data.html#bktec

References

Bernard H. R., Killworth P. and Sailer L. (1980). Informant accuracy in social network data IV. Social Networks, 2, 191-218. Bernard H. R., Killworth P. and Sailer L. (1982). Informant accuracy in social network data V. Social Science Research, 11, 30-66.

Examples

```
ds <- as.matrix(read.csv("../data/BernardKillworth_Tech_matrix_1.txt", header=FALSE))
```

`Dataset_Krackhardt_HighTech_Managers`
Krackhardt_HighTech_Managers

Description

A 21x21 symmetric unweighted sociomatrix developed by Krackhardt based upon data collected from managers withing a high tech company.

Usage

```
ds <- as.matrix(read.csv("../data/KrackhardtMgrsFriendship_matrix_1.txt", header=FALSE))
```

Format

A plain text tab delimited file with ones and zeros where the ones represent links.

`rows` represent individuals

`columns` represent individuals

Details

This dataset was produced from a file that was downloaded from a repository of data sets maintained by Dr. Linton Freeman.

Source

http://moreno.ss.uci.edu/data.html#krackht

References

Krackhardt D. (1987). Cognitive social structures. Social Networks, 9, 104-134.

Examples

```
ds <- as.matrix(read.csv("../data/KrackhardtMgrsFriendship_matrix_1.txt", header=FALSE))
```

Dataset_Krackhardt_Office_CSS

Krackhardt_Office

Description

A 21x21 asymmetric unweighted sociomatrix developed by Krackhardt based upon data collected from office personnel.

Usage

```
ds <- as.matrix(read.csv("../data/Krackhardt_OfficeFriendships_actor2.txt", header=FALSE))
```

Format

A plain text tab delimited file with ones and zeros where the ones represent links.

`rows` represent individuals

`columns` represent individuals

Details

This dataset was produced from a file that was downloaded from a repository of data sets maintained by Dr. Linton Freeman.

Source

http://moreno.ss.uci.edu/data.html#krackoff

References

Krackhardt D. (1987). Cognitive social structures. Social Networks, 9, 104-134.

Examples

```
ds <- as.matrix(read.csv("../data/Krackhardt_OfficeFriendships_actor2.txt", header=FALSE))
```

`Dataset_Krebs_IT_Department_Advice`
Krebs_IT_Department_Advice

Description

A 56x56 asymmetric weighted sociomatrix developed by Valdis Krebs based upon observations of a Fortune 500 Business IT Department.

Usage

```
ds <- as.matrix(read.csv("../data/KrebsITDeptAdvice_matrix_3.txt", header=FALSE))
```

Format

A plain text tab delimited file with ones and zeros where the ones represent links.

`rows` represent individuals

`columns` represent individuals

Details

This dataset was produced from a file that was downloaded from a repository of data sets maintained by Dr. Linton Freeman.

Source

http://moreno.ss.uci.edu/data.html#krebs

References

Chen C (2007) Social networks at Sempra Energy's IT division are key to building strategic capabilities. Global Business and Organizational Excellence 26:16–24

Examples

```
ds <- as.matrix(read.csv("../data/KrebsITDeptAdvice_matrix_3.txt", header=FALSE))
```

`Dataset_Krebs_IT_Department_Business`
Krebs_IT_Department_Business

Description

A 56x56 asymmetric weighted sociomatrix developed by Valdis Krebs based upon observations of a Fortune 500 Business IT Department.

Usage

```
ds <- as.matrix(read.csv("../data/KrebsITDept_matrix_only_1.txt", header=FALSE))
```

Format

A plain text tab delimited file with ones and zeros where the ones represent links.

`rows` represent individuals

`columns` represent individuals

Details

This dataset was produced from a file that was downloaded from a repository of data sets maintained by Dr. Linton Freeman.

Source

http://moreno.ss.uci.edu/data.html#krebs

References

Chen C (2007) Social networks at Sempra Energy's IT division are key to building strategic capabilities. Global Business and Organizational Excellence 26:16–24

Examples

```
ds <- as.matrix(read.csv("../data/KrebsITDept_matrix_only_1.txt", header=FALSE))
```

`Dataset_Lazega_Law_Firm`
Lazega_Law_Firm

Description

A 71x71 asymmetric unweighted sociomatrix based upon a network study of a corporate law firm.

Usage

```
ds <- as.matrix(read.csv("../data/Lazega_LawFirm_matrix_2.txt", header=FALSE))
```

Format

A plain text tab delimited file with ones and zeros where the ones represent links.

`rows` represent individuals

`columns` represent individuals

Details

This dataset was produced from a file that was downloaded from a repository of data sets maintained by Dr. Linton Freeman.

Source

http://moreno.ss.uci.edu/data.html#lazega

References

Emmanuel Lazega, The Collegial Phenomenon: The Social Mechanisms of Cooperation Among Peers in a Corporate Law Partnership, Oxford University Press (2001). Tom A.B. Snijders, Philippa E. Pattison, Garry L. Robins, and Mark S. Handcock. New specifications for exponential random graph models. Sociological Methodology (2006), 99-153.

Examples

```
ds <- as.matrix(read.csv("../data/Lazega_LawFirm_matrix_2.txt", header=FALSE))
```

Dataset_Robins_Australian_Bank

Robins_Australian_Bank

Description

An 11x11 binary asymmetric tab delimited plain text file.

Usage

```
dataset <- as.matrix(read.csv("../data/Robins_Australian_Bank.txt", header=FALSE))
```

Format

A plain text tab delimited file with ones and zeros where the ones represent links.

`rows` represent individuals

`columns` represent individuals

Details

Based upon data gathered by Garry Robins. This dataset was produced from a file that was downloaded from a repository of data sets maintained by Dr. Linton Freeman.

Source

http://moreno.ss.uci.edu/data.html#bank

References

Pattison P., S. Wasserman, G. Robins and A. M. Kanfer. 2000. "Statistical Evaluation of Algebraic Constraints for Social Networks." Journal of Mathematical Psychology, 44: 536-568.

Examples

```
rab <- as.matrix(read.csv("../data/Robins_Australian_Bank.txt", header=FALSE))
```

Dataset_Roethlisberger_Dickson_Wiring_Room

Roethlisberger_Dickson_Wiring_Room

Description

Observations of 14 employees in the Western Electric Hawthorne bank wiring room. A 14x14 plain text symmetric unweighted sociomatrix. Data file was downloaded from a repository of data sets maintained by Dr. Linton Freeman.

Usage

```
ds <- as.matrix(read.csv("../data/HawthornPlant_WiringRoom.txt", header=FALSE))
```

Format

A plain text tab delimited file with ones and zeros where the ones represent links.

`rows` represent individuals

`columns` represent individuals

Source

http://moreno.ss.uci.edu/data.html#wiring

References

Roethlisberger F. and Dickson W. (1939). Management and the worker. Cambridge: Cambridge University Press.

Examples

```
ds <- as.matrix(read.csv("../data/HawthornPlant_WiringRoom.txt", header=FALSE))
```

`Dataset_Sampson_Monastery`
Sampson_Monastery

Description

An 18x18 asymmetric weighted sociomatrix observed by Sampson.

Usage

```
ds <- as.matrix(read.csv("../data/SampsonMonestary_matrix_1.txt", header=FALSE))
```

Format

A plain text tab delimited file with ones and zeros where the ones represent links.

`rows` represent individuals

`columns` represent individuals

Details

This dataset was produced from a file that was downloaded from a repository of data sets maintained by Dr. Linton Freeman.

Source

http://moreno.ss.uci.edu/data.html#sampson

References

Breiger R., Boorman S. and Arabie P. (1975). An algorithm for clustering relational data with applications to social network analysis and comparison with multidimensional scaling. Journal of Mathematical Psychology, 12, 328-383. Sampson, S. (1969). Crisis in a cloister. Unpublished doctoral dissertation, Cornell University.

Examples

```
ds <- as.matrix(read.csv("../data/SampsonMonestary_matrix_1.txt", header=FALSE))
```

`Dataset_Schwimmer_Taro_Exchange`
Schwimmer_Taro_Exchange

Description

A 22x22 symmetric unweighted sociomatrix developed by Schwimmer based upon observations of gift exchanges among housholds in a Papuan village.

Usage

```
ds <- as.matrix(read.csv("../data/Schwimmer_Taro_Exchange.txt", header=FALSE))
```

Format

A plain text tab delimited file with ones and zeros where the ones represent links.

`rows` represent individuals

`columns` represent individuals

Details

This dataset was produced from a file that was downloaded from a repository of data sets maintained by Dr. Linton Freeman.

Source

http://moreno.ss.uci.edu/data.html#taro

References

Hage P. and Harary F. (1983). Structural models in anthropology. Cambridge: Cambridge University Press. Schwimmer E. (1973). Exchange in the social structure of the Orokaiva. New York: St Martins.

Examples

```
ds <- as.matrix(read.csv("../data/Schwimmer_Taro_Exchange.txt", header=FALSE))
```

Dataset_Thurman_Office

Thurman_Office

Description

A 15x15 symmetric unweighted sociomatrix.

Usage

```
ds <- as.matrix(read.csv("../data/Thurman_Office_matrix_2.txt", header=FALSE))
```

Format

A plain text tab delimited file with ones and zeros where the ones represent links.

`rows` represent individuals

`columns` represent individuals

Details

This dataset wase produced from a file that is bundled with the UCINet software.

Source

https://sites.google.com/site/ucinetsoftware/datasets/thurmanoffice

References

Thurman B. (1979). In the office: Networks and coalitions. Social Networks, 2, 47-63.

Examples

```
ds <- as.matrix(read.csv("../data/Thurman_Office_matrix_2.txt", header=FALSE))
```

`Dataset_Webster_Accounting_Firm`
Webster_Accounting_Firm

Description

A 24x24 symmetric weighted sociomatrix observed by C.M. Webster.

Usage

```
ds <- as.matrix(read.csv("../data/WebsterAcctObservedSocial_matrix_1.txt", header=FALSE))
```

Format

A plain text tab delimited file with ones and zeros where the ones represent links.

`rows` represent individuals

`columns` represent individuals

Details

This dataset was produced from a file that was downloaded from a repository of data sets maintained by Dr. Linton Freeman.

Source

http://moreno.ss.uci.edu/data.html#acct

References

Webster, C. M. (1993). Task-related and context-based constraints in observed and reported relational data. Doctoral Dissertation, University of California, Irvine. Webster, C. M. (1995). "Detecting context-based constraints in social perception." Journal of Quantitative Anthropology, 5:285-303.

Examples

```
ds <- as.matrix(read.csv("../data/WebsterAcctObservedSocial_matrix_1.txt", header=FALSE))
```

Dataset_Zachary_Karate_Club *Zachary_Karate_Club*

Description

A 34x34 asymmetric unweighted sociomatrix, observed by Wayne Zachary, of a university karate club.

Usage

```
ds <- as.matrix(read.csv("../data/Zachary_Karate_Club.txt", header=FALSE))
```

Format

A plain text tab delimited file with ones and zeros where the ones represent links.

`rows` represent individuals

`columns` represent individuals

Details

This dataset was produced from a file that was downloaded from a repository of data sets maintained by Dr. Linton Freeman.

Source

http://moreno.ss.uci.edu/data.html#zachary

References

Zachary W. (1977). An information flow model for conflict and fission in small groups. Journal of Anthropological Research, 33, 452-473.

Examples

```
ds <- as.matrix(read.csv("../data/Zachary_Karate_Club.txt", header=FALSE))
```

gaMetricsSearch *Genetic Algorithm Search for Optimum Network Metrics*

Description

Using a real world sociomatrix for comparison, this evolutionary algorithm produces an intial population of sociomatrices and compares the metrics with the metrics of network generated from the real world sociomatrix. A fitness function compares the difference between the metrics and returns a score.

Usage

```
gaMetricsSearch(iSampleSize, iPopSize, fnMat, fnMet, ct, fnStat, fnOpt, fnR,
  fnS, tLimit)
```

Arguments

ct	A personality compatibility look up table
fnStat	A file name for a status report from this search function
fnOpt	A text file with a matrix with the optimum set of personalities
rwmat	A real world sociomatrix

Value

This function does not return anything

Examples

```
cpat <- as.matrix(read.csv("CompatibilityTable.csv")
rbmet <- calculateMetrics(rb)
rgmet <- avgRandomNetMet(rbmet[1],rbmet[4])
gaSearch(1000,"Robins_Bank.txt",cpat,"gaStat.csv","GA_OptSet.csv")
```

---

generateComparisonTable

Generate an Algorithm Comparison Table

Description

The report generator accepts a compiled report, which is produced by another function in this package. This function uses the formatter and format_table functions from the formattable package. The formatted table returned from this function can be written to an HTML file and viewed with a web browser.

Usage

```
generateComparisonTable(rpt, reportTitle)
```

Arguments

rpt	A compiled report with five columns of metrics
reportTitle	The name of the real world social network

Value

HTML code that can be written to a file

Examples

```
sn <- realnetwork("sociomatrix.txt")  # Metrics from a real world network
ravgmet <- avgRandomNetMet(40,0.32)   # Mean metrics from random net pop.
savgmet <- socialnetSynthesizer(40,0.32) # Mean metrics
rpt <- compileReport(sn,ravgmet,savgmet)
dfrmTbl <- generateTable(rpt,"Social Network Name")
fileConn<-file("outputfileName.html")
writeLines(dfrmTbl, fileConn)
close(fileConn)
```

---

generateTable *Generate a Report Table*

Description

The report generator accepts a compiled report, which is produced by another function in this package. This function uses the formatter and format_table functions from the formattable package. The formatted table returned from this function can be written to an HTML file and viewed with a web browser.

Usage

```
generateTable(rpt, reportTitle)
```

Arguments

rpt	A compiled report with five columns of metrics
reportTitle	The name of the real world social network

Value

HTML code that can be written to a file

Examples

```
sn <- realnetwork("sociomatrix.txt")  # Metrics from a real world network
ravgmet <- avgRandomNetMet(40,0.32)   # Mean metrics from random net pop.
savgmet <- socialnetSynthesizer(40,0.32) # Mean metrics
rpt <- compileReport(sn,ravgmet,savgmet)
dfrmTbl <- generateTable(rpt,"Social Network Name")
fileConn<-file("outputfileName.html")
writeLines(dfrmTbl, fileConn)
close(fileConn)
```

InputData_CustomCompatibilityTable_MBTI *Custom Compatibility Table for MBTI*

Description

A Myers Briggs Type Indicator (MBTI) compatibility table. Values in the table represent a likelihood for link formation.

Usage

```
data("InputData_CustomCompatibilityTable_MBTI")
```

Format

Column headers identify MBTI profiles. Rows represent MBTI profiles.

`x,y` a likelihood value for probable link formation

Details

The author developed this compatibility table based upon an analysis of the MBTI profiles described in Dr. David Kiersey's book 'Please Understand Me II'. The analysis invovled identification of work environment factors and assessing whether each MBTI would have a high or low opinion of those factors. Pairwise comparisons identified the number of opinions in common and the percentages of those common opinions were scaled to fit a normal distribution.

References

Keirsey, D. (1998). Please understand me 2. Prometheus Nemesis Book Company.

Examples

```
Refer to the vignettes, which read this data file.
```

InputData_gaMetInputs *gaMetInputs*

Description

A Comma Separated Value file containing parameters and pathnames.

Usage

```
gaMetIns <- as.data.frame(read.csv("../data/gaMetInputs.csv",header=FALSE))
```

Format

Columns are for parameters that define population size and time limit and pathnames for generated results and reports.

`column 1` population size

`column 2` time limit

`column 3` path to a real world sociomatrix

`remaining columns` path names for

Examples

```
Refer to the Genetic Algorithm vignette, which includes code that reads this file.
```

`InputData_mcMeanMetInputs`
mcMeanMetInputs

Description

A Comma Separated Value file containing parameters and pathnames to be used by the Monte Carlo based search function.

Usage

```
mcMetIns <- as.data.frame(read.csv("../data/mcMeanMetInputs.csv",header=FALSE))
```

Format

A CSV file the specifies a time limit, a real world sociomatrix, and pathnames for generated results and reports.

`column 1` time limit

`column 2` a numeric vector

`remaining columns` pathnames for generated results and reports

References

Refer to other sections of this manual for descriptions of the datasets containing real world sociomatrices.

Examples

```
Refer to the Monte Carlo vignette, which includes code that reads this file.
```

makeMBTI *Make an Myers Briggs Type Indicator*

Description

This function constructs an Myers Briggs Type Indicator (MBTI) in accordance with the following table: Extroverts 46.3 iNtuitive 31.9 Thinking 52.9 Judging 58.1 Hammer, Allen L., and Wayne D. Mitchell. "The distribution of MBTI types in the US by gender and ethnic group." Journal of Psychological Type 37 (1996): 2-15.

Usage

```
makeMBTI()
```

makeSociomatrix *Make a Sociomatrix*

Description

Based upon random numbers and a compatibility table, this function makes a symmetric sociomatrix.

Usage

```
makeSociomatrix(a, b, lut, goaldensity)
```

Arguments

a	list of indices for the compatibility table
b	list of indices for the compatibility table
lut	a compatibility table

Value

a matrix

Examples

```
comptable <- as.matrix(read.csv(ctableName))
team <- read.csv("personalityList.csv", header=FALSE)
indices <- match(team,colnames(comptable)
sm <- makeSociomatrix(indices,indices,comptable)
```

mcSearch *Monte Carlo Search for Optimum Personality Assignment*

Description

Using real world and mean metrics of randomly generated networks, this function synthesizes a population of social networks, averages the metrics, and compares the mean metrics with the metrics from the real world network and the randomly generated network population. Results are compiled into a report and a report generator produces an HTML file with a color coded table and a status report of the search.

Usage

```
mcSearch(iSampleSize, fnMat, fnMet, ct, fnStat, fnOpt, fnR, fnS, tLimit)
```

Arguments

iSampleSize	Number of sociomatrices to synthesize for statistics
fnMat	Input real world sociomatrix for comparison.
fnMet	file name for the best metrics found during this search
fnStat	A file name for a status report from this search function
fnOpt	A text file with a matrix with the optimum set of personalities
tLimit	A time limit in number of seconds
lut	A personality compatibility look up table

Value

This function does not return anything

Examples

```
cpat <- as.matrix(read.csv("CompatibilityTable.csv")
rb <- realnetwork("RobinsBank.txt")  # Generate an igraph object
rbmet <- calculateMetrics(rb)
rgmet <- avgRandomNetMet(rbmet[1],rbmet[4])
mcSearch(rbmet,rgmet,cpat,"MC_SearchStatus.csv","OptimumSet.csv")
```

meanSynthNetMet *Mean Metrics of Synthesized Social Networks from a file of personalities*

Description

Given an assignment of personalities and a compatibility table, this function will synthesize 30 social networks and calculate the mean metrics. This function reads a file that contains an assignment of personalities; so, the intent of this function is to work with the optimized assignment.

Usage

```
meanSynthNetMet(fn, fnct, d)
```

Arguments

fn	File name of a file that contains an assignment of personalities
fnct	A file that contains personality compatibility table
d	A desired density for the synthesized social networks

Value

A column of mean metrics for 30 synthsized social networks

Examples

```
ravgmet <- meanSynthNetMet("personalities.csv","compatibilities.csv",0.32)
```

---

realnetwork *A Real Network*

Description

A sociomatrix is a square matrix where each row and column represent a person. A one in a cell at the intersection of a row and column indicates that the two people have some connection. A zero in a cell indicates that the two people do not have a connection. This function reads a sociomatrix and returns a network as an igraph object.

Usage

```
realnetwork(fname)
```

Arguments

fname	Name of a text file containing a sociomatrix.

Value

An iGraph object

Examples

```
sn <- realnetwork("sociomatrix.txt")
```

`setMetricGoals` *Set Goals for the Metrics*

Description

setMetricGoals receives two sets of metrics and calculates one minus the ratio of the difference over the first metrics set.

Usage

```
setMetricGoals(metA, metB)
```

Arguments

`metA`	a set of metrics for a real world network
`metB`	a set of metrics for a random or synthesized network

Index