

Package ‘rgexf’

February 13, 2020

Type Package

Encoding UTF-8

Title Build, Import and Export GEXF Graph Files

Version 0.16.0

Date 2020-02-10

Description Create, read and write 'GEXF' (Graph Exchange 'XML' Format) graph files (used in 'Gephi' and others). Using the 'XML' package, it allows the user to easily build/read graph files including attributes, 'GEXF' visual attributes (such as color, size, and position), network dynamics (for both edges and nodes) and edge weighting. Users can build/handle graphs element-by-element or massively through data-frames, visualize the graph on a web browser through 'gexf-js' (a 'javascript' library) and interact with the 'igraph' package.

URL <https://gvegayon.github.io/rgexf>

BugReports <http://github.com/gvegayon/rgexf/issues>

Imports XML,
igraph,
grDevices,
utils,
servr

License MIT + file LICENSE

LazyLoad yes

RoxygenNote 7.0.2

Suggests knitr,
rmarkdown,
testthat,
covr

VignetteBuilder knitr

Roxygen list(markdown = TRUE)

R topics documented:

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 rgexf-package

Build, Import and Export GEXF Graph Files

Description

Create, read and write GEXF (Graph Exchange XML Format) graph files (used in Gephi and others).

Details

Using the XML package, it allows the user to easily build/read graph files including attributes, GEXF viz attributes (such as color, size, and position), network dynamics (for both edges and nodes) and edge weighting.

Users can build/handle graphs element-by-element or massively through data-frames, visualize the graph on a web browser through "gexf-js" (a javascript library) and interact with the igraph package.

Finally, the functions `igraph.to.gexf` and `gexf.to.igraph` convert objects from igraph to gexf and viceversa keeping attributes and colors.

Please visit the project home for more information: <https://github.com/gvegayon/rgexf>.

Note

See the GEXF primer for details on the GEXF graph format: <https://gephi.org/gexf/1.2draft/gexf-12draft-primer.pdf>

References

- rgexf project site: <https://github.com/gvegayon/rgexf>
- Gephi project site: <https://gephi.org/>
- GEXF project site: <http://gexf.net/>
- gexf-js project website: <https://github.com/raphv/gexf-js>
- Sigmasj project site: <http://sigmajs.org/>

Examples

```
if (interactive()) {  
  demo(gexf) # Example of gexf command using fictional data.  
  demo(gexfattributes) # Working with attributes.  
  demo(gexfbasic) # Basic net.  
  demo(gexfdynamic) # Dynamic net.  
  demo(edge.list) # Working with edges lists.  
  demo(gexffull) # All the package.  
  demo(gexftwitter) # Example with real data of chilean twitter accounts.  
  demo(gexfdynamicandatt) # Dynamic net with static attributes.  
  demo(gexfbuildfromscratch) # Example building a net from scratch.  
  demo(gexfigraph) # Two-way gexf-igraph conversion  
  demo(gexfrandom) # A nice routine creating a good looking graph  
}
```

add.gexf.node

Adding and removing nodes/edges from gexf objects

Description

Manipulates gexf objects adding and removing nodes and edges from both, its dataframe representation and its XML representation.

Usage

```
add.gexf.node(  
  graph,  
  id = NA,  
  label = NA,  
  start = NULL,  
  end = NULL,  
  vizAtt = list(color = NULL, position = NULL, size = NULL, shape = NULL, image = NULL),  
  atts = NULL  
)  
  
add.gexf.edge(  
  graph,
```

```

    source,
    target,
    id = NULL,
    type = NULL,
    label = NULL,
    start = NULL,
    end = NULL,
    weight = 1,
    vizAtt = list(color = NULL, thickness = NULL, shape = NULL),
    atts = NULL,
    digits = getOption("digits")
)

rm.gexf.node(graph, id = NULL, number = NULL, rm.edges = TRUE)

rm.gexf.edge(graph, id = NULL, number = NULL)

add.node.spell(
  graph,
  id = NULL,
  number = NULL,
  start = NULL,
  end = NULL,
  digits = getOption("digits")
)

add.edge.spell(
  graph,
  id = NULL,
  number = NULL,
  start = NULL,
  end = NULL,
  digits = getOption("digits")
)

```

Arguments

graph	A gexf-class object.
id	A node/edge id (normally numeric value).
label	A node/edge label.
start	Starting time period
end	Ending time period
vizAtt	A list of node/edge viz attributes (see write.gexf()).
atts	List of attributes, currently ignored.
source	Source node's id.
target	Target node's id.

<code>type</code>	Type of connection (edge).
<code>weight</code>	Edge weight.
<code>digits</code>	Integer. Number of decimals to keep for nodes/edges sizes. See print.default()
<code>number</code>	Index number(s) of a single or a group of nodes or edges.
<code>rm.edges</code>	Whether to remove or not existing edges.

Details

`new.gexf.graph` Creates a new `gexf` empty object (0 nodes 0 edges).

`add.gexf.node` and `add.gexf.edge` allow adding nodes and edges to a `gexf` object (graph) one at a time. `rm.gexf.node` and `rm.gexf.edges` remove nodes and edges respectively.

In the case of `rm.gexf.node`, by default every edge linked to the node that is been removed will also be removed (`rm.edges = TRUE`).

`add.node.spell` and `add.edge.spell` allow to include spells to specific nodes or edges in a `gexf` object.

Value

A `gexf` object (see [write.gexf\(\)](#)).

Author(s)

George Vega Yon

Jorge Fabrega Lacoa

References

The GEXF project website: <http://gexf.net>

Examples

```
if (interactive()) {  
  demo(gexfbuildfromscratch)  
}
```

check.dpl.edges	<i>Check (and count) duplicated edges</i>
-----------------	---

Description

Looks for duplicated edges and reports the number of instances of them.

Usage

```
check.dpl.edges(edges, undirected = FALSE, order.edgelist = TRUE)
```

Arguments

edges	A matrix or data frame structured as a list of edges
undirected	Declares if the net is directed or not (does de difference)
order.edgelist	Whether to sort the resulting matrix or not

Details

check.dpl.edges looks for duplicated edges reporting duplicates and counting how many times each edge is duplicated.

For every group of duplicated edges only one will be accounted to report number of instances (which will be recognized with a value higher than 2 in the reps column), the other ones will be assigned an NA at the reps value.

Value

A three column data.frame with colnames "source", "target" "reps".

Author(s)

George Vega Yon

See Also

Other manipulation: [switch.edges\(\)](#)

Examples

```
# An edgelist with duplicated dyads
relations <- cbind(c(1,1,3,3,4,2,5,6), c(2,3,1,1,2,4,1,1))

# Checking duplicated edges (undirected graph)
check.dpl.edges(edges=relations, undirected=TRUE)
```

checkTimes	<i>Checks for correct time format</i>
------------	---------------------------------------

Description

Checks time

Usage

```
checkTimes(x, format = "date")
```

Arguments

x	A string or vector char
format	String, can be "date", "dateTime", "float"

Value

Logical.

Author(s)

George Vega Yon
Jorge Fabrega Lacoa

Examples

```
test <- c("2012-01-17T03:46:41", "2012-01-17T03:46:410")
checkTimes(test, format="dateTime")
checkTimes("2012-02-01T00:00:00", "dateTime")
```

edge.list	<i>Decompose an edge list</i>
-----------	-------------------------------

Description

Generates two data frames (nodes and edges) from a list of edges

Usage

```
edge.list(x)
```

Arguments

x	A matrix or data frame structured as a list of edges
---	--

Details

`edge.list` transforms the input into a two-elements list containing a dataframe of nodes (with columns “id” and “label”) and a dataframe of edges. The last one is numeric (with columns “source” and “target”) and based on auto-generated nodes’ ids.

Value

A list containing two data frames.

Author(s)

George Vega Yon

Jorge Fabrega Lacoa

Examples

```
edgelist <- matrix(  
  c("matthew", "john",  
    "max", "stephen",  
    "matthew", "stephen"),  
  byrow=TRUE, ncol=2)  
  
edge.list(edgelist)
```

followers

Edge list with attributes

Description

Sample of accounts by December 2011.

Format

A data frame containing 6065 observations.

Source

Fabrega and Paredes (2012): “La politica en 140 caracteres” en *Intermedios: medios de comunicacion y democracia en Chile*. Ediciones UDP

gexf-class	<i>Creates an object of class gexf</i>
------------	--

Description

Takes a node matrix (or dataframe) and an edge matrix (or dataframe) and creates a gexf object containing a data-frame representation and a gexf representation of a graph.

Usage

```
gexf(
  nodes,
  edges,
  edgesLabel = NULL,
  edgesId = NULL,
  edgesAtt = NULL,
  edgesWeight = NULL,
  edgesVizAtt = list(color = NULL, size = NULL, shape = NULL),
  nodesAtt = NULL,
  nodesVizAtt = list(color = NULL, position = NULL, size = NULL, shape = NULL, image =
    NULL),
  nodeDynamic = NULL,
  edgeDynamic = NULL,
  digits = getOption("digits"),
  output = NA,
  tFormat = "double",
  defaultedgetype = "undirected",
  meta = list(creator = "NodosChile", description =
    "A GEXF file written in R with \"rgexf\"", keywords =
    "GEXF, NodosChile, R, rgexf, Gephi"),
  keepFactors = FALSE,
  encoding = "UTF-8",
  vers = "1.3",
  rescale.node.size = TRUE
)

write.gexf(nodes, ...)
```

Arguments

nodes	A two-column data-frame or matrix of “id”s and “label”s representing nodes.
edges	A two-column data-frame or matrix containing “source” and “target” for each edge. Source and target values are based on the nodes ids.
edgesLabel	A one-column data-frame, matrix or vector.
edgesId	A one-column data-frame, matrix or vector.
edgesAtt	A data-frame with one or more columns representing edges’ attributes.

<code>edgesWeight</code>	A numeric vector containing edges' weights.
<code>edgesVizAtt</code>	List of three or less viz attributes such as color, size (thickness) and shape of the edges (see details)
<code>nodesAtt</code>	A data-frame with one or more columns representing nodes' attributes
<code>nodesVizAtt</code>	List of four or less viz attributes such as color, position, size and shape of the nodes (see details)
<code>nodeDynamic</code>	A two-column matrix or data-frame. The first column indicates the time at which a given node starts; the second one shows when it ends. The matrix or data-frame must have the same number of rows than the number of nodes in the graph.
<code>edgeDynamic</code>	A two-column matrix or data-frame. The first column indicates the time at which a given edge starts; the second one shows when it ends. The matrix or dataframe must have the same number of rows than the number of edges in the graph.
<code>digits</code>	Integer. Number of decimals to keep for nodes/edges sizes. See <code>print.default()</code>
<code>output</code>	String. The complete path (including filename) where to export the graph as a GEXF file.
<code>tFormat</code>	String. Time format for dynamic graphs (see details)
<code>defaultedgetype</code>	“directed”, “undirected”, “mutual”
<code>meta</code>	A List. Meta data describing the graph
<code>keepFactors</code>	Logical, whether to handle factors as numeric values (TRUE) or as strings (FALSE) by using <code>as.character</code> .
<code>encoding</code>	Encoding of the graph.
<code>vers</code>	Character scalar. Version of the GEXF format to generate. By default “1.3”.
<code>rescale.node.size</code>	Logical scalar. When TRUE it rescales the size of the vertices such that the largest one is about \ region.
<code>...</code>	Passed to <code>gexf</code> .

Details

Just like `nodesVizAtt` and `edgesVizAtt`, `nodesAtt` and `edgesAtt` must have the same number of rows as nodes and edges, respectively. Using data frames is necessary as in this way data types are preserved.

`nodesVizAtt` and `edgesVizAtt` allow using visual attributes such as color, position (nodes only), size (nodes only), thickness (edges only) shape and image (nodes only).

- Color is defined by the RGBA color model, thus for every node/edge the color should be specified through a data-frame with columns *r* (red), *g* (green), *b* (blue) with integers between 0 and 256 and a last column with *alpha* values as a float between 0.0 and 1.0.
- Position, for every node, it is a three-column data-frame including *x*, *y* and *z* coordinates. The three components must be float.
- Size as a numeric colvector (float values).
- Thickness (see size).

- Node Shape (string), currently unsupported by Gephi, can take the values of *disk*, *square*, *triangle*, *diamond* and *image*.
- Edge Shape (string), currently unsupported by Gephi, can take the values of *solid*, *dotted*, *dashed* and *double*.
- Image (string), currently unsupported by Gephi, consists on a vector of strings representing URIs.

nodeDynamic and edgeDynamic allow to draw dynamic graphs. It should contain two columns *start* and *end*, both allowing NA value. It can be use jointly with tFormat which by default is set as “double”. Currently accepted time formats are:

- Integer or double.
- International standard *date* yyyy-mm-dd.
- dateTime W3 XSD (<http://www.w3.org/TR/xmlschema-2/#dateTime>).

Value

A gexf class object (list). Contains the following:

- meta : (list) Meta data describing the graph.
- mode : (list) Sets the default edge type and the graph mode.
- atts.definitions: (list) Two data-frames describing nodes and edges attributes.
- nodesVizAtt : (data-frame) A multi-column data-frame with the nodes’ visual attributes.
- edgesVizAtt : (data-frame) A multi-column data-frame with the edges’ visual attributes.
- nodes : (data-frame) A two-column data-frame with nodes’ ids and labels.
- edges : (data-frame) A five-column data-frame with edges’ ids, labels, sources, targets and weights.
- graph : (String) GEXF (XML) representation of the graph.

Author(s)

George Vega Yon

Jorge Fabrega Lacoa

References

The GEXF project website: <http://gexf.net>

See Also

[new.gexf.graph\(\)](#)

Examples

```

if (interactive()) {
  demo(gexf) # Example of gexf command using fictional data.
  demo(gexfattributes) # Working with attributes.
  demo(gexfbasic) # Basic net.
  demo(gexfdynamic) # Dynamic net.
  demo(edge.list) # Working with edges lists.
  demo(gexffull) # All the package.
  demo(gexftwitter) # Example with real data of chilean twitter accounts.
  demo(gexfdynamicandatt) # Dynamic net with static attributes.
  demo(gexfbuildfromscratch) # Example building a net from scratch.
  demo(gexfrandom)
}

```

gexf-methods

S3 methods for gexf objects

Description

Methods to print and summarize gexf class objects

Usage

```

## S3 method for class 'gexf'
print(x, file = NA, replace = F, ...)

## S3 method for class 'gexf'
summary(object, ...)

```

Arguments

x	An gexf class object.
file	String. Output path where to save the GEXF file.
replace	Logical. If file exists, TRUE would replace the file.
...	Ignored
object	An gexf class object.

Details

`print.gexf` displays the graph (XML) in the console. If `file` is not `NA`, a GEXF file will be exported to the indicated filepath.

`summary.gexf` prints summary statistics and information about the graph.

Value

```
list("print.gexf")
      None (invisible NULL).
list("summary.gexf")
      List containing some gexf object statistics.
```

Author(s)

George G. Vega Yon
Joshua B. Kunst

See Also

See also [write.gexf](#), [plot.gexf](#)

Examples

```
if (interactive()) {
  # Data frame of nodes
  people <- data.frame(id=1:4, label=c("juan", "pedro", "matthew", "carlos"),
                      stringsAsFactors=F)

  # Data frame of edges
  relations <- data.frame(source=c(1,1,1,2,3,4,2,4,4),
                        target=c(4,2,3,3,3,4,2,4,1,1))

  # Building gexf graph
  mygraph <- gexf(nodes=people, edges=relations)

  # Summary and print
  summary(mygraph)

  write.gexf(mygraph, output="mygraph.gexf", replace=TRUE)

  # Plotting
  plot(mygraph)
}
```

Description

Using the gexf-js, a JavaScript GEXF viewer, this function allows you to visualize your GEXF on the browser. The function essentially copies a template website, the GEXF file, and sets up a configuration file. By default, the function then starts a webserver using the `servr` R package.

Usage

```

gexf_js_config(
  dir,
  graphFile = "network.gexf",
  showEdges = TRUE,
  useLens = FALSE,
  zoomLevel = 0,
  curvedEdges = TRUE,
  edgeWidthFactor = 1,
  minEdgeWidth = 1,
  maxEdgeWidth = 2,
  textDisplayThreshold = 9,
  nodeSizeFactor = 1,
  replaceUrls = TRUE,
  showEdgeWeight = TRUE,
  showEdgeLabel = TRUE,
  sortNodeAttributes = TRUE,
  showId = TRUE,
  showEdgeArrow = TRUE,
  language = FALSE
)

## S3 method for class 'gexf'
plot(
  x,
  y = NULL,
  graphFile = "network.gexf",
  dir = tempdir(),
  overwrite = TRUE,
  httpd.args = list(),
  copy.only = FALSE,
  ...
)

```

Arguments

<code>dir</code>	Directory where the files will be copied (<code>tempdir()</code> by default).
<code>graphFile</code>	Name of the gexf file.
<code>showEdges</code>	Logical scalar. Default state of the "show edges" button (nullable).
<code>useLens</code>	Logical scalar. Default state of the "use lens" button (nullable).
<code>zoomLevel</code>	Numeric scalar. Default zoom level. At <code>zoom = 0</code> , the graph should fill a 800x700px zone
<code>curvedEdges</code>	Logical scalar. False for curved edges, true for straight edges this setting can't be changed from the User Interface.
<code>edgeWidthFactor</code>	Numeric scalar. Change this parameter for wider or narrower edges this setting can't be changed from the User Interface.

minEdgeWidth	Numeric scalar.
maxEdgeWidth	Numeric scalar.
textDisplayThreshold	Numeric scalar.
nodeSizeFactor	Numeric scalar. Change this parameter for smaller or larger nodes this setting can't be changed from the User Interface.
replaceUrls	Logical scalar. Enable the replacement of Urls by Hyperlinks this setting can't be changed from the User Interface.
showEdgeWeight	Logical scalar. Show the weight of edges in the list this setting can't be changed from the User Interface.
showEdgeLabel	Logical scalar.
sortNodeAttributes	Logical scalar. Alphabetically sort node attributes.
showId	Logical scalar. Show the id of the node in the list this setting can't be changed from the User Interface.
showEdgeArrow	Logical scalar. Show the edge arrows when the edge is directed this setting can't be changed from the User Interface.
language	Either FALSE, or a character scalar with any of the supported languages.
x	An object of class gexf.
y	Ignored.
overwrite	Logical scalar. When TRUE, the default, the function will overwrite all files copied from the template on the destination directory as specified by dir.
httd.args	Further arguments to be passed to <code>servr:httd</code> from the <code>servr</code> package.
copy.only	Logical scalar. When FALSE, the default, the function will make a call to <code>servr::httd</code> .
...	Further arguments passed to <code>gexf_js_config</code>

Details

Currently, the only languages supported are: German (de), English (en), French (fr), Spanish (es), Italian (it), Finnish (fi), Turkish (tr), Greek (el), Dutch (nl).

An important thing for the user to consider is the fact that the function only works if there are `viz` attributes, this is, color, size, and position. If the `gexf` object's XML document does not have `viz` attributes, users can use the following hack:

```
# Turn the object ot igraph and go back
x <- igraph.to.gexf(gexf.to.igraph(x))

# And you are ready to plot!
plot(x)
```

More details on this in the `igraph.to.gexf` function.

The files are copied directly from `/tmp/RtmpOxR4Ff/Rinst13a91598fb66/rgexf/gexf-js`. And the parameters are set up by modifying the following template file:

```
/tmp/RtmpOxR4Ff/Rinst13a91598fb66/rgexf/gexf-js/config.js.template
```

The server is lunched if and only if `interactive() == TRUE`.

References

gexf-js project website <https://github.com/raphv/gexf-js>.

Examples

```
if (interactive()) {  
  
  path <- system.file("gexf-graphs/lesmiserables.gexf", package="rgexf")  
  graph <- read.gexf(path)  
  plot(graph)  
  
}
```

igraph.to.gexf

Converting between gexf and igraph classes

Description

Converts objects between gexf and igraph objects keeping attributes, edge weights and colors.

Usage

```
igraph.to.gexf(igraph.obj, ...)  
  
gexf.to.igraph(gexf.obj)
```

Arguments

igraph.obj	An object of class igraph.
...	Further arguments passed to <code>gexf()</code> .
gexf.obj	An object of class gexf.

Details

If the position argument is not NULL, the new gexf object will include the position viz-attribute.

Value

- For `igraph.to.gexf`: gexf class object
- For `gexf.to.igraph`: igraph class object

Author(s)

George Vega Yon <g.vegayon@gmail.com>

See Also[layout\(\)](#)**Examples**

```

if (interactive()) {
  # Running demo
  demo(gexfigraph)
}

fn <- system.file("gexf-graphs/lesmiserables.gexf", package = "rgexf")
gexf1 <- read.gexf(fn)
igraph1 <- gexf.to.igraph(gexf1)
gexf2 <- igraph.to.gexf(igraph1)

if (interactive()) {
  # Now, let's do it with a layout! (although we can just use
  # the one that comes with lesmiserables :)
  pos <- igraph::layout_nicely(igraph1)
  plot(
    igraph.to.gexf(igraph1, nodesVizAtt = list(position=cbind(pos, 0))),
    edgeWidthFactor = .01)
}

```

`new.gexf.graph`*Build an empty gexf graph*

Description

Builds an empty gexf object containing all the class's attributes.

Usage

```

new.gexf.graph(
  defaultedgetype = "undirected",
  meta = list(creator = "NodosChile", description =
    "A graph file writing in R using 'rgexf'", keywords =
    "gexf graph, NodosChile, R, rgexf")
)

```

Arguments

defaultedgetype "directed", "undirected", "mutual"

meta A List. Meta data describing the graph

Value

A gexf object.

Author(s)

George Vega Yon
Jorge Fabrega Lacoa

References

The GEXF project website: <http://gexf.net>

Examples

```
if (interactive()) {  
  demo(gexfbuildfromscratch)  
}
```

read.gexf	<i>Reads gexf (.gexf) file</i>
-----------	--------------------------------

Description

read.gexf reads gexf graph files and imports its elements as a gexf class object

Usage

```
read.gexf(x)
```

Arguments

x String. Path to the gexf file.

Value

A gexf object.

Note

By the time attributes and viz-attributes aren't supported.

Author(s)

George Vega Yon
Jorge Fabrega Lacoa

References

The GEXF project website: <http://gexf.net>

Examples

```
fn <- system.file("gexf-graphs/lesmiserables.gexf", package = "rgexf")
mygraph <- read.gexf(fn)
```

switch.edges

Switches between source and target

Description

Puts the lowest id node among every dyad as source (and the other as target)

Usage

```
switch.edges(edges)
```

Arguments

edges A matrix or data frame structured as a list of edges

Details

edge.list transforms the input into a two-elements list containing a dataframe of nodes (with columns "id" and "label") and a dataframe of edges. The last one is numeric (with columns "source" and "target") and based on auto-generated nodes' ids.

Value

A list containing two data frames.

Author(s)

George Vega Yon

See Also

Other manipulation: [check.dpl.edges\(\)](#)

Examples

```
relations <- cbind(c(1,1,3,4,2,5,6), c(2,3,1,2,4,1,1))
relations

switch.edges(relations)
```

twitteraccounts	<i>Twitter accounts of Chilean Politicians and Journalists (sample)</i>
-----------------	---

Description

Sample of accounts by December 2011.

Format

A data frame containing 148 observations.

Source

Fabrega and Paredes (2012): “La politica en 140 caracteres” en *Intermedios: medios de comunicacion y democracia en Chile*. Ediciones UDP

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