Building, Importing, and Exporting GEXF Graph Files with rgexf

George G Vega Yon

1 Department of Preventive Medicine, University of Southern California

Summary

First introduced in 2012, the rgexf package for the R programming language was the first effort to make the Graph Exchange XML Format (GEXF) (Heymann et al., 2009) specification available to the R world. With more than 500,000 downloads1, it is one of the most popular ways to incorporate GEXF files into the R programming language environment.

Developed by the Gephi Core Group (Bastian et al., 2009), the GEXF specification is a flexible and widely used format to describe graphs. Although it has not been updated since 2009, the GEXF format has been introduced to several tools and programming environments. A few examples include:

- The python library networkx (Hagberg et al., 2008)
- The stand-alone software Cytoscape (Smoot et al., 2010)
- The JavaScript library sigma.js https://sigma.js
- The java library gexf4j https://github.com/francesco-ficarola/gexf4j
- The JavaScript library gexf-js https://github.com/raphv/gexf-js

Besides the rgexf package, other R packages provide functions that interact with GEXF files:

- sigmajs: Interface to ‘Sigma.js’ Graph Visualization Library (Coene, 2018)
- vkR: Access to VK API via R (Sorokin, 2020)
- microeco: Microbial Community Ecology Data Analysis (Liu et al., 2021)
- netCoin: Interactive Analytic Networks (Escobar & Martinez-Uribe, 2020)

Nevertheless, the rgexf package continues to be the de-facto tool to interact with GEXF files in R.

Statement of Need

This R package has been serving the scientific community for many years now. Scientists and data analysts across the board have been using rgexf to enhance their analyses by smoothly moving between R and other applications used for graph visualization. Some concrete examples include gene networks (Kauffman et al., 2018; Starr et al., 2017), interactions among species (Leclerc et al., 2018), and social networks (Alsaedi et al., 2016).

1According to the https://cranlogs.r-pkg.org/ website, as of June 14, 2021.
Features

Beyond reading and writing GEXF files from within R, the rgexf R package has various other features that can help to create beautiful network visualizations, in particular:

- Using gexf objects—the main class implemented in rgexf—users can create GEXF objects from scratch, adding and removing nodes and edges—including features—as needed.
- Users of the igraph package can directly convert objects between gexf and igraph classes.
- Thanks to the gexf-js javascript library, users can immediately visualize their network objects in the web browser.

Because of these and other reasons, the rgexf package has been featured in many scientific papers, stating the great utility that this R package has provided to the community. The rgexf package is available in the Comprehensive R Archive Network (CRAN) and the project repository at https://github.com/gvegayon/rgexf.

References


