The Journal of Open Source Software

Building, Importing, and Exporting GEXF Graph Files with rgexf

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DOI: 10.21105/joss.03456

Software

- Review
- Repository
- Archive

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Submitted: 13 June 2021
Published: 12 August 2021

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 downloads[1], 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://simga.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).

[1] According 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.

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