Package: statnet (via r-universe)

October 12, 2024

Version 2021.6

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Title Software Tools for the Statistical Analysis of Network Data

Depends R (>= 3.5), ergm (>= 4.0), tergm (>= 4.0)

Imports statnet.common (>= 4.5), network (>= 1.17), networkDynamic(>=
0.11), sna (>= 2.4), tsna (>= 0.3), ndtv (>= 0.13.0),
ergm.count (>= 4.0), ergm.rank (>= 4.0), ergm.ego (>= 0.9),
latentnet (>= 2.10), relevent (>= 1.0-4)

BugReports https://github.com/statnet/statnet/issues

Description This package is designed to make it easy to install and
load key packages from the 'statnet' suite in a single step.
The `statnet` suite is a collection of packages for statistical
network analysis that are designed to work together; they share
common data representations, 'API' design and a uniform user
interface. Together they provide an integrated set of tools
for the exploration, visualization, statistical analysis, and
simulation of many different forms of network data. Learn more
about 'statnet' at <https://www.statnet.org>. Tutorials for
many packages can be found at
<https://github.com/statnet/Workshops/wiki>. For an
introduction to functions in this package, type
help(package='statnet').

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URL https://statnet.org

RoxygenNote 7.1.1

Encoding UTF-8

Repository https://statnet.r-universe.dev

RemoteUrl https://github.com/statnet/statnet

RemoteRef HEAD

RemoteSha 8e86964318d782a2dee3cea30141ba485996bc0d

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statnet-package   *Easily Install and Load the* statnet *Packages for Statistical Network Analysis*

Description

statnet is a collection of software packages for statistical network analysis that are designed to work together, with a common data structure and API, to provide seamless access to a broad range of network analytic and graphical methodology. This package is designed to make it easy to install and load multiple statnet packages in a single step.

Details

statnet software implements advances in network modeling based on exponential-family random graph models (ERGM), as well as latent space models and more traditional descriptive network methods. Together, the set of packages provide a comprehensive framework for "tie-based" network analysis: analyzing the distribution of ties in cross-sectional and dynamic networks. There are tools for description, visualization model estimation, model evaluation, and model-based network simulation. The statistical estimation and simulation functions are based on a central Markov chain Monte Carlo (MCMC) algorithm that has been optimized for speed and robustness.

The code is actively developed and maintained by the statnet development team. New functionality is being added over time.

statnet packages are written in a combination of and C It is can be used interactively from within the graphical user interface via a command line, or in non-interactive (or "batch") mode to allow longer or multiple tasks to be processed without user interaction. The Statnet project uses an open development process for the packages, hosted on GitHub https://github.com/statnet, and contributions can be made via pull requests. Current versions of the packages are available on the Comprehensive R Archive Network (CRAN) at https://www.r-project.org/.

Extensive workshop and training materials are also available online, please see the statnet project website at https://www.statnet.org/ for more information.

The full suite of packages has the following components (those automatically downloaded with the **statnet** package are noted):

For data handling:

- **network** is a package to create, store, modify and plot the data in network objects. The network object class, defined in the **network** package, can represent a range of relational data types and it supports arbitrary vertex / edge /graph attributes. Data stored as network objects can then be analyzed using all of the component packages in the **statnet** suite. (automatically downloaded)

- **networkDynamic** extends **network** with functionality to store information about about evolution of a network over time, defining a `networkDynamic` object class that tracks changes in the status of nodes and links. (automatically downloaded)

For analyzing cross-sectional networks:

- **sna** is a set of tools for traditional social network analysis. (automatically downloaded)
- **ergm** is a collection of functions to fit, simulate from, plot and assess exponential-family random graph models. The main functions within the **ergm** package are `ergm`, a function to fit linear exponential random graph models in which the probability of a graph is dependent upon a vector of graph statistics specified by the user; `simulate.ergm`, a function to simulate random graphs using an ERGM; `mcmc.diagnostics`, a function for assessing model convergence; and `gof`, a function to evaluate the goodness of fit of an ERGM to the data. The package supports the analysis of both binary and continuously valued ties. (automatically downloaded)
- **ergm.count** is an extension to **ergm** enabling it to fit models for networks with ties measured as counts. (automatically downloaded)
- **ergm.rank** is an extension to **ergm** enabling it to fit models for networks with ties measured as ranks. (automatically downloaded)
- **ergm.ego** is an extension to **ergm** enabling it to fit models for networks based on egocentrically sampled network data. (automatically downloaded)
- **latentnet** is a package to fit and evaluate latent position and cluster models for statistical networks The probability of a tie is expressed as a function of distances between these nodes in a latent space as well as functions of observed dyadic level covariates. (automatically downloaded)
- **statnetWeb** is a shiny app that provides access to basic tools from **network**, **sna** and **ergm** for network analysis. This is a great package for teaching an introductory course, or for learning about basic **statnet** functionality in a user-friendly interactive GUI that runs in a web-browser. Running the online version of the app does not require any software to be downloaded or installed. (separate download required)

For temporal (dynamic) network analysis:

- **tsna** is a collection of extensions to **sna** that provide descriptive summary statistics for temporal networks. (automatically downloaded)
- **tergm** is a collection of extentions to **ergm** for fitting discrete time models for temporal (dynamic) networks. Like **ergm**, **tergm** has functions for estimation (`tergm`), and simulation (`simulate.tergm`, and uses the **ergm** functions for model diagnostics and assessment. **tergm** can be used with two different types of discrete temporal network data: a time-series network panel (using conditional maximum likelihood estimation), or a single cross-sectional network with ancillary data on tie duration (using equilibrium generalized method of moments). (automatically downloaded)
- **relevent** is a package providing tools to fit continuous time relational event models. (automatically downloaded)
- **ndtv** is a package for visualizing temporal network data. It renders dynamic network data from 'networkDynamic' objects as movies, interactive animations, or other representations of changing relational structures and attributes. (automatically downloaded)

Additional utilities and packages:

- **statnet.common** provides utilities for all the statnet packages. (automatically downloaded)
- **rle** provides utilities for "run-length-encoded" data. (automatically downloaded)
- **ergm.userterms** provides a template for users who want to write their own new ERGM terms. (separate download required)
- **degreenet** is a package for the statistical modeling of degree distributions of networks. It includes power-law models such as the Yule and Waring, as well as a range of alternative models that have been proposed in the literature. (separate download required)
- **networksis** is a package to simulate bipartite graphs with fixed marginals through sequential importance sampling. (separate download required)
- **EpiModel** is a package for simulating epidemic dynamics. This package provides access to a wide range of epidemic modeling frameworks, with functions for deterministic compartmental models, individual-based models, network models. The network models are based on the **statnet** suite. See the Epimodel Project website for more information https://www.epimodel.org/. (separate download required)

statnet is a metapackage; its only purpose is to provide a convenient mechanism for installing the core packages in the statnet suite. Those can, of course, also be installed individually.

Each package in statnet has associated help files and internal documentation. For the reference paper(s) that provide information on the theory and methodology behind each specific package use the citation("packagename") function in R after loading **statnet**.

We have invested much time and effort in creating the statnet suite of packages and supporting material. We ask in return that you cite it when you use it. For publication of results obtained from **statnet**, the original authors are to be cited as described in citation("statnet"). If you are only using specific package(s) from the suite, please cite the specific package(s) as described in the appropriate citation("packgename"). Thank you!

Author(s)

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| update_statnet | *Update the Core Component Packages of the* **statnet** *Suite* |

Description

A wrapper around update.packages to update the core component packages of the **statnet** Suite to their latest versions.

Usage

```
update_statnet(..., ask = FALSE, checkBuilt = TRUE, betas = FALSE)
```

Arguments

`...`	Additional arguments to be passed to `update.packages`.
`ask, checkBuilt`	Arguments to `update.packages` documentation. The defaults are different from those of that function.
`betas`	Optional repository specification `https://statnet.r-universe.dev` to install the latest public development versions of the packages. Defaults to FALSE.

Details

Updates the core component packages of Statnet Suite, using `setRepositories` and `update.packages`. For the list of packages automatically updated, see `statnet`.

This function should be called immediately after restarting R, since there are no good ways to update packages once they are loaded.

With no additional arguments specified, the function will update the packages from CRAN.

You can also obtain the latest build for the suite of packages from the master branches of the `statnet` public GitHub repositories with the `betas` argument. This will install from the binaries hosted at `https://statnet.r-universe.dev`. Note that while these nightly builds have passed continuous integration tests, they may have other bugs and incompatibilities. Please report any bugs on the GitHub package repository.

Value

`update_statnet` returns NULL invisibly.

See Also

`setRepositories`, `update.packages`, `install.packages`

Examples

```
## Not run:
# Update from CRAN
statnet::update_statnet()

# Update using latest build of GitHub public master branch on r-universe
statnet::update_statnet(betas = TRUE)

## End(Not run)
```

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