In February, two hundred forty-three new packages made it to CRAN, many of them very interesting and at least one entertaining. It was exceptionally difficult to pick the “Top 40”, but here they are, more or less, in eleven categories: Computational Methods, Data, Finance, Games, Genomics, Machine Learning, Mathematics, Medicine, Networks and Graphs, Statistics, Utilities, and Visualization. `iconr` in the Networks and Graphs section is a package for doing computational archaeology, a relatively new field that I hope will dig R. I also hope that `sassy` in the Statistics sections helps some statisticians find their way to R.

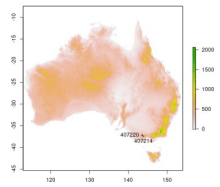
Computational Methods

blaster v1.0.3: Implements an efficient BLAST-like sequence comparison algorithm, written in C++11 and using native R data types. See Schmid et al. (2018) for background and README for an example.

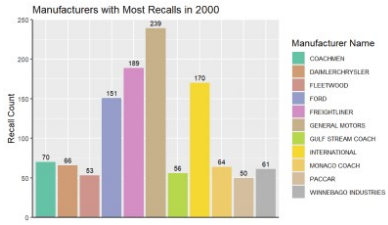
rando v0.2.0: Provides random number generating functions that are much more context aware than the built-in functions. The functions are also safer, as they check for incompatible values, and reproducible.

Data

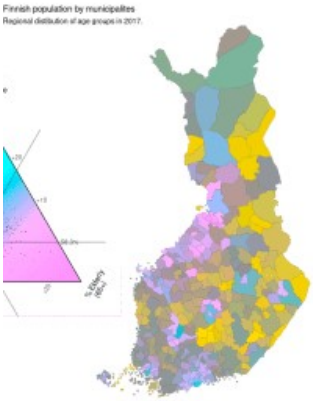
AWAPer 0.1.46: Provides catchment area weighted climate data NetCDF files from the Bureau of Meteorology Australian Water Availability Project for all of Australia. There is a vignette on Daily Area Weighted PET and Precipitation and another on Daily Point Precipitation



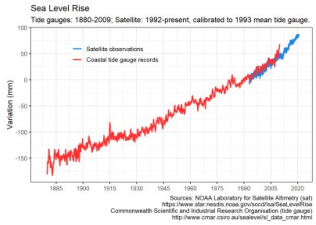
caRecall v0.1.0: Provides API access to the Government of Canada Vehicle Recalls Database used by the Defect Investigations and Recalls Division for vehicles, tires, and child car seats. See the vignette.



geofi v1.0.0: Provides tools for reading Finnish open geospatial data in R. There are vignettes on Datasets, Joining Attributes, Making Maps, Data Manipulation, and Color-coded Maps.



hockeystick v0.4.0: Provides easy access to essential climate change data sets for non-climate experts. Users can download the latest raw data from authoritative sources and view it via pre-defined `ggplot2` charts. Data sets include atmospheric CO2, instrumental and proxy temperature records, sea levels, Arctic/Antarctic sea-ice, and Paleoclimate data. Sources include: NOAA Mauna Loa Laboratory, NASA GISTEMP, National Snow and Sea Ice Data Center, CSIRO, NOAA Laboratory for Satellite Altimetry, and Vostok Paleo carbon dioxide and temperature data. See README for examples.

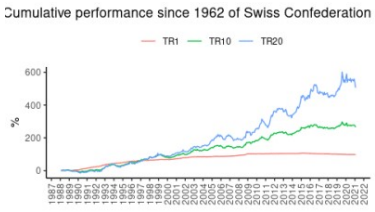


votesmart v0.1.0: Implements a wrapper to the Project VoteSmart API. See the vignette.

Finance

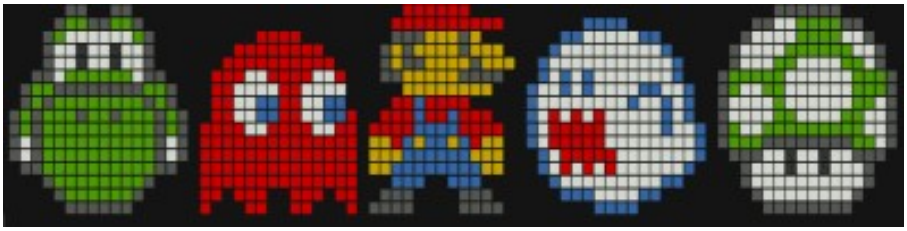
PriceIndices v0.0.3: Provides functions to compute bilateral and multilateral indexes. For details, see: de Haan and Krsinich (2017) and Diewert and Fox (2020). The vignette offers examples.

treasuryTR v0.1.1: Generates Total Returns (TR) from bond yield data with fixed maturity (e.g. reported treasury yields) which may provide an alternative to commercial products. See Swinkels (2019) for background and the vignette for examples.



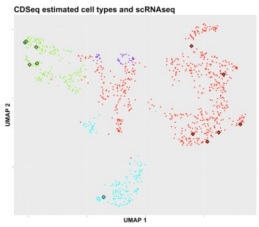
Games

pixelpuzzle v1.0.0: Implements a puzzle game that can be played in the R console. Restore the pixel art by shifting rows. Learn how to play here.

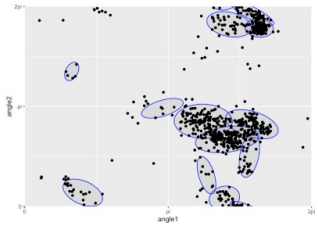


Genomics

CDSeq v1.0.8: Provides functions to estimate cell-type-specific gene expression profiles and sample-specific cell-type proportions simultaneously using bulk sequencing data. See Kang et al. (2019) for the theory and the vignette for examples.



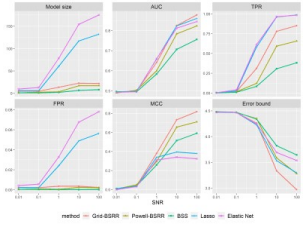
ClusTorus v0.0.1: Provides various tools for clustering multivariate angular data on the torus including angular adaptations of usual clustering methods such as the k-means clustering, pairwise angular distances. See the vignette for examples.



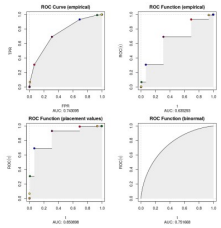
dsb v0.1.0: Provides a method for normalizing and denoising protein expression data from droplet based single cell experiments. See the vignette for tutorials on how to integrate `dsb` with Seurat, Bioconductor and the AnnData class in Python. The preprint Mulè et al. (2020) describes the details.

Machine Learning

besridge v1.0.4: Provides functions to perform ridge regression in complex situations on high dimensional data using the primal dual active set algorithm proposed in Wen et al. (2020). Functions support regression, classification, count regression and censored regression, group variable selection and nuisance variable selection. See the vignette for examples.



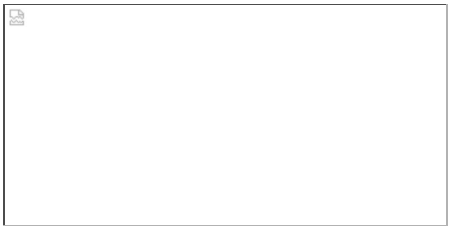
ROCket v1.0.1: Provides functions for estimating receiver operating characteristic (ROC) curves and area under the curve (AUC) calculation which distinguish two types of ROC curve representations: 1) parametric curves – the true positive rate (TPR) and the false positive rate (FPR) are functions of a score parameter and 2) function curves – TPR is a function of FPR. See Gonçalves et al. (2014) and Cai & Pepe (2004) for background and README to get started.



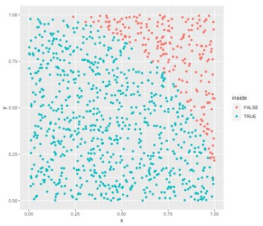
wordpiece v1.0.2: Provides functions to apply Wordpiece tokenization to input text, given an appropriate vocabulary. The BERT tokenization conventions are used by default. See the vignette for an example.

Mathematics

fractD v0.1.0: Estimates the of fractal dimension of a black area in 2D and 3D (slices) images using the box-counting method. See Klinkenberg (1994) for background and the vignette for examples.



spacefillr v0.2.0: Generates random and quasi-random space-filling sequences including Halton, Sobol and other sequences with errors distributed as various types of jittered blue noise. See Joe and Kuo (2018), Christensen et al. (2018) and Heitz et al. (2019) for background and look here for examples.

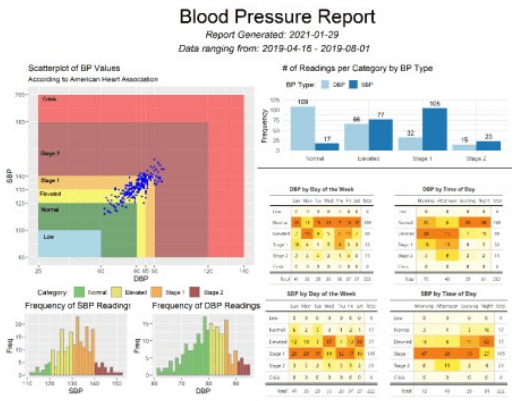


tensorsign v0.1.0: Provides an efficient algorithm for nonparametric tensor completion via sign series. The algorithm which employs the alternating optimization approach to solve the weighted classification problem is described in Lee and Wang (2021)

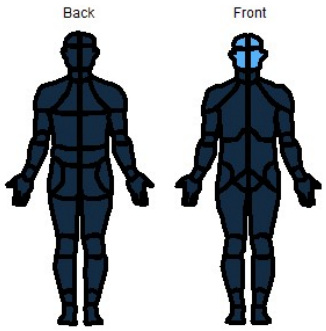
Medicine

bhmbasket v0.9.1: Provides functions to evaluate basket trial designs with binary endpoints using Bayesian hierarchical models and Bayesian decision rules. See Berry et al. (2013), Neuenschwander et al. (2016) and Fisch et al. (2015) for background and the vignette for an example.

bp v1.0.1: Provides functions to aid in the analysis of blood pressure data of all forms by providing both descriptive and visualization tools for researchers. There is a vignette.

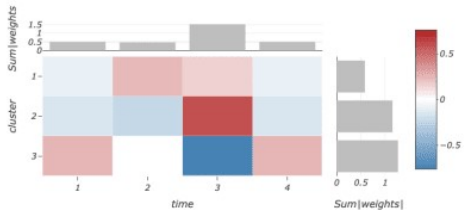


CHOIRBM v0.0.2: Provides functions for visualizing body map data collected with the Collaborative Health Outcomes Information Registry CHOIR). See the vignette.



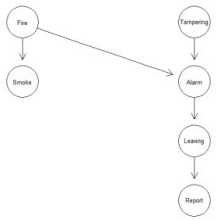
QDiabetes v1.0-2: Calculates the risk of developing type 2 diabetes using risk prediction algorithms derived by ClinRisk. Look here for information and examples.

SteppedPower v0.1.0: Provides tools for power and sample size calculations and design diagnostics for longitudinal mixed models with a focus on stepped wedge designs using methods introduced in Hussey and Hughes (2007) and extensions discussed in Li et al. (2020). See the vignette to get started.



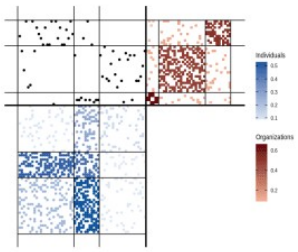
Networks and Graphs

bnmonitor v0.1.0. Implements sensitivity and robustness methods for Bayesian networks including methods to perform parameter variations via a variety of co-variation schemes, to compute sensitivity functions and to quantify the dissimilarity of two Bayesian networks via distances and divergences. See Chan and Darwiche (2002), Cowell et al. (2007), and Goergen and Leonell (2020) for background and README for examples.

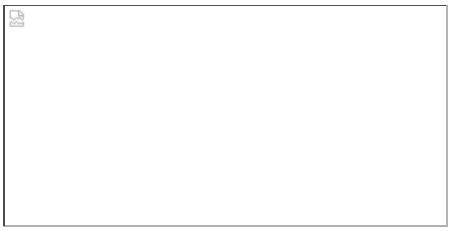


iconr v0.1.0: Provides formal methods for studying archaeological iconographic data sets (rock-art, pottery decoration, stelae, etc.) using network and spatial analysis See Alexander (2008) and Huet (2018) for background and the vignette for examples.

MLVSBM 0.2.1: Provides functions for simulation, inference and clustering of multilevel networks using a stochastic block model framework as described in Chabert-Liddell et al. (2021). There is a tutorial.

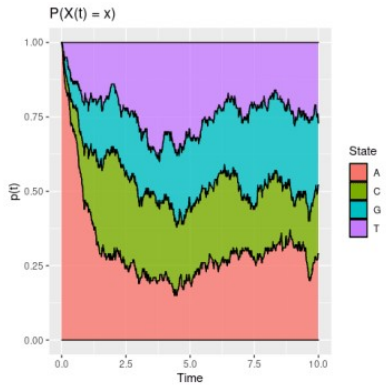


motifr v1.0.0: Provides tools to analyze motifs(small configurations of nodes and edges) in multi-level networks (networks which combine multiple networks in one, e.g. social-ecological networks.) See The motif zoo and Baseline model comparisons.

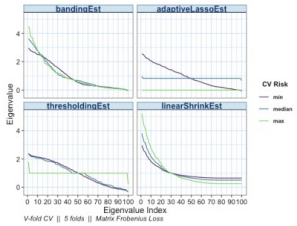


Statistics

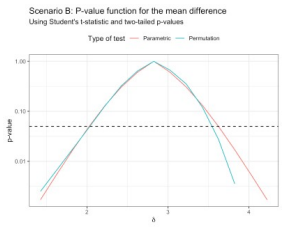
cfda v0.9.9: Provides functions to encode categorical data as functional data and perform basis statistical analysis. See Preda et al. (2020) for background and the vignette to get started.



cvCovEst v0.3.4: Implements an efficient cross-validated approach for covariance matrix estimation, particularly useful in high-dimensional settings. See the vignette for background and examples.



flipr v0.2.1: Implements a permutation framework point estimation, confidence intervals or hypothesis testing for multiple data types. There is a Tour of Permutation Inference, and vignettes on Alternative Hypothesis Testing, the Exactness of Permutation Tests, and Calculating p-value Functions.



ipmr v0.0.1: implements integral projection models using an expression based framework that handles density dependence and environmental stochasticity and provides tools for diagnostics, plotting, simulations, and analysis. See Easterling et al. (2000) for an in depth description of integral projection models. There is an Introduction and vignettes on Age-Size IPMS, Density Dependent IPMS, Hierarchical Notation, and Data Structures.

metapack v0.1.1: Provides functions performing Bayesian inference for meta-analytic and network meta-analytic models through Markov chain Monte Carlo algorithm. See Yao et al. (2015) for the theory, the vignette for an introduction and the online documentation.

sassy v1.0.4: Loads a collection of packages that collectively aim to make R easier for SAS® programmers. Functions bring many familiar SAS® concepts to R, including data libraries, data dictionaries, formats and format catalogs, a data step, and a traceable log. There is an Introduction, and vignettes with example Figures, Listings, and Tables, as well as a few Disclaimers which include a statement indicating that the packages were developed in the context of the pharmaceutical industry but should be generally helpful.

Utilities

gargoyle v0.0.1: Implements an event-Based framework for building `Shiny` apps. Instead of relying on standard `Shiny` reactive objects, this package allow to relying on a lighter set of triggers, so that reactive contexts can be invalidated with more control. See the vignette.

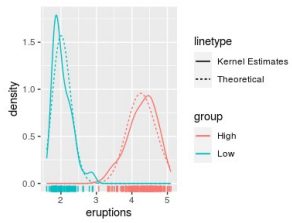
multidplyr Provides simple multicore parallelism through functions that partition a data frame across multiple worker processes. See the vignette.

auarto v0.1: Provides an interface to the Quarto markdown publishing system and allows converting R Markdown documents and Jupyter Notebooks to a variety of output formats.

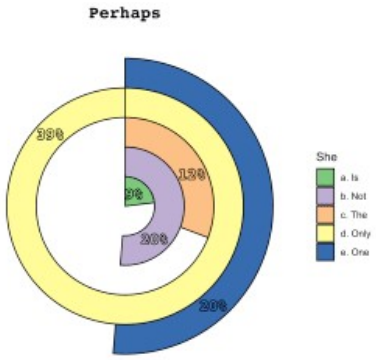
var v0.0.2: Provides functions to manage, provision and use virtual machines pre-configured for R, and develop, test and build package in a clean environment. Vagrant and a provider such as Virtualbox must be installed.

Visualization

ggh4x v0.1.2.1: Extends `ggplot2` facets by setting individual scales per panel, resizing panels, providing nested facets, and allowing multiple colour and fill scales per plot. See the Introduction, and the vignettes Facets, Misc, Position Guides, and Statistics.



tastypie v0.0.3: Provides functions and templates for making pie charts even though you probably shouldn't. See the vignettes available templates and Your favorite template, and look here for examples.



terrainr v0.3.1: Provides functions to retrieve, manipulate, and visualize geospatial data, with an aim towards producing '3D' landscape visualizations in the Unity 3D rendering engine. Functions are also provided for retrieving elevation data and base map tiles from the USGS National Map. There is an Introduction and a vignette on importing terrain tiles.