

Rcmdr Plug-In Package for the EZR (Easy R especially for medical statistics)

Description

This package provides an R Commander plug-in EZR (Easy R), which adds a variety of statistical functions, including survival analyses, ROC analyses, metaanalyses, sample size calculation, and so on, to the R commander. EZR enables point-and-click easy access to a variety of statistical functions as shown below, especially for medical statistics. A report that introduced the investigation of EZR was published in *Bone Marrow Transplantation*

(Nature Publishing Group) as an Open article. This report can be used as a simple manual. It can be freely downloaded from the journal website (URL: <http://www.nature.com/bmt/journal/vaop/ncurrent/pdf/bmt2012244a.pdf>). A complete manual of EZR is available only in Japanese (Chugai Igakusha, ISBN-10: 4498109007, URL: https://www.chugaiigaku.jp/modules/shop/index.php?main_page=product_info&products_id=1241)

Details

Package: RcmdrPlugin.EZR

Type: Package

Version: 1.21

Date: 2014-01-10

License: GPL (≥ 2)

Installation of EZR

RcmdrPlugin.EZR should be installed after the installation of Rcmdr and the other packages that Rcmdr or EZR depends on. Packages that are required by Rcmdr can be installed at the first start-up of R commander. Packages required by EZR can be easily installed at the same time with the installation of EZR by copying and pasting the following command to the R console window after "`>`".

```
install.packages(pkgs="RcmdrPlugin.EZR", dependencies=TRUE)
```

EZR is platform-independent, but only the Windows version of EZR can import Excel, Access, and dBase data set. This function requires "RODBC" package to be installed.

After installation, R commander can be started by the command, `library(Rcmdr)` from the R console. EZR can be loaded by selecting RcmdrPlugin.EZR from the "Tools" > "Load

Rcmdr plug-in(s)" menu. Answer "Yes" to "Restart now?".

On Windows, EZR plugin package will be loaded when R commander is started, if the following sentence is added to the Rprofile.site file in etc folder in the R folder (C:\Program Files\R\R-X.XX.X\etc).

```
options(Rcmdr=list(plugins="RcmdrPlugin.EZR"))
```

In addition, if the following phrase is added to the command in "Target:" column on the "Shortcut" tab of the "Property" of "R" shortcut on the desktop (which can be opened by right-clicking on the shortcut), R commander will start at the same time with launching R.

```
R_DEFAULT_PACKAGES="Rcmdr"
```

Therefore, if these two options were added, EZR can be started just by double-clicking on the "R" shortcut on the desktop.

The default data folder can be changed by right-clicking on this "R" shortcut on the desktop, selecting "Properties", and replacing the folder name in the "Start in:" column on the "Shortcut" tab.

EZR statistical functions

EZR includes following statistical functions.

For discrete variables

- Frequency distributions/cr Confidence interval for a proportion
- One sample proportion test
- Confidence interval for a difference between two proportions
- Confidence interval for a ratio of two proportions
- Compare two proportions (Fisher's exact test and Chi-square test)
- Compare proportions of two paired samples (McNemar test)
- Compare proportions of more than two paired samples (Cochran Q test)
- Cochran-Armitage test for trend in proportions
- Logistic regression

For continuous variables

- Numerical summaries
- Smirnov-Grubbs test for outliers
- Kolmogorov-Smimov test for normal distribution
- Confidence interval for a mean
- Single-sample t-test
- Two-variances F-test
- Two-sample t-test
- Paired t-test

Bartlett's test
One-way ANOVA
Repeated-measures ANOVA
Multi-way ANOVA
ANCOVA
Test for Pearson's correlation
Linear regression

*For nonparametric tests
for continuous variables*

Mann-Whitney U test
Wilcoxon's signed rank test
Kruskal-Wallis test
Friedman test
Jonckheere-Terpstra test
Spearman's rank correlation test

For survival analysis

Kaplan-Meier survival curve and logrank test
Logrank trend test
Cox proportional hazard regression
Cox proportional hazard regression with time-dependent covariate
Cumulative incidence of competing events and Gray test
Fine-Gray proportional hazard regression for competing events

*For diagnostic test
analysis*

Accuracy of qualitative test
Kappa statistics for agreement of two tests
Compute positive and negative predictive values
ROC curve analysis for quantitative test
Compare two ROC curves
Cronbach's alpha coefficient for reliability

*For matched-pair
analysis*

Extract matched controls (This function relies on optmatch package and is limited to academic use.)
Mantel-Haenszel test for matched proportions
Conditional logistic regression for matched-pair analysis
Stratified Cox proportional hazard regression for matched-pair analysis

*For meta-analysis and
meta-regression test*

Meta-analysis and meta-regression test for proportions
Meta-analysis and meta-regression test for means
Meta-analysis and meta-regression test for hazard ratios

*For sample size and
power calculation*

Calculate sample size from control and desired response rates
Calculate sample size from proportion and confidence interval
Calculate sample size or power for comparison with specified proportion
Calculate sample size or power for comparison between two proportions
Calculate sample size for non-inferiority trial of two proportions
Calculate sample size from standard deviation and confidence interval
Calculate sample size or power for comparison between two means
Calculate sample size or power for comparison between two paired means
Calculate sample size or power for comparison between two survival curves

For drawing graphs

Bar graph(Frequencies)
Pie chart(Frequencies)
Stem-and-leaf display
Histogram
Bar graph(Means)
Line graph(Means)
Line graph(Repeated measures)
Boxplot
Dot chart
Ordered chart
Scatterplot
Scatterplot matrix
Adjusted survival curve
Stacked cumulative incidences

*Statistical functions
from original R
commander*

Principal-components analysis
Factor analysis
k-means cluster analysis
Hierarchical cluster analysis
Summarize hierarchical clustering
Add hierarchical clustering to data set
Linear hypothesis
Variance-inflation factor

Breusch-Pagan test for heteroscedasticity
Durbin-Watson test for autocorrelation
RESET test for nonlinearity
Bonferroni outlier test
Basic diagnostic plots
Residual quantile-comparison plot
Component+residual plots
Added-variable plots
Influence plot
Effect plots

Basic operations in EZR

These EZR functions can be started by point-and-click access using the items on the menu bar. See `EZRdialogs` for details. R commander automatically creates and executes corresponding R commands that appear in the "Script window". Results are shown in the "Output window". If any errors or warnings are noted, messages will appear in the "Message window". The created commands can be saved by selecting "File" > "Save script" on the menu bar. The output can be saved by selecting "File" > "Save output". By saving the commands, users can reproduce the analyses and can also share the procedure with the other investigators.

The following EZR functions can be executed by typing the commands in the "Script window" and clicking on the "Submit" button.

Following functions are built to create a formatted table for presentation.

`w.twoway(table, filename)` function copies the results of two-way table analyses to the clipboard or text file.

`w.ttest(table, filename)` function copies the results of t-test to the clipboard or text file.

`w.survival(table, filename)` function copies the results of survival analyses to the clipboard or text file.

`w.ci(table, filename)` function copies the results of cumulative incidence analyses to the clipboard or text file.

`w.multi(table, filename)` function copies the results of multivariate regression analyses to the clipboard or text file.

"table" can be omitted except for logistic regression analysis and Fine & Gray proportional hazard regression analysis, in which "odds" and "crr.table" should be specified for "table" (default is "cox.table" to copy the results of Cox proportional hazard regression analysis).

If "filename" is omitted, the formatted table will be copied to the clipboard, which can be pasted into a spreadsheet.

`Mantel.Byar()` function is for Mantel-Byar test, which should be performed after executing "Cox proportional hazard modeling with time-dependent covariate".

Translations

EZR comes with translations from English into Japanese.

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References

Its complete manual is available only in Japanese (Chugai Igakusha, ISBN-10: 4498109007, URL: https://www.chugaiigaku.jp/modules/shop/index.php?main_page=product_info&products_id=1241), but a report that introduced the

investigation of EZR was published in *Bone Marrow Transplantation*

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Yoshinobu Kanda (2012). Investigation of the freely available easy-to-use software EZR for medical statistics. *Bone Marrow Transplantation*

(Open article, URL: <http://www.nature.com/bmt/journal/vaop/ncurrent/pdf/bmt2012244a.pdf>).

EZR web site: Division of Hematology, Saitama Medical Center, Jichi Medical University.

URL: <http://www.jichi.ac.jp/saitama-sct/SaitamaHP.files/statmedEN.html>