

# Towards a Java Framework for Rapid Development of Graphical User Interfaces for Statistical Applications based on R

Bernd Bischl

Fakultät Statistik, TU Dortmund  
bernd.bischl@uni-dortmund.de

Kornelius Rohmeyer

Institut für Biostatistik, LUH  
rohmeier@biostat.uni-hannover.de

## Abstract

Many users from a non-statistical background are not programmers and often are not up to the task of using R for their statistical problems. Therefore, specific and intuitive applications need to be provided, which hide much of the complexity of the underlying R system, in order to enable the users to solve their problems at hand.

While it is possible to either control R from different programming languages or to interface Java or C++ from R, it is not very efficient to create the above mentioned applications from scratch by any of these alternatives. Because many characteristics are shared, these should also be encapsulated in shared code. Hence we believe that a toolbox is necessary which helps the developers of statistical software to conveniently and flexibly design graphical applications in their area of expertise.

Our open source and platform independent framework, which is implemented in Java and builds upon JRI (<http://www.rforge.net/JRI>) and Rserve (<http://www.rforge.net/Rserve>), aims to achieve that goal by inserting an abstraction layer between the business logic of the application and these two packages. Thereby we can create the same application as a local variant (employing the user's already installed version of R) or as a web oriented application with minimal local requirements (which is automatically installed via Java Webstart and performs all computations on an R server, thus not forcing the user to have R installed at all).

Currently, there are utility classes and respective GUI elements to import data from XLS or CSV files, create dialogs to perform statistical analysis, generate, display and save plots and print output to PDF files. We also provide a basic  $\LaTeX$  support for tables.

Our framework has evolved from two major projects: One application to estimate dose-response models for the University of Copenhagen and one for the Leibniz Universität Hannover to do quality assessment and novel statistical analysis for toxicological data. The last one also includes convenience classes to generate dialogs regarding different assays of toxicology. These elements either act as a tutorial or provide a guided walk through the analysis of the user's own dataset.

In our presentation we will compare our own approach to existing frameworks for building statistical tools based on R by highlighting their general advantages and disadvantages. A short demo of the framework and the look-and-feel of an implemented application will be given. We are looking forward to receiving feedback and discussing further features and improvements with attending researchers, users and developers from the field.