RGG
An XML based GUI Generator for R

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Motivation

- **Typical analysis script includes:**
  - import and data preprocessing (e.g. reading files)
  - statistical interference, plotting, …
  - saving results (plots, tables, report)

- Each developer has his own collection of such R scripts.

- **Goal** → collect scripts in a public database → make them available on a GUI base.
RGG - An XML based GUI Generator for R

- GUI definition language
- GUI engine
- RGG repository
GUI definition language

- A markup language based on XML to describe the GUI.

- Inspired from other GUI markup languages like XUL, HTML

- Predefined GUI tags
  - Basic elements: <textfield>, <listbox>,
  - Complex elements: <matrix>, <mainimporter>

- A GUI is described by adding predefined GUI tags to the R script!

- GUI definition and R code are saved as “.rgg” file.
GUI elements

- Two types of GUI elements:
  - Elements returning R code (e.g. `<matrix>`)  
  - Visual element (e.g. `<h3>`, `<label>`)  
- A GUI element is composed of one or more GUI widgets.
  - e.g. `<filechooser>` has three widgets: a label, a text-field and a button

- Each GUI element defines:
  - What it does (behavior)?
  - What it returns (which R code)?
  - Attributes

- New GUI elements from the community!
GUI Engine

- **GUI engine – how it works**
  - reads .rgg file and draw GUI (in runtime)
  - converts user - GUI interaction to R code
  - returns new R script

- Software library → can be integrated in different tools

- Current implementation in Java using Swing UI toolkit
  Implementation in other languages and for other environments possible.

- RGG is currently available as R package for JGR and as standalone application (RggRunner).
A small example: Fisher‘s Exact Test

\[
data = \text{matrix(c(1,2,3,4), ncol=2)}
\]
\[
fisher.test(data, alternative="greater")
\]

```r
<rgg>
<h3 text="Fisher's Exact Test for Count Data"/>
<matrix var="data"/>
<group>
  <combobox var="x" label="Alternative Hypothesis" items="two.sided, greater, less"/>
</group>
fisher.test(data, alternative=x)
</rgg>
```

```r
data = \text{matrix(c(4,8,3,9), ncol=2)}
x = "two.sided"
fisher.test(data, alternative=x)
```
DEMO

arrayQualityMetrics

Audrey Kauffmann, Wolfgang Huber
BioConductor
Summary and Outlook

- GUI framework for R scripts on base of a common GUI definition language → GUI generation for R scripts as a community issue
- Public repository for R scripts with and without GUI (.r, .rgg) + documentation.
- Standard GUIs for packages, built-in functions, customized analysis scripts → wiki-like documentation system, under development
- RGG can be currently used as an R package for JGR and as a standalone application. In the future, it will be integrated into other softwares.
- Project site: http://rgg.r-forge.r-project.org
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