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.

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RGG - An XML based GUI Generator for R

- GUI definition language

- GUI engine

- RGG repository

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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>, <maimporter>

- A GUI is described by adding predefined GUI tags to the R script!
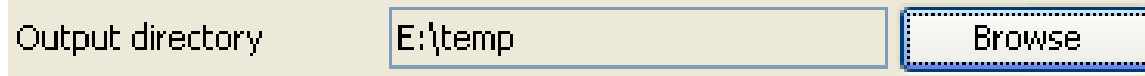
- GUI definition and R code are saved as ".rgg" file.

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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 (behaivor)?
  - ➢ What it returns (which R code)?
  - ➢ Attributes
- **New GUI elements from the community!**
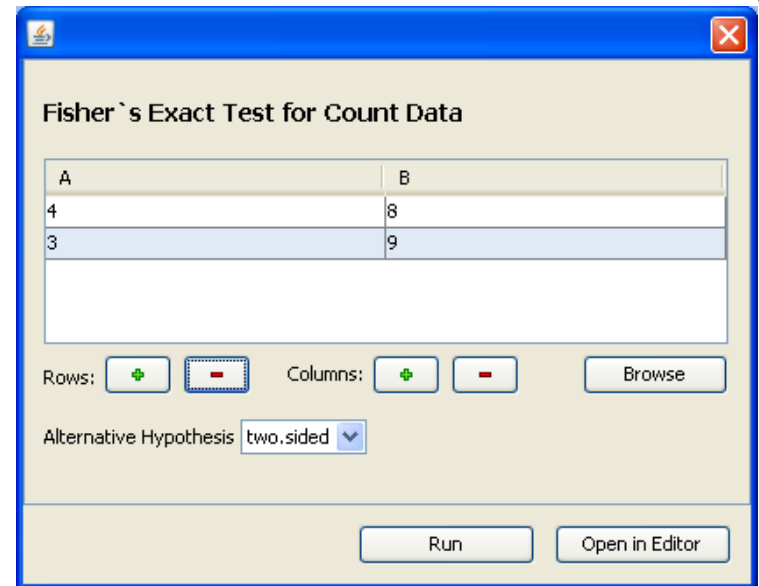
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GUI Engine

- **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).

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A small example: Fisher's Exact Test

```
data=matrix(c(1,2,3,4), ncol=2)
fisher.test(data,alternative="greater")
```

⬇

```xml
<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>
```

Fisher`s Exact Test for Count Data

A	B
4	8
3	9

Rows: [+] [-]   Columns: [+] [-]   [Browse]

Alternative Hypothesis [two.sided ▾]

[Run]   [Open in Editor]

⬇

```
data=matrix(c(4,8,3,9), ncol=2)
x="two.sided"
fisher.test(data,alternative=x)
```

DEMO

arrayQualityMetrics
Audrey Kauffmann, Wolfgang Huber
BioConductor

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Summary and 0utlook

- 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 Rscripts with and without GUI (.r, .rgg) + documentation.

- Standard GUIs for packages, build in functions, customized analysis scripts → wiki like documentation system, under development

- RGG can be currently used as R package for JGR and as standalone application. In the future it will be integrated in other softwares.

- Project site: http://rgg.r-forge.r-project.org

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