

Integrating R into the InfoVis System Visplore

Roland N. Boubela^{1 2} Peter Filzmoser¹ Harald Piringer²

¹Vienna University of Technology
Department of Statistics & Probability Theory

²VRVis Research Center
Vienna, Austria

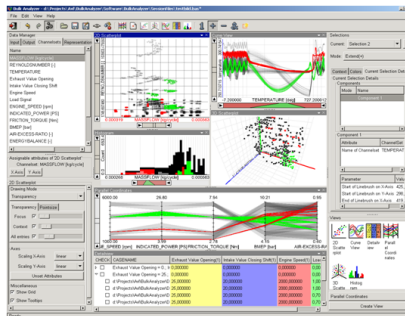
useR!, 2009

Motivation

- ▶ Lack of high performance visual exploratory analysis tools in R
- ▶ Convenient and powerful engine for explorative data analysis
- ▶ Seamless integration of visualization and processing

What is Visplore?

- ▶ Visual Analytics software
- ▶ Generic approach: applicable to analysis of many kinds of data
 - ▶ E.g., CRM-data, telecommunication network parameters, ...



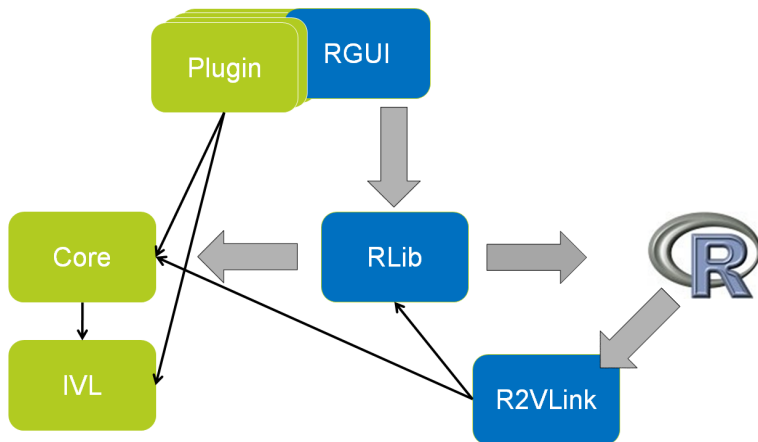
Features

- ▶ Multiple types of views for various data types and tasks
 - ▶ Currently 12 different types of highly parameterizable views
 - ▶ Arbitrary view layout
- ▶ Views linked by interactively defined subsets ("Brushing")
 - ▶ Complex brushes possible by compositing simple brushes via AND / OR / SUB
 - ▶ Different layers for comparison
- ▶ Interactive Optimization and Data Mining
- ▶ Interactively handling very large data (> 1 Mio. rows)
- ▶ System wide Undo- / Redo
- ▶ Support for Windows and Linux

Technical

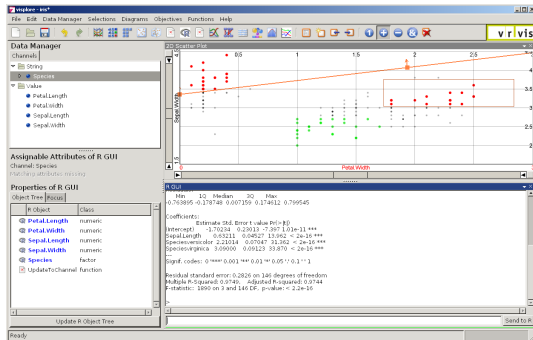
- ▶ Written in C++
- ▶ OpenGL used for rendering
- ▶ gtk+ used for GUI
- ▶ Designed for large data sets
 - ▶ Highly multi-threaded
 - ▶ Quick preview during interaction
 - ▶ Memory management
- ▶ Open architecture
 - ▶ Views / importers / etc. are plugins

Architecture



R integration

- ▶ Console
- ▶ Data synchronization
- ▶ Focus object
- ▶ R scripts
- ▶ Scripting Visplore features



R integration

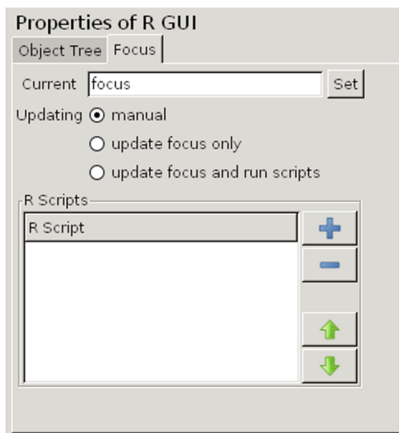
- ▶ Console
- ▶ Data synchronization
- ▶ Focus object
- ▶ R scripts
- ▶ Scripting Visplore features

The screenshot shows the 'Data Manager' window with a tree view of channels. The 'Value' channel is expanded, and a context menu is open over the 'Petal.Length' object. The menu options include 'Create', 'Clipboard', 'Find', 'Collapse All', 'Derived Channel', 'Subfolder', 'Toplevel Folder', and 'Named R Representation'. Below the tree view, the 'Assignable Attributes of R GUI' section shows 'Channel: Petal.Length' and 'Matching attributes missing'. The 'Properties of R GUI' section shows a table of R objects and their classes, with 'Petal.Width' selected. A context menu is also open over 'Petal.Width', showing options like 'Update To Channel', 'Update from Channel', 'Check synchronized', 'Rename', 'Delete', and 'Show and Edit Data'.

R Object	Class
Petal.Length	numeric
Petal.Width	numeric

R integration

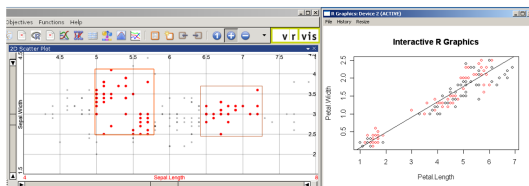
- ▶ Console
- ▶ Data synchronization
- ▶ **Focus object**
- ▶ R scripts
- ▶ Scripting Visplore features



R integration

- ▶ Console
- ▶ Data synchronization
- ▶ Focus object
- ▶ R scripts
- ▶ Scripting Visplore features

```
plot(Petal.Width~Petal.Length, col=focus+1, main="Interactive R Graphics")
abline(lm(Petal.Width~Petal.Length|focus))
```

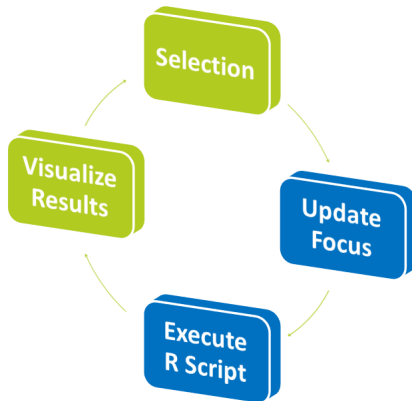


R integration

- ▶ Console
- ▶ Data synchronization
- ▶ Focus object
- ▶ R scripts
- ▶ Scripting Visplore features

```
Petal.Length[focus] = Petal.Length[focus] + 1  
UpdateToChannel(Petal.Length)
```

Interaction loop



Software demo

Future work

- ▶ Tight integration of R graphics into the Visplore system
- ▶ Results of R functions in Visplore views
- ▶ Convenient methods to visualize R results

Thank you for your attention!

Contact *Visplore*:
Harald Piringer hp@vrvis.at
www.vrvis.at