R: Introduction & Trellis Graphics

Christophe Rhodes

August 31, 2010

R

"a free software environment for statistical computing and graphics"

- "free":
  1. you don't have to pay for it;
  2. you are (broadly) free to modify it for your own purposes;
  3. you don't get to whine at the R developers if it doesn't work for you... unless you pay for support.
- "statistical computing"
  1. modelling, tests, time-series analysis, classification, clustering, ...
  2. typical strength: vector computations on large datasets, provided with BLAS and LAPACK (*c.f.* Matlab, Octave, S+, SAS, ...)
- "graphics"
  1. many predefined graphical facilities;
  2. publication-quality output.

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Language Semantics

General features:

- interactive (command-loop)
- lexical scope and reified environments
- implicit vectorization
- pass-by-value (with copy-on-write)
- prototype-based object system
- generic-based object system
- handlers and restarts

Summary:

- weird pseudo-Lisp with odd evaluation rules and ALGOL syntax

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- Emacs Speaks Statistics: `http://ess.r-project.org/`
- Comprehensive R Archive Network: `http://cran.r-project.org/`
- R Journal: `http://journal.r-project.org/`
- StackOverflow: `http://stackoverflow.com/questions/tagged/r`
- RSeek: `http://www.rseek.org/`

Mail / News:

- R help: `r-help@r-project.org` / `gmane.comp.lang.r.general`
- ESS help: `ess-help@stat.math.ethz.ch` / `gmane.emacs.ess.general`

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Trellis Graphics

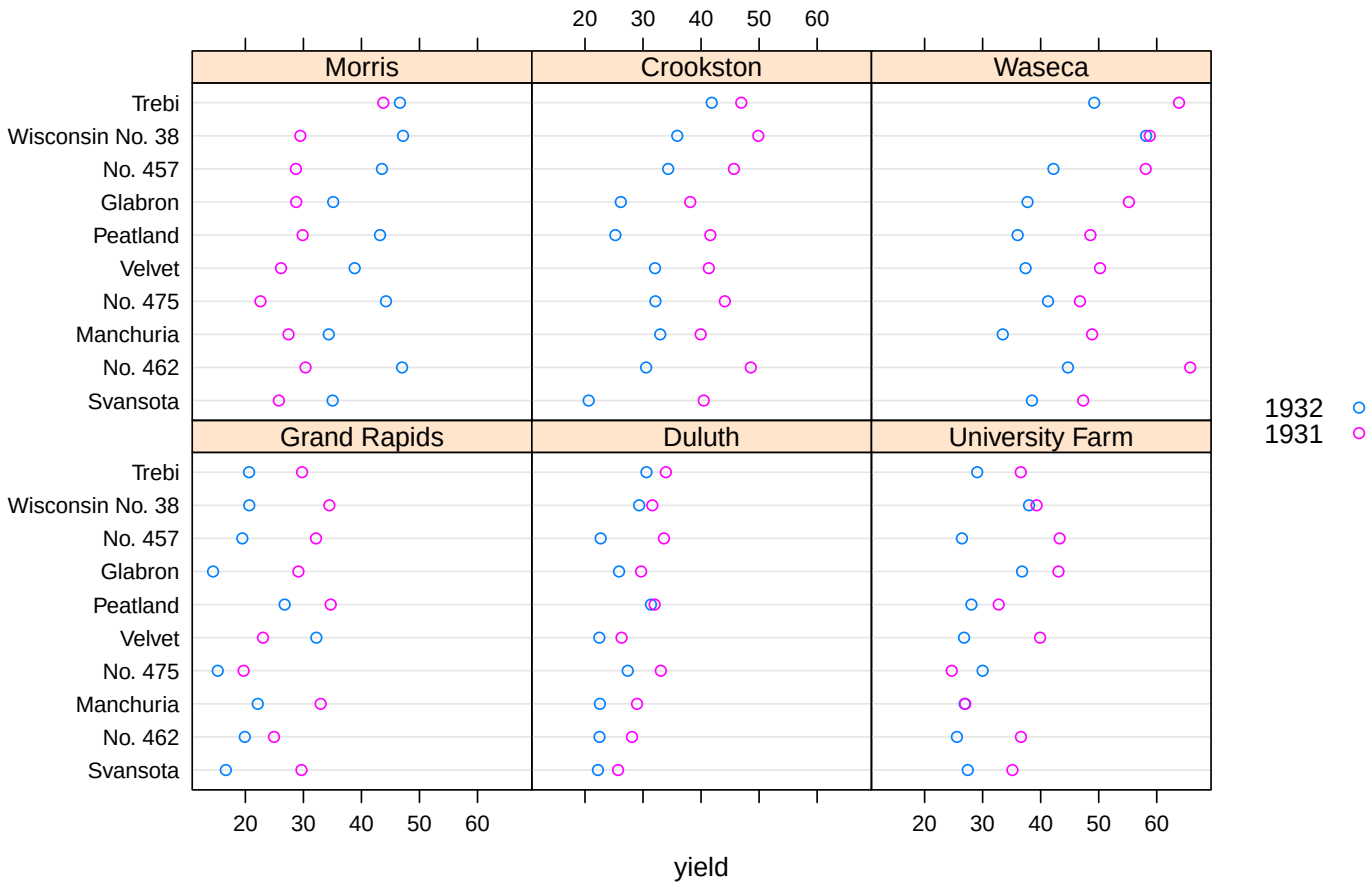
Distinct graphical and graphing system, originally for S+:

- Multipanel Conditioning
- Banking to 45°
- Automation
- Customization

Becker, R. A. and Cleveland, W. S., *S-PLUS Trellis Graphics User's Manual*, Seattle: MathSoft, Inc., Murray Hill: Bell Labs, 1996.

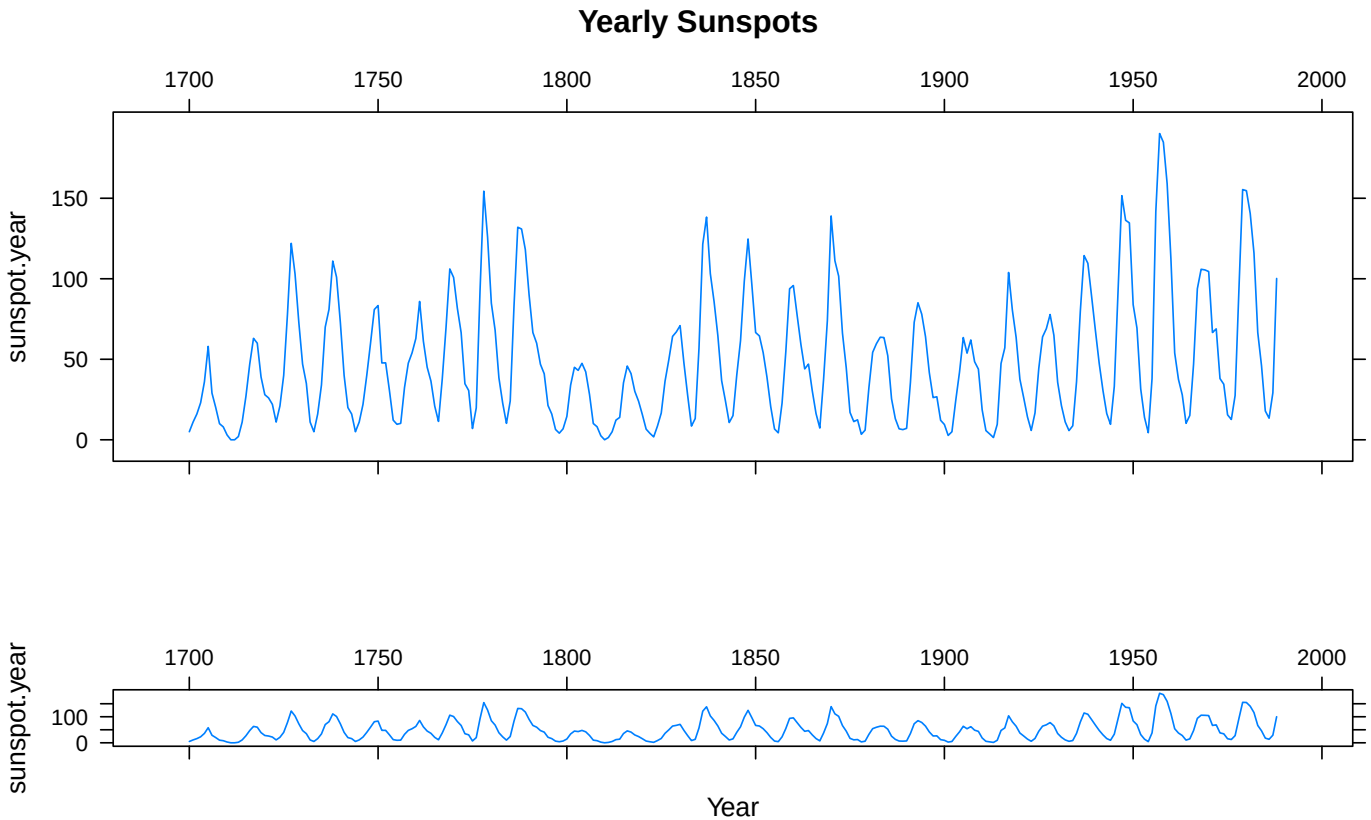
Trellis Graphics

Multipanel Conditioning



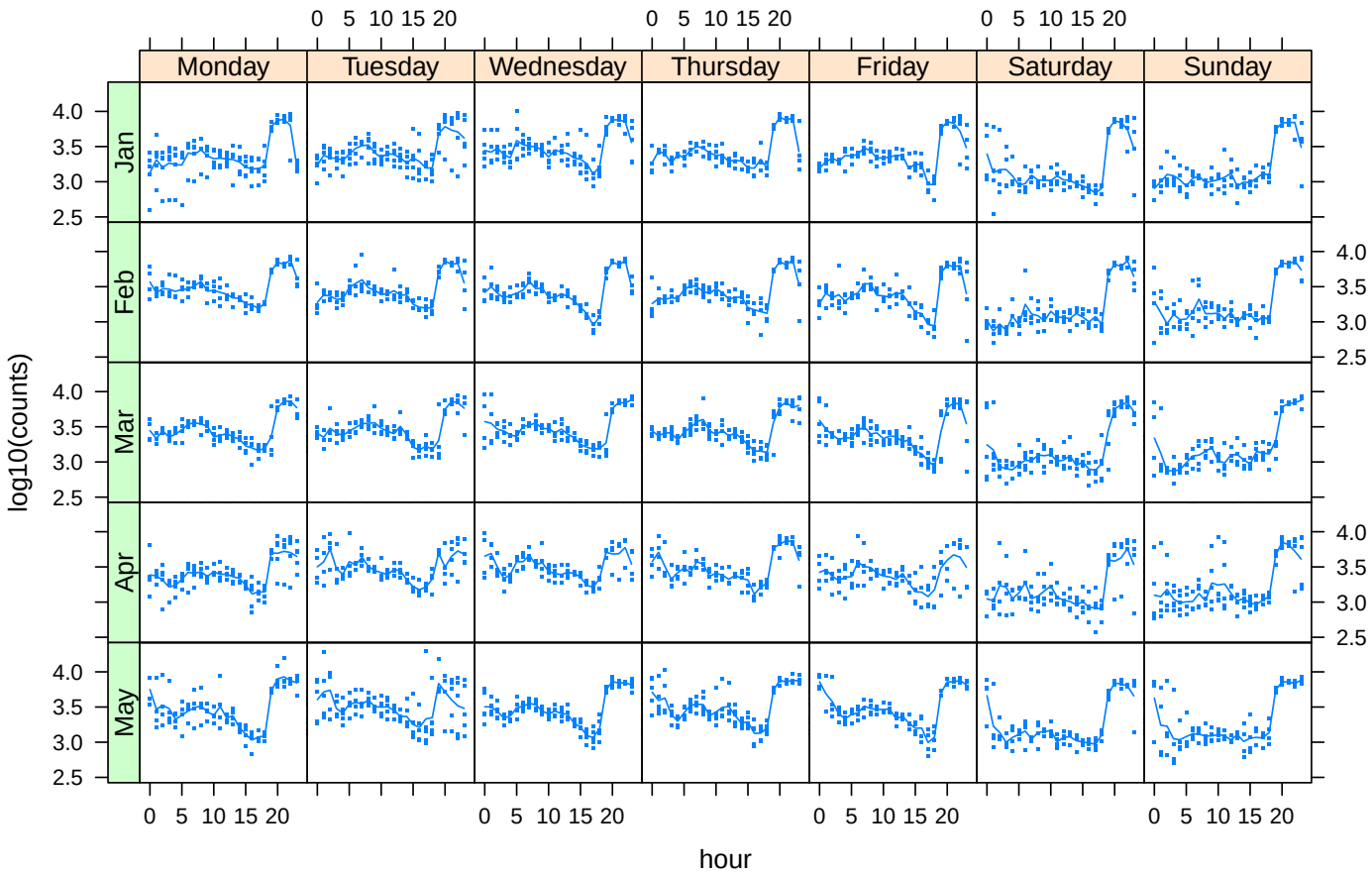
Trellis Graphics

Banking to 45°



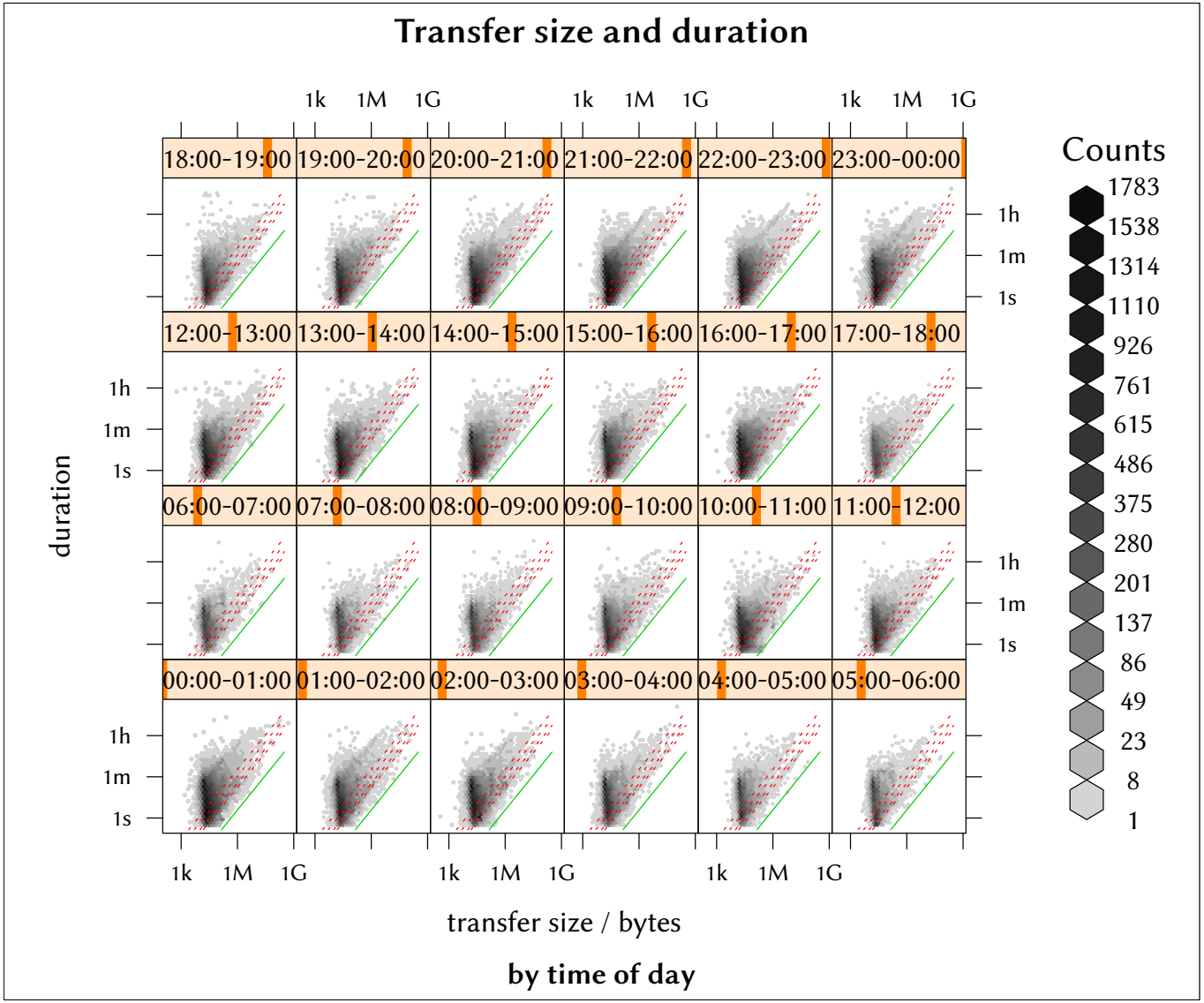
Trellis Graphics

Automation



Trellis Graphics

Customization



Trellis Graphics

Lattice

Implementation of Trellis concepts in R:

- 'high-level' functions: `xyplot`, `bwplot`, `densityplot`
- *panel* functions: `panel.xyplot`, `panel.bwplot`, `panel.densityplot`
- utility functions: `useOuterStrips`, `resizePanels`

Sarkar, D., *Lattice: Multivariate Data Visualization with R*, New York: Springer Science+Business Media, 2008.