e-Workshop

Spatial analysis in 'R'

Spring term 2009

Introduction

Although some GIS include functionality for spatial analysis, many workers in the field are unhappy with these implementations, which do not provide an environment in which innovative new approaches can be developed. Although several systems have been developed, in the research community many now use the R environment. Initially, work at Lancaster used the commercial S+ system, which was then coupled to ArcINFO, but this has subsequently been replaced by use of the public domain R environment. In turn this has been coupled to several GIS, particularly GRASS, and a number of libraries have been developed to facilitate analysis. In addition R is used as a major computing vehicle in many departments of statistics and is taught in at least three UK Masters courses in Geography and GIS. In short, R has become the research environment of choice for advanced spatial statistical analysis. Moreover, through the R community other disciplines are being introduced to GISc 'objects' and how they can be handled, so it forms a useful means of spreading the good word.

In collaboration with the Quantitative Methods Research Group of the Royal Geographical Society (with IBG), the WUN Global GISc Academy will use its Marratech™ desk top collaborative environment to deliver six workshop sessions that collectively will provide a course in the use of R for spatial problems.

For an introduction to R, see

Verzani, John (2005) *Using R for Introductory Statistics*. Chapman & Hall/CRC, Boca Raton, FL, ISBN 1-584-88450-9., a version of which is free at http://cran.r-project.org/doc/contrib/Verzani-SimpleR.pdf. The same site has numerous other R-related resources.

A text dedicated to spatial work is due out in August 2008:

Bivand, Roger S., Pebesma, Edzer J., Gómez-Rubio, Virgilio (2008) *Applied Spatial Data Analysis with R* Approx. 410 p., Softcover, ISBN: 978-0-387-78170-9, (£34.00) and all the code and data used to make the book will be at http://www.asdar-book.org

Target Audience

The workshop has been designed to meet the needs of:

- Faculty wishing to learn about spatial R;
- Beginning PhD and research Masters students who anticipate a need to program spatial analysis in a GIS environment;
- Students on MSc in GIS courses, taking the series as an adjunct to their work;
- Faculty familiar with R wishing to engage with spatial applications.

Pre-requisites

In each case familiarity with standard computing environments will be assumed as will a willingness to work between sessions and familiarity with basic statistical analysis of spatial data. Familiarity with basic concepts of programming will be an advantage, as will an up-to-date knowledge of methods of spatial statistical analysis. Although the workshop is a collaborative venture between WUN and the Quantitative Methods Research Group of the RGS (with IBG), both are agreed that membership of one or the other isn't a necessary condition for attendance.

If you are interested and intend to follow the workshop, then please e-mail to let Dave Unwin know and reserve a place (d.unwin@wun.ac.uk).

Objectives

After completing the workshop, you will be able to

- Drive basic statistical analysis using R commands;
- Use contributed R packages to run more complex spatial analyses;
- Visualize geographic data using appropriate tools;
- Develop R code to perform your own analysis as necessary.

Workshop Environment

The workshop is freely open to all who have an interest and can be accessed from the desk top (time zone permitting) from anywhere in the World. Would-be participants are strongly advised to download the rather 'thick' Marratech™ client and familiarize themselves with its use well ahead of the first session. A web-cam isn't essential and to conserve bandwidth we will ask participants other than the presenter not to use the video channel. We also strongly advise use of a quality noise canceling headset for audio communication. There is a guide to the Marratech™ environment to be used at

http://www.wun.ac.uk/ggisa/documents/pdfs/Seminar_user_guide.pdf

Timings & Schedule

The sessions will be every two weeks, all at 1700GMT as:

Date (2009)	Presenter	Topic
Jan 14th	Rich Harris (Bristol)	**Why R? Using R for geographical research**
Jan 28th	Nick Tate (Leicester)	**Basic statistics in R**
Feb 11th	Roger Bivand (Bergen)	**Handling spatial data in R**
Feb 25th	Edzer Pebesma (Munster)	**Spatial statistical analysis in R**
March 11th	Chris Brunsdon (Leicester)	**Visualization in R and OpenGL**
March 25th	Virgilio Gomez-Rubio (Imperial, London)	**Spatial epidemiology and disease mapping in R**

Dave Unwin
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