Workshop: spatial data analysis

Roger Bivand

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This workshop

- 5/10 10:00-13:00 A partial review of packages covered by recent articles in JSS and RJ and others. Does it help to provide code as supplementary material?
- 5/10 14:30-17:30 Maybe trying out and comparing some of these estimation methods based on the fresh articles and their attached code; open for participants' own suggestions for discussion and attempts to implement workflows

Let's consider some options, then propose some workshop tasks to see how far we get together. Maybe working in several groups in parallel may be helpful; we can switch after lunch too, and report back before we conclude?

Uses

- **CARBayes**: Bayesian Spatial Modeling with Conditional Autoregressive Priors Lee (2013) used in the Australian Cancer Atlas

GIS/R interfaces ?

- **rpostgis**: Linking R with a PostGIS Spatial Database Bucklin and Basille (2018)
- **RQGIS**: Integrating R with QGIS for Statistical Geocomputing Muenchow et al. (2017)
- Chapter 9 in: https://geocompr.robinlovelace.net/

Books

- Advanced Spatial Modeling with Stochastic Partial Differential Equations Using R and INLA

Geostatistics

- **spTest**: Nonparametric Tests of Isotropy Weller (2018)
- **spBayes**: Large Univariate and Multivariate Point-Referenced Spatio-Temporal Data Models Finley et al. (2015)
- **spTimer**: Spatio-Temporal Bayesian Modeling Bakar and Sahu (2015)
- **gstat**: Spatio-Temporal Interpolation Gräler et al. (2016)
- **geoCount**: Analysis of Geostatistical Count Data Jing and Oliveira (2015)

Spatial edidemiology

- **SpatialEpiApp** and **SpatialEpi**: Small Area Disease Risk Estimation and Visualization Moraga (2018)
- **EpiModel**: Mathematical Modeling of Infectious Disease over Networks Jenness et al. (2018)

Spatio-temporal

- Probabilistic Forecasting of Thunderstorms in the Eastern Alps Simon et al. (2018)
- **BAMLSS**: Bayesian Additive Models for Location, Scale, and Shape Umlauf et al. (2018)
- **surveillance**: Spatio-Temporal Analysis of Epidemic Phenomena Meyer et al. (2017)
- **CARBayesST**: Spatio-Temporal Areal Unit Modeling in R with Conditional Autoregressive Priors Lee et al. (2018)

- **glmmTMB**: Speed and Flexibility for Zero-inflated Generalized Linear Mixed Modeling Brooks et al. (2017)
- **brms**: Advanced Bayesian Multilevel Modeling Bürkner (2018), Bürkner (2017)

Spatial econometrics

- Estimation of spatial autoregressive models with measurement error for large data sets Suesse (2018a)
- Computational aspects of the EM algorithm for spatial econometric models with missing data Suesse and Zammit-Mangion (2017)
- Marginal maximum likelihood estimation of SAR models with missing data Suesse (2018b)

Spatial survival

- **spatsurv**: Bayesian Inference with Spatial Survival Models Taylor and Rowlingson (2017)
- **spBayesSurv**: Bayesian Modeling and Analysis of Spatially Correlated Survival Data Haiming Zhou and Timothy Hanson

R's sessionInfo()

```
> sessionInfo()

## R version 3.5.1 (2018-07-02)
## Platform: x86_64-pc-linux-gnu (64-bit)
## Running under: Fedora 28 (Workstation Edition)
##
## Matrix products: default
## BLAS: /home/rsb/topics/R/R351-share/lib64/R/lib/libRblas.so
## LAPACK: /home/rsb/topics/R/R351-share/lib64/R/lib/libRlapack.so
##
## locale:
##  [1] LC_CTYPE=en_GB.UTF-8
##  [2] LC_NUMERIC=C
##  [3] LC_TIME=en_GB.UTF-8
##  [4] LC_COLLATE=en_GB.UTF-8
##  [5] LC_MONETARY=en_GB.UTF-8
##  [6] LC_MESSAGES=en_GB.UTF-8
##  [7] LC_PAPER=en_GB.UTF-8
##  [8] LC_NAME=C
##  [9] LC_ADDRESS=C
## [10] LC_TELEPHONE=C
## [11] LC_MEASUREMENT=en_GB.UTF-8
## [12] LC_IDENTIFICATION=C
##
## attached base packages:
## [1] stats     graphics  grDevices utils
## [5] datasets  methods   base
##
```