OpenSpat, spread the spatial wor(l)d

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The project

OPEN SPAT

- Building a learning module on spatial data analysis, based on open and freely available tools
- Focus on practice and peer-learning
The project

OPEN SPAT

Erasmus+

- Three partners
  - Liege University
  - Montpellier SupAgro
  - University of Lisboa

- Funded by
  - Erasmus+ Key Action 2
  - Strategic Partnerships for adult education
Why?

- Increasing availability of data

- Growing set of applications
Need for skills

Need for skills and tools to

- access
- extract
- explore
- analyse such data.

Choice of open-source and freely available dedicated tools

- R
- QGIS

⇒ increase the potential impact and ease the spreading
Learning modules

Goal: analyze and interpret spatial data

1. Online prequel module
2. Face to face sessions

- Access and manipulate spatial data
- Spatial autocorrelation - variogram - variance estimation
- Introduction to linear model
- Regression over spatially autocorrelated variables
- Variogramme - Kriging
- Pattern recognition with spatial constraints: clustering and classification
Prequel Online Course

- Introduction for the OpenSpat project
- Overview of the contents of the face to face sessions
- Link with QGIS community (exchanges between QGIS and R)
Face to face sessions

- **Standard day schedule**
  - **AM**: background theory and technical introduction to the associated tools with small examples
  - **PM**: real-size case studies in peer learning
**Tools**

- **R markdown documents**
  - illustrated with examples, *R* commands and *R* outputs

  **Calibration of the Model Variogram**

  To choose the best model between the list of possible models, a visual inspection is often enough but some statistical criteria like AIC or the weighted Sum of Squares (WSS) are also used.

  To go further, **WSS mathematical definition**:

  \[
  WSS = \sum_{k=1}^{K} w(h_k) [\gamma(h_k) - \gamma(h_k)]^2
  \]

  where \(2\gamma(h_k)\) and \(2\gamma(h_k)\) are respectively the experimental and the model variogram values for sites separated by a lag/distance \(h_k\).

  The weight, \(w(h_k)\), is usually proportional to the number of site pairs at lag \(h_k\).

- add interactivity in the provided support documents for future reference and reproducibility
Tools

- Implementation of the course with free software scenario

- Plickers: create interactivity during the lesson
Test drive and evaluation

On this first session, 14 participants were chosen from the three different partners (young researchers and PhD students)

- different countries (France, Portugal, Belgium)
- different backgrounds (geomatics, agronomy, forestry,...)

They were assigned surveys about

- contents and organisation of the courses
- motivation and self-efficacy

after the prequel online module and the 3 face to face modules.
Student self-efficacy

- I'm confident in my abilities to resolve autonomously a problem of spatial data at the end of this course
- At the end of this learning module, I feel much more efficient in this field
- I'm confident in my abilities to choose the right method for analyzing my spatial data at the end of this course
Student heterogeneity as an asset

- You appreciated to work collaboratively with your peers
- Interact with peers increased your motivation to learn
- You have benefited from interacting with your peers
- Have peers coming from different countries is source of motivation
Open source tools

Open source and/or freely available tools like

- facilitate the delimitation of technical prerequisites (as everybody can install and learn the basics before the course)
- ease the exchange between participants
- tons of dedicated packages (sometimes confusing)
- lead to a better take home follow up (as everybody will be able to practice the tools once the course is over)
What’s next

- Improvement of the content and organisation based on 1st session surveys
  - Clearer outline of the prequel module
  - Reorganisation of the content sequence
  - Update of the written supports

- Next year session
  - held in one place (Gembloux Agro-Bio Tech, Belgium)
  - two weeks session
  - blended learning (online support and free group work assignements)

More information on the dedicated website

http://www.openspat.eu