

Faculty of Humanities
AGH University of Science and Technology
Academic Year 2016/2017

Academic field: Sociology

1. Subject title: Analysis and Visualization of Event Data

2. Subject duration: 30 hrs.

3. Lecturer: Prof. Bohdan Yuskiv, PhD (yuskivbm@gmail.com)

4. Classes form: lecturing + laptop-based laboratory works

5. Objective:

introducing students to analysis and visualization of events

6. Subject requirements:

- knowledge of the subject-related basics (statistics and related methods),
- PC user knowledge,
- no more than 15 persons per group,
- Internet access is required.

7. Subject results:

- students will get knowledge in data visualization and analysis, characterizing basics of visualization processing, describing the visualizing event data,
- students will use new methods in the R language to perform deep data analysis and visualization of event,
- students will be able to obtain additional information from the data using scientific approach.

8. Subject contents with specific classes:

LECTURES:

1. Introduction to data visualization. An overview of visualization types and visualization processes. Stages of visualizing event data (2 hrs.)
2. The Base Graphics system in R. Univariate and multivariate plots. Customizing graphs and saving them in various formats (3 hrs.)
3. The Lattice Graphics in R. Exploring multivariate event data with trellis graphs (2 hrs.)
4. A comprehensive system for graph development with the ggplot2 in R (2 hrs.)
5. Event data and Interactive Graphics in R (2 hrs.)
6. Event data and Google Chart Tools in R (2 hrs.)
7. Case Study: Visualizing Categorical Data (2 hrs.)

LABORATORY WORKS (based on examples of the event data visualization)

1. Introduction to R as a statistical programming language. R installation (3 hrs.)
2. The Base Graphics system in R. Univariate and multivariate plots. Customizing graphs and saving them in various formats (3 hrs.)
3. The Lattice Graphics in R. Exploring multivariate event data with trellis graphs (2 hrs.)
4. A comprehensive system for graph development with the ggplot2 in R (2 hrs.)
5. Event data and Interactive Graphics in R (2 hrs.)

6. Event data and Google Chart Tools in R (2 hrs.)
7. Case Study: Visualizing Categorical Data (2 hrs.)

PROGRAMS / SUBJECT TOOLS:

- R
- RStudio
- R packages

9. Literature

9.1. Recommended reading

1. Alain F.Zuur, Elena N.Ieno, Erik H.W.G.Meerters, *A Beginner's Guide to R*, Springer 2009
2. Crawley Michael J., *The R Book*, John Wiley & Sons Ltd 2007
3. *Data Visualization* / Duke University Libraries, <http://library.duke.edu/data/data-visualization>
4. J.H.Maindonald, *Lattice and Other Graphics in R*, 2008, <http://maths-people.anu.edu.au/~johnm/r/rgraphics.pdf>
5. Kabacoff Robert I., *R in Action. Data analysis and graphics with R*, Manning Publications Co 2011 (Кабачков Роберт И. *R в действии. Анализ и визуализация данных в программе R*, ДМК Пресс, Москва 2014)
6. Maindonald John, Braun W. John, *Data Analysis and Graphics. Using R – an Example-Based Approach*, Cambridge University Press 2003
7. Markus Gesmann, Diego de Castillo, *Using the Google Chart Tools with R*, August 2015, <https://cran.r-project.org/web/packages/googleVis/vignettes/googleVis.pdf>
8. Michael Friedly, *Visualizing Categorical Data*, www.datavis.ca/books/vcd/vcdstory.pdf
9. Paradis Emmanuel, *R for Beginners*, Institut des Sciences de l' Evolution 2005
10. Przemysław Biecek, *Przewodnik po pakiecie*, Oficyna Wydawnicza 2008
11. Remko Duursma, Jeff Powell, Glen Stone, *Data analysis and visualization with R*, University of Western Sdney 2015
12. *Statystyczna analiza danych z wykorzystaniem programu R*, pod red. nauk. M.Walesiaka, E.Gatnara, Wydawnictwo Naukowe PWN, Warszawa 2013

9.2. Additional literature

13. Adler Joseph, *R in a Nutshell*, O'Reilly 2010.
14. Doantam Phan, *Supporting the visualization and forensic analysis of network events*, A dissertation submitted to the Department of Computer Science And The Committee On Graduate Studies of Stanford University in partial fulfillment of the requirements for the degree of doctor of philosophy, 2008, http://graphics.stanford.edu/papers/dphan_thesis/doantam.phan.thesis.pdf
15. Ledolter Johannes, *Data mining and business analytics with R*, University of Iowa, Wiley 2013.
16. Torgo Luis, *Data Mining with R: learning with case studies*, LIACC-FEP, University of Porto 2003.
17. Venables W. N., Smith D. M. and the R Core Team, *An Introduction to R. A Programming Environment for Data Analysis and Graphics*, 2015.
18. Vries Andrie de, Meys Joris, *R For Dummies*, John Wiley & Sons, Ltd 2012.
19. Yanchang Zhao, *R and Data Mining: Examples and Case Studies*, Elsevier 2012.