OTTO VON GUERICKE UNIVERSITÄT MAGDEBURG

WW FAKULTÄT FÜR WIRTSCHAFTSWISSENSCHAFT

Chair of Operations Management
PD Dr. Thomas Kirschstein / summer term 2020

Scientific Project: Decision Support for Operations Management Issues

Syllabus

Objective/purpose:
Students learn to conduct all phases of a data analytics project:

1. Data analysis
2. Problem formalization
3. Implementation of solution procedure
4. Reporting

Organization:

- students work in groups with 4-5 persons
- each group is provided with a real-world data set and a problem description
- all phases are supposed to be realized with R (www.r-project.org) and Rstudio (www.rstudio.com)
- It is helpful to have an own laptop/PC with R and RStudio installed
- students will provide their results in a presentation and a (written) report
- Structure: The project is divided into two parts:
  1. part: Introduction to R and RStudio → in class in April
  2. part: teams work independently, weekly sessions to present progress and discuss issues in class

Content:

- syntax & programming with R
- data management (reading, writing, manipulating data)
- data analysis techniques (basic statistical tools like linear models, cluster analysis, etc.)
- data visualization
- continuous optimization (via the build-in optimx() framework)
- mixed-integer optimization (via ROI framework and GLPK solver http://gusek.sourceforge.net/gusek.html)
- RMarkdown and Shiny Apps for reporting in R

Sources:

- Online Courses: https://datascienceplus.com/tutorials/
- H. Wickham: R for Data Science, https://r4ds.had.co.nz/
- K. Healy: Data visualization – A practical introduction, https://socviz.co/
- S. Theußl, F. Schwendinger, K. Hornig: ROI: An extensible R Optimization Infrastructure, https://epub.wu.ac.at/5858/
- Y. Xie: R Markdown: The Definitive Guide, https://bookdown.org/yihui/rmarkdown/
- Coding Style Guide: http://web.stanford.edu/class/cs109l/unrestricted/resources/google-style.html