Seminar in Business Analytics:
Analytical Modeling of Business Problems in R and Python

Summer Term 2019

Course Description:

Prior to the start of the Information Age in the late 20th century, companies were forced to collect data from non-automated sources manually. Companies back then lacked the computing capabilities necessary for data to be analyzed, and as a result, decisions primarily originated not from knowledge but from intuition. With the emergence of ubiquitous computing technology, company decisions nowadays rely strongly on computer-aided **"Data Mining"**.

Business Intelligence refers to technologies that target how business information (or sometimes information in general) is collected, analyzed and presented. Combining these features results in software called Business Intelligence systems. These systems serve the purpose of providing better decision support.

In this seminar, we will focus on what distinguishes the varying capabilities across Data Mining – namely the underlying methods. We will review different strategies for data collection, data analysis, and data visualization. Sample approaches include dimension reduction of big data, data visualization, model selection, clustering and forecasting.

In particular, the seminar will answer the following questions:

- **Forecasting:** Based on historical values, how can businesses predict future developments ahead of time? Given the current stock market prices, can we predict tomorrow's values?
- **Data analysis:** How does weather impact electricity prices? Which parameters of second-hand cars correlate with their value?
- **Clustering:** How can businesses group consumers into distinct categories according to their purchase behavior? Can businesses group job applicants into groups of similar characteristics?
- **Dimension reduction:** How can businesses simplify a large amount of indicators into a smaller subset with similar significance? Can the huge set of features characterizing supermarkets (e.g. gas station, discounts, service) be combined into groups?

Individual assignments will consist of a specific problem from Data Mining. Each participant will be provided with a dataset to which a certain method should be applied to using the programming languages Python or R.

Target Group:

This Seminar specifically addresses students all IMP disciplines, as well as in the M.Sc. Economics and M.Sc. VWL programs. Interested and committed B.Sc. VWL and BWL students may also participate.

Organization:

Registration: from March 17, 2019 to April 25, 2018

Application via email to gunther.gust@is.uni-freiburg.de with the following details:

- First name, last name
- Matriculation number (Matrikelnummer)
- Email, phone number
- Study program, semester
- Transcript of records (Leistungsübersicht)
- Short description of experience level in Python or R if available

Response whether application was successful will be sent out shortly after the registration deadline

First meeting: **Mai 3, 2019 at 16ct**

HS 3042

Paper due: July 1, 2019
Final presentation: Second week of July
Revised paper due: August 31, 2019

Communication:
All announcements, handouts, etc. will be sent via email.

Topics:

Exact topics along with hints on literature will be announced at a later point. Each participant will give an introduction into a specific library from Python or R.

Policies and Procedures

Grading:	Paper (about 15 pages, 33%), presentation (33%), and revised final paper (33%). In addition, you have to hand in your programming code and datasets (if applicable). The grading will take into account the study level (Bachelor/Master) of the individual participant. The seminar paper can be written in English only.
Credit points:	4 for Bachelor, 6 for Master
Credit points are applicable to:	B.Sc. BWL PNPM: Allgemeine BWL B.Sc. VWL: BWL, Wirtschaftsinformatik M.Sc. BWL PNPM: Allgemeine BWL, Wirtschaftsinformatik M.Sc. VWL (2011): BWL, Wirtschaftsinformatik M.Sc. VWL (2014): Business Analytics M.Sc. Economics: Elective in Information Systems and Network Economics profile M.Sc. Computer Science: Wahlmodule BWL und VWL
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