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Albert-Ludwigs-
Universität Freiburg

Abteilung für Wirtschaftsinformatik
Information Systems Research
Prof. Dr. Dirk Neumann

Seminar in Business Analytics: Advanced Data Science in Businesses Summer Term 2023

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"**. Data Mining algorithms are a central part of **Business Intelligence** systems, which refers to technologies that target how business information (or sometimes information in general) is collected, analyzed and presented. These systems serve the purpose of providing better decision support.

In this seminar, students will acquire either of the two kinds following skills. Either, students will learn to build a webscraper to collect their own dataset from the web and review different strategies for data analysis and data visualization. Alternatively, students are asked to describe and visualize the content of an existing dataset and pick a statistical method / data mining algorithm of their choice and perform a descriptive or predictive data mining task on their dataset.

In the following, we list typical methods and questions that will be addressed in this seminar:

- **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?

Target Group:

This Seminar specifically addresses students all IMP disciplines, as well as in the M.Sc. Economics and M.Sc. VWL programs. There are no formal prerequisites; however, the assignments involve programming tasks (languages Python or R) so that programming skills and/or the willingness to acquire them are a must.

Organization:

Registration: **By April 3 (end of day), 2023**

Application via email to bernhard.lutz@is.uni-freiburg.de.
Make sure that the following information is provided:

- First name, last name
- Matriculation number (Matrikelnummer)
- Transcript of records
- Attended lectures and seminars at our chair and grade obtained
- Email, phone number
- Study program, semester
- Short description of experience level in Python or R
- Personal preferences regarding one (or several) of potential topics: Energy Analytics, Urban Analytics, Social Media Analytics, Text Mining and Analytics of Financial Data

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

First meeting: **April 27, 2023 at 16ct, PC Pool 3, Werthmannstraße 4**

Paper due (1st version): **June 18, 2023 (end of day)**

Presentation: **June 28, 2023 at 16ct, PC Pool 3, Werthmannstraße 4**

Revised paper due: **September 30, 2023 (end of day)**

Communication:

Communication is done via email. All materials are provided on Ilias.

Topics:

Exact topics along with hints on literature will be announced at a later point.

Policies and Procedures:

Grading:	1. Paper Version (33%), Presentation (33%), and 2. Paper Version (33%). In addition, you have to hand in your programming code and datasets (if applicable). The seminar paper should be written in English and consist of 10-15 pages.
ECTS:	6

Credit points are applicable to:

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

Chair:

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