Seminar: "E-Energy – Information Systems and Analytics for Smart Energy Systems"

Summer Term 2020

Course Description:

Electricity used to be generated in large power plants close to the areas where the energy was used. The rise of wind and solar power has changed this traditional paradigm and created new problems for energy distribution. In addition, the deregulation of the energy market, the introduction of a range of new subsidies and the necessity of providing a secure and reliable energy supply have turned the energy sector into a very complex industry.

Information systems (IS) contribute in many ways to make the power system more efficient and its complexity more manageable. At home, they allow people to reduce their overall energy consumption and to align electricity demand with the generation from renewable sources. They enable the grid operator to integrate intermittent renewable sources and allow for an efficient exchange of information in energy trading. They support new data-centric business models and ease the coordination between the players in the energy market. Information systems lessen the trade-off between comfort and sustainability in energy consumption and are an integral part of the change in the energy sector.

In this seminar, we will research on economic and technological aspects in the modern energy sector, topics include:

- Business intelligence for energy efficiency in industrial companies

- Integration of distributed generation (e.g. solar power) into the grid

- Gird expansion planning using techniques from operations research

- The role of battery storages as capacity provider in energy markets

- Novel business models enabled by smart-meter data

- Analysis and design of energy markets

The research in this area is highly interdisciplinary. It combines methods from economics, computer science as well as electrical engineering. We will fit the topics to your preferences and skills. They range from theoretical research to the development and implementation of

prototypes of information systems. Additionally, students are typically required to conduct a quantitative analysis based on real-world data (preferably in R or Python).

Target Group:

This Seminar addresses students pursuing a Master's degree in Economics, VWL, BWL, as well as Computer Science. Interested and committed B.Sc. candidates are encouraged to apply as well. Further details are given in the "Credit points" section.

Organization:

The seminar is held by the Chair for Information Systems Research of the University of Freiburg.

Organization:

Registration: Until May 3, 2020

                       Application via email to gunther.gust@is.uni-freiburg.de. **Make sure the following information is contained in the email body**:

- First name, last name

- Matriculation number (Matrikelnummer)

- Current overall grade average

- 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

                       In addition, you need to send your **transcript of records in the attachment**.

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

First meeting: **May 12, 2020 at 17ct** (**Online Meeting**)

Paper due: **Jul 3, 2020**
Online presentation: **Jul 10, 2020, 16 ct.**
Revised paper due: **Aug 31, 2020**

Communication:

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

Topics:

Exact topics along with hints on literature will be announced together with the response to your application.

Policies and Procedures

Grading:	Paper (about 15 pages, 50%) and revised final paper (50%). In addition, you have to hand in your programming code and datasets (if applicable). In addition, there will be a presentation session (online), where the participants get feedback on their preliminary work. The seminar paper can be written in English only.
Credit points:	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:	Prof. Dr. Dirk Neumann Albert-Ludwigs-Universität Chair of Information Systems Platz der Alten Synagoge 79085 Freiburg Germany