

The Research Group Digitalization and Information Systems

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Abstract: In this paper the Research Group Digitalization and Information Systems at the University of Fribourg and its research topics are presented. This is followed by a discussion on the relevance for the EMISA special interest group.

Keywords: Digitalization; Information Systems; Research

1 General Orientation

The Research Group Digitalization and Information Systems at the University of Fribourg, Switzerland is part of the interfaculty Department of Informatics. The research activities of the group are positioned with the field of design-oriented business informatics and in particular within information systems engineering and development [Ö11]. Based on the principle of research-guided teaching, courses are offered for the business informatics bachelor and master curricula as well as for the curricula in business and economics of the University of Fribourg and the Swiss Joint Master of Science in Computer Science by the Universities of Bern, Neuchâtel, and Fribourg.

2 Research Topics

Within the field of business informatics we follow an engineering-oriented, explorative and experimental research approach that ultimately leads to the design of new types of modeling languages, the realization of innovative software prototypes and the application of these artifacts in industrial use cases and practical scenarios. The research topics are currently grouped by the following focus areas: Digitalization, Metamodeling, Blockchain, and Visualization. Research on these topics and across the topics is conducted in internally and externally funded research projects as well as theses and seminal work.

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2.1 Digitalization

Digitalization encompasses the technology-based transformation of organizations including their business models, products and services, business processes, and IT architectures. The support of organizations who aim for digitalization is one of the core competencies of business informatics. Through our research we contribute to this field by designing, implementing and applying various kinds of enterprise modeling methods, c.f. [Sa18]. These permit to represent domain requirements in a visual and intuitive way and enable at the same time a transition to technology-oriented views for designing, analyzing, optimizing and implementing information systems.

We are particularly interested in new and innovative technologies that have the potential of radically changing existing business models, processes, and IT architectures. Current technologies under investigation in our group comprise blockchains, virtual and augmented reality, novel forms of device-less interaction, and semantic technologies. Thereby we follow a human-centric approach with the goal of integrating technologies and the society.

2.2 Metamodeling

Metamodeling takes up a fundamental approach of science in the sense that it aims for discovering concepts on a metalevel that are applicable in multiple scenarios. In particular, metamodeling as we use it in our research and teaching activities stands for the design, formalization, and development of domain-specific conceptual modeling methods. It is thus concerned with the discovery of concepts for modeling languages, model algorithms, and modeling procedures and their technical realization in the form of modeling tools and services [FK13]. The application domains of metamodeling are manifold and constantly expanding. Domains that have been investigated in the past include: Strategic Management [Fi11b], Business Process Management [Fi12, Fi11a], Quality Management [JF17], Software Engineering [Fi04], Data Management and Databases [GI17, FKL15], Smart Cities [Bo16], Product Service Systems [BMF16], Ontologies and Rule Languages [Fi17, Fi18, PF19], Legal Informatics [NF17, FH16].

2.3 Blockchain

Blockchains constitute a new way of combining well-known and experienced technologies for realizing innovative IT-based applications. Their core elements comprise the decentralized storage of information, distributed consensus mechanisms, smart contracts, and digital signatures. From a business and economic perspective, blockchains have the potential to replace intermediaries through an automated and trustworthy consensus mechanism, which does not require physical persons for deciding about the validity of transactions.

In our research group we approach blockchains from three perspectives: i. the *business perspective* for designing and evaluating new types of business models; ii. the *technical perspective* for further developing enterprise information systems; and iii. the *societal perspective* for designing IT-based solutions that are accessible by non-technical users. Recent research results of the group include the approach of Knowledge Blockchains [FH18] and an approach for the decentralized modeling and tracking of processes [Hä18].

2.4 Visualization

In the context of digitalization and information systems, visualization plays a major role for communicating and analyzing complex types of information between different stakeholders [Fi09]. In this context, new forms of visualizations such as used in Virtual Reality and Augmented Reality applications also require new forms of interaction. In this research topic we thus not only investigate new types of visualizations for information systems but also emerging interaction paradigms such as device-less interaction where humans communicate with information systems in new ways.

3 Relevance for the EMISA Special Interest Group

The described research topics all contribute to development methods for information systems and their application. Thereby, the topic of digitalization stands for the alignment of information systems with current challenges for businesses, organizations, and individuals. Metamodeling is an established method for the creation of domain-specific conceptual modeling methods as used in many areas of information systems' development. The topics of blockchains and visualization stand for innovative contributions to information systems and their application in new and existing business scenarios.

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