Next Generation Enterprise Modelling
in the Age of Internet of Things

NEMO´2015 PROGRAMME

General Information

Summer School Venue

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Tram station: Spitalgasse/Währinger Straße
Trip planning: http://www.wienerlinien.at/eportal2/ep/
channelView.do/pageTypeId/66533/channelId/-48703

Taxi
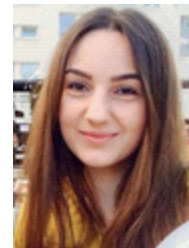
Taxi 31300: +43 1 31300
Taxi 40100: +43 1 40100

Emergency calls

Rescue 144
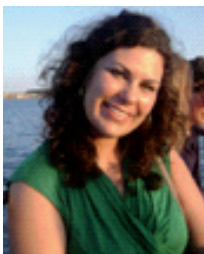Police 133
Fire department 122

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Welcome

The "Next Generation Enterprise Modelling" (NEMO) Summer School welcomes you to its 2nd Edition, this year hosted by the University of Vienna.

As in 2014, this year's summer school will bring together a wide international community of academics and students with interests in various aspects of modelling. Since in today's enterprises modelling methods are widely used on every level and for numerous purposes, NEMO 2015 will cover different domains and approaches of modelling, addressing especially:

• Foundations of Conceptual Modelling, e.g. formal methods and tools for the creation, transformation, and application of modelling methods.
• Technologies for Conceptual Modelling, e.g. model execution technologies, meta-modelling platforms, model compilers, adaption to diverse devices and multi-client applications.
• Application Domains, e.g. Enterprise Information Systems, e-Government, and Ambient Assisted Living.
• Cross-cutting Issues, e.g. information security, privacy, risk management and governance, and quality assurance of models and methods.

Participating students have the opportunity to acquire knowledge by listening to more than 30 speakers from all over the world, covering current developments in one of the four pillars mentioned above. And in order to consolidate it, practical courses will take place. There, students will develop prototyping solutions to different kinds of problems and will discuss issues encountered in enterprises and practice. But to form a community, common experiences to bond are needed as well. Different cultural activities and social events will assure the start of a closely linked international community of young specialists.

We would like to thank all the speakers and their teams, who supported us with their commitment and work along the way in order to create this event.

The summer school could not have been realised without the work of the organisational team at the Research Group Knowledge Engineering and the support of the Faculty of Computer Science at the University of Vienna.

And last but not least we would like to thank Erasmus+ and the Austrian National Agency for Lifelong Learning, who supported our endeavor with European Commission funds. Our special thanks go to Mr. Gerhard Volz and Mr. Lucas Petri, who provided us with guidance and support during the project implementation.

We hope that you all will have an extraordinary time, learning and enjoying your time at the NEMO Summer School.

Dimitris Karagiannis

Heinrich C. Mayr

Vienna and Klagenfurt, June 2015

Maps

Hotels

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Open Models Laboratory
University of Vienna

The Open Models Laboratory (OMiLAB) is a dedicated research and experimentation space for modelling method engineering. Both a physical and virtual place, it is equipped with tools to explore method creation and design, experiment with method engineering and deploy software tools for modelling.

Open to all those interested, the laboratory is a platform where all participants can bring in ideas related to modelling and engage in the exploration process.

The lab follows a user-driven approach in its understanding of the term „model". Experts and novices are equally invited to contribute and extract knowledge. The lab's idea is to act as a facilitator to the development and application of scientific methods to communities who value models, and implicitly modelling methods. Users are not limited to certain domains or functional areas of organizations. There are useful models in widely different domains like information technology, biology, chemistry, or medicine as well as various models for functional areas like procurement, marketing, logistics or engineering.

At the same time the lab promotes openness of community projects and encourages communities to share their projects to the extent feasible.

As the construction of modelling methods is a complex task, the OMiLAB introduces the OMiLAB Lifecycle which uses the "Conceptualization Process" as a framework for developing modelling methods. Starting with the "Creation" step and ranging until the "Deployment" of the modelling method as an IT-tool, the laboratory provides the conceptual steps, the collaborative environment and the necessary working resources. For the "Design", "Formalization" and "Development" steps the OMiLAB makes an open use of the ADOxx meta-modelling platform. Such a platform allows the use of concepts that support the modelling me-

thod engineering process (e.g. patterns, DSML) and formalisms which favour the re-use/evolution/variants of modelling methods. It also grants openness to other tools and open source add-ons.

The main vision carrying the idea of the OMiLAB is: Models for Everyone!

Visit us at **www.omilab.org**!
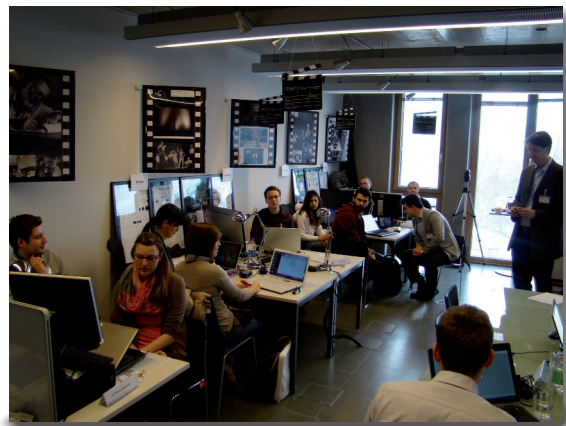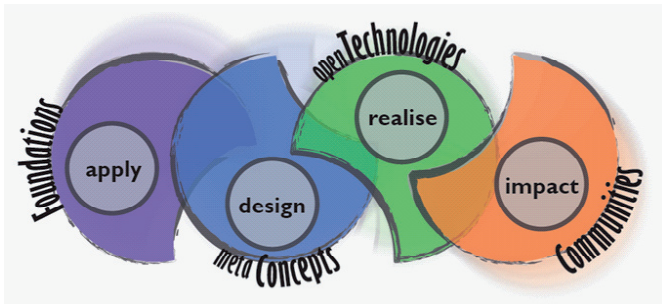
To provide transparent, ubiquitous knowledge that can be semantically processed by IT systems is the main research goal of the Research Group Knowledge Engineering. The group develops concepts for modelling languages and methods as well as step models and realizes concrete models. The contributions herewith advert to the research paradigm of design science in business informatics. Thereby realized results are deployed primarily within the research field of modelling methods and find their applicability in the form of information systems in the economy.

According to the development plan of the University of Vienna and the Faculty of Computer Science the scientific work of the research group is associated to the overall defined research focus "Knowledge-based Process Management". Within this core area the work accomplished by the group provides novel research results in the areas of Meta-Modelling, Meta-Data and Ontologies, Hybrid Method Engineering and Business Intelligence.

Based on mathematical and statistical foundations, theoretical approaches are adapted and applied. The fundamental research paradigm relies on concepts of meta-modelling that are further developed and deployed to derive knowledge out of (un)structured data on the one side and to provide transparent knowledge with formal and semi-formal modelling methods on the other side. The developed meta-models are realized with open technologies in form of web based user and context specific applications and made available to the community.

In order to promote the exchange in regards to content and technological advancements in the method engineering community, the group has established the Open Model Laboratory. The dissemination of established know how, the exploitation of recent research results and their further development assure a sustainable impact on the community. The strategic goal of the initiative is to offer modelling methods and their applications freely available for subject matter experts. Technologically the Open Models Laboratory is supported by the ADOxx Platform, that provides open interaction and discussion for its users, as well as the exchange and advancements of modelling methods (www.omilab.org).

In the context of international cooperation the group provides research-guided teaching on an advanced scientific level with practical relevance mainly in the area of business informatics.
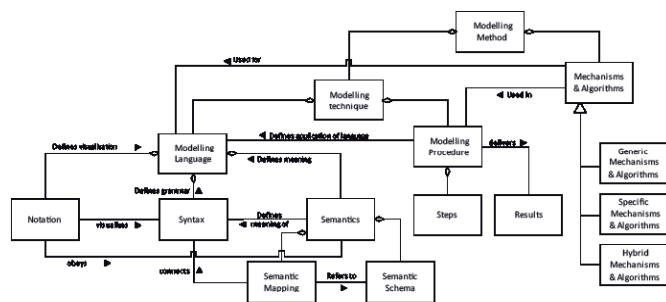
Karagiannis, D.; Kühn, H.: Metamodelling Platforms. In: Bauknecht, K.; Min Tjoa A; Quirchmayr, G. (Eds.): Proceedings of the Third International Conference EC-Web 2002 - Dexa 2002, Aix-en-Provence, France, September 2-6, 2002, LNCS 2455, Springer-Verlag, Berlin, Heidelberg, p. 182

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The Application Engineering Institute
Alpen-Adria-Universität Klagenfurt

We are committed to human-centred informatics: our research and teaching activities address the design, architecture, implementation and quality of human-centred application systems. We conduct both, fundamental as well as applied/experimental research with an emphasis on modelling, computational linguistics, and software quality. Currently, we are working on research projects in the areas of Active and Assisted Living (AAL), Text Understanding, and Quality Management in Software Development Processes.

AAL research aims at IT methods that enable people to live as autonomously and for long as possible in their domestic environment. In our project HBMS (Human Behavior Monitoring and Support) we use conceptual modelling and computational linguistics for deriving an individual cognitive model from the observed behaviour of a particular person. For that purpose, the Human Cognitive Modeling Language HCM-L has been developed, and underpinned by a tool using the meta-modelling platform ADOxx®. In the productive support phase, reasoning procedures exploit a person's HCM-L model for deriving the best-suited ambient support when needed. Thus, HBMS is to support persons based on their own prior episodic knowledge.
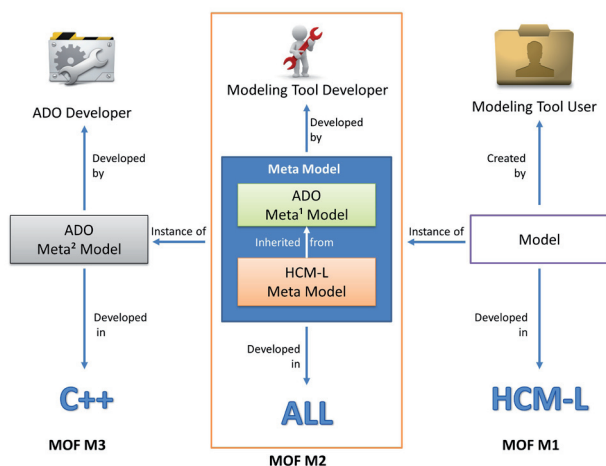
Effective **Quality-Related Communication** is crucial for the success of software development processes. Consequently, the different parties involved have to be supported by properly managed quality-related information throughout a software development process. In particular, it is necessary to ensure that all parties have a consistent understanding of the communicated information. In the QuASE (Quality Aware Software Engineering) project, we aim at establishing means for this, based on acquired and formalized domain knowledge about quality issues in software processes. Moreover, we work on supporting decision making in the software process as well as on the reuse of quality-related experience.
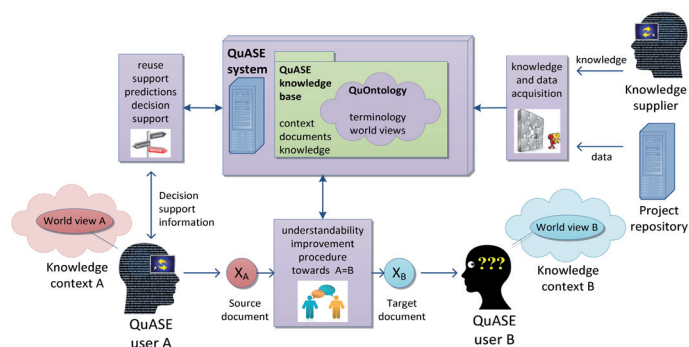
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Social Events

The NEMO Summer School comes with a programme chock-full of lectures and working group sessions: the participants, students and lecturers thus will experience two intensive weeks of insights into the present state of research, theory and practice of modelling.

However, this is only one side of the coin: the other side is the opportunity to meet student colleagues and renowned professors from all over the world, to discuss with them, to exchange ideas, to learn from each other, and to make new friends - all that in the beautiful and exciting capital of Austria, Vienna.

A couple of social events and excursions will be offered, for example
- a guided tour of the University of Vienna, a 650 years old university with remarkable history and architecture
- a guided tour of Vienna, a city rich in culture, history and beautiful places
- an exciting and challenging day in Prater, the oldest amusement park in the world with lunch at Schweizerhaus, a renowned beer garden and restaurant offering delicious traditional specialties
- a farewell party on Friday, July 31st.

Detailed information will be provided at the summer school.

Sources: Photo Copyright Vlad Filipas

Hotel contacts

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Vienna

Vienna is the capital and largest city of Austria. It is Austria's largest city, with a population of about 1.794 million (2.6 million within the metropolitan area, nearly one third of Austria's population), and its cultural, economic, and political centre.

Until the beginning of the 20th century it was the largest German-speaking city in the world, and before the splitting of the Austro-Hungarian Empire in World War I the city had 2 million inhabitants.

Apart from being regarded as the City of Music because of its musical legacy, Vienna is also said to be „The City of Dreams" because it was home to the world's first psycho-analyst – Sigmund Freud. The city's roots lie in early Celtic and Roman settlements that transformed into a Medieval and Baroque city, the capital of the Austro-Hungarian Empire.

It is well known for having played an essential role as a leading European music centre, from the great age of Viennese Classicism through the early part of the 20th century.

The historic centre of Vienna is rich in architectural ensembles, including Baroque castles and gardens, and the late-19th-century Ringstrasse lined with grand buildings, monuments and parks.

University of Vienna

The University of Vienna was founded by Duke Rudolph IV in 1365 and is the oldest university in the German-speaking world. With its long and rich history, the University of Vienna has developed into one of the biggest universities in Europe, and also one of the most renowned, especially in the Humanities. It is associated with 15 Nobel prize winners and has been the academic home of a large number of figures both of historical and academic importance.

This year, the University celebrated its 650th Anniversary on 12 March 2015, its foundation day.

The Faculty of Computer Science is one of 15 faculties at the University of Vienna. It is a principal centre for teaching and research in Computer Science and Business Informatics in Austria, being home of twelve research groups, the Computer Science Didactics and Learning Research Center and taking part in the research platform Computational Science Center. It runs several research projects in the field of Computer Science and Business Informatics funded by national, European and international agencies and industry. The institutes have established strategic partnerships with partners from academia and industry.

Sources: https://en.wikipedia.org/wiki/Vienna, https://en.wikipedia.org/wiki/University_of_Vienna, https://cs.univie.ac.at/research/faculty/, https://www.flickr.com/photos/univienna/sets/72157634231687550, Copyright Universität Wien

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Floor Plan
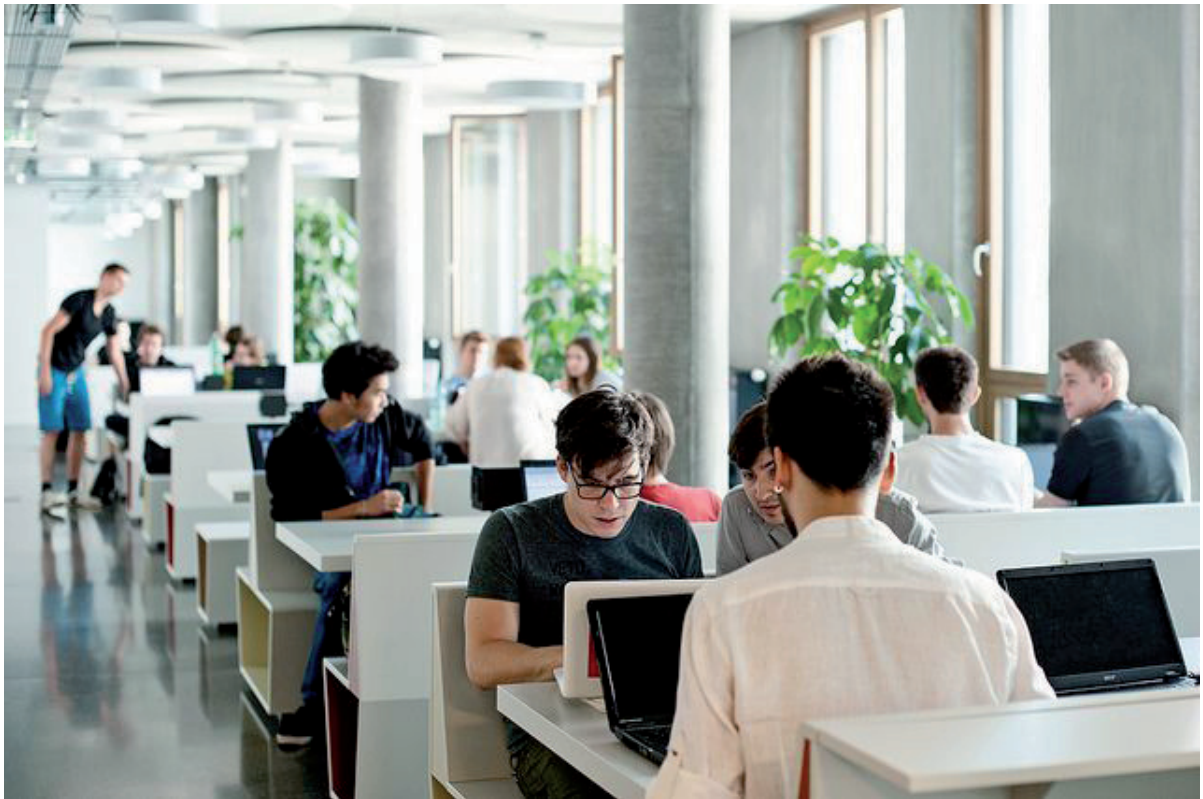
Address:
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Basement:
Lectures in HS 1
Coffee Break in the Basement Lobby

Ground Floor:
Registration

1st Floor, Basement:
Working-Groups in:
PC1, PC2, PC3, PC4

4th Floor:
Organization Team

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Foundations and Principles of Conceptual Modelling
Prof. Dr. Wolfgang Reisig, Humboldt University Berlin

Abstract

The basic notions of the NEMO summer school include the terms of enterprise modelling, modelling methods, etc. We start with some general observations about those notions and their role in (business) informatics. This includes the validation, verification, evaluation, and transformation etc. of models. The second part of this contribution is dedicated to foundations of conceptual modelling. Here we pose the question of what the very basics of (discrete) models are, and how a systematic setting of modelling techniques, in particular for enterprise models, may be achieved. We study a number of fundamentally different, yet successful modelling- and analysis methods and discuss the trade off between expressiveness and analysis techniques.

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Prof. Dr. Wolfgang Reisig
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Bio

Wolfgang Reisig is a full professor at the Computer Science Institute of Humboldt-Universität zu Berlin, Germany. Prof. Reisig is the speaker of the PhD school Service-oriented Architectures for the Integration of Software-based Processes, exemplified by Health Care Systems and Medical Technology (SOAMED). Prof. Reisig is a member of the European Academy of Sciences, Academia Europaea. He published and edited numerous books and articles on Petri Net Theory and Applications. He is a member of the Petri Net Conference Steering Committee since 1982 and a co-editor of the journal „Software and Systems Modeling".

Agile Modelling Method Engineering - AMME

Prof. Dr. Dimitris Karagiannis, University of Vienna

Abstract

As the paradigm of enterprise modelling originally envisioned, a hybridization of modelling approaches is needed in order to cover the multiple facets of a business view, its context and requirements for different types of resources - including IT services and infrastructure. The "modelling method framework" [Karagiannis/Kühn, 2002] establishes key building blocks - i.e. the modelling language, the modelling procedure and mechanisms/algorithms - to enable the required hybrid modelling and to increase the value of models beyond their traditional functions. As the importance of Next Generation Enterprise Modelling in the age of the Internet of Things, Industry 4.0, Industrial 3-D printing etc. increases, new modelling capabilities, semantically enriched design concepts and adapted operational functionality must satisfy evolving needs, in order to successfully manage not only the transformation in the digital enterprise stage, but also the adaptation and extension of existing services. In this context, the foundations of a „conceptual-model"-awareness approach for next generation enterprise information systems will be presented. This novel approach makes use of semantic networks to extend model-awareness towards arbitrary types of models that are developed for specialized communities aiming for domain-specificity (or even case-specificity) in their modelling language, therefore favoring productivity at the expense of reusability across domains. The technological space for capturing and bridging knowledge through model semantics is primarily based on diagrammatic models. Two categories of models are employed in this context: (1) Models of Concepts for describing a common understanding of a domain through its concepts and relations; (2) Models that use Concepts are typically domain-specific models based on some already established understanding of the domain. The hereby introduced life cycle of Agile Modeling Method Engineering - AMME [PCI2015] aims to apply the principle of agility established in Software Engineering (e.g., evolutionary development, flexible response to change) to the practice of Modelling Method Engineering. The main assumption is that a modelling method may evolve iteratively based on changing modelling requirements and feedback loops. Within the context of AMME, a full methodological approach is established by the OMiLAB (http://www.omilab.org), with a life cycle encompassing five phases: (1) create, (2) design, (3) formalize, (4), develop and (5) deploy/validate. The approach is supported, in its fast prototyping stage, by the meta-modelling domain-specific language MM-DSL and the meta-modelling platform ADOxx (http://www.adoxx.org).

Bio

Dimitris Karagiannis is head of the Research Group Knowledge Engineering at the University of Vienna. His main research interests include knowledge management, modelling methods and meta-modelling. Besides his engagement in national and EU-funded research projects Dimitris Karagiannis is the author of research papers and books on Knowledge Databases, Business Process Management, Workflow-Systems and Knowledge Management. He serves as expert in various international conferences and is on the editorial board of several intenational journals. He is member of IEEE and ACM and on the steering committee of the Austrian Computer Society and its Special Interest Group on IT Governance. He is the founder of the Open Models Laboratory (www.omilab.org).

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Foundation

Application

Technologies

Crosscutting Issues

Capability-oriented Enterprise Modelling and Requirements Engineering

Prof. Dr. Jelena Zdravkovic, University of Stockholm

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Crosscutting Issues

Abstract

Lately the notion of capability is gaining much presence within the field of Information Systems Engineering, due to a number of factors: the notion directs business investment focus, it can be used as a baseline for business planning, and it leads directly to service specification and design. Historically, it has been examined in Economics, Sociology, and Management Science. More recently, it has been considered in the context of Enterprise Modelling, for the specification and design of Information Systems using business planning as the baseline. The need for organizations to operate in changing environments is addressed by proposing a capability-oriented approach that integrates organizational development with IS development taking into account changes in the application context of the solution. This is referred to as Capability Driven Development (CDD). To ensure the needs of business stakeholders for variety of business contexts that an organization faces, and thus facilitate successful systems delivery, capability-driven development includes a well-defined method for requirements engineering, as well as its confirmation in practices. A number of components related to the use of the CDD approach are elaborated - CDD methodology, capability delivery application, patterns for reuse, industrial cases and a tool support.

Bio

Associate Professor Jelena Zdravkovic is the head of the Information Systems unit of the Department of Computer and Systems Sciences at Stockholm University. She has a PhD in Computer and Systems Sciences at Royal Institute of Technology (KTH) from 2006, as well as the MBA in E-commerce. Jelena has published more than 70 refereed papers in international conferences and scientific journals on the topics of enterprise modelling, business/IT alignment and requirements engineering. She has participated in several national and international projects on the interoperability, service modelling, and model-driven engineering. In her department Jelena is the head of the study program „Enterprise Systems and Service Design", and the main responsible for the subjects Requirements Engineering and System Integration. She is a regular reviewer for a number of international journals including several of Springer, such as Requirements Engineering Journal, as well as Elsevier's Journal of Systems and Software, and Information & Software Technology journal, also IEEE Computing journal. She serves in the program committees of more than 10 international conferences and workshops.

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The Role of Modelling in Educational Learning Design

Prof. Dr. Peter Reimann, University of Sydney

Abstract

Modelling in the Computer Science sense so far plays only a minor role in educational computing. In order to change this, not only do educational design and technology specialists gain a better understanding of modelling, but those involved in developing modelling methods and tools will have to understand the nature of educational design, and the challenges involved. My goal for this small lecture series is to provide for a basic understanding for the nature of design that is relevant to education (in particular, but not exclusively, higher education), to sketch the state of the art of modelling in learning design, and to identify challenges for a better integration of modelling into educational computing and design practices:

•	The first lecture will focus on design patterns in education.
•	The second lecture will focus on formal approaches to modelling.
•	The third lecture will look at open research issues, and probe into the question of how to engage the educational design community with modelling methods and tools.

Bio

Peter has a PhD in psychology from the University of Freiburg, Germany. Since 2002, he has been holding a position as Professor in the Faculty of Education and Social Work, University of Sydney. Before that, he was Professor of Educational Psychology at the University of Heidelberg. His primary research areas are cognitive learning research with a focus on educational computing, multimedia-based and knowledge-based learning environments, e-learning, and the development of evaluation and assessment methods. Peter has helped to organize various conferences over the years, recently the International Conference of the Learning Sciences, and is on the editorial board of numerous journals, among them the Journal of the Learning Sciences and Educational Psychologist. He just completed a four year project in the European Commission's research program on technology enhanced learning called Next-Tell (www.next-tell.eu) that also dealt with issues of learning design modelling.

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Application

Technologies

Crosscutting Issues

Modelling for Ambient Assistance
Prof. Dr. Dr. h. c. Heinrich C. Mayr, Alpen-Adria Universität Klagenfurt

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Technologies

Crosscutting Issues

Abstract

Ambient Assistance is a growing field in ICT: Based on smart sensors, life video analysis techniques as well as speech recognition human centred assistance become feasible and affordable. The range of applications is broad and covers everyday situations in private and business environments as well as support for people with special needs. Consequently, Ambient Assistance is a challenging and promising field for computer scientists, software engineers and information technicians in both, research and application, with lots of questions to answer and technical solutions to find. Since dealing with the support of humans, it is an interdisciplinary field affecting Psychology, Neurology, Medicine, Law, Philosophy, Domotics and others more.

Models play a key role in ambient assistance systems as they act as the integral means for data and knowledge acquisition, representation, evaluation and exchange for the various system components. We will start our lecture with a short overview of already existing best practice examples and then work out the key notions and concepts that form the basis of modelling endeavours in that field. Based here on, we will discuss the objectives, concepts and elements of the "Human Cognitive Modelling Language" HCM-L, which was developed in the "Human Behavior Monitoring and Support" project HBMS. Deeper insight will be gained in the afternoon Parallel Working Groups that are headed by members of the Application Engineering Research Group: Dr Judith Michael and Suneth Ranasinghe, MSc.

Bio

Heinrich C. Mayr has been a full professor of Informatics at Universität Klagenfurt since 1990 leading the Application Engineering Research Group. Until then he was an assistant professor at the University of Karlsruhe (today: KIT), visiting professor at several universities, and CEO of a German software company. His research is documented in over 190 publications and includes information system design methodologies, requirements and model engineering, and knowledge management. He has held, amongst other functions, that of President of the Gesellschaft für Informatik (GI). For 6 years he served as Rector of the University. Currently he is editor in chief of the "Lecture Notes in Informatics", council member of the Carinthian College of Education, chairperson of the Council of the Software Internet Cluster SIC, and Member of the TC "Wirtschaftsinformatik" of the German Accreditation Organisation ASIIN.

Judith Michael received her doctorate in Informatics from the Universität Klagenfurt in 2014. From 2006 on, she has worked as a software engineer and consultant in IT-companies. Currently she is senior scientist at the Application Engineering Research Group, and member of the Supervisory Board of Carinthian Tech Research AG (CTR, Austria). Her research focuses on Conceptual Modelling, Knowledge Management, Model Driven Architecture, Human Centred Computing, and Active and Ambient Living.

Suneth Ranasighe received his BSc from the University of Colombo (Sri Lanka) and his MSc in Software Engineering from the University of Hertfordshire (UK). Currently he works as a university assistant and PhD student at the Application Engineering Research Group. His research focuses on the integration of activity recognition systems into ambient assistance systems.
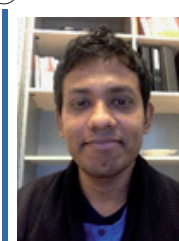
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Dr. Judith Michael **Suneth Ranasighe**

Capability Driven Enterprise Knowledge Modelling for Representation and Analysis

Prof. Dr. Evangelia Kavakli, University of the Aegean
Prof. Dr. Pericles Loucopoulos, University of Manchester

Abstract

Enterprise modelling has been defined as the 'art of externalising enterprise knowledge'. In addition, analysis of enterprise models has been used to gain knowledge through simulation or deduction, often by comparing a model of the current state and a model of a future, potentially better state. Examples of analysis made possible by the use of enterprise models include strategic planning, process optimisation, change management and business/IT alignment. Traditional approaches to enterprise modelling rely on "blueprint thinking" that focuses on the formal structure and organisation of the enterprise, with business processes being the fundamental components of the enterprise operation. Such approaches generally assume enterprises as deterministic, top-down managed entities, with a well defined group of clients, a set of services or products provided to these clients, processes to develop and maintain products or services, and suppliers providing the input to processes. However, the prevalence and volatility of digital enterprises shift enterprise modelling towards a more dynamic enterprise configuration, to embrace the idea of dynamic adaptation according to the internal and external influences that constantly (re-)shape the business environment. To this end, enterprise modelling research has adopted model driven development methods and service oriented architectures originating from the software development domain, as a means to achieve flexible service delivery and the notion of dynamic capability from the strategic management domain in order to address adaptation to the dynamic business context. This talk will outline emergent trends in the field, introduce a conceptual framework for capability driven development of enterprise knowledge and discuss how this can be used to enable the design of capabilities and services using examples from various application areas.

Bio

Dr. Evangelia Kavakli is an Ass. Prof. at the Dep. of Cultural Technology and Communication of the University of the Aegean, since 2002. She is in charge of the Cultural Informatics Laboratory of the University of the Aegean. Her research work supported in the context of national and EU funded projects, focuses on the topics of goal oriented requirements engineering, enterprise knowledge modelling, information systems privacy and cultural informatics. She is a member of the working group for the International Committee for Documentation Conceptual Reference Model (CIDOC/CRM). She can be virtually reached at http://cilab.ct.aegean.gr.

Prof. Pericles Loucopoulos holds appointments at the Manchester Business School of the University of Manchester (UK) and at Harokopio University of Athens (Greece). His research has been supported by numerous research grants supporting over 20 research projects, most of them in collaboration with industry. He is the editor-in-chief of the Journal of Requirements Engineering and also serves as Associate Editor on 15 other journals. His research focus is on the use of conceptual modelling for achieving alignment between enterprise and information technology systems. He has been awarded the Edelman Laureate medal and the President's Medal of the UK OR Society, two of the top distinctions in the field of Operations Research and Management.

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Application

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Model driven DevOps of Multi-clouds Applications
Prof. Dr. Elisabetta di Nitto, Politecnica di Milano

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Application

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Crosscutting Issues

Abstract

Cloud computing is a major trend in the ICT industry. The wide spectrum of available Clouds, such as those offered by Microsoft, Google, Amazon, HP, AT&T, and IBM, just to mention big players, provides a vibrant technical environment, where even small and medium enterprises (SMEs) use cheap and flexible services creating innovative solutions and evolving their existing service offer. Despite this richness of environments, Cloud business models and technologies are characterized by critical issues, such as the heterogeneity between vendor technologies and the resulting lack of interoperability between Clouds. This implies that developing and operating applications on the Cloud can show some difficulties and that migrating the application from one Cloud to another may require some re-development effort.

The purpose of this course/presentation is to show how model-driven engineering can be applied both to design and operation (DevOps) of cloud applications and can allow applications to exploit different clouds without requiring significant effort. Moreover, we will show how, thanks to models, it is possible to analyze and QoS characteristics of applications and keep them under control both at design time and at runtime.

Bio

Elisabetta Di Nitto is an Associate Professor at DEIB of POLIMI. Elisabetta's expertise lies in the areas of Software Engineering, Cloud Computing and large-scale service-oriented systems with a special attention to the techniques to make these systems self-adaptable. Elisabetta has published more than 90 papers in international journals and renowned conferences. She has been member of the editorial board of IEEE TSE, SOCA journal and Journal of Software: Evolution and Process. Moreover, she has been general chair of ESEC-FSE 2015 and program co-chair of ASE 2010 and of ServiceWave 2010. Elisabetta has participated in various European projects (among the others, S-CUBE, SLA@SOI, SOA4All, Cascadas). Currently, she is the coordinator of the FP7 IP MODAClouds (2012-2015), principal investigator for POLIMI in the STREP SeaClouds (2013-2015), and scientific coordinator in the H2020 project DICE (2015-2018).

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Business Process Management and Ontologies as an Application Domain for Meta-Modelling

Univ. Prof. PD Dr. Hans-Georg Fill, University of Vienna

Abstract

In this lecture it will be shown how concepts of meta-modelling can be applied in two core areas of modern information systems. For this purpose the lecture will start with a brief introduction into the theoretical foundations of meta-modelling and the corresponding realization of modelling methods on the ADOxx meta-modelling platform. Subsequently, the application areas of business process management and ontologies will be introduced. Thereby it will be particularly focused on the challenges and opportunities of adapting existing modelling concepts in these areas to the personal needs of users, organizations, as well as technical processing functionalities in the form of algorithms. As a solution to these challenges the introduced meta-modelling concepts will be applied. Furthermore, it will be discussed how this approach permits to design and implement innovative software applications that bring together the technical opportunities of semantic technologies and established business process management methodologies. The concepts and applications will be illustrated using case studies from research and industry projects. In particular it will be reverted to concepts and implementations from the SeMFIS research project conducted at Stanford University that is hosted at www.omilab.org.

Bio

Univ. Prof. PD Dr. Hans-Georg Fill is professor at the University of Vienna and deputy head of the Research Group Knowledge Engineering. He holds a master degree in international business administration and a PhD in business informatics both from the University of Vienna, Austria. In 2013 he received the venia docendi (habilitation) in business informatics from the University of Vienna. In 2010 he was awarded an Erwin-Schrödinger fellowship for conducting a one year research project at Stanford University in the area of semantic based modelling for information systems. He regularly teaches courses in business informatics on the bachelor and master level at the University of Vienna and at the Ecole Nationale Supérieure des Mines St. Etienne, France. His research interests include semantic information systems, meta-modelling for enterprise information systems and visualization.

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Enterprise Engineering Needs for Product Service Systems
Prof. Dr. Xavier Boucher, Ecole Nationale Superieure des Mines de Saint-Etienne

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Abstract

This contribution to NEMO 2015 is not oriented on innovations or research works concerning the theory and implementation of enterprise modelling tools and methodology. Complementary, it is focusing on an application area, which induce specific requirements and needs for such methodologies.

Industrial Product Service Systems (PSS) are a recent industrial concept offering strong opportunities both for business innovation and sustainability improvement. Coupling or even integrating industrial production and service delivering poses many innovative challenges for the manufacturing industry at the technological, organizational and even human level. In recent years, many international projects have contributed to important scientific advances in the field. The lecture will first give a synthetic insight on Product Service Systems (PSS), to make possible for the audience to understand the key concepts of PSS and key industrial needs to manage an economical transition towards this new form of industrial economy. Then, the lecture will underline specific research orientations directly linked to the needs of developing enterprise modelling and engineering solutions, to support the configuration, deployment, and life cycle management of Product Service Systems and value creation chains.

The practical part of the lecture will propose to the audience the experimentation of a customized modelling tool, dedicated to the engineering and evaluation of PSS scenarios.

Bio

Prof. Xavier Boucher is currently Professor in Industrial Management at the Ecole Nationale Supérieure des Mines de Saint-Etienne. His current research focuses on Product Service Systems, Service oriented production systems, collaborative-agile networks and decision models to manage the supply chain agility. Prof. Boucher is currently European co-chair of the working group WG 5.5 of IFIP (International Federation for Information Processing) and has been involved in SOCOLNET community (Society for Collaborative Networks) for many years, and co-leader of a French CNRS research group on Model Driven Enterprise and Information Systems Engineering. Prof. X. Boucher is currently leading several collaborative research projects in the field of design and management of Product Service Systems with an economic and manufacturing point of view.

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Business Decision Modelling

Prof. Dr. Jan Vanthienen, Katholieke Universiteit Leuven

Abstract

Business processes incorporate lots of decisions. Business decisions are important, but are often hidden in process flows or activities. It is not considered good practice to model the detailed decision paths in the business process model, because hardcoding (decision) rules in processes lead to complex and inflexible process models. Separating rules and decisions from the process simplifies the process model (separation of concerns). In analogy with the Business Process Modelling & Notation Standard (BPMN), a Decision Model & Notation standard (DMN) is developed. Decision modelling describes business decisions to be made, with their interrelationships and requirements, together with the detailed decision logic used to make the decision. One of the common forms of decision modelling is a structure of decision tables, describing the premises and resulting outcomes of a specific decision situation. This course is about the relations between business rules, decisions, decision tables, and business processes.

Bio

Jan Vanthienen is full professor of information systems at KU Leuven (Belgium), Department of Decision Sciences and Information Management, Information Systems Group, where he is teaching and researching on business intelligence, analytics, business rules & processes, decision modeling, and business information systems. He has published numerous papers in reviewed international journals and conference proceedings. Jan is a founding member and coordinator of the Leuven Institute for Research in Information Systems (LIRIS) and received the Belgian Francqui Chair 2009 at FUNDP and an IBM Faculty Award in 2011. He is cofounder and president-elect of the Benelux Association for Information Systems (BENAIS). Jan is actively involved in the upcoming Decision Modeling & Notation standard (DMN) at OMG (Object Management Group). This standard is designed to complement the Business Process Modeling & Notation (BPMN) standard, in order to integrate and distinguish business processes and business decisions. He is also member of the IEEE task force on process mining, and co-author of the Business Process Mining Manifesto.

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Case Management Modelling and Decision-aware Business Processes

Prof. Dr. Knut Hinkelmann, Fachhochschule Nord-West Schweiz

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Abstract

Case management is the management of long-lived collaborative processes that require knowledge, information, and resources to achieve an objective or goal. The path of execution cannot be predefined. Human judgment is required in determining how to proceed. The OMG recently developed a new standard: Case Management Modelling and Notation (CMMN). The lecture will give an introduction into this modelling language and shows, how it can be integrated with Business Process Model and Notation (BPMN). Decision-making is a type of knowledge-intensive tasks which occurs in both cases and structured processes. Decision-aware business processes separate decision logic from process flow, making process models simpler and easier to modify.

Bio

Knut Hinkelmann is dean of the Master of Science in Business Information Systems at the University of Applied Sciences and Arts Northwestern Switzerland FHNW and research associate at the University of Pretoria. At the University of Camerino he is permanent member of the PhD Committee. In 1988 he obtained a diploma in Computer Science from the University of Kaiserslautern and in 1995 a PhD in Natural Sciences from the Computer Science Department of the same university. From 1990 until 1998 he was researcher and head of the Knowledge Management research group at the German Research Center for Artificial Intelligence (DFKI). From 1998 until 2000 he worked as product manager for Insiders Information Management GmbH. He joined the University of Applied Sciences and Arts Northwestern Switzerland FHNW in August 2000 as a professor for Information Systems. From 2002 to 2008 he was dean of the Bachelor of Science in Business Information Technology. His research topics include modelling of knowledge-intensive processes, knowledge management and knowledge technologies. He has been supervisor and external examiner of many PhD theses and guest lecturer at the University of Vienna and University of Camerino. Furthermore he was CEO of the KIBG GmbH from 1996 until 1998; and from 2006 until 2012 he was Scientific Advisor of STEAG & Partner AG.

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Process Modelling and Business Intelligence
Prof. Dr. Wilfried Grossmann, University of Vienna

Abstract

Business Process Modelling (BPM) and Business Intelligence (BI) are two important areas in business informatics, which are treated often rather separated from each other. Looking at the literature and the activities in the two areas shows that process modelling takes a look at the business from a more production and organizational oriented view, whereas business intelligence activities emphasize more the role of the customer in the business process.

In this lecture we want to take a unified view onto these two approaches and show how BPM and BI support each other. For demonstration we use the activities of data understanding and data provisioning which are at the beginning of any BI activity. Due to the abundance of data on the Internet integration of traditional data sources and big data is a challenging task. We present a process model for data integration and show how this model can be realized using the ADOxx platform. The basic idea of the model is simultaneous processing of the data workflow and the associated workflow of the metadata which describe the data processing activities. Such a model supports better understanding of the data and extends traditional methods for accessing data quality.

Bio

Wilfried Grossmann is retired professor at the Faculty of Computer Science at the University of Vienna. He got his PhD at the University of Vienna in Mathematics and has worked and published in the areas Information Management, Mathematical Statistics, Applied Statistics, Statistical Computing, Operations Research, and Metadata. In connection with his research he has participated in European research programs in Official Statistics (Eurostat) as project coordinator and as work group leader. From 2005-2010 he was chair of the Quality Board of Statistics Austria and vice chair of the Austrian Statistics Council. At the moment his main interests are Business Analytics, Applied Statistics and Information Management. Christoph Moser and Wilfrid Utz are PhD students at the University of Vienna.

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Invited Talk
Strategic Models of Enterprises
Prof. Dr. John Mylopoulos, University of Trento & University of Toronto

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Abstract

Enterprise modelling is largely focused on tactical and structural models that capture respectively business processes and enterprise architecture. However, for business analysis and design, strategic models are arguably more important, as they capture the strategic objectives of an enterprise and the alternative ways they might be achieved. This presentation will offer an overview of strategic modelling techniques, and will then focus on the Business Intelligence Model (aka BIM), the types of analysis it supports and some of its extensions and applications.

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Bio

John P. Mylopoulos is professor at the University of Toronto, Canada, and at the University of Trento, Italy. He is known for his work in the field of conceptual modelling, specifically the development of an agent-oriented software development methodology called TROPOS. Mylopoulos was awarded the Peter P. Chen Award for outstanding contributions to the field of conceptual modelling in 2010. In 2012 he also received a Honorary Doctorate from the RWTH Aachen University in recognition of „his excellent and distinctive contributions on the methodology of conceptual modelling as a basis for databases, software technology and artificial intelligence, as well as its interdisciplinary applications".

Changing Corporate Growth Strategy and Shifting Organisational Structure

Prof. Dr. Takashi Hikino, University of Kyoto

Abstract

Management research has long suggested that the development of the firm will follow a similar pattern of growth from a small company with a focused product or process to a large enterprise with technologically-related products and/or vertically-integrated processes. Within a single country or across national economies, the original variations in terms of focus and size of companies may have exhibited for societal non-economics reasons, but ultimately the market efficiency and effectiveness of related product portfolio and vertical integration eventually force most enterprises to adapt to the single trajectory of corporate evolution. Originally proposed by Alfred D. Chandler in the 1960s, this "convergence" model based on the experiences of U.S. large industrial enterprises has appealed to management scholars thanks to the continuous hegemony of American economy and its large industrial enterprises that play the major role within it. Ironically, however, as market liberalization progressed in the global economy since the 1980s, two different models of corporate evolution emerged to challenge the efficiency-driven model of firm growth. The first of the two models is the development of business groups with unrelated product portfolio mainly, yet not exclusively, in emerging markets. Management scholars have conventionally discarded this form of business enterprises as an inherently-inefficient organization that can survive only in the immature economic environment of emerging markets. As some of those economies have got to belong to the high-income OECD group such as South Korea, however, the nation's flagship firms like Samsung and LG still hold on to their original business group form. The second development that has contested the supremacy of the Chandlerian evolutionary model has come from the large enterprises that extensively adopted a network-type organizational structure. Rather than relying on intra-firm operations, enterprises today actively utilize extra-firm resources such as open innovation for R&D, OEM for production and strategic alliances for operational coordination. Through these reform measures today's corporations aim to maximize strategic effectiveness and operational efficiency. This presentation aims to give a systematic review of the ongoing changes of corporate strategy and organizational structure and their economic reasoning and managerial implications.

Bio

Takashi Hikino is Associate Professor of Business and Industrial Organization at the Graduate School of Management and the Graduate School of Economics at Kyoto University. His previous academic affiliation includes: Harvard Business School, Stanford Center for Japanese Studies, Columbia University's Kyoto Center for Japanese Studies, and Institute of Social Sciences, Tokyo University. His publications include Big Business and Wealth of Nations, Cambridge University Press, 1997 (co-edited with Alfred D. Chandler and Franco Amatori), Competing Policies for Competitiveness: Microeconomic Policies During the Golden Age of Capitalism, Oxford University Press, 1998 (co-edited with Hideaki Miyajima and Takeo Kikkawa), The Global Chemical Industry in the Age of the Petrochemical Revolution, Cambridge University Press, 2006 (co-edited with Louis Galambos and Vera Zamagni), and Oxford Handbook of Business Groups, Oxford University Press, 2010 (co-edited with Asli M. Colpan and James R. Lincoln). He is currently working on the research project on the evolution of large enterprises from internationally-comparative perspectives that will be published from Oxford University Press in 2016.

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Crosscutting Issues

Supply Chain Security Services, Models and Procedures
Ass. Prof. Nineta Polemi, University of Piraeus

Foundation

Application

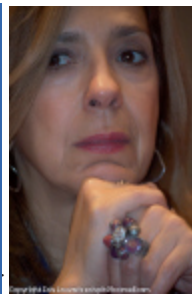**Technologies**

Crosscutting Issues

Abstract

For over a decade significant research efforts have been made towards risk assessment (RA) methodologies especially suited to Critical Infrastructures (CIs). In principle, most of the risk assessment methodologies focus on the identification of threats, vulnerabilities and the related impact and ultimately on the evaluation of the underlying risks. During the lecture, the basic RA concepts and methodological steps will be clarified and open issues will be presented; emphasis will be provided in the weakness of the existing risk assessment methodologies to capture the cascading effects occurring from cross-sectoral and/or cross-border dependencies. As a consequence, they tend to focus on organization-wide risks and they fail to capture the security needs of more complex eco-systems of interdependent organizations. Supply chains are an instance of such a complex, inter-dependent eco-system. A supply chain (SC) contains all resources and processes for the purchase of goods including manufacturing, processing, handling and delivery of goods and related services to the purchaser. SC security management involves the assessment of security risks deriving from interdependent CIs from various sectors, with the transportation sector playing a central role. Indeed, CIs of the transportation sector such as ports, railways and airports are characterized by a plethora of interdependencies at multiple levels (infrastructural, national/intra-sectoral).

During the lecture a SC risk assessment methodology (MEDUSA methodology) will be presented that aims to systematically identify and model interdependencies among business partners within a SC; to evaluate the security risks affecting each business partner and the SC as a whole; to evaluate the security risks arising from various sub-chains within the SC. Specific case study in the maritime sector will be presented in order to clarify the steps of the MEDUSA methodology. The students will be provided with supportive material in order to model the methodology in the specific case study.

Bio

Ass. Prof. Nineta Polemi obtained the Degree in Applied Mathematics from Portland State University (USA), a Ph.D. in Applied Mathematics (Coding Theory) from The City University of New York (Graduate Center). She held teaching positions in Queens College, Baruch College of City University of New York and the State University of New York at Farmingdale. She acted as President of the BoD and Technical Manager in the security consultancy company Expertnet. She is currently an Ass. Prof. in the University of Piraeus (Dept. of Informatics) teaching cryptography, security of ICT systems, port security and e-business. Her current research interests are in the fields of security and collaborative e-services. She has over 100 publications in the above areas and has organised numerous security scientific events. She has received many research grants from various organizations such as the Danish Research Foundation, MSI Army Research Office/Cornell University, IEEE, State University of New York (SUNY), and The Graduate School of City University of New York (CUNY). She has been project manager (PM) / technical manager (TM) in security projects of various programmes such as National Security Agency (NSA), Dr. Nuala McGann Drescher Foundation, Greek Ministry of Defence, INFOSEC (Biometrics Study, EUROMED-ETS, BESTS), TELEMATICS for Administrations (COSACC) and the European Commission (EC). She has acted as an expert and evaluator in the EC and the European Network and Information Security Agency (ENISA).

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Modelling with the eGPM Method

Prof. Dr.-Ing. Heinz Züllighoven and Dr. Holger Breitling, Universität Hamburg

Abstract

The example-based business process modelling method (eGPM) is a visual approach to model selected business processes and their IT-support. The models are easy to understand for people in different departments, business organization and its specialists alike. The method aims at common understanding and communication about the processes which are modelled. Characteristics of the eGPM method are: (a) cooperative business processes are modelled as "cooperation pictures" based on selected scenarios, (b) simple pictograms make models easy to comprehend, (c) processes are structured along the lines of "who makes what with whom". The initial lecture will present the conceptual basis of the eGPM approach, putting business process modelling into the context of application-oriented software development. It will characterize software development as a learning and communication process with a strong need for feedback among all parties concerned. The basic principles and concepts of eGPM approach will be explained. The tutorial will provide hands-on experience with the eGPM tool. Examples from different application domains and usage contexts will show the usability of eGPM in many professional contexts.

Bio

Heinz Züllighoven, graduated in Mathematics and German Language and Literature, holds a PhD in Computer Science. Since October 1991 he is professor at the Computer Science Department of the University of Hamburg and head of the attached Software Technology Centre. He is one of the original designers of the Tools & Materials approach to object-oriented application software and the eGMP approach. Since 2000, Heinz Züllighoven is also one of the managing directors of WPS Workplace Solutions Ltd. He has published a number of papers and books on various software engineering topics. Among his current research interests are a re-vision of the Tools & Materials approach in the light of new interaction means of current frontend technologies and the architecture of large industrial software systems. In addition, he and his co-researchers are further developing the tool support for the eGPM approach.

Holger Breitling graduated in Software Engineering and works as a software architect and managing consultant at Hamburg-based Workplace Solutions, Ltd. He is one of the designers of the eGPM method and acts as product owner (in Scrum terminology) for the eGPM modelling tool. He has frequently given talks and tutorials on example-based modelling. In his daily work, he uses the eGPM method and tooling in projects ranging from off-the-shelve-software evaluation and selection to pure software development, as well as projects that have transformative impact on the structure, processes, IT and business model of a company.

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First Week

Time	19.07.2015	20.07.2015	21.07.2015	22.07.2015
09:00 - 10:30	Participants Arrival	**Opening** W. Klas, Dean, Faculty of Computer Science G. Volz, National Agency for Lifelong Learning **Welcome & Introduction** H.C. Mayr D. Karagiannis	**Capability-oriented Enterprise Modelling and Requirements Engineering** J. Zdravkovic	**Capability Driven Enterprise Knowledge Modelling for Representation and Analysis** E. Kavakli, P. Loucopoulos
10:30 - 11:00				
11:00 - 12:30		**Invited Talk** **Foundations and Principles of Conceptual Modelling** W. Reisig	**The Role of Modelling in Educational Learning Design** P. Reimann	**Model driven DevOps of Multi-clouds Applications** E. di Nitto
12:30 - 14:00				
14:00 - 15:30		**Agile Modelling Method Engineering** D. Karagiannis	**Modelling for Ambient Assistance** H.C. Mayr	**BPM and Ontologies as an Application Domain for Meta-Modelling** H. G. Fill
15:30 - 16:00				
16:00 - 17:30		*Exercises I: Foundations Parallel Working-Groups* Lead: D. Bork	*Exercises II: Applications Parallel Working-Groups* Lead: J. Michael S. Ranasinghe	*Exercises III: Foundations Parallel Working-Groups* Lead: D. Bork

Second Week

Time	26.07.2015	27.07.2015	28.07.2015	29.07.2015
09:00 - 10:30	Leisure Day	**Modelling with the eGPM Method** H. Züllighoven H. Breitling	**Constraints between Modelling Perspectives** M. Jeusfeld	**Vocabulary Problem in BPM** J. P. Moreira de Oliveira
10:30 - 11:00				
11:00 - 12:30		**Ontology Modelling with Description Logics** U. Reimer	**Modelling Knowledge, Action and Time:** **Action Theories and their Application in Dynamic Uncertain Domains** D. Plexousakis T. Patkos	**Analysing Fundamentals of JCS and its Application to Global Service Enhancement** Y. Hara H. Masuda
12:30 - 14:00				
14:00 - 15:30		**A Method for Designing Domain-Specific Modelling Languages** U. Frank	**Enrichment of Run-time Linked Data with Conceptual Model Semantics** R. Buchmann	**Modelling Adaptive Complex Systems** L. Maciaszek
15:30 - 16:00				
16:00 - 17:30		*Exercises IV: Applications Parallel Working-Groups* Lead: H.. Breitling	*Exercises V: Foundations Parallel Working-Groups* Lead: D. Bork	**Modelling Issues for Distributed Mobile Business Processes** M. K. Lee

23.07.2015	24.07.2015	25.07.2015
Enterprise Engineering Needs for Product Service Systems X. Boucher	**Invited Talk** **Strategic Models of Enterprises** J. Mylopoulos	
Break		
Business Decision Modelling J. Vanthienen	**Invited Talk** **Changing Corporate Growth Strategy and Shifting Organizational Structure** T. Hikino	Cultural Activities
Lunch		
Case Management Modelling and Decision-aware Business Processes K. Hinkelmann	**Supply Chain Security Services, Models and Procedures** N. Polemi	
Break		
Process Modelling and Business Intelligence W. Grossmann	**Sponsor Presentation** HILTI	

30.07.2015	31.07.2015	01.08.2015
Domain Specific Modelling M. Rossi	**From Requirements to Code: Conceptual Model-based Software Design** O. Pastor	
Break		
Quality of Enterprise Models J. Krogstie	**Enterprise Modelling and Information Security** M. Kirikova	Participants Departure
Lunch		
Business Processes for Business Communities A. Oberweis A. Koschmider	**Examinations**	
Break		
Exercises VI: Applications *Parallel Working-Groups* Lead: A. Koschmider	**Closing Ceremony** H.C. Mayr D. Karagiannis	

Ontology Modelling with Description Logics

Prof. Dr. Ulrich Reimer, University of Applied Sciences St. Gallen

Abstract

After a short introduction into what an ontology is the course will focus on modelling ontologies using description logics. We will explain the rationale behind the use of a mathematical formalism like description logics as the means to model ontologies. The model-theoretic semantics underlying description logics lays the foundation for terminological reasoning from which various added-value services can be derived. Moreover, since representing ontologies with description logics makes them machine-understandable the ontologies can be easily shared and utilized by different applications, i.e. the semantics is inherent in the representation and does not reside in the programs interpreting the representations. The course will give examples from various application areas how ontology modelling can be utilised.

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Bio

Ulrich Reimer studied computer science and received his doctorate in 1987 at the Information Science Dept. of the University of Konstanz with a thesis on formal ontologies for natural language understanding. From 1987 to 1991 he was assistant professor at the University of Konstanz before becoming the head of the IT R&D group of Swiss Life, the biggest life insurance company in Switzerland, in 1991. In his 10 years at Swiss Life he was responsible for large-scale research projects in the areas of Semantic Web, knowledge management, data mining and e-tutoring. Subsequently he joined an IT and consulting company where he was working on enriching Web-based information systems with Semantic Web functionality. In 2005 he changed to his current position at the Institute of Information and Process Management at the University of Applied Sciences St. Gallen where he is responsible for applied R&D projects. His current research activities are primarily in the application area of e-health and include semantic technologies, knowledge extraction from texts, knowledge management, and model-driven information systems.

A Method for Designing Domain-Specific Modelling Languages

Prof. Dr. Ulrich Frank, Universität Duisburg-Essen

Abstract

In recent years, the development of domain-specific modelling languages (DSML) has gained remarkable attention. This is for good reasons: A DSML incorporates concepts that represent domain-level knowledge. Hence, systems analysts are not forced to reconstruct these concepts from scratch. At the same time, DSML contribute to model integrity, because they include already constraints that would otherwise have to be added manually. Even though there has been a considerable amount of research on developing and using domain-specific modelling languages, there is still lack of comprehensive methods to guide the design of these languages.

In this course the participants will learn to use a method for designing DSML. It includes heuristics to analyse requirements and meta-modelling guidelines that support frequent design decisions. The use of the method will be illustrated by the development of an example DSML.

Bio

Ulrich Frank holds the chair of Information Systems and Enterprise Modelling at the Institute of Computer Science and Business Information Systems at the University of Duisburg-Essen. His main research topic is enterprise modelling, i.e. the development and evaluation of modelling languages, methods and corresponding tools. Further areas of research include research methods, method engineering, models at run time and methods for IT management. He is on the editorial boards of the journals Information Systems Architectures, Business & Information Systems Engineering, Journal of Information System Modeling and Design, Software and Systems Modeling and Information Systems and E-Business Management. He has been actively involved in numerous conferences and various major research projects. He had assignments as visiting researcher/professor in various countries.

Ulrich Frank is the founding director of the international student exchange network IS:link.

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Crosscutting Issues

Constraints between Modelling Perspectives

Prof. Dr. Manfred Jeusfeld, University of Skövde

Abstract

Enterprise models span all levels and perspectives of objects relevant to an enterprise, such as goal models, process models, data models, product models, network structures, interfaces, and so forth. Such models must be kept consistent with each other. The lecture proposes a constraint language that allows to formulate rules at an abstraction level that facilitates their automated re-use. We also discuss the mechanism that makes the elements of heterogeneous modelling languages related to each other and how we can use this view to plan the links between such modelling languages. The technique is applied to existing enterprise modelling approaches such as 4EM and Archimate to demonstrate the required effort. Practical examples and exercises use the ConceptBase meta-modelling system.

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Bio

Manfred Jeusfeld studied computer science from 1980 to 1986 at the University of Technology Aachen (RWTH), Germany. In 1992 he received his Doctoral degree in Natural Sciences from the University of Passau. In 1992 he returned to the RWTH Aachen as a senior researcher of the Information Systems Institute (Informatik V). He is the principal developer of the ConceptBase system (http://conceptbase.cc), which is now used by more than a thousand institutes and companies world-wide for designing information systems and meta-modelling. From 1997 to 2013, he was assistant professor in the department Information Management (IM) of the Tilburg University, The Netherlands. Since 2013 he is lector at the Department of Information Technology, University of Skövde, Sweden. His research covers cooperative conceptual modelling, data warehouse quality management, meta-modelling, method engineering, and repository systems. He is associate information director for ACM SIGMOD and the founder of CEUR Workshop Proceedings, a publication service for open-access proceedings of scientific workshops and conferences.

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Modelling Knowledge, Action and Time: Action Theories and Their Application in Dynamic Uncertain Domains

Prof. Dr. Dimitris Plexousakis, University of Crete and FORTH-ICS
Dr. Theodore Patkos, FORTH-ICS

Abstract

The modelling of knowledge, action and time is a topic of current research within the broader domain of knowledge representation and reasoning. The course will focus on declarative approaches for modelling and reasoning with change, paying particular attention to the integration of knowledge and action (by means of artificial software agents). As time is inherent in any type of activity and process, the course will also deal with the representation of temporal properties that characterize the occurrence of actions and the knowledge they generate. Practical aspects of reasoning about knowledge, action and time in the context of agent-based systems, ambient intelligence and cognitive robotics will be exposed in addition to the theoretical frameworks. Students will also have the ability to conduct exercises with software implementing a fully-axiomatized event-based formalism, in order to address reasoning problems involving aspects such as commonsense reasoning and planning, cast in the context of ambient environments and cooperating intelligent agents.

Bio

Dimitris Plexousakis is a Professor of Computer Science at the Univ. of Crete and Head of the Information Systems Lab. He obtained a PhD in Computer Science from the Univ. of Toronto in 1996. His research interests lie in the areas of Conceptual Modeling, Knowledge Representation and Reasoning; Formal models and query languages for the Semantic Web; process and service modelling. He has extensive experience in coordinating and participating in National and European Projects and over 150 publications in peer-reviewed journals and conferences.

Theodore Patkos is a postdoctoral researcher at FORTH-ICS. He holds a PhD in Computer Science from the University of Crete since 2010 studying formal methods for commonsense reasoning in dynamic environments and their application to Ambient Intelligence domains. His research interests include knowledge representation and non-monotonic reasoning with emphasis on action languages, contextual and commonsense reasoning, multi-agent systems, argumentation and formal knowledge representation models for the Semantic Web.

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Enrichment of Run-time Linked Data with Conceptual Model Semantics

Ass. Prof. Dr. Robert Buchmann, University Babes-Bolyai Cluj

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Abstract

The lecture discusses „process-aware information systems" (PAISs) and „schema-aware information systems" as specializations for the overarching notion of „conceptual model"-awareness. To this aim, the vision employs meta-modelling and Agile Modelling Method Engineering (AMME) as enablers for domain-specific diagrammatic modelling, which enriches the semantics of back-end information, therefore extending the query possibilities at run-time. Linked Data is employed as integration technology for model repositories, thus establishing a convergence between the paradigm of process-awareness and the Web of Data. The lecture generalizes ideas that emerged from experiences within the ComVantage EU research project. In order to facilitate understandability, a demonstrative proof-of-concept of minimal complexity based on the AMME approach illustrates the vision.

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Bio

Ass. Prof. Dr. Robert Buchmann received his PhD from „Babeș-Bolyai" University Cluj, Romania, in 2005, in the field of Business Information Systems. As a lecturer in the same university, he further specialised in semantic information systems design. He worked between 2011 and 2014 at the University of Vienna, Research Group Knowledge Engineering, as a team leader in the ComVantage FP7 research project, investigating the interplay between modelling methods and semantic information systems.
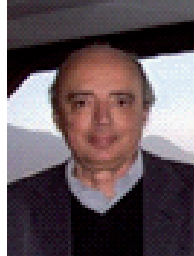
Vocabulary Problem in BPM

Prof. Dr. Jose Palazzo Moreira de Oliveira, Universidade Federal do Rio Grande do Sul

Abstract

The central point of this presentation is the vocabulary problem in the context of process models and why ontologies can improve this representation. Process models are composed of graphical elements and words. However, words used to name elements during process design have potentially ambiguous meanings, which might result in quality problems. Different levels of explicitness affect the labels but are not sufficient to solve the vocabulary problem. The use of ontologies, dictionaries, and thesaurus is a mean to improve the identification of activity process models' labels. This presentation discusses aspects related to words used to represent concepts in labels and why ontologies can improve this representation. Another aspect discussed is the verification if ontologies supporting modelling do not generate drawbacks such as increasing modeller's cognitive load.

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Bio

José Palazzo Moreira de Oliveira is full professor of Computer Science at Federal University of Rio Grande do Sul - UFRGS. He has a doctor degree in Computer Science from Institut National Politechnique de Grenoble, France IMAG (1984), a M.Sc. degree in Computer Science from PPGC-UFRGS (1976) and has graduated in Electronic Engineering (1968). His research interests include information systems, e-learning, database systems and applications, conceptual modelling and ontologies, applications of database technology and distributed systems. He has published about 320 papers, has being advisor of 78 graduate students (18 Ph.D. and 60 M.Sc.). Prof. Palazzo was head of the graduate program in Computer Science, UFRGS; member of the Computer Science advisory board of the National Research Council of Brazil, CNPq; head of the Computer, Statistics and Mathematics section of the State Research Founding Agency – FAPERGS among other administrative duties.

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Analysing Fundamentals of Japanese Creative Services and its Application to Global Service Enhancement

Prof. Dr. Yoshinori Hara, Kyoto University
Ass. Prof. Dr. Hisashi Masuda, Japan Advanced Institute of Science and Technology

Abstract

We define Japanese creative services and discuss how they have been sustained successfully and their application to global service enhancement. There are many "Shinise" (shops of long standing) service companies in Japan that are quite unique compared to the companies located in any other geographical region. They typically have anecdotal values based on nature and seasons, various types of culture, histories, and/or lifestyles. Several Japanese creative services are expanding their activities toward global markets. We explain the mechanisms of the sustainability and scalability of advanced cases of Japanese Creative Services. A key aspect of the mechanism is a communication between service providers and consumers based on sharing/interpreting/utilizing of tacit context in a community. For analysing the key aspect, we propose the combined approach of sociology/anthropology, psychology, engineering and design thinking. We developed a meta-modelling platform for handling the combined analysis of the Japanese Creative Services. We believe that this kind of approach will contribute to creating new values within the field of service science and for value-added global services.

Bio

Dr. Yoshinori Hara serves as professor, Graduate School of Management, Kyoto University, since April 2006, when the graduate school was established. His current research focus includes innovation management, service and design management, and open innovation with IT frameworks. Prior to joining Kyoto University, he held various research and key management positions at R&D organizations in NEC Corporation, for 13 years in Japan, and for 10 years in the Silicon Valley, California, USA. He was responsible for conducting research and development on advanced ubiquitous computing including Web/Hypermedia systems, mobile & embedded systems, adaptive user interfaces, advanced information retrieval technologies, system security & reliable systems, etc. From 1990 to 1991, he was Visiting Researcher at the Department of Computer Science, Stanford University. He received his B.E. and M.E. from University of Tokyo, and his Ph.D. from Kyoto University.

Dr. Hisashi Masuda serves as assistant professor, School of Knowledge Science, Japan Advanced Institute of Science and Technology. He received his B.S. from Chiba University in 2008, and received his MBA and his Ph.D. from Kyoto University in 2010 and in 2013, respectively. His research focuses on service engineering, service marketing, applied microeconomics, and knowledge engineering. Some of his publications are: (1) Hisashi Masuda and Wilfrid Utz, "The Development of Web Questionnaire with Business Process Modeling for Service Evaluation", The Second Asian Conference on Information Systems (ACIS), 2013, (2) Hisashi Masuda and Yoshinori Hara, "Using Value-in-Use: A Dynamic Model for Value-in-Exchange and Value-in-Use", 1st International Conference on Human Side of Service Engineering (HSSE) pp. 5972-5980, 2012.

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Modelling Adaptive Complex Systems
Prof. Dr Hab. Leszek A. Maciaszek, Wroclaw University of Economics

Abstract

Traditional software engineering and management struggles to properly address systems complexity and adaptiveness. It offers only incomplete and disconnected methods for building software systems with only fragmentary ability to dynamically accommodate change and to grow gracefully. The contemporary paradigm shift to cloud-based service-oriented software production and delivery has introduced new difficulties and perspectives on complexity management. Service systems assume dynamic composition of services and emergent behavior and, therefore, they emphasize implementation over architecture (and over project management at large). The consequences are unclear. This course will discuss modelling of both traditional and modern information systems from the viewpoint of their adaptive complexity and will identify opportunities and risks that service-centered thinking brings into the discipline of software engineering.

Computer Science and Information Systems).

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Bio

Leszek A. Maciaszek is an academic, researcher, industry consultant and author. He resides in Poland and in Australia. He holds the chair of Information Systems and is the Director of Institute of Business Informatics at Wrocław University of Economics. He is also an Honorary Research Fellow at Macquarie University Sydney, Australia. He has worked as a Visiting Professor/ Scientist in more than 20 universities/research centers in countries on four continents. He has authored a number of books „Database Design and Implementation" (Prentice Hall), "Requirements Analysis and System Design" (Addison Wesley, three editions) and "Practical Software Engineering" (Addison Wesley), some translated from English to Chinese, Russian and Italian. He has co-initiated a number of yearly international conferences, including ENASE (Evaluation of Novel Approaches to Software Engineering) and FedCSIS (Federated Conference on

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Modelling Issues for Distributed Mobile Business Processes

Prof. Dr. Moon Kun Lee, Chonbuk National University

Abstract

Generally enterprise modelling for business processes has not significantly dealt with process' mobility with temporal requirements over geographical space. For example, it will be one of the mobility issues that the mobility of actors in business processes should be geographically specified and verified with deadlines in a target business environment. Among formal methods, process algebra is the most suitable method for modelling the mobility over such distributed environments, due to the notion of the concurrency, distribution, movement, interaction and the control of processes, as well as their temporality. The most well-known process algebras are CCS, π-Calculus, Mobile Ambient, ACSR, etc. However they have limitations to represent the real aspects of the mobility due to the lack of features to represent different types of mobility, based on different aspect of autonomy, synchrony, priority, temporality, etc. In the lecture, a new algebra, called δ-Calculus, will be introduced to show how the algebra with the full features can be used to model the mobility. The appropriateness of the calculus will be demonstrated in a tool, called SAVE, which has been developed on ADOxx meta-modelling platform. At the end, the detailed architecture of the tool will be presented to show how effectively and efficiently the tool has been developed by using the basic facilities of ADOxx.

Bio

Currently, Prof. in Division of Computer Science and Engineering in Chonbuk National University, Republic of Korea. Received Bachelor degree in Computer Science, Pennsylvania State University, USA; Master degree in Computer & Information Science, The University of Pennsylvania, USA, Analysis of Parallelism for MODEL Equational Language, advised by Prof. Noah Prywes; Ph.D. degree in Computer & Information Science, The University of Pennsylvania, USA. An Environment for Understanding Real-time Software, advised by Prof. Noah Prywes and Prof. Insup Lee. Worked at CCCC, USA, as a Computer Scientist; Developed SRE(SW Re/reverse-engineering Environment); Applied to modernization of legacy OS and SW from US Navy at NSWC. Main research interests are SW round-trip engineering, distributed real-time systems, formal methods - developed ATM, CARD-MI and Onion, behaviour engineering - developed Behavior Ontology with n:2-Lattice, etc. Currently focused on collective behaviour engineering for distributed mobile systems with δ-Calculus, to be implemented in ADOxx$^{®}$.

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Domain Specific Modelling
Prof. Dr. Matti Rossi, Aalto University

Abstract

The course introduces students to developing new modelling languages through Domain Specific Modelling approach with MetaEdit+ platform. During this course the students will get an overview of working with MetaEdit+ when developing DSM's and then develop support environment for their own modelling language. The tool allows language developers to rapidly build and evolve their methods and then try them out on the fly.

Bio

Matti Rossi is a professor of information systems at Aalto University School of Business. He has worked as research fellow at Erasmus University Rotterdam, visiting assistant professor at Georgia State University, Atlanta and visiting researcher at Claremont Graduate University. He has been the principal investigator in several major research projects funded by the technological development center of Finland and Academy of Finland. He was the winner of the 2013 Millenium Distinction Award of Technology Academy of Finland for open source and data research. His research papers have appeared in journals such as MIS Quarterly, Journal of AIS, Information and Management and Information Systems. He has been a senior editor of JAIS and Database, and he is the editor in chief of Communications of the Association for Information Systems. Matti Rossi is a member of IEEE, ACM and AIS.

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Quality of Enterprise Models
Prof. Dr. John Krogstie, Norwegian University of Science and Technology

Abstract

We have for many years worked with SEQUAL, a framework for understanding the quality of models and modelling languages, which covers all main aspects relative to quality of models. SEQUAL has three unique properties compared to other frameworks for quality of models:

- It distinguishes between quality characteristics (goals) and means to potentially achieve these goals by separating what you are trying to achieve from how to achieve it.
- It is closely linked to linguistic and semiotic concepts. In particular, the core of the framework including the discussion on syntax, semantics, and pragmatics is parallel to the use of these terms in the semiotic theory of Morris. A term such as 'quality' is applicable on all semiotic levels. We include physical, empirical, syntactical, semantical, pragmatic, social, and deontic quality in the work on SEQUAL.
- It is based on a constructivistic world-view, recognizing that models are usually created as part of a dialogue between those involved in modelling, whose knowledge of the modelling domain changes as modelling takes place.

We will in the talk present the general SEQUAL framework and how it can be specialized for investigating the quality of enterprise models. Starting from a generic framework means that we can reuse a number of aspects being of general relevance for modelling, and thus better ground the proposals, both for quality of enterprise models, modelling languages, and accompanying approaches, methods and tool to achieve and keep models of high quality.

Bio

Prof. John Krogstie (1967) received a M.Sc. in Information Systems from IDT, NTH in 1991 and has a Ph.D. in Information Systems (IDI, NTNU) from 1995. He was employed as a manager in Accenture 1991-2000. In 2000-2005 he was employed by SINTEF as senior researcher, and was a senior advisor at SINTEF 2005-2008. Since 2005 he has been Professor at IDI, NTNU, focusing on enterprise and process modelling, quality of models and modelling languages, eGovernment, digital ecosystems, and mobile and ubiquitous information systems. Krogstie leads the faculty lighthouse on Open, Autonomous Digital Ecosystems (OADE), and the Wireless Trondheim Living Lab. Krogstie is Chair of IFIP WG 8.1 on Design and Evaluation of Information Systems (2010-2015, vice-chair 2004-2009) John Krogstie has published around 200 refereed papers in journals, books and archival proceedings since 1991. Current (May 2015) H-index is 30. G-index 48. See http://www.idi.ntnu.no/~krogstie/ for more information.

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Business Processes for Business Communities
Prof. Dr. Andreas Oberweis and Dr. Agnes Koschmider, Karlsruhe Institute of Technology

Abstract

Several languages have been suggested for modelling business processes. Practice shows, however, that a powerful modelling language alone is not enough. Users require guidance and assistance in the preparation of models, that is, during application of the language. In this course the students will learn the Horus Method. This method defines various stages of modelling and is a recipe-like guideline that has been proven in practice. In practical exercises to this lecture students will collaborate in a Web 2.0-based social network, to define business objectives, strategies and business processes together and will elaborate a common understanding of an organization.

Bio

Andreas Oberweis is Professor for Applied Informatics at the Karlsruhe Institute of Technology (KIT) since 2003. Since 2004 he is also Director at the Research Center for Information Technology (FZI) Karlsruhe in the Research Group Software Engineering. He received a Doctoral Degree in Informatics from Universität Mannheim in 1990 and a Habilitation Degree in Applied Informatics from Universität Karlsruhe in 1995. From 1995 to 2003 he was Professor for Information Systems Development at Goethe-Universität Frankfurt/Main. His research and teaching interests are in the field of business process engineering and information systems development. He is co-founder of PROMATIS software GmbH (1994) and HORUS software GmbH (2009) in Ettlingen. Since 2004 he is Program Director of the Master Program Service Management and Engineering at the Hector School of Engineering and Management. Since 2014 he is Vice President of the Gesellschaft für Informatik (GI).

Agnes Koschmider is a post-doctoral researcher at the Institute of Applied Informatics and Formal Description Methods (AIFB) at the Karlsruhe Institute of Technology (KIT). In 2007 Agnes received a doctoral Degree in Applied Informatics from University Karlsruhe. She studied from 1998-2003 and, received her Diploma degree 2003 in Business Administration from the Goethe University Frankfurt/Main. Her current research concentrates on process model reuse, modeling support techniques and empirical business process modelling. In September 2013 she was named a junior fellow of the German Informatics Society (Gesellschaft für Informatik).

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From Requirements to Code:
Conceptual Model-based Software Design
Prof. Dr. Oscar Pastor, Universidad Politecnica de Valencia

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Abstract

A crucial success factor in information systems development is the alignment of the system with business goals, business semantics and business processes. Developers should be freed from programming concerns and be able to concentrate on these alignment problems. The application of sound Conceptual Modelling techniques within a Model-driven system development (MDD) not only provides a structured and systematic approach to systems development, but also offers developers the possibility of using model transformation technologies to derive models of a lower abstraction level that can be further refined, and even generate software code automatically.

From the experience got with the advanced MDD platform provided by Integranova, this presentation will show how to successfully integrate business process modelling (BPM), requirements engineering (RE) and object-oriented conceptual modelling with the objective of leveraging MDD capabilities. The current state of the art on modelling methods and code generation tools will be discussed to explore different ways to match an information system with business requirements. Concrete principles, concepts and common practices of MDD will be presented with a special focus on model-driven requirements engineering, meaning by it how business process models and requirements models can be embedded in a complete Conceptual Modelling-based software production process. As a practical application, a specific method and notations are explained, but the ultimate goal is that assistants are able to apply this knowledge to their own contexts, either in industrial practice or academic research.

Bio

Full Professor and Director of the Research Center on „Métodos de Producción de Software (PROS)" at the Universidad Politécnica de Valencia (Spain). He received his Ph.D. in 1992. He was a researcher at HP Labs, Bristol, UK. He has published more than two hundred research papers in conference proceedings, journals and books, received numerous research grants from public institutions and private industry, and been keynote speaker at several conferences and workshops. Chair of the ER Steering Committee, and member of the SC of conferences as CAiSE, ICWE, CIbSE or RCIS, his research activities focus on conceptual modeling, web engineering, requirements engineering, information systems, and model-based software production. He created the object-oriented, formal specification language OASIS and the corresponding software production method OO-METHOD. He led the research and development underlying CARE Technologies that was formed in 1996. CARE Technologies has created an advanced MDA-based Conceptual Model Compiler called OlivaNova, a tool that produces a final software product starting from a conceptual schema that represents system requirements. He is currently leading a multidisciplinary project linking Information Systems and Bioinformatics notions, oriented to designing and implementing tools for Conceptual Modelling-based interpretation of the Human Genome information.

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Enterprise Modelling and Information Security
Prof. Dr. Marite Kirikova, Riga Technical University

Abstract

Current business process modelling approaches are well suited for showing the sequence of activities. They are less appropriate for reflecting information flows. However, in the context of information security, the reflection of information flows is an essential instrument for analysing the way how information shall be organized with respect to the activity flow and enterprise architecture. Taking into consideration that security concerns not only technical devices and access rights in databases, the enterprise models that reflect organizational structure (including particular individuals), technical architecture, information architecture, and relationships between aforementioned models are useful to identify and use different patterns that reflect the need for caring for security. The usage of the enterprise models also helps to identify methods for establishing the requested level of security. To illustrate how enterprise models are used in caring for information security, several security patterns prescribed by SREBP approach and corresponding methods of ensuring requested level of security will be presented and analysed.

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Bio

Dr.sc.ing. Mārīte Kirikova is a Professor in Information Systems Design at the Department of Artificial Intelligence and Systems Engineering, Faculty of Computer Science and Information Technology, Riga Technical University, Latvia. She has more than 150 publications on the topics of requirements engineering, business process modelling, knowledge management, systems development and educational informatics. She is also a co-editor of several scientific proceedings in the area of databases, information systems, information systems engineering, enterprise modelling, systems and business, and business informatics. Marite Kirikova has participated in university research and teaching teams in Sweden, Denmark, Austria, and USA. In her research currently she focuses on continuous information systems engineering in the context of agile and viable systems paradigms.

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Foundation Exercises:
Modelling Scenarios for a Smart City

Internet of Things (IoT) such as ubiquitous sensors, mobile devices, and permanent online interaction have recently also been adopted for the area of urban development. Thereby, the transition towards user-driven digital ecosystems in the form of Smart Cities becomes apparent on three levels: a) innovation economy, b) city infrastructure and utilities, and c) governance [1]. In the following exercises we will primarily focus on the aspects of the city infrastructure and the utilities. This will be a key element in realizing services such as smart parking, mobility, or the monitoring of the environment in terms of real-time alerts and safety management.

In particular, the increasing usage of IoT technology in smart vehicles, smart infrastructure and smart phones allows developing new business models and services. Based on the tremendous amount of information that is generated every second by sensors in a smart environment, innovative applications such as services for environmental and energy monitoring, services for the prediction of mobility requirements, smart meters for measuring resource consumption can be realized [cf. 2]. In this context three foundation exercises have been designed to familiarize the students with modelling concepts, model querying and model processing in an independent application domain.

Foundation Exercises	**I: Modelling Concepts**	**How to model concepts of a Smart City?** Basic meta-modelling concepts required to realize a modelling language for a Smart City are taught. Tools of the OMiLAB, e.g., the GraphRep generator will be introduced and utilized to create graphical visualizations for the Smart City concepts.
	III: Queries, e.g, Analysis	**How to analyze Smart City models using query techniques?** Basic model analysis techniques will be discussed, enabling the modeler to use the information captured in the models in order to e.g., answer non-trivial questions, or support decision makers. As an illustrative scenario, queries will be executed on Smart City models.
	V: Processing, e.g., Simulation	**How to process Smart City models using simulation?** Introduction to simulation algorithms and how they can be applied to process the information captured in conceptual models. Afterwards, hands-on experience will be achieved by realizing and executing several simulation algorithms using the built-in functionality of the ADOxx platform and the Smart City models.

In three sessions, the students are given an introduction to the foundations of meta-modelling, model analysis & querying, and model processing through simulation & algorithms. Every session will comprise theoretical background, a demonstration using the Smart City scenario, and hands-on parts by means of practical implementation using the ADOxx meta-modelling platform.

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[1] Schaffers et al. (2011): Smart Cities and the Future Internet: Towards Cooperation Frameworks for Open Innovation, in: J. Domingue et al. (Eds.): Future Internet Assembly, pp. 431–446, Springer.
[2] Hernández-Muñoz, J.M. et al. (2011): Smart Cities at the Forefront of the Future Internet, in: J. Domingue et al. (Eds.): Future Internet Assembly, pp. 447–462, Springer.

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