SKY'2015

6th International Workshop on Software Knowledge

12 November 2015, Lisbon, Portugal

Hosted by IC3K'2015 – The 7th International Joint Conference on Knowledge Discovery, Knowledge Engineering and Knowledge Management

Committees

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Advisory Committee

To be announced soon.

Important Dates

September 02, 2015: Full & Position Papers Submission

September 18, 2015: Author Notification

September 25, 2015: Final Paper Submission and Registration

November 12, 2015: Full day Workshop

Scope

"**S**oftware **K**nowledge" – in short SKY – means that software in its higher abstraction levels is a new kind of *knowledge*, *Runnable knowledge* as an end goal. Thus, the classes and relationships of a software system design are easily viewed as classes and relationships in a knowledge ontology.

For further details and previous SKY Workshops visit **www.SoftwareKnowledge.org**.

The main theme of the SKY2015 Workshop is *Big Data in Software Knowledge.* The exponential growth and availability of data, both structured and unstructured is the main focus point for SKY2015. Time is ripe to investigate the promising implications of Big Data and new ideas on how to deal with huge amounts of Knowledge in the System Environments.

The Workshop main objective is to discuss and propose practical tools and scientific approaches to deal not only with experimental and laboratory research, but to facilitate the management of Big Data for industrial systems.

Program Committee

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Expected Outcomes

Expected outcomes of the SKY2015 Workshop are:

- Proposals of new tools, techniques, methods and methodologies for large-scale Software-Knowledge Big Data management.

- A continuing effort to standardize a Software-Knowledge representation consisting of software models encompassing semantics as first class objects.

Publications

All accepted papers, including position papers, will be published in the workshop proceedings book and on CD-ROM support, under an ISBN reference.

All papers presented at the conference venue will be available at the SciTePress Digital Library
 (http://www.scitepress.org/DigitalLibrary/).
SciTePress is a member of CrossRef
(http://www.crossref.org/).

Topics of Interest

Software Knowledge is a *runnable expression of meaning*. Running facilitates understanding in a very general sense. This is the rationale for the debugging process in a micro scale, where one runs and breaks at desired points to understand the reason of software failures. This is the basis of agile methods to manufacture and test concurrently, in a medium scale. This is the possible source of great new tools, in a macro scale, from the software hierarchy *highest abstraction levels* down to executable code.

SKY2015 topics of relevance include but are not limited to

Software-Knowledge Big Data: Tools, Operations and Methods

Big Data in the Software-Knowledge view
Dealing with huge amounts of Knowledge
Big Data in the Cloud
Big Data Analytics and Data Mining
Natural Language Processing for Big Data
Dealing with diverse kinds of Big Data
Capture, manage, process and visualize data within a tolerable elapsed time
Big social and semantic data analysis
Sentiment-based indexing and information retrieval
Opinion mining
Machine Learning and Big Data
Large scale Knowledge management
Software Knowledge for higher level services and tools (e.g, Hadoop, Hive)

Software-Knowledge Runnability and Meaning

Ontologies in complex systems
Ontologies for Software Requirements verification
Semantics above and beyond design patterns
Runnable and testable knowledge representations
Software-Knowledge representation and modeling
Web dynamics and interestingness
Software-Knowledge Requirements for Large Scale Systems
Abstract Operations for Industrial Applications
Software-Knowledge selectivity and traceability
Software-Knowledge Sharing: Meta-models, interchange formats, and tools
Knowledge Driven Architecture and Engineering

Paper Submission

Prospective authors are invited to submit papers in any of the topics listed above. Instructions for preparing the manuscript (in Word and Latex formats) are available at: http://www.ic3k.org/GuidelinesTemplates.aspx.
Papers should be submitted electronically via the web-based submission system at: http://www.insticc.org/Primoris.

Invited Speakers

Formal Ontology, Patterns and Anti-Patterns for Next-Generation Conceptual Modeling

Giancarlo Guizzardi

Federal University of Espirito Santo, Brazil and Laboratory for Applied Ontology (LOA), Institute for Cognitive Science and Technology, Italian National Research Council (CNR) Italy

Brief Bio

Giancarlo Guizzardi holds a PhD (with the highest distinction) in Computer Science from the University of Twente, in The Netherlands. He coordinates the Ontology and Conceptual Modeling Group (NEMO) at the Federal University of Espírito Santo in Brazil. He is also an Associate Researcher at the Laboratory of Applied Ontology (ISTC-CNR), Trento, Italy. Between 2013 and 2015, he was also a Visiting Professor at the University of Trento, Italy. He has been doing research in ontology and conceptual modeling for the past two decades and has published over 170 publications in these areas (including 9 award-wining publications). Over the years, he has contributed to the ontology and conceptual modeling communities in roles such as keynote speaker (e.g., ER), general chair (e.g., FOIS), tutorialist (e.g., CAISE, ER) and PC Chair (e.g., FOIS, EDOC). He is an associate editor of the Applied Ontology journal and is a member of editorial boards of a number of other international journals (e.g., Requirements Engineering). Between 2012 and 2014, he was an elected member of the Executive Council of the International Association of Ontologies and its Applications (IAOA) and currently is a member of its Advisory Board (since 2014). Finally, his experience in ontology-driven conceptual modeling has also been acquired in a number of industrial projects in domains such as off-shore software development, energy, digital journalism, government, telecommunications, product recommendation, and complex media management.

Abstract

In his ACM Turing Award Lecture entitled "The Humble Programmer", E. W. Dijkstra discusses the sheer complexity one has to deal with when programming large computer systems. His article represented an open call for an acknowledgement of the complexity at hand and for the need of more sophisticated techniques to master this complexity. This talk advocates the view that we are now in an analogous situation with respect to Conceptual Modeling. We will experience an increasing demand for building Reference Conceptual Models in subject domains in reality, as well as employing them to address classes of problems, for which sophisticated ontological distinctions are demanded. One of these key problems is Semantic Interoperability. Effective semantic interoperability requires an alignment between worldviews or, to put it more accurately, it requires the precise understanding of the relation between the (inevitable) ontological commitments assumed by different conceptual models and the systems based on them (including sociotechnical systems). This talk advocates the view that an approach that neglects true ontological distinctions (i.e., Ontology in the philosophical sense) cannot meet these requirements. The talk discusses the importance of foundational axiomatic theories and principles in the design of conceptual modeling languages and models. Moreover, it discusses the role played by three types of complexity management tools: Ontological Design Patterns (ODPs) as methodological mechanisms for encoding these ontological theories; Ontology Pattern Languages (OPLs) as systems of representation that take ODPs as higher-granularity modeling primitives; and Ontological Anti-Patterns (OAPs) as structures that can be used to systematically identify possible deviations between the set of valid state of affairs admitted by a model (the actual ontological commitment) and the set of state of affairs actually intended by the stakeholders (the intended ontological commitment). Finally, the talk elaborates on the need for proper computational tools to support a process of pattern-based conceptual model creation, analysis, transformation and validation (via model simulation).

Learning the Meaning of Language and Using it Creatively

Hugo Gonçalo Oliveira

Center for Informatics and Systems, Department of Informatics Engineering, University of Coimbra, Portugal

Brief Bio

Hugo Gonçalo Oliveira is a researcher in the Center of Informatics and Systems of the University of Coimbra (CISUC), Portugal, and a PhD holder since May 2013. His research activities started in 2006, with the development of Tra-la-Lyrics, a system for the automatic generation of text, given a rhythm, in the scope of his MSc degree in Computer Science, obtained in 2007, in the University of Coimbra (UC). Hugo was a researcher of Linguateca, a distributed language resource center for Portuguese, where he worked on the development of the lexical network PAPEL, automatically extracted from a Portuguese dictionary, and he co-organized the Second HAREM, an evaluation campaign on Portuguese Named Entity Recognition. As a student of the Doctoral Program in Information Science and Technology, also in the UC, he developed Onto.PT, a wordnet-like lexical ontology for Portuguese, and ECO, its automatic creation approach from textual sources. Since September 2013, Hugo is an (Invited) Assistant Professor in the Department of Informatics Engineering of the UC. He currently works on Information Extraction and Natural Language Processing (NLP), in the scope of national projects, and he is involved in the FP7 project ConCreTe -- Concept Creation Technologies -- where he has been applying different NLP tools and resources to produce creative text, including poetry, in different languages, or humor, in Portuguese.

Abstract

Unlike programming languages, natural language is ambiguous. To deal with semantic ambiguities, applications often resort to wordnets, knowledge bases structured in the words of a language and their

meanings. There are wordnets for many languages, mostly handcrafted or relying on the translation of Princeton WordNet, the original, which targets English and is the product of 30 years of manual labor. The first part of this talk will present ECO, an alternative approach for learning wordnets automatically from dictionaries and other textual resources of a language. Semantic relations are extracted, concepts are discovered from the synonymy relations, and the remaining relations are attached to the most suitable concepts. ECO was applied to the creation of Onto.PT, a large Portuguese wordnet. Wordnets are useful when ambiguities need to be solved, when considering related words increases recall, or to add vocabulary and handle meaning in natural language generation systems. The second part of this talk will overview PoeTryMe, an intelligent system for poetry generation, where language is used creatively, but still with semantic and form constraints. A common feature of poetry is the presence of figurative language. So, ambiguity can be seen as a plus for this purpose, which is why PoeTryMe uses the relations in a wordnet, but does consider the different senses of the same word.

Ontology-based Systems Engineering - The Smart Way of Realizing Complex Systems

Ralf Bogusch
Airbus Defense and Space,   Germany

Brief Bio

Dr. Ralf Bogusch received a MS degree in Technical Cybernetics from the University of Stuttgart, Germany, in 1992 and his PhD in Computer-aided Modelling from the Technical University of Aachen, Germany, in 2001. After his academic career, he has practiced application of software and systems engineering in the aerospace and automotive industry for fifteen years. His research interests and published papers cover requirements engineering, product family management, model-based systems engineering and model-based testing. Currently he is an Expert for Validation and Verification Processes, Methods and Tools at Airbus Defence and Space. In this role he supports the Airbus Group PLM (Product Lifecycle Management) strategy, provides corporate trainings and leads improvement projects. He has represented Airbus Defence and Space in a number of EU funded ARTEMIS (Advanced Research & Technology for EMbedded Intelligence and Systems) projects on developing ontologies for systems engineering, pushing interoperability specifications towards standards and industrializing reference technology platforms for the development of safety-critical embedded systems. He received a Lean Six Sigma Black Belt degree in 2011 and the Airbus Engineering Award   Top Innovation and Design   in 2012.

Abstract

Systems engineering constitutes a holistic and interdisciplinary approach to enable the realization of successful systems that meet customer expectations. Today, stakeholders demand increasingly capable systems that are growing in complexity. Model-based approaches which involve application of system modelling for requirements, design, analysis, verification, and validation, are becoming more and more popular in order to deal with the increase of system complexity. However, model-based systems engineering is still in the early stage of maturity. According to the INCOSE Systems Engineering Vision 2025, formal systems modelling based on knowledge representation will be a standard practice in the future. Advanced simulation capabilities will enable understanding of complex system behaviour in a virtual environment, immersive technologies will allow data visualization, semantic web technologies will facilitate data integration, reasoning will aid decision making, and finally communication technologies will support collaboration across interdisciplinary teams. Ontology engineering helps advance model-based systems engineering towards this vision. For example, the combination of a controlled vocabulary and underlying formalism provides the opportunity to create high-quality requirements and models, improve semantic interoperability and enable additional analysis. This talk reports about current experiences gained from the European research project CRYSTAL and the envisioned work.

Registration Information

At least one author of an accepted paper must register for the workshop, and the registration fees received by **September 25, 2015**, in order to have the paper published in the workshop proceedings book.

Secretariat Contacts

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