FedCSIS 2012 Tutorial - Semantic Knowledge Engineering for Business Intelligence: concepts and tools

The workshop is targeted on a broad audience familiar with methods of Artificial Intelligence and Business Intelligence. It is intended to give a theoretical background as well as practical approach and tools. It can also serve as a source of inspiration both for researchers involved in this and similar domain and PhD students working in the area of Knowledge Engineering and Software Engineering. Representatives of industry and members of software management staff are also cordially welcome.

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Abstract

Knowledge-Based Systems are an important class of intelligent systems originating from the field of Artificial Intelligence, and now widely used in business and industry. In the creation of such systems a number of knowledge formalization and representation methods are used. Recently there has been a growing interest in the use of the socalled Business Rules in such systems. Moreover, the rules need to be aligned and integrated with the Business Processes of an enterprise. The semantics of such a heterogeneous systems is often captured with the use of Formal Ontologies providing a common vocabulary for business concepts. Design, analysis and deployment of such systems remains a great challenge for knowledge engineers and business software architects. The tutorial presents a coherent methodology capturing knowledge representation, knowledge management and application with focus on semantic aspects – the Semantic Knowledge Engineering approach. It supports design, verification and deployment of knowledge base systems that integrate rules, process and ontologies using a formalized framework for knowledge representation and processing. During the tutorial the conceptual foundations of the methodology are given, including the hierarchical design process, concept formalization with the ALSV(FD) logic, and rule representation with the XTT2 method. Then a number of practical methods and tools for a visual and collaborative modeling rules and business process based on ontologies are given. Finally, the applications of this approach in the field of Business Intelligence are discussed and presented.

Table of Content

1. SKE: Introduction, Concepts, and Design Process. (Grzegorz J. Nalepa - gjn@agh.edu.pl)
2. Rule Formalization with ALSV(FD) and XTT2. (Antoni Ligęza - ligeza@agh.edu.pl)
3. Visual Rule Modeling with HQEd. (Krzysztof Kaczor - kk@agh.edi.pl)

4. Rule Execution in HeaRT. (Szymon Bobek - szymon.bobek@agh.edu.pl)
5. Knowledge Modeling with Loki. (Weronika T. Adrian - wta@agh.edu.pl)
6. Integrating Rules with Processes towards Semantic Business Intelligence. (Krzysztof Kluza - kluza@agh.edu.pl)

Useful Resources

Papers

- Antoni Ligęza, Grzegorz J. Nalepa: *A study of methodological issues in design and development of rule-based systems: proposal of a new approach*, WIRES, Wiley, 2011.
- Krzysztof Kaczor, Szymon Bobek, Grzegorz J. Nalepa Overview of Rule Inference Algorithms for Structured Rule Bases, 2010.
- Grzegorz J. Nalepa, Antoni Ligęza, *The HeKatE methodology. Hybrid engineering of intelligent systems*, J. AMCS, 1(20), 2010.
- Grzegorz J. Nalepa, Antoni Ligeza, Krzysztof Kaczor, FORMALIZATION AND MODELING OF RULES USING THE XTT2 METHOD
- Grzegorz J. Nalepa, Antoni Ligeza, Krzysztof Kaczor and Weronika T. Furmanska, *HeKatE Rule Runtime and Design Framework*, RuleApps 2009.
- Grzegorz J. Nalepa, LNCS/LNAI 6114/2010 Paper: Architecture of the HeaRT Hybrid Rule Engine (2010)
- LNCS/LNAI 6359/2010 Paper: Pellet-HeaRT – Proposal of an Architecture for Ontology Systems with Rules (2010) based on the DAAL concept,
- Springer SCI vol. 244/2009 Paper: Proposal of a New Rule-Based Inference Scheme for the Semantic Web Applications (2009)
- TCCI II, LNCS/LNAI 6450/2010 Paper: Integration Proposal for Description Logic and Attributive Logic – Towards Semantic Web Rules (2010)
- Weronika T. Furmańska, Grzegorz J. Nalepa *Description logics and OWL*, 2009.
- Weronika T. Furmańska, Grzegorz J. Nalepa *From HeKatE to the Semantic Web - Translations of Knowledge Representation*, 2010.
- **Loki (PlWiki)** – a semantic wiki using strong logic-based knowledge representation, a prototype Dokuwiki plugin using Prolog → concept, design, implementation, supervision; extended implementation by MSc. student: M. Kotra, revised version by M. Ozgowicz, see LNCS/LNAI 5796/2009 Paper: PlWiki – A Generic Semantic Wiki Architecture (2009), JUCS paper: Collective Knowledge Engineering with Semantic Wikis (2010), as well as TCCI III LNCS paper: Loki Semantic Wiki with Logical Knowledge Representation (2011,
- Krzysztof Kluza, Grzegorz J. Nalepa: *Visual Business Rules and Process Modeling*, 2009.
- Łukasz Łysik, Krzysztof Kluza, Grzegorz J. Nalepa, *Proposal of a New Approach to the Design of the Modularized Rule Bases*, 2010.
- Grzegorz J. Nalepa, Antoni Ligęza, Krzysztof Kluza, Krzysztof Kaczor, Szymon Bobek, Weronika T. Adrian, Łukasz Łysik, *The BIMLOQ Project Overview*, 2011.

Links

- HaDEs webpage
- Download VirtualBox Disk with hades framework

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