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Additional Information

Guest editorial

Special issue on conceptual modeling — 34th International Conference on Conceptual Modeling (ER 2015)

We are happy to bring you this special issue of Data and Knowledge Engineering based on the 34th International Conference on Conceptual Modeling (ER 2015), which was held on 19 - 22 October 2015 in Stockholm, Sweden. Since 1979, when its first edition was held in Los Angeles, the ER conference has been the flagship conference series and the premier international meeting space for the Conceptual Modeling community. In 2015, the conference attracted 131 submissions from all parts of the world, 41 of which were accepted as long and short papers. The technical program also included four keynotes, nine workshops, five tutorials, a PhD colloquium, a demo session, and a panel session. The conference covered a broad range of areas in conceptual modeling, from ontology-based modeling and data model semantics to conceptual modeling for big data and applications of modeling in health and social care.

Based on review rankings and the quality and maturity of the research, six of the papers presented at the conference were selected for this special issue. Each paper is an extended and carefully revised version of the original paper from the conference. All the papers went through a rigorous reviewing process before they were accepted for the special issue.

The first paper “Multi-Level Ontology-based Conceptual Modeling” by Carvalho et al. is a contribution to the area of ontology-supported conceptual modeling. The paper investigates taxonomies of types in ontology-based conceptual modeling languages. It points out that there is a need to support not only types whose instances are individuals but also types whose instances are types. In order to address this issue, the paper proposes an extension of the Unified Foundational Ontology with a multi-level theory (MLT). The combination of UFO and MLT serves as a foundation for multi-level conceptual modeling.

The second paper “Planning Runtime Software Adaptation through Pragmatic Goal Model” by Guimarães investigates the notion of software adaptivity, i.e. the capability of a system to choose between alternative ways to fulfil requirements. The paper shows how Contextual Goal Models can be used to choose among alternatives as well as determining their quality with respect to quality measures in the form of softgoals. Furthermore, the paper introduces an automatic analysis that aids planning and execution of tasks so they can meet pragmatic goals. The results are evaluated with

respect to correctness and performance, showing that they can be applied in real-life situations.

The third paper “From Reference Ontologies to Ontology Patterns and Back” by Ruy et al. addresses the task of building reference ontologies. This task has traditionally made use of foundational theories, domain and core ontologies, as well as development methods and software tools. The paper proposes the novel approach of using ontology patterns for building reference ontologies. The paper first shows how ontology patterns can be derived from ontologies, including both foundational and domain ontologies. Secondly, the paper addresses the opposite direction, i.e. building reference domain ontologies based on ontology patterns.

The fourth paper “Probabilistic Object Deputy Model for Uncertain Data and Lineage” by Wang et al. starts from the observation that lineage is an important notion in uncertain data management where it can be used for finding out which part of data contributes to a result. However, lineage allows a user to only find the tuples and not the specific attributes that contribute to the results. The paper proposes an alternative approach to model uncertain data that overcomes this limitation. The proposed model achieves a low maintenance cost and it also reduces redundant storage and join operations. The paper also describes how to compute probability with lineage and it proposes an algorithm that transforms lineage for correct probability computation.

The fifth paper “A Conceptual Framework for Large-scale Ecosystem Interoperability and Industrial Product Lifecycles” by Selway et al. addresses the challenge of ensuring interoperability between heterogeneous software systems. The paper suggests that translation between data models is best handled by means of model-driven engineering techniques. The translation task requires that multiple levels of data can be managed within a single model, and for this purpose the paper proposes the SLICER conceptual framework. This framework builds on multilevel modelling principles and the differentiation of basic semantic relations for dynamically structuring models. Furthermore, the framework allows for a propagation of constraints over multiple levels of instantiation.

The sixth paper “Mining task post-conditions: Automating the acquisition of process semantics” by Santiputri et al. contributes to the area of semantic annotation of business process models. Semantic annotation has been extensively studied in research but its application in practice is still limited, as annotations can be difficult and expensive to acquire. The paper proposes a data-driven approach to mining and validating semantic annotations, in particular context-independent annotations. The approach makes use of both activity execution events and state update events. The paper also includes an empirical evaluation, which indicates that the approach provides reliable results.

We would like to thank all those who have contributed to this special issue. Thanks to Peter P. Chen,

Editor-in-Chief of Data and Knowledge Engineering, for accepting the proposal to organize this special issue. Many thanks to the Elsevier Support Team, particularly Mr. Michael, for assisting us during the entire reviewing process and publication process. We would also like to thank the authors who did an excellent job in extending and improving their conference contributions. Last but not least, thanks to all the reviewers for their work with ensuring and improving the quality of the papers in this special issue.

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