Review of Doctoral Thesis

Author: Jakub Malý

Title: XML Document Adaptation and Integrity Constraints in XML

Reviewer: Martin Nečaský, Ph.D. (thesis supervisor)

General Overview of the Thesis and Scientific Contribution

The goal of the thesis was to extend the previous results of the supervisor of the thesis (Martin Nečaský) in the area of conceptual modeling for XML. The supervisor proposed a two-layered conceptual model. At the first layer, a conceptual schema of a given problem domain is designed. At the second layer, conceptual schemas of particular XML schemas are designed. The conceptual schemas at the second layer map the first-layer conceptual schema to the XML schemas.

The author of the thesis should extend the conceptual model in two ways. First, he should propose a method which enables to automatically or semi-automatically update XML documents structured according to a previous version of the designed XML schemas when their conceptual schemas (at the first or second layer) changed. The method should produce XSLT scripts which enable to convert existing XML documents between the two versions. Second, he should extend both layers of the conceptual model with a capability of modeling integrity constraints (expressed in Object Constraints Language /OCL/). He should consider not only modeling integrity constraints but also their translation to executable validation scripts (expressed in XSLT 3.0). And, he should also propose a method which considers changes in conceptual schemas at both levels and propagates them correctly to the integrity constraints (which reflect the structure of the conceptual schemas and have to be, therefore, updated appropriately).

During the three years of his doctoral studies, he successfully introduced novel methods in both areas mentioned above. All three methods (XML documents adaptation, OCL contraints modeling and translation to executable scripts, OCL contraints adaptation) were successfully published at scientific conferences and in IF journals. He also implemented the methods to a software tool for XML schema designers – eXolutio, which is developed at our research group (XML and Web Engineering Research Group at Charles University). His results fully fit into the specialization of our group and department. What is also important is that he did not achieved only contributions important for the scientific community but his results have also been appreciated by the community of XML developers (his work was awarded at the Balisage conference in 2012; Balisage is one of premiere conference for XML developers).

Publications

The publications covered in this thesis involve 3 journal papers with IF (Jakub is the first and main author of one of them and he participated at the other two as a co-author together with other members of his research group - he contributed mainly at the implementation and experimental level.) and 11 papers

published at reviewed international conferences and workshops (he is the first author of most of these publications; 2 of the papers have been awarded). Jakub published his results at several acknowledged events such as ICWS, ICWE, APCCM or Balisage.

Therefore, his results are more than sufficient with regard to the respective research level.

Other Activities

Jakub Malý was also involved in teaching at our department. He supervised student works. He also works on his own project funded by the internal grant agency of Charles University (GAUK).

Even though he decided that he will not continue in academia, he still cooperates with his supervisor even after completing the thesis – currently (23.8.2013) we have 2 journal papers (with IF) in the review process (with minor revision status).

Conclusion

The thesis of Jakub Malý fulfills all the conditions for gaining the Ph.D. degree in Computer Science at Charles University in Prague. Therefore, it is recommended.

In Prague, Aug 23, 2013

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Martin Nečaský, Ph.D.

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