Proceedings of the
13th International Workshop on Graph Transformation
and Visual Modeling Techniques
(GTVMT 2014)

Preface

5 pages

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GT-VMT 2014 was the thirteenth workshop of a series that serves as a forum for all researchers and practitioners interested in the use of visual, especially graph-based notations, techniques and tools for the specification, modelling, validation, manipulation and verification of complex systems. The aim of the workshop was to promote engineering approaches that provide effective sound tool support for visual modelling languages, enhancing formal reasoning at the syntactic as well as semantic level (e.g., for model specification, model analysis, model transformation, and model consistency management) in different domains, such as UML, Petri Nets, graph transformation, or business process and workflow models.

The GT-VMT 2014 workshop was held as part of ETAPS 2014, the European Joint Conferences on Theory and Practice of Software in Grenoble, France, on April 5–6.
The special theme of the 2014 GT-VMT edition was "Reliability", particularly addressing the following questions:

1. How can graph transformation and visual modelling support the modelling, analysis and/or verification of functional requirements?
2. How can these techniques ensure a certain level of robustness of systems?

A selection of topics were identified as being, among others, relevant to the scope of the GT-VMT workshop:

- visual languages definition and syntax (incl. meta-modelling, grammars and graphical parsing);
- static and dynamic semantics of visual languages (incl. OCL, graph constraints, simulation, animation, compilation);
- visual/graph-based analysis in software engineering (incl. testing, verification & validation, static & dynamic analysis techniques);
- visual/graph constraints (incl. definition, expressiveness, analysis techniques involving constraints);
- model transformations and their application in model-driven development (incl. in particular, transformations between graphical and textual formalisms);
- visual modelling techniques and graph transformations applied to patterns;
- visual modelling techniques and graph transformations for systems with quality properties like performance, real-time, safety, reliability, energy consumption;
- case studies and novel application areas (e.g. within engineering, biology, etc.);
- tool support and efficient algorithms.

The workshop received 14 full paper submissions. Each submission was reviewed by at least three reviewers. Reviewing was done by programme committee members assisted by external reviewers. After thorough discussion the programme committee accepted nine papers for presentation at the workshop and inclusion in the pre-proceedings which were distributed at the workshop.

The workshop programme also included two invited keynote presentations:

- Philippe Palanque (University Paul Sabatier, Toulouse, France):
  Model-Based Engineering of Resilient Interactive Systems.

  Philippe Palanque, who is a professor in computer science at the University Toulouse 3 - Paul Sabatier, France, and head of the Interactive Critical Systems group at the Institut de Recherche en Informatique de Toulouse (IRIT), talked about the engineering of interactive critical systems. He showed that the specificities of interactive systems require dedicated methods, notations, and tools to support their design, specification, validation and development. He introduced these specificities and argued how the deployment of these systems in critical contexts such aviation introduces additional constraints such as certification. He discussed possible research directions and their benefits in combining several complementary approaches to engineer interactive critical systems. The solution he proposed treats the human operator, the interaction and the underlying system as three inter-related components that have to be taken into account on an equal basis in order to build resilient interactive systems. In particular, he presented how operators task models and formal models of the interactive system can play a central role and how to leverage research work from those usually unconnected domains. Philippe Palanque illustrated his approach with numerous examples taken from interactive cockpits on large civil commercial aircrafts (such as the Airbus A380), satellite ground segment application and Air Traffic Control workstations.

- Dániel Varró (Budapest University of Technology and Economics, Hungary):
  Distributed Incremental Model Queries.

  Dániel Varró, who is an Associate Professor in the Department of Measurement and Information Systems at Budapest University of Technology and Economics, Hungary, dealt with validation of design rules in his talk, e.g. the validation of well-formedness rules in domain-specific languages. As a solution he presented incremental model queries. In model-driven software engineering (MDE), model queries are core technologies of many tool and transformation-specific challenges such as design rule validation, model synchronization, view maintenance, simulation and many more. He argued that traditional MDE tools frequently face scalability issues that decrease productivity of engineers and increase development costs as software models are rapidly increasing in size and complexity. Incremental graph queries offer a graph pattern based language for capturing queries. The result set of a query is cached and incrementally maintained upon model changes to improve query response time. Dániel Varró provided a brief overview on the EMF-IncQuery framework, an official Eclipse subproject. Then he discussed how to incorporate incremental queries over a distributed Cloud infrastructure (to scale up from a single-node tool to a cluster of nodes), deployed over popular database back-ends (such as Cassandra. 4store, Neo4J, etc). He presented first benchmarking experiments with IncQuery-D to highlight that distributed incremental model queries can perform significantly better than the native query technologies of the underlying database back-end, especially, for complex queries.

In the workshop programme, we alloced plenty of time for discussions of both individual presentations and broader themes. Topics that gained particular attention were synchronization of models at runtime, e.g. supporting consistency and co-evolution of models, and the expressiveness of different formalisms, e.g. with respect to constraints, application conditions, and control structures. Another topic of interest was the provision of benchmarks ('exmple zoos' or just a 'pet farm') for tool contests and comparison with existing solutions based on reusable examples. Striking arguments, 'killer applications' and unique selling points of graph transformation in particular and visual modelling techniques in general were intensively discussed, addressing aspects such as model representation in graphical and textual formalisms, modelling of networks and model transformations, interactive visual modelling techniques, as well as usage and challenges for graph transformation tools.

After the workshop, an additional review phase was conducted on two of the workshop submissions which had originally been conditionally accepted for presentation at the workshop and publication in the pre-proceedings. The second review phase resulted in the final acceptance of eight full papers. Several of the articles have been significantly revised or extended during the extra time given to the authors after the workshop. The outcome is this volume of Electronic Communications of the EASST, constituting the final post-proceedings of GT-VMT 2014. The following contributions are included:

LIST OF ARTICLES

- Abdullah Alshanqiti and Reiko Heckel:
  Towards Dynamic Reverse Engineering Visual Contracts from Java

- Christian Brenner, Joel Greenyer, Jörg Holtmann, Grischa Liebel, Gerald Stieglbauer and Matthias Tichy:
  ScenarioTools Real-Time Play-Out for Test Sequence Validation in an Automotive Case Study

- Frederik Deckwerth and Gergely Varró:
  Generating Preconditions from Graph Constraints by Higher Order Graph Transformation

- Mudhafar Hussein, Reiko Heckel, Vincent Danos and Paweł Sobociński:
  Modelling Adaptive Networks: The Case of the Petrified Voters

- Erhan Leblebici, Anthony Anjorin, Andy Schürr, Stephan Hildebrandt, Jan Rieke and Joel Greenyer:
  A Comparison of Incremental Triple Graph Grammar Tools

- Jan Stückrath and Benjamin Weyers:
  Lattice-extended Coloured Petri Net Rewriting for Adaptable User Interface Models

- Xiaoliang Wang, Yngve Lamo and Fabian Büttner:
  Verification of Graph-based Model Transformations Using Alloy

- Eduardo Zambon and Arend Rensink:
  Solving the N-Queens Problem with GROOVE - Towards a Compendium of Best Practices

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They all worked very hard in reviewing papers within a short time and providing extensive and valuable feedback to the authors.

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July 2014   Frank Hermann (University of Luxembourg, Luxembourg)
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                                  PC chairs of GT-VMT 2014