

# 2nd Modelling Symposium (ModSym 2016)

Vinay Kulkarni, Y Raghu Reddy

## Preface

The 2<sup>nd</sup> Modelling Symposium (ModSym'16) is held on 18<sup>th</sup> February 2016 in Goa, India as part of the Indian Software Engineering Conference (ISEC). The principal objective of modelling symposium is to help form an active community working on various aspects of modelling and its applications. The focus is on problems that would be critical 3-5 years out in future. For example, problem spaces such as enterprises, systems, cyber-physical systems, etc. will be given more importance. The event has a keynote and two invited talks delivered by acknowledged experts from Academia and Industry around the world. This year ModSym sought submissions mainly in but not restricted to topics in modeling for Software and Systems engineering (in any domain). Each submission was reviewed by 3 steering committee members. Total 6 papers were accepted out of 9. All accepted papers are accompanied by poster to be displayed for the entire duration of ISEC.

## Keynote

**Title of the talk:** Quality of Models

**Speaker:** Prof John Krogstie, Norwegian University of Science and Technology

**Abstract:** What is a good conceptual model? We have for many years worked with SEQUAL, a framework for understanding the quality of models and modelling languages, which covers all main aspects relative to quality of models. SEQUAL has three unique properties compared to other frameworks for quality of models:

- It distinguishes between quality characteristics (goals) and means to potentially achieve these goals by separating what you are trying to achieve from how to achieve it.
- It is closely linked to linguistic and semiotic concepts. In particular, the core of the framework including the discussion on syntax, semantics, and pragmatics is parallel to the use of these terms in the semiotic theory of Morris. A term such a 'quality' is applicable on all semiotic levels. We include physical, empirical, syntactical, semantical, pragmatic, social, and deontic quality in the work on SEQUAL.
- It is based on a constructivistic world-view, recognizing that models are usually created as part of a dialogue between those involved in modelling, whose knowledge of the modelling domain evolves as modelling takes place.

We will in the talk present the general SEQUAL framework and how it can be specialized for investigating the quality of different types of models relevant in information systems development.

**Bio:** John Krogstie holds a PhD (1995) and a MSc (1991) in information systems from the Norwegian University of Science and Technology (NTNU), where he is currently a full professor in information systems. John Krogstie is the Norwegian representative for IFIP TC8 and chair of IFIP WG 8.1 on information system design and evaluations. His research interests are information systems modelling, quality of models and modelling languages, eGovernment and mobile information systems. He has published around 200 refereed papers in journals, books and archival proceedings since 1991.

## Invited Talk

**Title of the talk:** Towards fine-grained human behavioural models: Possibilities, status and challenges

**Speaker:** Vivek Balaraman, TCS Research, Pune

**Abstract:** The study of human behaviour and its many aspects has traditionally lain in the realm of the social sciences in particular psychology, sociology and economics. Agent based simulation and its variants began the process of computational modelling of human behaviour to understand emergent macro phenomena as a consequence of micro actions of individual entities. The evolution of ABS have led to systems at two ends of a spectrum: minimalist systems usually used by social scientists to understand phenomena such as the formation of norms or culture spread and at the other end very large scale real world systems used by planners to do better planning such as urban traffic simulations or realistic disease spread models . Both of these systems use fairly simple models of individual human agent decision making. There have been relatively fewer attempts at coming up with more complex behaviour models that factor in internal behavioural dimensions such as personality or affect or activity patterns / daily routines and their impact on decision making. This is understandable because till recently, it has been very difficult to capture such data. For example, daily activity patterns could be recorded only through self-reports or by tailing a person which were effort intensive, obtrusive and error prone. Today however the existence of wearables, the ubiquity of smartphones, routine human activity logging in electronic data form (whether it is logging into the office network or use of a credit card), allow us to collect high quality behaviour data. This can then be fused with other data sources (such as organizational data on demographics, performance etc) to produce multi-modal multi-dimensional human behavioural data. The maturing of data masking techniques also ensures that necessary data privacy concerns can be addressed. The analysis of such fused and masked data can produce behavioural relations and patterns within a domain of interest. Past empirical research in the social sciences too can be mined and provide an additional source of such relations and patterns. Together these can be used to compose rich models of how internal processes coupled with external events or situations lead to individual decisions or actions. This in turn can help us to ask and answer sophisticated questions both on individual behaviour as well as group decision making and group dynamics. We use an example in workforce modelling to demonstrate some of these ideas. The approach of course has several challenges and we will discuss some of these and possible angles of attack on these challenges.

**Bio:** Vivek Balaraman heads the Human Data Collection and Behaviour Modelling (HDCBM) Research Program in TCS R&D. The HDCBM program is an effort to build fine grained human behaviour models. It is a multi-disciplinary effort and the team comprises people with a background in various AI disciplines, psychology, data science, game design and modelling and simulation among others. Prior to this Vivek headed the BFS Innovations Group at Cognizant Technologies where he led the research team that created the enterprise textual knowledge management system Wizdom Tree as well as other management decision support systems. Prior to Cognizant, Vivek headed the AI & Knowledge Management Research in TCS R&D where he worked on structured and unstructured experiential knowledge management. Vivek began his career as Research Officer in the Knowledge Based Computer Systems Project, Department of Computer Science, IIT Madras. He is a member of ACM.

## Accepted Papers

1. Early Experience with System Dynamics Modeling for Organizational Decision Making  
*Asha Rajbhoj and Krati Saxena*
2. A Multi Agent Based Human Behaviour Modelling Approach to Enterprise Simulation  
*Meghendra Singh, Mayuri Duggirala, Harshal Hayatnagarkar and Vivek Balaraman*
3. ACT (Abstract to Concrete Tests) - A tool for generating Concrete test cases from Formal Specification of Web Applications  
*Khusbu Bubna and Sujit Kumar Chakrabarti*
4. Using Component Interaction Model and Network Traces for Root-cause Analysis  
*Atul Kumar and Anil Nair*

5. A Model Driven Framework for Integrated Computational Materials Engineering

*Prasenjit Das, Raghavendra Reddy Yeddula and Sreedhar Reddy*

6. Toward (Semi-) Automated End-to-End Model-driven Compliance Framework

*Sagar Sunkle and Deepali Kholkar*

### **Steering Committee**

Anjaneyula Pasala, Infosys, Bangalore

Meenakshi D' Souza, IIIT Bangalore

Y. Raghu Reddy, IIIT Hyderabad

Vinay Kulkarni, TCS Research, Pune