



Analysing a Collaborative Modeling Game

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Abstract

Analysing the modeling process within collaborative (group) modeling sessions is not a trivial task. In such environments, there are many things that influence the way the modeling process is carried along. These include the skills and expertise of the modelers, the communication between them, the decision-making process, rules and goals driving the process etc. To study and analyze such a collaborative modeling process, we describe in this work, a three-tier conceptual framework that uses the game-metaphorical approach. Our findings reveal that collaborative modeling is driven by the modelers' negotiations and rules set in and set for the game.

Background & Motivation

- In system development and enterprise engineering communication plays a vital role.
- A number of stakeholders with varying skills, expertise, and knowledge collaboratively develop a model.
- Participants engage in various types of conversations during the creation of *agreed models*.
- Such conversations involve *negotiation*, which results in: acceptance, rejections, modifications and/or new proposals.

The Methodology of CMG Design

- We design collaborative modeling games (CMGs) to study and analyze the modeling process.
- Collaborative modeling sessions can be analyzed as if they are games.

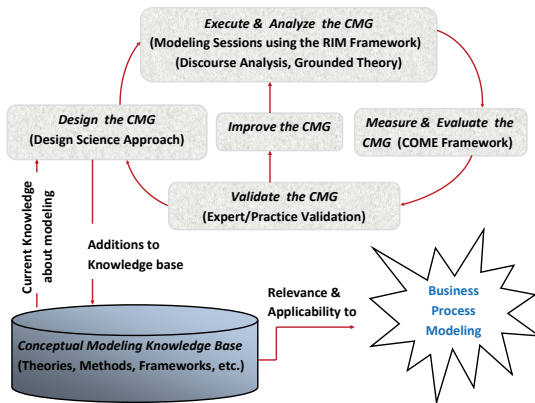


FIGURE 1: Methodology for studying, analyzing and evaluating CMGs

The RIM Framework

- The RIM (Rules, Interactions and Models) framework identifies and establishes a relationship between the:
 - rules, interactions, and models within the collaborative modeling session.
- The interactive process is "played out" within the boundaries of specific constraints (rules).
- Modelers are guided by rules/goals set for, and set in, the game.

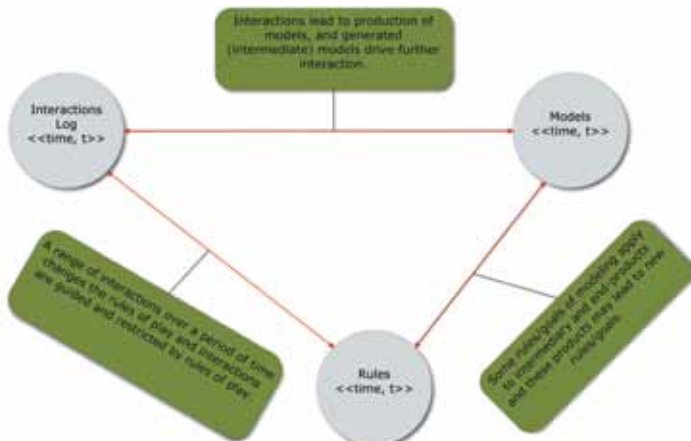


FIGURE 2: The RIM framework

Modeling Session Sample Results

A snapshot of the modeling session for the CMGs is shown below.



FIGURE 3: The collaborative modeling game session

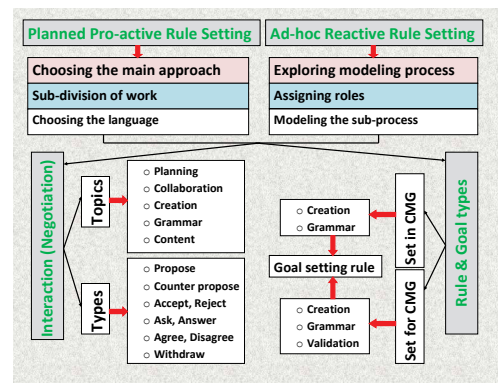


FIGURE 4: Interaction and rule types

We evaluate the modeling process artifacts and select the (best) CMG that satisfies the quality goals using the **analytic hierarchy process (AHP)** (Saaty, 1980).

	CMG1	CMG2	CMG3	Priorities vector
CMG1	1	2	7	0.603
CMG2	1/2	1	4	0.315
CMG3	1/7	1/4	1	0.082
$\lambda_{max} = 3.002$ C.I. = 0.001 C.R. = 0.002				

FIGURE 5: Evaluation and selection of CMG using AHP

λ_{max} = principal eigenvalue of matrix $A(n \times n)$, w = priority vector, C.I. = consistency index, C.R. = consistency ratio and R.I. = random index given by 1.

$$Aw = \lambda_{max}w, \quad C.I. = (\lambda_{max} - n)/(n - 1), \quad C.R. = C.I./R.I. \quad (1)$$

Related Work & Projects

- Collaboration Modeling Architecture (COMA) - (Rittgen, 2007)
- Quality of Modeling (QoMo) - (van Bommel et al., 2007)
- Method Engineering as Game Design (Game Metaphor) - (Hoppenbrouwers et al., 2008)

Conclusion and Further Directions

- The CMG process, is a well-structured process. The interaction is driven by rules set for and set in the game.
- In line with Rittgen(2007), communication among the modelers can broadly be categorized as a *negotiation*.
- Future Work: Developing an evaluation framework to evaluate the effectiveness and efficiency CMGs.

Acknowledgements: We acknowledge the support and facilitation for the modeling sessions from R. Janssen, D. Aarts, M. Tissink and G.J. Hans van der Linden.

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