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Model checking of component connectors

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Citation
Izadi, M. (2011, November 6). *Model checking of component connectors*. *IPA Dissertation Series*. Retrieved from https://hdl.handle.net/1887/18189

Version:	Corrected Publisher's Version
License:	Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden
Downloaded from:	https://hdl.handle.net/1887/18189

Note: To cite this publication please use the final published version (if applicable).

Propositions belonging to the PhD dissertation
Model Checking of Component Connectors
by Mohammad Izadi, defense scheduled on 6 December 2011

1. The behavior of a component based system can be verified using a two phases model checking process consisting of the model checking of its components and of its coordination subsystem. (Chapter 6, this Thesis)

2. In order to define the semantics of coordination systems, the classical modeling formalisms such as automata on infinite objects are enough. It is not necessary to use new or more complicated formal systems. (Chapters 4 and 6, this Thesis)

3. The classical theory of Büchi automata can be enhanced so the coordination systems with unconditional fairness and context dependency constraints over their behaviors can be modeled and then verified by model checking. (Chapters 4 and 5, this Thesis)

4. It is convenient and even feasible to minimize coordination models with respect to an appropriate behavioral equivalence to improve model checking. (Chapter 8, this Thesis)

5. To specify the desired properties of component connectors an action based linear temporal logic can be defined such that its formulas are translatable into automata on infinite strings both with of an inductive or an on-the-fly manner. (Chapter 6, this Thesis)

6. Extending a linear time temporal logic with types does not change its decidability but allows for specifying systems with some extra nonfunctional properties. ([70])

7. First recurrence automata allows for an efficient model checking of an interesting fragment of the μ-calculus. ([81])

8. The state space of the models of coordination systems can be reduced (even with some logarithmic factors) using functional and data abstraction techniques. ([118,119])

9. Hoare's failure-based semantic model proposed for CSP and the ones proposed by Valmari for LOTOS can be applied over some kinds of transition systems with compound transition-labels that are used to model the interactions among the interfaces of the components of a component based system. ([79,74])

10. Philosophy, Mathematics and Computer Science have essentially the same goals: the study of general and fundamental problems and trying to find the truth.

11. It is not important that a lot of our theories on the nature of the world are false. It is important that in a historical process of progress our theories become more and more truth-like (with higher degrees of verisimilitude).