Algorithmic Verification of Channel Machines Using Small Models

Mid-Course Meeting

Jonathan Sharyari

Department of Information Technology

Uppsala University

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Verification

- Verification is the process of evaluating software to determine whether the products of a given development phase satisfy the conditions imposed at the start of that phase[1]
- Model checking is the task of automatically verifying the correctness of a program, with regard to its specification.
- This is generally done through an exhaustive graph search

Channel Systems

- A channel system is a system that relies on channels for its operation, e.g. communication protocols
- If channels are unbounded, the model checking of such protocols corresponds to searching an infinite graph

Small Models

- One technique of overcoming this problem is to use small models
- For some types of problems, a small problem instance may exhibit all the relevant behaviour of a larger system
- Using small models, undecidable verification problems can be made decidable

Problem Formulation

- Combine the ideas of small models with that of a well-known verification technique – abstract interpretation to be applicable on channel systems
- Implement the verification algorithm

Remaining Work

- Complete the implementation
- Analyse results and compare to existing verification tools

References

 "IEEE Standard Computer Dictionary: A Compilation of IEEE Standard Computer Glossaries". In: *IEEE Std 610* (1991), pp. 1–217.

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