



Software Engineering Seminar

Study on Real-Time Model Checkers

Description

Model checking is a computer-assisted verification method. In order to perform verification, the system specification is translated to a temporal-logic formula and the system description is translated to a system model. One of the famous real-time model checker is UPPAAL [1]. Recently, the qualitative model checker NuXMV [2] has been extended to support timed transition systems and temporal properties [3]. Both these model checkers have their own advantage and disadvantage. For instance, NuXMV extends LTL logic to represent linear timed properties MTL logic while, UPPAAL supports branching logic TCTL. Therefore, NuXMV is not suitable for verifying branching time logic.

The student should provide an overview of the real-time model checker NuXMV and UPPAAL, investigate their potentials and discuss the inference.

References

- [1] Gerd Behrmann, Alexandre David, Kim Guldstrand Larsen, John Håkansson, Paul Pettersson, Wang Yi, and Martijn Hendriks. UPPAAL 4.0. In *Third International Conference on the Quantitative Evaluation of Systems (QEST 2006), 11-14 September 2006, Riverside, California, USA*, pages 125–126, 2006.
- [2] Roberto Cavada, Alessandro Cimatti, Michele Dorigatti, Alberto Griggio, Alessandro Mariotti, Andrea Micheli, Sergio Mover, Marco Roveri, and Stefano Tonetta. The nuxmv symbolic model checker. In *Computer Aided Verification - 26th International Conference, CAV 2014, Held as Part of the Vienna Summer of Logic, VSL 2014, Vienna, Austria, July 18-22, 2014. Proceedings*, pages 334–342, 2014.
- [3] Alessandro Cimatti, Alberto Griggio, Enrico Magnago, Marco Roveri, and Stefano Tonetta. Extending nuxmv with timed transition systems and timed temporal properties. In *Computer Aided Verification - 31st International Conference, CAV 2019, New York City, NY, USA, July 15-18, 2019, Proceedings, Part I*, pages 376–386, 2019.

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