Invited Talk

Real-Time Systems Specification and Verification

Joseph Sifakis
VERIMAG
Mini-Parc-Zirst, Rue Lavoisier
F-38330 Montbonnot, France

Abstract

We present a survey of recent results on the specification and verification of real-time systems.

The specification uses timed automata which are automata extended with timers, state variables measuring the continuous time elapsed since their last reset. This model allows to describe basic control mechanisms such as timeouts and watchdogs. We define its semantics and illustrate its use for real-time systems modeling.

The verification method allows the comparison of timed automata against real-time properties. The latter are expressed in a temporal logic with modalities possible and inevitable parameterized by timing constraints. The verification method consists in evaluating the meaning of a formula describing a property by using symbolic model checking techniques. We illustrate the application of the method by several examples.