

Timing Validation and Temporal Quality-of-Service Guarantees

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Abstract

In recent years, real-time (computing and communication) systems are becoming increasingly more pervasive and their applications increasingly broad. Many applications have widely varying time and resource demands and must deliver dependable and adaptable services with guaranteed temporal qualities. Moreover, both technical and economical considerations make it necessary to build these systems using commodity hardware and software components.

This talk focuses on the techniques needed to validate of such real-time systems. Here, the term validation refers specifically to the demonstration, using rigorous methods, that when applications are integrated together and compete for time and resources, their timing constraints are always met, and hence temporal qualities of services provided by the system are guaranteed. Despite the tremendous progress in the past ten years, the existing validation techniques remain inadequate for many important applications and run-time environments. Following an overview of the state-of-the-art validation algorithms and methods, this talk discuss the limitations of existing techniques, recent advances to overcome the limitations, and future directions of research.