Discrete control for adaptive and reconfigurable computing systems

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Recently in Computer Science, the notion of adaptive or autonomic computing systems has been introduced and defined as computing systems that can reconfigure themselves through feedback loops. Motivations for dynamic adaptivity are important issues like resource management, quality of service and dependability. It concerns systems ranging from hardware to operating systems to services and applications, from tiny embedded systems to the Cloud. They work in a closed-loop, and their management cannot anymore rely on human administrators. The correct design and implementation of automated control of the reconfigurations is recognized as a key issue for the effectiveness of these adaptive computing systems.

Therefore, there is a need for well-founded methods, models and techniques for the design of controllers, and there is a growing interest in using Control Theory for their design, in order to provide designers with a support to master the complexity of designs, and with guarantees w.r.t. their correctness or optimality. A significant approach addresses synchronization and coordination problems using discrete control techniques.

The purpose of this special session is to group contributions about the model-based control of adaptive and reconfigurable computing or embedded systems, especially involving models and algorithms related to Discrete Event Systems. On the one hand it will introduce this interesting new application domain, with very wide and lively potential, and differences from traditional applications of DES e.g. in manufacturing. On the other hand, it will bring together researchers working in this area, up to now quite separately for the lack of an established community.

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