Call for Papers / Invitation to Special Session SS09

CLOSED-LOOP MODELLING FOR DESIGN AND VALIDATION OF REACTIVE SYSTEMS IN DISCRETE CONTROL

Special Session Organizers

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Aim: The intention of this call is to lay down the tracks for a science of discrete control development. This means that existing different design methodologies, different modelling approaches, etc. should be unified within a global framework that is comparable with the established theories and approaches for designing controllers in continuous control domain. The proposed methodology therefore strictly follows the well-established, successful and scientifically proven approaches of continuous systems. It does not blindly imitate them, it has its own specific phenomena and problems that just partially correspond with the continuous side. The pattern, however, is the same because it is universal and we cannot see significant differences between the worlds of continuous and discrete control.

There is obviously a sound theory for discrete-event dynamic systems, namely the Supervisory Control Theory. It works well on higher levels of control. If we go down, however, on the sensor/actuator level, where real physical systems interact via signals with a controller, it might be too abstract to cover the arising problems completely. This proposal therefore focuses on control on the sensor/actuator level and will explore the model-based technologies that are available at the moment and the paths of future development in academia and industry that must be taken. In particular, the special session will be focusing on (but not limited to) the following topics:

- How to construct plant models systematically from informal or semi-formal plant descriptions?
- How to construct larger plant models from models of its components?
- How to handle input/output signals in plant models?
- How to compose a closed-loop model from plant and controller models keeping in mind that the formal composition of plant model and controller model must be possible without changing the internal dynamic behaviour of the components?
- How to construct formal specifications of desired or forbidden plant behaviour from informal or semi-formal specifications?
- How to perform model checking and interpretation of the results by the design engineer?
- How to perform synthesis and control code generation on the sensor/actuator level?

Any contribution covering parts of the above mentioned problems is welcome, but it should explicitly include *plant modelling* in the design and engineering process.

SUBMISSION OF PAPERS

Papers should be submitted electronically. For further details, please refer to the conference web page.

AUTHOR'S SCHEDULE

Deadline for submission of papers: April 8, 2012

Notification of papers acceptance: May 30, 2012

Final manuscripts due: July 8, 2012

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