Plenary II

Speaker: Prof. Bengt Lennartson
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Title:

Optimization and Knowledge Management for a Sustainable Future

Abstract:

A sustainable future requires economical, human and environmental sustainability. Focusing on automation systems, these three aspects are in this keynote illustrated by modeling and optimization of moving devices, and flexible transformation of information to knowledge. More specifically, novel methods for energy optimization of multi-robot cells and manikins are presented. A multi-robot system can be considered as a hybrid system, including continuous movements and high-level discrete interactions. A generic modeling framework for hybrid systems is therefore introduced based on modular predicate transition models. Efficient energy optimization is then obtained, applying suitable abstractions and a recent integrated constraint and nonlinear programming procedure. Robustness issues and online adaption are also incorporated to handle uncertainties in the controlled system. Finally, a flexible event driven data management system is presented, called the "twittering factory". Traditional database systems are then replaced by massive unstructured data, which is transformed to knowledge utilizing process mining and search engine techniques. To summarize, the goal of this keynote is to present a set of recently proposed generic concepts that support the development of flexible and sustainable automation systems based on the latest modeling and software technology.

Biography:

Bengt Lennartson received the Ph.D. degree in automatic control from Chalmers University of Technology, Gothenburg, Sweden, in 1986. Since 1999, he has been a Professor of the Chair of Automation, Department of Signals and Systems. He was Dean of Education at Chalmers University of Technology from 2004 to 2007, and since 2005, he is a Guest Professor at University West, Trollhättan. He was Associate Editor for Automatica 2002-2005, General Chair of WODES 2008, and Vice Program Chair of CASE 2013 and WODES 2014, and currently he is Co-Chair of the RAS-TC on Sustainable Production Automation, Associate Editor for IEEE Transaction on Automation Science and Engineering, General Chair of CASE 2015 and Vice Program Chair of ADHS 2015. Prof. Lennartson is (co)author of two books and more than 230 peer reviewed international papers. His main areas of interest include discrete event and hybrid systems, especially for manufacturing applications, as well as robust feedback control. He received together with Mohammad Reza Shoai and Prof. Lei Feng the Best Student Paper Award at CASE 2012, and the Best Conference Paper Finalist Award at CASE 2010.