Call for Proposal for IEEE ICRA 2011 Workshop on: Uncertainty in Automation

Ken Goldberg and Dezhen Song

Automation has potential to improve quality (consistency), efficiency, safety, and cost for manufacturing, and has many other applications such healthcare and security. However, a major issue for automation systems is how to effectively cope with uncertainty and dynamics arising in the physical and human environment. In this workshop we will consider new models and methods for effectively modeling and resolving uncertainty in automation.

The fact that ICRA 2011 will be held in Shanghai, China will allow this workshop to bring top researchers from China and the rest of world together to study the uncertainty issues in automation. Due to its booming manufacturing and other industry sectors, China can be viewed as the largest test bed for researchers in automation science and engineering, which offers different automation levels and all kinds of imaginable settings. Researchers and decision-makers in China have to routinely face uncertainty issues in the automation processes, which present challenges arise from both physical and human-related sources. Successfully address the issues would have a profound impact on efficiency, productivity, safety, and mental/physical health of workforce for China and the rest of the world. A tentative list of workshop topics includes

- Physical Uncertainty
    - Uncertainty in sensing and actuation: new sensors, sensing models, and calibration
    - Error models
    - New designs and algorithms to facilitate modulization and reconfigurability
    - Planning and scheduling with consideration of uncertainty
    - Response to change in environments and systems: flexible automation
- Human-related uncertainty
    - Models of human-in-the-loop automation
    - Automation and occupation safety, human stress and mental health
    - Surveillance systems: detection of abnormality
    - Automation for drug delivery, health care and senior citizen care
- Models, metrics, standardization, test bed developments, benchmarking methods, and experimental validations.

We are fortunate to many researchers endorsing this workshop. A partial list of currently confirmed speakers include:

- Professor Peter Luh, University of Connecticut, "*Automation for Green and Safe Buildings*"
- Professor Vijay Kumar, University of Pennsylvania, "*Uncertainty in Robot Grasping*"
- Professor Michael Y Wang, The Chinese University of Hong Kong, Hong Kong, China, "*Uncertainty and closure property in workpiece localization*"
- Professor Qianchuan Zhao, Tsinghua University, China, "*Planning production line capacity to handle uncertain demands for a class of manufacturing systems with multiple products*"
- Professor Dawn Tilbury, University of Michigan in Ann Arbor, "*Anomaly detection in event-based systems*"
- Professor Ken Goldberg, UC Berkeley, "*Uncertainty in Grasp Mechanics*"
- Professor Dez Song, Texas A&M University, "*A PODS-based Extended Kalman Filter: Quantifying Uncertainties in Automatic Bird Species Detection*"
- Professor Yangmin Li, University of Macau, Macau, China, "*Model Uncertainty issues in Micro/Nano Manipulation by Parallel Manipulator*"

- Dr. Raj Madhavan and Elena Messina NIST, *"Addressing Uncertainty in Performance Measurement of Intelligent Systems"*

We would like to invite more researchers in this area to give a talk and/or participate this exciting workshop. The workshop can be registered through ICRA conference registration website. If you are interested in presenting you recent work please send the following items to us (email: dzsong@cse.tamu.edu) on or before **March 1st**,

1. Full contact info including affiliation

2. Proposed title (if there is any change)

3. A short (150 words) abstract addressing how the talk relates to workshop theme

4. A URL to the home page describing related research or a related research paper

(does not matter whether it is published elsewhere.)