

WORKSHOP
Intelligent Systems for Modeling and Control:
Advances in Design and Validation

Organizers:

Dr. Danil Prokhorov

TRI-NA, Toyota Tech Center, Ann Arbor, MI, dvprokhorov@gmail.com

Dr. Johann Schumann

Robust Software Engineering, RIACS/NASA Ames, Johann.M.Schumann@nasa.gov

Intelligent systems, or systems which include neural, fuzzy or evolutionary components, have to be designed or trained carefully, taking into account uncertainties, and verified/validated well before they are accepted for deployment. This workshop intends to present an overview of the state of the art and recent advances in intelligent systems for modeling and control, with examples from automotive, aerospace and chemical industries. With respect to automotive processes and in-vehicle systems, steps undertaken to design and validate intelligent control, diagnostics and prognostics will be discussed. Among several automotive examples, fever-like symptoms in an engine suffering from an unknown fault will be demonstrated, recognized and mitigated through a novel approach of artificial immune system. With respect to aerospace systems, advanced methods for verification, validation, and certification of intelligent control systems will be discussed and illustrated via examples including UAV and NASA Intelligent Flight Control System project. An overview of application of computational intelligence solutions in the chemical industry will then be presented, with emphasis on the key technical, organizational, and political issues to be resolved for successful application of computational intelligence in industry in general. Presentations by researchers from both industrial and non-profit organizations will ensure effective sharing of knowledge and cross-disciplinary relevance.

Schedule, September 2:

- 8:30 - 8:45** Opening remarks
- 8:45 - 9:30** **Neural networks in automotive applications** (Danil Prokhorov, Toyota-USA)
- 9:30 - 10:30** **Real Time Autonomous Diagnostics, Prognostics and Process Control in Automotive Manufacturing** (Dimitar Filev, Ford Research)
- 10:30 - 11:00** COFFEE BREAK
- 11:00 - 11:45** **Statistical Verification for Intelligent Control** (Tariq Samad, Honeywell)
- 11:45 - 13:15** LUNCH BREAK
- 13:15 - 14:15** **Intelligent and Adaptive Systems in High Assurance Applications**
(Johann Schumann, NASA Ames)
- 14:15 - 15:00** **Advances in Immune Systems Engineering for Automotive Engines**
(Dragan Djurdjanovic, University of Texas-Austin)
- 15:00 - 15:30** COFFEE BREAK
- 15:30 - 16:30** **Applied Computational Intelligence in the Chemical Industry**
(Arthur Kordon, The Dow Chemical Company)
- 16:30 - 17:15** **Machine Learning for On-Road Autonomous Driving**
(Kristopher Kozak, Southwest Research Institute)
- 17:15 - 17:30** Concluding remarks/Discussion

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