INVITED SESSION SUMMARY

Title of Session: Fuzzy Logic for Robotics and Control Systems

Name, Title and Affiliation of Chair:

Prof. Ahmad Taher Azar, IEEE Senior Member

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Details of Session (including aim and scope):

Fuzzy logic has evolved as a useful tool in robotics and control systems, providing a flexible and simple way to dealing with complicated and unpredictable data. Unlike standard binary logic, which only accepts true or false values, fuzzy logic accepts partial facts, allowing robots and control systems to make judgements based on degrees of confidence. This versatility makes it particularly well-suited for applications characterised by imprecision and ambiguity in real-world settings.

Fuzzy logic is used extensively in robotics to improve the decision-making skills of autonomous systems. Fuzzy logic controller-equipped robots can navigate through dynamic surroundings, modifying their behaviours in response to constantly changing sensor inputs. Fuzzy logic, by combining linguistic variables and membership functions, enables robots to understand sensory inputs like closeness or temperature in a way that mimics human thinking. The robot's capacity to interact with its environment and adapt to unforeseen events is enhanced by this human-like decision-making process.

Control systems, whether they regulate industrial processes or automobiles, are frequently challenged by nonlinear and unpredictable dynamics. Fuzzy logic controllers have proved essential in such situations, providing a reliable and efficient method of handling complicated systems. Control systems may provide steady and accurate control across a wide variety of operating situations by using fuzzy rules and membership functions to fine-tune their responses to input variables. Fuzzy logic's versatility makes it an appealing alternative for situations where standard control approaches may struggle to deal with the system's inherent complexity.

This special session intends to provide a forum for scholars, engineers, and practitioners to exchange ideas, share their latest research discoveries, and debate the potential of fuzzy logic in enhancing robotics and control system capabilities. The session aims to cover a wide variety of issues concerning the use of fuzzy logic in various disciplines.

Topics of interest for submission include but are not limited to:

Design and optimization of fuzzy systems	Fuzzy system applications in computer vision
Fuzzy decision making	Fuzzy system applications in robotics
Fuzzy evolutionary computing	Intelligent health systems
Fuzzy rule-based systems	Intelligent optimization
Fuzzy neural systems	Intelligent transportation systems
Fuzzy-evolutionary systems	Intelligent computing
Fuzzy control technology	Neuro-fuzzy systems

Fuzzy system applications in human–machine interface	Rough fuzzy set
Fuzzy Rough	Machine learning
Type-2 fuzzy logic control	Optimization of type-2 fuzzy systems
Application of computational intelligence	Pattern recognition

Overall, the purpose of this special session is to improve knowledge of the possibilities and limits of fuzzy logic in robotics and control systems, to provide a venue for multidisciplinary debates, and to stimulate new research paths in this interesting and quickly expanding subject. Participants from academia and industry are encouraged to join and share their experience to enhance the state-of-the-art in fuzzy logic applications for robotics and control systems.

Main Contributing Researchers / Research Centres (tentative, if known at this stage):

Researchers / Research Centres would be invited upon approval of this SS.

Website URL of Call for Papers (if any):

https://sites.google.com/view/profazar/recent-announcements/call-for-chapters?authuser=0

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