Customizing the Design of Hierarchical Fuzzy Logic Systems for Multi-Robot Control: Theory and Practice

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Abstract
Hierarchical fuzzy logic systems are increasingly used in modelling and control applications. Their ability to cope with uncertainty inherent in complex systems makes them an attractive method for solving complex, uncertain, and dynamic systems. Hierarchical fuzzy logic systems are developed based on the individualistic systems. Such systems are unable to face the challenge of interaction that might be necessary between different fuzzy logic systems in hierarchical fuzzy logic systems for solving complex problems. This talk will investigate and report current and intelligent design and development of hierarchical fuzzy logic systems in multi-robot control and navigation. Several structured approaches to design and development of hierarchical fuzzy logic systems are explained. Design and development of hierarchical fuzzy logic systems and determination of the number of layers in a hierarchical fuzzy logic system are considered. The advantages and disadvantages of using hierarchical fuzzy logic systems for robotic control are also considered. The use of evolutionary algorithms in design and development of hierarchical fuzzy logic systems are discussed. The application of evolutionary learning to control of a simulated multi-robot system using hierarchical fuzzy logic systems are considered and simulation results are presented.

Biography of the presenter:
Associate Professor Masoud Mohammadian graduated with a PhD degree from the University of Central Queensland, an MSc degree from the University of Central Queensland, Australia and his undergraduate degree at the Flinders University, Australia.

He taught various undergraduate and postgraduate courses in the areas of computer science and information systems at Edith Cowan University, Monash University for almost 5 years before joining the University of Canberra in late 1998.

Besides teaching, he has been actively pursuing research related to neural networks, fuzzy logic, evolutionary computing, intelligent agents, optimisation, data analytics, modelling of complex adaptive systems, decision support systems and data security and privacy and their applications in industrial, financial and business problems

which involve real time data processing, planning and decision making. His current research interests lies in adaptive self-learning systems, fuzzy logic, genetic algorithms, neural networks and application of computational intelligence techniques for learning and adaptation of intelligent systems and intelligent agents for decision making, data security and privacy, web-based information filtering, data mining and cloud computing in public sector. He has successfully completed a number of industry projects related to real-time data processing, planning, and decision-making.

To date, he has edited 24 books and conference proceedings in the area of Computational Intelligence and Intelligent Agents. He has written more than 160 refereed publications in the form of books, book chapters, journal articles and conference papers, among others.

He has chaired fourteen international conferences on computational intelligence, intelligent agents and software engineering. Associate Professor Masoud Mohammadian has twenty seven years of academic experience and he has served as program committee member and/or co-chair of a large number of national and international conferences. He was the chair of IEEE ACT Section and he was the recipient of awards from IEEE from USA and Ministry of Commerce from Austria and several awards for his academic services in Australia. He was a scientific advisor to SolveIT Pty Ltd and he is current a scientific advisor to Complexica Pty Ltd. He has delivered a large number of keynote speeches at national and international conferences. Among many national and international awards that he has received, he has received an honorary professorship in 2018 from the Amity University in India.