



Computational Intelligence (CI) Chapter

Membership Event

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Introduction

This membership event is a 2-hr free tutorial titled *Type-2 Fuzzy Logic Systems* to be given by Assistant Professor Erdal Kayacan from the School of Mechanical and Aerospace Engineering at Executive Seminar Room S2.2-B2-53 of Nanyang Technological University on Friday, 4th November 2016 2-4 pm.

Abstract

In model-based control, the control accuracy highly depends on the representativeness of the model describing the system behaviour. In real life, the information one can learn from a system is always uncertain and limited in scope due to the noise from both inside and outside of that system as well as the limitations of our cognitive abilities. Even if an accurate model of the system is available, the control system encounters various environmental conditions (such as humidity, temperature, etc.). These time varying working conditions might decrease the control accuracy or even lead overall control system to instability when a conventional controller, e.g. a proportional-integral-derivative (PID) controller, is used. Since conventional controllers have time invariant coefficients and do not have the ability of adapting themselves to changing conditions, they are not suitable to be used in such changing working conditions. The use of advanced learning algorithms, which can learn the operational dynamics online and adjust the operational parameters accordingly, might be a candidate solution to all the aforementioned problems. In this speech, model-free control and learning methods by using type-1 and type-2 fuzzy neural networks will be addressed to handle various real-time problems.

Biography



Dr. Erdal Kayacan received the B.Sc. degree in electrical engineering in 2003 from *Istanbul Technical University* in Istanbul, Turkey as well as a M.Sc. degree in systems and control engineering in 2006 from *Bogazici University* in Istanbul, Turkey. In September 2011, he received the Ph.D. degree in electrical and electronic engineering at *Bogazici University* in Istanbul, Turkey. After finishing his post-doctoral research in KU Leuven at the division of mechatronics, biostatistics and sensors (MeBioS), he is currently pursuing his research in Nanyang Technological University at the School of Mechanical and Aerospace Engineering as an assistant professor.

He has published more than 50 refereed journal and conference papers in the area of intelligent control, fuzzy systems and grey systems theory. His research areas are flight dynamics and control, unmanned aerial vehicles, robotics, mechatronics, soft computing methods, sliding mode control and model predictive control. Dr. Kayacan is a Senior Member of *IEEE* and active in the *IEEE SMC Technical Committee on Grey Systems*. He has been serving as an editor in *Journal on Automation and Control Engineering* (JACE) and editorial advisory board in *Grey Systems Theory and Application*.