报告题目： Neural Learning in Multi-class Pattern Classification

报 告 人： Prof. Yi Lu Murphey，Professor of the ECE Department at the University of Michigan-Dearborn, IEEE Fellow

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地　　点：空天学院一楼报告厅

Dr. Yi Lu Murphey is an Associate Dean for Graduate Education and Research, a Professor of the ECE(Electrical and Computer Engineering) department and the director of the Intelligent Systems Lab at the University of Michigan-Dearborn. She received a M.S. degree in computer science from Wayne State University, Detroit, Michigan, in 1983, and a Ph.D degree with a major in Computer Engineering and a minor in Control Engineering from the University of Michigan, Ann Arbor, Michigan, in 1989. Her current research interests are in the areas of machine learning, pattern recognition, computer vision and intelligent systems with applications to engineering diagnostics and prognostics, optimal vehicle power management, data analytics, and robotic vision systems. She has authored over 130 publications in refereed journals and conference proceedings. She is an editor for the Journal of Pattern Recognition. She has served on technical committees and session chairs for many conferences and organized special sessions for various conferences sponsored by the IEEE Society. Her research has been funded by the National Science Foundation (NSF), US Army TARDEC, State of Michigan, Ford Motor Company, TRW and many others. A number of the technologies she and her students developed have been deployed in manufacturing or implemented in systems currently in operation. She is a fellow of IEEE.

ABSTRACT Multi-class pattern classification has many applications including text document classification, speech recognition, object recognition, etc. Multi-class pattern classification using neural networks is not a trivial extension from 2-class neural networks. This lecture presents a comprehensive and competitive study in multi-class neural learning with focuses on issues including neural network architecture, encoding schemes, training methodology and training time complexity. This lecture includes multi-class pattern classification using either a system of multiple neural networks or a single neural network, and modeling pattern classes using One-Against-All, One-Against-One, One-Against-Higher-Order, and *P*-Against-*Q*. We also discuss implementations of these approaches and analyze training time complexity associated with each approach. We evaluate six different neural network system architectures for multi-class pattern classification along the dimensions of imbalanced data, large number of pattern classes.