2010 IEEE Systems, Man, and Cybernetics
IEEE Circuits and Systems
Society Distinguished Lecture Series
IEEE SMCS (SMC 學會) 學術講座系列

日期 **Date** ：**4th July 2010**
時間 **Time** ：**14:40 – 18:00**
地點 **Venue**：**HG01 Lecture Theatre, University of Macau**
澳門大學何賢中心 HG01 演講廳

2010 IEEE Systems, Man, and Cybernetics Society (SMC 學會)將邀請 IEEE SMC 學會領導和相關的國際著名學者 (包括國際知名期刊主編，IEEE 院士，IAPR 院士, AAAS 院士, 等) 舉辦多場高水準學術講座。

參加本次 IEEE SMC 學會的學術講座系列 2010 的國際著名專家學者：

14:40 Opening Remarks

15:00 Title: *Intelligent Systems for a Global World*
William A. Gruver, IEEE Fellow, Simon Fraser University, Canada, and Past President, IEEE SMC Society; Associate Editor, IEEE Trans. On SMC

15:20 Title: *Smart Grid*
Loi Lei Lai, IEEE Fellow, City University London, UK, and Vice President, IEEE SMC Society

15:40 Title: *Sensitivity Based Localized Generalization Error Model for Supervised Classification Systems and Applications*
Daniel S. Yeung, IEEE Fellow, South China University of Technology, China, and Junior Past President, IEEE SMC Society

16:00 Refreshment and Discussions

16:30 Title: *Analysis of Internet Topologies*
Ljiljana Trajkovic, IEEE Fellow, Simon Fraser University, Canada, and Vice President, IEEE SMC Society, Past President of IEEE CAS Society

16:30 Title: *Multimedia Information Security: An Overview of Research and Challenges*
C. L. Philip Chen, IEEE Fellow, AAAS Fellow, University of Macau, and Vice President, IEEE SMC Society; Associate Editor, IEEE Trans. On SMC

16:50 Title: *The 21st century, Computers, Pattern recognition*
Yuan-Yan Tang, IEEE Fellow, IAPR Fellow, Hong Kong Baptist University, Chongqing University; Editor-in-Chief, International Journal on Wavelets, Multiresolution and Information Processing

17:10 Refreshment and Discussions

Abstract

Title: *Intelligent Systems for a Global World*

Computer and communication technologies are rapidly shrinking the world. While companies are more global and service infrastructures are increasingly distributed, there is a need for higher levels of performance, integration, and interoperability. Fortunately, there is a significant convergence of cost-effective products based on high performance computer hardware, high speed wireless networking products and standards, and platform independent software. Personal robots with the ability to communicate by engaging multiple senses assist people in their daily tasks. Machine learning and pattern recognition algorithms automatically learn to recognize complex patterns from data and recommend decisions. RFID systems provide improved services for supply chain and healthcare management. Brain-machine interfaces are beginning to transform thought into action and sensation into perception. Finally, systems previously depending on client-server networks are being integrated using new serverless architectures of distributed intelligent systems that provide improved robustness, scalability, and flexibility. This lecture presents an overview of intelligent systems that are changing our lives and businesses with emphasis on the technologies of systems science and engineering, human-machine systems, and cybernetic systems. Applications of intelligent systems will be presented from a variety of fields including robotics, manufacturing automation, RFID, healthcare, distributed energy management, and integrated digital services.

Title: *Smart Grid*

This talk aims to answer some of the following questions and stimulate further discussions in the area of smart grid development and research worldwide.
What is smart grid?
Where are we now?
Where next?
How computational intelligent may contribute to smart grid development?
What is the international picture at present?

Title: *Sensitivity Based Localized Generalization Error Model for Supervised Classification Systems and Applications*

A classification system such as a neural network maps input data characterized by a number of features onto output classes. Successful deletion of "irrelevant or unimportant" features and samples in the training set, without sacrificing the classification accuracy, could reduce network complexity and learning effort. Such a reduction technique is highly desirable for many application problems. In this talk a comparison on a number of well-known techniques based on the principal component analysis, the mutual information, the support vector machines and the neural network sensitivity analysis will be presented. We shall present a proposal to develop a feature and sample selection method for supervised multi-classification problems using Sensitivity Measures for an ensemble of multiplayer feedforward neural networks (Multilayer Perceptrons or Radial Basis Function Neural Networks). This proposed technique is based on some recent results on generalization error locally near the training points. A number of experimental results using datasets such as the UCI, the 99 KDD Cup, and the text categorization, will be presented.

Title: *Analysis of Internet Topologies*

Discovering properties of the Internet topology is important for evaluating performance of various network protocols and applications. The discovery of power-laws and the application of spectral analysis to the Internet topology data indicate a complex behavior of the underlying network infrastructure that carries a variety of the Internet applications. In this talk, we present analysis of datasets collected from the Route Views and RIPE projects. The analysis of collected data shows certain historical trends in the development of the Internet topology. While values of various power-laws exponents have not substantially changed over the recent years, spectral analysis of the adjacency matrix and the normalized Laplacian matrix of the associated graphs reveals notable changes in the clustering of Autonomous System (AS) nodes and their connectivity.

Title: *Multimedia Information Security: An Overview of Research and Challenges*

Digital multimedia content, can be created, edited, distributed, shared, and stored with convenience at a very low cost over the mobile and ad hoc nature of today's various networks. As a result, multimedia security and digital authentication, transmission and detection of sensitive information via communication systems have become a very important research subject recently. Encryption and data hiding are two most popular areas in multimedia security research. This talk will focus on data hiding techniques, especially, steganography and steganalysis techniques.

Steganography is the hiding of a message within another message so that the presence of the hidden message is indiscernible. Practically, it is the art of secret communication. Digital data can be hidden in pictures, videos, music, text, binary files, or source code. The key concept behind steganography is that the message to be transmitted is not visible to the informal eye or ears. In fact, people who are not intended to be the recipients of the message should not even suspect that a hidden message exists.
One the hand, the purpose of steganalysis is to discover the presence of hidden messages in digital media. Both steganography and steganalysis have not been completely examined in detail by the scientific community outside the military. This lecture will discuss this fast growing field.

Title: *The 21st century, Computers, Pattern recognition*

This lecture reviews the history of computer development, showing the various stages of computer development, the typical prototype, there are many photos, including the world's first computer, in the 20th century the fifties and sixties of the computer, the first personal computer and so on. These photos were reports from the British Museum in London filming. This talk provides a perspective of computer science and technology trends and directions for future development. Highlights an important branch of artificial intelligence, pattern recognition, the seminar discusses the basic concepts, the basic approach and the current international developments and research focus in the area of pattern recognition. The lecture also gives some examples of applications of pattern recognition in the medical, military, and Chinese characters.