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Prof. Qing Li, China Jiliang University*

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APPLIED COMPUTER & APPLIED COMPUTATIONAL SCIENCE

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*Proceedings of the 8th WSEAS International Conference on
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SCIENCE (ACACOS '09)*

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Preface

This year the 8th WSEAS International Conference on Applied Computer and Applied Computational Science (ACACOS '09) was held in Hangzhou, China. The Conference remains faithful to its original idea of providing a platform to discuss theoretical and applicative aspects of programming languages, software design and development, project management, software for parallel and distributed systems, communication software, distributed knowledge-base systems, computer networks etc. with participants from all over the world, both from academia and from industry.

Its success is reflected in the papers received, with participants coming from several countries, allowing a real multinational multicultural exchange of experiences and ideas.

The accepted papers of this conference are published in this Book that will be indexed by ISI. Please, check it: www.worldses.org/indexes as well as in the CD-ROM Proceedings. They will be also available in the E-Library of the WSEAS. The best papers will be also promoted in many Journals for further evaluation.

A Conference such as this can only succeed as a team effort, so the Editors want to thank the International Scientific Committee and the Reviewers for their excellent work in reviewing the papers as well as their invaluable input and advice.

The Editors

Table of Contents

<u>Plenary Lecture 1: Addressing Challenges in Engineering Education via Computer-related Teaching and Research Activities</u>	15
<i>Thomas Yang</i>	
<u>Plenary Lecture 2: Network Traffic Models</u>	16
<i>Ming Li</i>	
<u>Plenary Lecture 3: The Visualization of Gas-Assisted Injection Long Bubble in a Tube</u>	17
<i>Kuang Yuan Kung</i>	
<u>Plenary Lecture 4: Application of GM(1,1) Model to Speech Enhancement and Voice Activity Detection</u>	18
<i>Cheng-Hsiung Hsieh</i>	
<u>Plenary Lecture 5: The Ethics of Computer Science Applications</u>	19
<i>Mansoor Al-Aali</i>	
<u>Plenary Lecture 6: A Modeling Framework for Quality Safety Traceability based on Petri Net Case by Meat Food</u>	20
<i>Xiaoshuan Zhang</i>	
<u>Automated Deduction in Frege-Hilbert Calculi</u>	21
<i>Elmar Eder</i>	
<u>Analyzing Longitudinal Data using Gee-Smoothing Spline</u>	26
<i>Noor Akma Ibrahim, Suliadi</i>	
<u>Fractional Gaussian Noise and Network Traffic Modeling</u>	34
<i>Ming Li</i>	
<u>Fault-Tolerant VQ-style Secret Image Sharing</u>	40
<i>Wei-Kai Su, Lee Shu-Teng Chen, Ja-Chen Lin</i>	
<u>Geodesic and Balanced Bipancyclicity of Hypercubes</u>	44
<i>Pao-Lien Lai, Chang-Hsiung Tsai, Hong-Chun Hsu</i>	
<u>Iterative Numerical Method of SiC-GTO Thyristor</u>	50
<i>Muhamad Zahim Sujod, Norainon Mohamed</i>	
<u>A New Method for Indoor Location Base on Radio Frequency Identification</u>	55
<i>Rung-Ching Chen, Sheng-Ling Huang</i>	
<u>Health Information System for the Comprehensive Management of a Sleep Clinic</u>	61
<i>Edgar Daniel Acosta, Francklin Rivas-Echeverria, Solange Gonzalez, Carlos Rivas-Echeverria</i>	
<u>Expert System for the Diagnosis of Learning Difficulties in Children's Basic Education</u>	67
<i>Jose Hernandez, Gloria Mousalli, Francklin Rivas</i>	
<u>Effect of Feedback Control on Marangoni Convection in a Fluid Layer with Variable Viscosity</u>	72
<i>Norihan Md. Arifin, Nurul Hafizah Zainal Abidin</i>	

<u>Design & Development of Collaborative Workflow for Lean Production in a Repair & Overhaul Industry</u>	78
<i>Teh Ying Wah, Ng Hooi Peng, Ching Sue Hok</i>	
<u>Singly Diagonally Implicit Fifth Order Five-Stage Runge-Kutta Method for Linear Ordinary Differential Equations</u>	82
<i>Fudziah Ismail, Nur Izzati Che Jawias, Mohamed Suleiman, Azmi Jaafar</i>	
<u>Peer Assessment for Developing Students' 2D Animation Skills</u>	87
<i>Songshen Yeh, Jung-Chuan Yen, Jin-Lung Lin, Shun-Der Chen</i>	
<u>Smoothing Curve by Orthogonal Polynomials with Non-Differentiable Functions as their Weight Functions</u>	94
<i>Maitree Podisuk, Kasem Bundit, Pornchai Chaisanit, Terdkwan Changpuak, Wichuta Pispeng, Sutisa Kameesak, Piyapong Sujarakittikul</i>	
<u>Integration Method with Orthogonal Polynomials</u>	100
<i>Wannaporn Sanprasert, Ungsana Chundang, Maitree Podisuk</i>	
<u>Impulse Noise Removal with Modified BDND and Adaptive Switching Median Filter</u>	106
<i>Cheng-Hsiung Hsieh, Po-Chin Huang</i>	
<u>An Anonymous Mutual Authentication System with Smart Card</u>	112
<i>Chin-Ling Chen, Wei-Chech Lin, Zong-Min Guo, Yung-Fa Huang</i>	
<u>Copyright Ownership Authentication by Embedding a Biometric Watermark with Discrete Cosine Transform</u>	118
<i>Ioi-Tun Lam, Chi-Man Pun</i>	
<u>Dynamic Processor</u>	124
<i>Mahdi Falizkaran Yazdi, Ali Javid, Mostafakamkar Khaboushan</i>	
<u>Robust Estimation of Regression Parameters with Heteroscedastic Errors in the Presence of Outliers</u>	128
<i>Habshah Midi, Sohel Rana, A. H. M. R. Imon</i>	
<u>Weighted Bootstrap with Probability in Regression</u>	135
<i>M. R. Norazan, M. Habshah, A. H. M. R. Imon</i>	
<u>Study of the Rigidity Prediction of Linear Motion Guide through the Grey Theory and the Neural Network</u>	142
<i>Y. F. Hsiao, Y. S. Tarng, K. Y. Kung</i>	
<u>A Comparison between the Grey Modeling and Neural Network in the Prediction of the Lubrication Oil Consumption of Linear Motion Guide</u>	150
<i>Y. F. Hsiao, Y. S. Tarng</i>	
<u>Transient Analysis of a Cylindrical Heat Equation</u>	158
<i>Ko-Ta Chiang, G. C. Kuo, K. Y. Kung, Y. F. Hsiao</i>	
<u>The Visualization of Gas-Assisted Injection Long Bubble in a Tube</u>	163
<i>Cheng-Hsing Hsu, Kuang-Yuan Kung, Po-Chuang Chen, Shu-Yu Hu</i>	
<u>Quarterly Accounting Earnings Forecasting: A Grey Group Model Approach</u>	169
<i>Zheng-Lin Chen, Chia-Jui Lai</i>	

<u>A Greedy Location-Aided Routing Protocol for Mobile Ad Hoc Networks</u>	175
<i>Neng-Chung Wang, Jong-Shin Chen, Yung-Fa Huang, Si-Ming Wang</i>	
<u>Effectiveness of a Novel Feature and Confidence Level Assignments to Classifiers in Fingerprint Matching</u>	181
<i>Khurram Yasin Qureshi, Shoab A. Khan, M. Y. Javed</i>	
<u>The Conceptual Model of Fish Disease Diagnosis</u>	187
<i>Guoyonghong</i>	
<u>A Fault-Tolerant Capacity Enhancement Strategy for the Speed-Sensitive Allocation in Hierarchical Wireless Networks</u>	192
<i>Jong-Shin Chen, Mei-Wen Li, Neng-Chung Wang, Yung-Fa Huang</i>	
<u>Frame Rate Up-Conversion Using Adaptive Bilateral Motion Estimation</u>	199
<i>Tsung-Han Tsai, Hong-Guang Chen, Hsueh-Yi Lin</i>	
<u>The Inertial Effects on the Flow Pattern in a Gas-Assisted Injection Molding Process</u>	203
<i>Cheng-Hsing Hsu, Kuang-Yuan Kung, Po-Chuang Chen, Gia Chaun Kuo</i>	
<u>A Study of Heat Transport Capacity in a Heat Pipe</u>	209
<i>C. H. Hsu, K. Y. Kung, S. Y. Hu, C. C. Chang</i>	
<u>A Study on Temperature Control with Indirect Liquid/Steam Heating</u>	215
<i>Cheng Hsing Hsu, K. Y. Kung, Shu Yu Hu, Gia Chaun Kuo</i>	
<u>Using Data Mining for Inverse Process of QFD to Analyse Product Reuse Satisfaction in Reverse Logistics</u>	221
<i>Tzu-Yuan Lee</i>	
<u>A Study into the Method of Selecting a Graduation Computer Science Project</u>	225
<i>Mansoor Al-A'Ali, Sakina Al-A'Ali, Samia Yousif</i>	
<u>Using a Compound Options Approach to Evaluate CRM Project Investment</u>	231
<i>Hsiu-Yuan Wang, Yu-Sheng Chang, Tung-Jung Chan, Ching-Mu Chen, Shwu-Huey Wang</i>	
<u>Modeling a 4-phase Customer Relationship to Evaluate a Project Investment</u>	235
<i>Hsiu-Yuan Wang, Tung-Jung Chan, Yu-Sheng Chang, Ching-Mu Chen, Shwu-Huey Wang</i>	
<u>Extracting Wetland using Decision Tree Classification</u>	240
<i>Hui Yuan, Rongqun Zhang, Xianwen Li</i>	
<u>Design and Implementation of Spatial Variation Analysis System</u>	246
<i>Lingling Gao, Rongqun Zhang, Ming Zhao</i>	
<u>An Efficient Method for Copy-Move Forgery Detection</u>	250
<i>Hwei-Jen Lin, Chun-Wei Wang, Yang-Ta Kao</i>	
<u>Simulation of Wetlands Evolution Based on Markov-CA Model</u>	254
<i>Rongqun Zhang, Huiqing Zhai, Chengjie Tang, Suhua Ma</i>	
<u>A GA-based System for Allocating Activities of a Physical Education Program to Undergraduate Students</u>	260
<i>Rong-Chang Chen, Tung-Shou Chen, Tian-Huei Jhang, Tzu-Han Lin, Chih-Jung Hsu, Pei-Hsuan Hung</i>	

<u>HNN-based Multiuser Detection in UWB Systems</u>	265
<i>Chia-Hsin Cheng, Guo-Jun Wen, Chun-Yan Li, Yung-Fa Huang, Hsinying Liang</i>	
<u>The Effects of Data Mining in ERP-CRM Model – A Case Study of Madar</u>	270
<i>Abdullah S. Al-Mudimigh, Farrukh Saleem, Zahid Ullah</i>	
<u>Fitting Study of the Performance Curve of Fans</u>	283
<i>Cheng-Hsing Hsu, Kuang-Yuan Kung, Ching-Chuan Chang, Chia-Chuan Kuo</i>	
<u>Delta-Fuzzy Measures and its Application</u>	289
<i>Hsiang-Chuan Liu, Der-Bang Wu, Yu-Du Jheng, Tian-Wei Sheu</i>	
<u>An Effective Method for the Arrangement of Multimedia Classrooms</u>	294
<i>Yi-Lin Wang, Yu-Fang Cheng, Tung-Shou Chen, Rong-Chang Chen</i>	
<u>Colour Vision Properties For Peel of Mango's Fruit: An Approach to Objective of Total Pigments Assessment: RGB, CMY And Total Pigments Relations Mathematical Guide</u>	299
<i>Ahmed Hammad, Farid Kassim</i>	
<u>Template-Based Design for Language Instruction CMS</u>	305
<i>Afendi Hamat, Mohamed Amin Embi, Supyan Hussin</i>	
<u>Numerical Simulation of Whipping Process in Electrospinning</u>	309
<i>Yongchun Zeng, Zeguang Pei, Xinhou Wang</i>	
<u>Computer-Assisted Instruction in Teaching Early Childhood Literature</u>	318
<i>Chew Fong Peng, Teh Ying Wah, Zahari Ishak</i>	
<u>Method on Feature Selection of Hyperspectral Images based on Bhattacharyya Distance</u>	324
<i>Simin Cai, Rongqun Zhang, Hui Yuan</i>	
<u>A Study of PBL On-Line System Flows</u>	330
<i>Lung-Hsing Kuo, Li-Min Chen, Hung-Jen Yang, Hsieh-Hua Yang, Jui-Chen Yu</i>	
<u>Mechanical and Numerical Modeling of the Cracks Closure/opening Effects in Laminates</u>	337
<i>F. Trivaudey, V. Guicheret-Retel, L. Boubakar</i>	
<u>A Simulation of Forging Process by the Point Collocation Method with a Boundary Layer of Finite Element</u>	344
<i>Yong-Ming Guo</i>	
<u>Align-Encode Delay Assignment In The Case of XOR-Decompressors: Impact of Parallel Computations</u>	351
<i>Mohammed Nael Taha, Nader Al-Awadhi, Ozgur Sinanoglu, Mohammed Al-Mulla</i>	
<u>Information Modeling for Real-Time Decision Support in Intensive Medicine</u>	360
<i>M. F. Santos, F. Portela, M. Vilas-Boas, J. Machado, A. Abelha, J. Neves, A. Silva, F. Rua</i>	
<u>The Design and Adoption of Quality and Cost control System in Small and Medium-Sized Enterprise: A Case Study in Taiwan</u>	366
<i>Tseng-Fung Ho, Chih-Ling Lin</i>	
<u>Boolean Conversion</u>	370
<i>Fengming M. Chang</i>	

<u>A Class of Alternating Group Iterative Method for Convection-Diffusion Equations</u>	375
<i>Qinghua Feng, Bin Zheng</i>	
<u>A Class Of Parallel Difference Method for Solving Convection-Diffusion Equation With Variable Coefficient</u>	379
<i>Qinghua Feng</i>	
<u>Parallel Alternating Group Explicit Iterative Method for Convection-Diffusion Equations</u>	383
<i>Qinghua Feng, Bin Zheng</i>	
<u>An Adaptive Load Balance Allocation Strategy for Adaptive Antenna Array Wireless Networks</u>	388
<i>Jong-Shin Chen, Young-Wei Chang, Neng-Chung Wang, Yung-Fa Huang</i>	
<u>Intelligent Agents and Medical Moral Dilemmas</u>	394
<i>Jose Machado, Miguel Miranda, Gabriel Pontes, Dias dos Santos, Manuel Santos, Antonio Abelha, Jose Neves</i>	
<u>An Advantage Factor of Probabilistic Risk Assessment in Information Security</u>	400
<i>Naoki Satoh, Hiromitsu Kumamoto</i>	
<u>Applying Fuzzy Theory based Data Mining to Establish the Female Sizing Systems for Garment Production</u>	408
<i>Tzu-Yuan Lee, Hui-Ming Kuo, Chin-Hung Hsu</i>	
<u>A Parallel Finite Difference Method for Fourth Order Parabolic Equations</u>	411
<i>Qinghua Feng, Bin Zheng</i>	
<u>A Three Time Level Finite Difference Method with intrinsic Parallelism for Diffusion Equations</u>	417
<i>Qinghua Feng, Bin Zheng</i>	
<u>A Quantum-Inspired Hybrid Evolutionary Method</u>	422
<i>Zhonggang Liu, Liang Zhou</i>	
<u>A New Real-Coded Quantum Evolutionary Algorithm</u>	426
<i>Zhifeng Zhang, Hongjian Qu</i>	
<u>A New Hybrid Intelligence Algorithm</u>	430
<i>Zongyao He, Juan Hong</i>	
<u>Components Reduction of Double-Layer Networks with Holographic Optical Switches</u>	435
<i>Jiun-Shiou Deng, Chi-Ping Lee, Chien-Ping Chang, Ming-Feng Lu, Yang-Tung Huang</i>	
<u>A Pulse-Coupled Neural Network for Color Image Edge Detection</u>	441
<i>QiuHong Chen, Liang Zhou</i>	
<u>Constrained Optimization Evolutionary Algorithm</u>	446
<i>Meng Guo, Hongjian Qu</i>	
<u>A New Genetic Algorithm for solving Traveling Salesman Problem</u>	451
<i>Xiaojuan Bai, Liang Zhou</i>	
<u>Discussion on the Deterministic Approaches for Evaluating the Voltage Deviation due to Distributed Generation</u>	456
<i>Tsai-Hsiang Chen, Nien-Che Yang</i>	

<u>Case Studies of the Impact of Voltage Imbalance on Power Distribution Systems and Equipment</u>	461
<i>Tsai-Hsiang Chen, Chwnng-Han Yang, Ting-Yen Hsieh</i>	
<u>Informational technology in realization of sports and technique education in primary schools</u>	466
<i>Danimir Mandic, Dragan Martinovic, Dragoljub Visnjic</i>	
<u>Estimation of Labor Time at the Information Security Audit and Improvement of Audit Work Quality by Usage of Probabilistic Risk Assessment</u>	472
<i>Naoki Satoh, Hiromitsu Kumamoto</i>	
<u>Applying Divergence Principles to French to English Machine Translation</u>	477
<i>Violaine Prince, Jacques Chauche</i>	
<u>Inverse Eigenvalue Problems Arising in Population Models</u>	485
<i>Mei Qin Chen, Tao Hsiang Chang</i>	
<u>An Efficient Anti-Collision Algorithm for RFID System</u>	488
<i>Tzay-Farn Shih, Wen-Li Hsu</i>	
<u>Multiprocessor-Based Real-Time Control of a Moving Object</u>	495
<i>Ognian Nakov, Plamenka Borovska, Nadejda Kuchmova, Desislava Andreeva</i>	
<u>A Frame-based Resource Description Framework Expert System</u>	499
<i>Napat Prapakorn, Suphamit Chittayasothorn</i>	
<u>Finding the Nearly Optimal Makespan on Identical Machines with Mold Constraints Based on Genetic Algorithms</u>	504
<i>Tzung-Pei Hong, Sheng-Shin Jou, Pei-Chen Sun</i>	
<u>Multitime Hamilton-Jacobi Theory</u>	509
<i>Constantin Udriste, Laura Matei, Iulian Duca</i>	
<u>Troubled Asset Relief Program, Bank Interest Margin and Default Risk in Equity Return: An Option-Pricing Model</u>	514
<i>Jyh-Jiuan Lin, Ching-Hui Chang, Jyh-Horng Lin</i>	
<u>An Integrated System to Reform World Financial Crisis by Facilitating EU Auditing License Test with Virtues Evaluation</u>	520
<i>Panagiota Kiriafini, Dimitrios Zissopoulos, Nikos Kartalis, Nikos Sarriandis, Kostas Tsioras</i>	
<u>Topological Customization for Materials Composition of 3D Heterogeneous Multi-Functional Components</u>	525
<i>Anping Xu, Yunxia Qu, Yi Yang, Nikos E. Mastorakis</i>	
<u>The Effects of Sunshine-Induced Mood on Bank Lending Decisions and Default Risk: An Option-Pricing Model</u>	531
<i>Jyh-Jiuan Lin, Jyh-Horng Lin, Rosemary Jou</i>	
<u>Internet and eBusiness</u>	537
<i>Beatrice Sion, Daniela Firoiu, Maria Cristina Titrade, Cezar Mihalcescu</i>	
<u>Modeling and Operation Analysis of Meshed Distribution Systems with Distributed Generation</u>	541
<i>Wen-Chih Yang, Tsai-Hsiang Chen, Jun-Den Wu</i>	
<u>Authors Index</u>	547

Plenary Lecture 1

Addressing Challenges in Engineering Education via Computer-related Teaching and Research Activities



Assistant Professor Thomas Yang

Department of Electrical and Systems Engineering
(Joint Appointment) Department of Freshman Engineering
Embry-Riddle Aeronautical University
Daytona Beach, FL 32114,
U.S.A.

Email: yang482@erau.edu

Abstract: Around the world, engineering education faces a multitude of challenges in the 21st century. With the ever increasing globalization of industry, it is particularly important for new engineering education practices to be adopted in developed countries to produce quality engineers and to maintain a competitive edge in the global economy. In this talk, we focus on the trends and challenges in the US engineering educational system and present some computer-related teaching and research activities implemented at Embry-Riddle Aeronautical University (ERAU).

Some of the major concerns in the US engineering education include:

1. Student motivation and retention, especially during the first year of college;
2. Cultivation of oral and written communication skills;
3. Math skills essential for the engineering profession;
4. Knowledge of systems engineering and business process;
5. Attracting women and minority students traditionally underrepresented in engineering disciplines;
6. Diversity of cultural environment and world markets;
7. Increasing interdependence between engineering and other disciplines, such as social science, medicine, economics, etc.

The new computer-related teaching and research activities we have been implementing at ERAU include:

1. Integrating the use of computer software (such as Matlab) in engineering instruction;
2. Introducing graphical user interface (GUI) design projects in freshman engineering courses to promote the awareness of usability and systems engineering knowledge among low level engineering students;
3. Implementing web-based automated student learning assessment tools in engineering courses to facilitate timely and effective assessment;
4. A project-based freshman engineering course in Matlab and C;
5. Student research projects in unmanned autonomous rescue vehicles for computer and software engineering majors.

Brief Biography of the Speaker: Dr. Thomas Yang received his Ph.D. in Electrical Engineering from the University of Central Florida, Orlando, Florida, USA in 2004. Since January 2005, he has been an Assistant Professor of Electrical Engineering at Embry-Riddle Aeronautical University (ERAU) in Daytona Beach, Florida, USA. Since August 2006, he has also maintained a joint appointment at ERAU's Department of Freshman Engineering.

Dr. Yang has extensive experience in undergraduate engineering education, and has taught numerous engineering courses for freshman through senior students. He has been involved in proposing and implementing several new teaching initiatives, including: integration of MATLAB usage in an electric circuit course, introduction of GUI design in two freshman engineering courses, and design of a web-based automated learning assessment tool. He also contributed to the writing of two chapters on communication skills and essential math knowledge for a new textbook of the Introduction to Engineering course at ERAU. He also serves as a faculty mentor in ERAU's McNair Scholar's Program, a program funded by the US Department of Education seeking to increase the attainment of Ph.D. degrees by students from underrepresented segments of society.

Dr. Yang's research interests include adaptive and statistical signal processing and wireless communications with applications in aviation. He published more than 30 papers in refereed journals and conference proceedings, and has served as PI or Co-PI in two research projects funded by the US federal government.

Plenary Lecture 2

Network Traffic Models



Professor Ming Li

East China Normal University
CHINA

Email: mli@ee.ecnu.edu.cn

Abstract: Traffic models are crucial to network management and performance evaluation of communication networks. The modeling theory from a view of applied mathematics and the applications of traffic models from the point of view of networking gain wide interests of applied mathematicians, applied statisticians, physicists, and the scientists in electrical engineering and computer science.

There are two main categories in traffic modeling. One is statistical modeling based on random processes, in particular, fractal time series. The other is deterministic modeling by using bounded models. On the one hand, statistical models are useful to reveal the statistical properties of aggregated traffic, such as self-similarity, long-range dependence, and heavy-tailed distributions. On the other hand, deterministic models, instead of a statistical description, can be used to well characterize traffic at connection level with a set of bounds on the packet generation process for the purpose of guaranteed quality of service, such as guaranteed end-to-end delay for a specific connection. The theory and practice of both types of traffic models are desired.

Owing to the large impact upon the performance of communication network systems, two concepts are particularly discussed. One is the local irregularity of traffic, which may be characterized by the fractal dimension with the model of fractal time series or represented by the traffic burstiness with a bounded model. The other is the global persistence of traffic, which may be explained from the point of view of the long-range dependence if the model of fractal time series is used or interpreted as an average rate when one makes use of a bounded model.

This plenary lecture will give a talk with respect to the statistical modeling of traffic based on fractal time series and the deterministically bounded models. Applications of two types of models will also be mentioned. This speech was supported in part by the National Natural Science Foundation of China (NSFC) under the project grant numbers 60573125 and 60873264.

Brief Biography of the Speaker: Ming Li, Ph.D. (City University of Hong Kong), is a professor at East China Normal University, PR. China. He was with the School of Computing, National University of Singapore, before joining East China Normal University in 2004. His research areas relate to applied statistics and signal processing with the recent interests in fractal time series and time-frequency analysis, computer science currently focusing on network traffic modeling and network security, and measurement & control in the aspects of error analysis and optimal control. He has published over 90 papers in international journals and international conferences in those areas. His research is supported in part by the National Natural Science Foundation of China (NSFC) under the project grant numbers 60573125 and 60873264.

Dr. Ming Li is an editorial member of Journal of Universal Computer Science, the guest editor (with Pierre Borgnat) of Telecommunication Systems by Springer for the Special Issue on Traffic Modeling, Its Computations and Applications in 2008, and the guest co-editor (with Carlo Cattani and Cristian Toma) of Mathematical Problems in Engineering by Hindawi Publishing Corporation for the Special Issue on Short Range Phenomena: Modeling, Computational Aspects and Applications in 2008. Ming Li is also the editor-in-chief of two international journals, International Journal of Electronics and Computers, and International Journal of Engineering and Interdisciplinary Mathematics.

Plenary Lecture 3

The Visualization of Gas-Assisted Injection Long Bubble in a Tube



Associate Professor Kuang Yuan Kung

Nanya Institute of Technology

Taiwan

E-mail: ky.kung@msa.hinet.net

Abstract: A long bubble-driven fluid flow in a circular tube is visualized by an optical method. A pressurized airflow was injected into an 8 mm I.D. and 1,500 mm long horizontally placed glass tube filled with silicon oil to produce a long bubble in the tube. The images were analyzed by two-value calculation and a thinning process to extract the contour of the bubble front. Data points on the contour were then deduced to undergo a regression curve fitting. The results show a good verification of the theoretically derived non-dimensional contour equation. The deduced penetration speed indicates that the speed is increasing downstream due to the decreasing fluid slug in the tube. The experimental results shows the theoretical bubble profile can be introduced to the simulation study to reduce the calculating time. The theoretical bubble profile is more precise in a lower λ value than in a higher one.

Brief Biography of the Speaker:

Education:

PhD.Chung-Yuan Christian University(Advisor: Professor C.H.Hsu)

M.S.n Mechanical Engineering,Feng Chia University

B.S. in Mechanical Engineering,Chung-Yuan Christian University

Work Experience:

Associate Professor, Nanya Institute of Technology (1999-)

Leader of Department of Mechanical Engineering(1998-2000)

a lecturer , Nanya Institute of Technolog(1989-1998)

Engineer,VISHAY SILICONIX TAIWAN

Engineer, Philips Electronics

Honor:

Session Chair (The 24th national Conference on Mechanical Engineering) (2007.11.23-24)

Session Chair (The 25th national Conference on Mechanical Engineering) (2008.11.21-22)

Research Interests:

Heat Transfer

Differential Equation Analysis

Advanced Manufacturing Technology

Plenary Lecture 4

Application of GM(1,1) Model to Speech Enhancement and Voice Activity Detection



Associate Professor Cheng-Hsiung Hsieh

Department of Computer Science and Information Engineering
Chaoyang University of Technology
Taiwan

E-mail: chhsieh@cyut.edu.tw

Abstract: This talk is about the application of GM(1,1) model to speech enhancement and voice activity detection. It consists of four parts: First, GM(1,1) model is briefly reviewed. Second, a noise estimation scheme based on GM(1,1) model is introduced which is called grey noise estimation (GNE). Third, with GNE a magnitude spectral subtraction approach is given to improve the quality of noisy speech. The approach is called the grey magnitude spectral subtraction (GMSS). Finally, the GMSS is used as a preprocessing scheme for voice activity detection (VAD). By an energy-based VAD (EVAD), the enhanced speech by GMSS is segmented and determined as a speech or non-speech segment. The approach presented here is called the GMSS/EVAD.

Brief Biography of the Speaker: Cheng-Hsiung Hsieh received his B.S. degree in Electronic Engineering from National Taiwan Institute of Technology, Taiwan, in 1989. In 1995, he earned the M.S. degree from Department of Electrical Engineering of Tennessee Technological University, USA. He obtained his Ph.D. degree in Electrical Engineering from the University of Texas at Arlington, USA, in 1997. Since 1998, he has developed several grey models and schemes which have been applied to signal processing and noise estimation. Those studies have been published in journals and conferences. Currently, he is an associate professor at Department of Computer Science and Information Engineering in Chaoyang University of Technology, Taiwan. His researches of interest include grey systems, artificial neural networks, digital video/image processing, and speech signal processing.

Plenary Lecture 5

The Ethics of Computer Science Applications



Professor Mansoor Al-Aali
Department of computer science
College of IT
University of Bahrain
Kingdom of Bahrain
Email: malaali@itc.uob.bh

Abstract: Computer science applications touch all aspects of life. The people involved in computer science development and applications and the users of these applications have tremendous responsibilities to honour the ethical values as specified in many codes of conducts and in their belief for their own benefit and for the benefit of humanity in general. We study the applications of ethics for computer professionals and users alike in terms of a number of realistic potential scenarios which are difficult to encircle or categorize in terms of their ethical boundaries. In a world where the reward for ethical conduct and the penalty for unethical acts tend to go unnoticed, we attempt make a case for a better ethical conduct by making the effect of unethical conduct more apparent through carefully chosen and applied scenarios. We have achieved this by using popular codes of conducts linking them to realistic scenarios and then surveying a sample of computer professionals, users and selected members of society and then challenge their belief and their standing. We expect that our work will have effect on the application of computer technology on all concerned.

Brief Biography of the Speaker: Mansoor Al-A'ali finished his B.Sc. in Computer Studies from the University of Teesside, UK in 1982. He received his M.Sc. in Computer Science from the University of Aston in Birmingham, UK in 1984. He received his Ph.D. from the University of Aston in Birmingham, UK in 1989. Mansoor is currently working in the department of computer science at the University of Bahrain. His research interests include: Computer Ethics, AI, algorithms, software engineering, computers in education and Arabization. He has over seventy refereed publications in these areas. More recently, Mansoor has been especially interested in the areas of computer ethics from an Islamic point of view and in new methods for teaching computer ethics.

Mansoor was for four years the chairman of the department of computer science at the University of Bahrain and was for another four years the director of continuing education. Since 1989 he has been working as a consultant for a number of leading Bahraini organizations leading the design and quality assurance issues of major industrial computer systems.

Plenary Lecture 6

A Modeling Framework for Quality Safety Traceability based on Petri Net Case by Meat Food



Professor Xiaoshuan Zhang
College of Computing
The University of Portsmouth (UoP)
UK
E-mail: zhxshuan@cau.edu.cn

Abstract: The quality safety traceability of agricultural products has play important role in governmental law, food industry management strategies, and consumers. Literature reviews show that the research goal of quality safety traceability has transferred from the theoretical reference to the decision support, research methods from simple analysis to system integrated modeling. But there is few works done by the researchers in China. The paper describe to develop a set of efficient and practical system modeling methods for the quality safety traceability integrated Petri nets, FMECA, with fuzzy probability, theory of evidence. The framework supposes to make a breakthrough progress at the system integrated modeling methods for the quality safety traceability to improve reusability and sharing from the theory perspective, to enhance the practical problems solution, and improve the efficiency and decision-making quality for fast orientation and forward warning in quality safety traceability.

Brief Biography of the Speaker: Dr. ZHANG Xiaoshuan: is an associate Professor in China Agricultural University, Deputy Director of CITA(center of information technology and management in agriculture). He received his PhD degree in Information Management & information system. He is an expert in agriculture/food/Aquaculture supply chain management & quality safety traceability system, e-business and IS/IT application in agribusiness. He has good scientific backgrounds and research experience in UK. He has fulfilled successfully 6 research projects in fishery supply chain & information management. Now as the coordinator, he is running an EU FP6 project, a NSFC project and Sino-Romanian S&T Cooperation relevant to the aquaculture quality safety & traceability.