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RECENT ADVANCES IN COMPUTER ENGINEERING AND APPLICATIONS

Proceedings of the 4th WSEAS International Conference on COMPUTER ENGINEERING and APPLICATIONS (CEA '10)

Harvard University, Cambridge, USA, January 27-29, 2010

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Preface

This year the 4th WSEAS International Conference on COMPUTER ENGINEERING and APPLICATIONS (CEA '10) was held at Harvard University, Cambridge, USA, January 27-29, 2010. The conference remains faithful to its original idea of providing a platform to discuss network architecture, network design software, mobile networks and mobile services, digital broadcasting, e-commerce, optical networks, hacking, trojian horses, viruses, worms, spam, information security, standards of information security: aes, ipsec, high-tech crime prevention, real-time operating systems, hardware engineering, supercomputing, artificial intelligence, microprocessors, microcomputers, antennas and radars, lightwave technology, numerical methods for electromagnetics, aerospace systems, atm networks, military communications, cyber-science and cyber-space, mathematical logic and computers, image, video and internet technologies, web-based education, law aspects related to informatics 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

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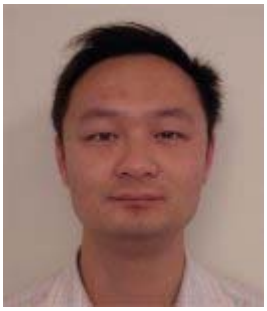
Plenary Lecture 1

Modeling and Solution for Micro/Nano Scale Gas Flow and Heat Transfer



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Abstract: High efficiency heat exchanger is needed for electronic cooling, otherwise, the operating temperature of the electronic devices and micro systems could reach values where the components loose their physical integrity, and the related function would cease. Due to the large heat transfer surface area to volume ratio, microchannels cooling with gas or liquid coolant have been shown to be strong prospects. Therefore, research on the flow and heat transfer in these microchannels is as important topic.
Based on Kn number, the gas flow in microchannel is classified into four flow regimes: continuum flow regime, slip flow regime, transition flow regime and free molecular flow regime. The flow in many applications of the micro/nano systems, such as hard disk drive, micro pumps, micro valves and micro nozzles, is in slip and transition flow regime, which is characterized by slip flow at wall. Here, we modeled the flow in slip and transition flow regime, and give the purely analytical solution by homotopy analysis method(HAM). The results are validated by comparing the numerical results. Effect of key parameters on flow characteristics are discussed in details. Also, an "inverted velocity" profile, which has been found by other investigators by using molecular-based method, is found by solving the conventional governing equations, which are Navier-Stokes equations, combined with high-order accurate slip boundary conditions.

Brief Biography of the Speaker:
Tiantian Zhang is currently a visiting scholar at Rutgers University (RU) in NJ, USA. He is a PhD in Beijing Jiaotong University (BJTU). He got his bachelor degree from Huazhong University of Science and Technology (HUST). His current research interests include micro/nano-scale flow and heat transfer, design and optimize micro heat sink, CFD et al. He has published about 20 peer reviewed papers. He is member of APS and ASME. Also, He is referee for some archival journals.

Plenary Lecture 2

Machine Learning of Human Faces: Global versus Local Face Recognition

Professor Adnan Khashman
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Faculty of Engineering, Near East University
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Abstract: Face recognition by machines can be invaluable with various important applications in real life, such as electronic and physical access control, national defense and international security. Machine learning of faces requires usually a facial image database where different face images of a person are included to account for variations in facial features. Current face recognition methods rely on: detecting local facial features and using them for face recognition (local recognition) or on analyzing a face as a whole (global recognition). However, despite the emergence of many methods and systems for face recognition over the past decade, we are still far from deploying such systems for our daily use.
Why are we still hesitant to rely on machine face recognition? What are the problems of face detection and recognition systems? What is the significance of facial databases? What can be done to make us trust a machine's decision over who is who? These questions and more will be discussed during the lecture. Moreover, we review the difference between local and global face recognition, and present two intelligent facial recognition systems which we developed based on the local and global recognition approaches.

Brief Biography of the Speaker:
Adnan Khashman received his Ph.D. and M.Sc. degrees in electronic engineering from University of Nottingham, England, UK, in 1992 and 1997, respectively, and his B.Eng. degree in electronic and communication engineering from University of Birmingham, England, UK, in 1991. During 1998-2001 he was an Assistant Professor and Chairman of the Computer Engineering Department, Near East University, Nicosia, N. Cyprus. During 2001-2009 he was an Associate Professor and Chairman of the Electrical and Electronic Engineering Department at the same university. From 2007 till 2008 he was also the Vice-Dean of the Engineering Faculty. Since 2009 he is a full Professor and the Head of the Intelligent Systems Research Group (ISRG) which he founded in 2001 at the same university.
His current research interests include emotion modeling in neural networks and their engineering applications, intelligent systems and their applications, image processing, and pattern recognition. Prof. Dr. Khashman is a Senior Member of IEEE, and a reviewer for many journals. He has authored and co-authored more than 65 scientific publications in books, journals, and conference proceedings.

Plenary Lecture 3

Knowledge Reuse: Promises of Web-Based Service

Professor Hung-Jen Yang
Director of Center for Instructional & Learning Technology
National Kaohsiung Normal University
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Abstract: One of the key themes in knowledge management today is the role of communication technology in the transfer of knowledge between those who have it and those who don't. It is widely acknowledged that knowledge has two dimensions. One is explicit and another is tacit. Only explicit knowledge is the province of communication technology, including the information system by which people informally share their experience and the more formal repositories in which structured knowledge is stored for later reuse. Although knowledge reuse has been observed and researched under many different names in many different settings, findings about knowledge reuse have remained relatively dispersed and un-integrated. One possible explanation is that knowledge reuse is seen as a unitary phenomenon—pretty much the same regardless of who does it, how, and why. However, despite the traditional image of knowledge reuse, web-based technology provides services for boosting knowledge reuse.
Based upon empirical data of knowledge reuse, the structure of applying web-based service was identified. Activities for implementation were designed and illustrated according to knowledge reuse. The impacts of web-based service on knowledge management were also discussed.

Brief Biography of the Speaker:
Prof. Dr. Hung-Jen Yang (born in 1961 in Taipei, Taiwan) is the Director of Center for Instructional & Learning Technology of National Kaohsiung Normal University, Taiwan. He got master degree from University of North Dakota in Industrial Technology major at 1989 and Dr. Degree from Iowa State University in Industrial Education and Technology major at 1991.
From 1991 to 1994, he served as associated professor at Ping-tong teachers' college. In the same period time, he also took the job of computer center director. From 1994 till now, he is working as professor in the department of industrial education and took several different administration jobs. In the semester year of 2003, he was invited as a visiting professor at University of North Dakota, USA. Since 1994 till now, Dr. Yang has already done 25 National Science Council supported projects. His research is focused on both areas of technology education and educational technology.

Plenary Lecture 4

High Level Architecture (HLA) Principles for Distributed Simulation in Industry: A Framework for Controlling Federations over a WAN

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Abstract: One of the major simulation issues, once we consider HLA distributed simulation systems, is the ability of federation execution to be controlled by a single point without the need of involving different teams in different locations. This is turning to be especially important when HLA federation are used to feed complex Decision Support Systems with their results. The talk proposes a Java based architecture (HLA Remote Exec) able to properly solve this problem, by using this application all the process involved in a federation execution can be controlled by a single user in a single location. The talk outlines a general architecture of the proposed methodology, it discuss the characteristics of the enabling technologies and proposes an Agent Based implementation. A case study is, then, presented and discussed.

Brief Biography of the Speaker:
He earned his degree in mechanical engineering at the University of Genoa and he completed his master thesis in Genoa Mass Transportation Company developing an automatic system integrating ANN (Artificial Neural Networks) and simulation with the ERP (Enterprise Resource Planning) for supporting purchasing activities. He had consulting experience in modeling applied to environmental management for the new Bosch plant facility TDI Common Rail Technology in construction near Bari. During his service in the Navy as officer, he was involved in the development of WSS&S (Weapon System Simulation & Service) Project. He completed is PhD in Mechanical Engineering in 2001 defending his Doctoral thesis on “Advances in Industrial Plant Management” by applying Artificial iontelligence and Distributed Simulation to several Industrial Cases. Since 1998 is active in Distributed Simulation by moving US DoD HLA (High Level Architecture) Paradigm from Military to Industrial application. In 2000 he succesfully led a research group first demonstrating practical application of HLA in not dedicated network involving a 8 International University Group. He is currently involved, as reseacher, in the DIP of Genoa University, working on advanced modeling projects for Simulation/ERP integration and DSS/maintenance planning applied to industrial case studies (Contracting & Engineering and Retail companies). He is active in developing projects involving simulation with special attention to Distributed Discrete Event and Agent Based Continuous Simulation (SwarmSimulation Agents). He is teaching Modelling & Simulation, VV&A, Distributed Simulation (HLA), Projecty management in Master Courses Worldwide and he is teaching Industrial Plants Design in University of Genoa Masters' Courses. He is Associated Professor in Mechanical Engineering and Logistics.

Plenary Lecture 5

Military Path Planning for Unmanned Autonomous Agents

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Abstract: Due to the uncertainties and higher risks of fatality in combat situations, Unmanned Autonomous Agents (UAA) may be proven to be a safer alternative for carrying our critical missions, such as search and rescue, and reconnaissance operations. In this presentation we discuss a Military Path Planning Algorithm (MPPA) for a robot or an Unmanned Autonomous Agent (UAA) to map out a safe and efficient path from a specified origin to destination in a combat environment surrounded by enemies. It is assumed that the UAA (or robot) moves along a digital terrain and has sensing capability which is a function of distance, i.e., it will not know where the enemies are located unless it is at a certain distance from them. The objective is to reach the destination point from the origin in a safe and efficient manner while maintaining a safe distance from enemies. The MPPA is tested with two enemies randomly located on the terrain along which the UAA moves. Several ongoing works as well as directions of future research are also presented.

Brief Biography of the Speaker:
Dr. Manoj K. Jha is Associate Professor and Founding Director of the Center for Advanced Transportation and Infrastructure Engineering Research (CATIER) in the department of civil engineering at the Morgan State University, Baltimore, MD, USA. He obtained a Ph.D. in Civil Engineering with transportation specialization from the University of Maryland, College Park in 2000; a M.S. degree in Mechanical Engineering from the Old Dominion University in 1993; and a B.E. degree in Mechanical Engineering from the National Institute of Technology, Durgapur, India in 1991. He also attended the Rensselaer Polytechnic Institute during 1993-94 as a Ph.D. student in Mechanical Engineering and Virginia Tech.'s National Capital campus as a post doctoral fellow during 2000-2001.
Dr. Jha's research interests are in investigating mathematic foundation of artificial intelligence-based optimization algorithms, and route optimization and visualization. For his scholastic and research achievements Dr. Jha has received several awards, among which are the 2007 National Science Foundation (NSF) Small Technology Transfer Research (STTR) award; 2005 and 2006 United Negro College Funds Special Program/Department of Defense (UNCFSP/DoD) Faculty Development Award; 2005 Department of Homeland Security (DHS) Summer Faculty Research award by the Study of Terrorism and Responses to Terrorism (START) Center of Excellence, University of Maryland, College Park, and 2005 NSF-PASI-TS (National Science Foundation's Pan-American Advanced Study Institute on Transportation Sciences) award by the Rensselaer Polytechnic Institute. He is a registered Professional Engineer in the State of Maryland since 1997.
Dr. Jha has served as a PI, Co-PI, or collaborator with other researchers on numerous research projects totaling over $4 million. The key sponsoring agencies of his research projects include Department of Defense, Scientific Research Corporation, Computer Science Corporation, Army Research Lab., Maryland State Highway Administration, Federal Highway Administration, National Science Foundation, and several Baltimore area consulting firms. Dr. Jha has authored (or co-authored) more than 100 articles in journals, books, and conference proceedings in the highway design, optimization, and transportation literature. He has also co-authored 2 books on road design entitled "Intelligent Road Design" and "Fundamentals of Road Design."