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
**Editors:**
Prof. Stephen Lagakos, Harvard University, USA  
Prof. Leonid Perlovsky, Harvard University and the Air Force Research Lab., USA  
Prof. Manoj Jha, Morgan State University, USA  
Prof. Brindusa Covaci, Advancement of Scholarly Research Center - Contemporary Science Association, New York, USA  
Prof. Azami Zaharim, Universiti Kebangsaan, Malaysia  
Prof. Nikos Mastorakis, Technical University of Sofia, Bulgaria

**International Program Committee Members:**
<table>
<thead>
<tr>
<th>Alexander Zemliak, MEXICO</th>
<th>Edgar Sanchez-Sinencio, USA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alexander Pisarchik, MEXICO</td>
<td>Jim C. Bezdek, USA</td>
</tr>
<tr>
<td>Phillip G. Bradförd, USA</td>
<td>A. J. van der Schaft, the NETHERLANDS</td>
</tr>
<tr>
<td>Victor Ramos, MEXICO</td>
<td>Istvan Nagy, Hungary</td>
</tr>
<tr>
<td>Alexander Grebennikov, MEXICO</td>
<td>Wasfy B. Mikhael, USA</td>
</tr>
<tr>
<td>Alba Sanchez, MEXICO</td>
<td>M. N. S. Swamy, CANADA</td>
</tr>
<tr>
<td>Aleksey Nenarokomov, RUSSIA</td>
<td>M. Araki, JAPAN</td>
</tr>
<tr>
<td>Alexander Grebennikov, MEXICO</td>
<td>Abbas El Gamal, USA</td>
</tr>
<tr>
<td>Alireza Yazdizadeh, IRAN</td>
<td>Franco Maloberti, Italy</td>
</tr>
<tr>
<td>Andres Fraguela Collar, MEXICO</td>
<td>Alan N. Willson Jr., USA</td>
</tr>
<tr>
<td>Andrey Ostrovsky, MEXICO</td>
<td>Yoji Kajitani, JAPAN</td>
</tr>
<tr>
<td>Armando Barranon, MEXICO</td>
<td>Mohammed Ismail, USA</td>
</tr>
<tr>
<td>Divakar Yadav, INDIA</td>
<td>Kemin Zhou, USA</td>
</tr>
<tr>
<td>Hasan Cimen, TURKEY</td>
<td>Ruey-Wen Liu, USA</td>
</tr>
<tr>
<td>Joel Suarez, MEXICO</td>
<td>Nabil H. Farhat, USA</td>
</tr>
<tr>
<td>Jorge alberto Ruiz vanoye, MEXICO</td>
<td>John I. Sewell, UK</td>
</tr>
<tr>
<td>Karel Slavicek, CZECH REPUBLIC</td>
<td>Jerry M. Mendel, USA</td>
</tr>
<tr>
<td>Lotfi Merad, ALGERIA</td>
<td>Magdy A. Bayoumi, USA</td>
</tr>
<tr>
<td>Mariko Nakano-Miyatake, MEXICO</td>
<td>Bertram E. Shi, HONG KONG</td>
</tr>
<tr>
<td>Marius Cioca, ROMANIA</td>
<td>M. Omair Ahmad, CANADA</td>
</tr>
<tr>
<td>Nodari Vakhania, MEXICO</td>
<td>N. K. Bose, USA</td>
</tr>
<tr>
<td>Oleg Starostenko, MEXICO</td>
<td>Igor Lemberski, LATVIA</td>
</tr>
<tr>
<td>Osamu Uchida, JAPAN</td>
<td>Alfred Fettweis, GERMANY</td>
</tr>
<tr>
<td>Pavel Makagonov, MEXICO</td>
<td>Brockway McMillan, USA</td>
</tr>
<tr>
<td>Rider Jaimes-Readegui, MEXICO</td>
<td>H. J. Orchard, USA</td>
</tr>
<tr>
<td>Shaneel Narayan, NEW ZEALAND</td>
<td>Jacob Katzenelson, ISRAEL</td>
</tr>
<tr>
<td>Sherin Youssef, EGYPT</td>
<td>Vincent Poor, USA</td>
</tr>
<tr>
<td>Shin-Shin Kao, TAIWAN</td>
<td>Abraham Kandel, USA</td>
</tr>
<tr>
<td>Stojan Kravanja, SLOVENIA</td>
<td>Bor-Sen Chen, CHINA</td>
</tr>
<tr>
<td>Taeho Jo, KOREA</td>
<td>C. S. George Lee, USA</td>
</tr>
<tr>
<td>Vicente Aboites, MEXICO</td>
<td>Hamid R. Berenji, USA</td>
</tr>
<tr>
<td>Vladimir Vasek, CZECH REPUBLIC</td>
<td>Kevin M. Passino, USA</td>
</tr>
<tr>
<td>Woosaeng Kim, KOREA</td>
<td>Lawrence O. Hall, USA</td>
</tr>
<tr>
<td>Zeljko Panian, CROATIA (HRVATSKA)</td>
<td>Ronald R. Yager, USA</td>
</tr>
<tr>
<td>ZHAO zhengjie ZHANG jilong, CHINA</td>
<td>Witold Pedrycz, CANADA</td>
</tr>
<tr>
<td>Irwin W. Sandberg, USA</td>
<td>Agoryaswami J. Paulraj, USA</td>
</tr>
<tr>
<td>Asad A. Abidi, USA</td>
<td>Ahmed H. Tewfik, USA</td>
</tr>
<tr>
<td>Andreas Antoniou, USA</td>
<td>Alan V. Oppenheim, USA</td>
</tr>
<tr>
<td>Antonio Cantoni, AUSTRALIA</td>
<td>Alfonso Farina, ITALY</td>
</tr>
<tr>
<td>Lotfi Zadeh, USA</td>
<td>Alfred O. Hero, USA</td>
</tr>
<tr>
<td>George Szentirmai, USA</td>
<td>Ali H. Sayed, USA</td>
</tr>
<tr>
<td>Michael Peter Kennedy, IRELAND</td>
<td>Anders Lindquist, SWEDEN</td>
</tr>
<tr>
<td>Paresh C. Sen, CANADA</td>
<td>Arthur B. Baggeroer, USA</td>
</tr>
<tr>
<td>Michel Gevers, BELGIUM</td>
<td>Arye Nehorai, USA</td>
</tr>
<tr>
<td>James S. Thorp, USA</td>
<td>Benjamin Friedlander, USA</td>
</tr>
<tr>
<td>Armen H. Zemanian, USA</td>
<td>Bernard C. Levy, USA</td>
</tr>
<tr>
<td>Guanrong Chen, HONG KONG</td>
<td>Bhaskar D. Rao, USA</td>
</tr>
</tbody>
</table>
Brian D. O. Anderson, AUSTRALIA
Bruce A. Francis, CANADA
C. Richard Johnson, USA
C. Sidney Burrus, USA
Charles M. Rader, USA
Desmond P. Taylor, NEW ZEALAND
Donald L. Duttweiler, USA
Donald W. Tufts, USA
Douglas L. Jones, USA
Earl E. Swartzlander, USA
Ed F. Deprettere, the NETHERLANDS
Edward A. Lee, USA
Edward J. Powers, USA
Ehud Weinstein, ISRAEL
Eli Brookner, USA
Ezio Biglieri, Italy
Faye Boudreaux-Bartels, USA
Georgios B. Giannakis, USA
Gonzalo R. Arce, USA
H. Vincent Poor, USA
Hagit Messer, ISRAEL
John V. McCanny, UK
Joos Vandewalle, BELGIUM
Jose C. Principe, USA
Jose M. F. Moura, USA
K. J. Ray Liu, USA
Kaushik Roy, USA
Kenneth Rose, USA
Keshab K. Parhi, USA
Kon Max Wong, CANADA
Kung Yao, USA
Louis L. Scharf, USA
Martin Vetterli, USA
Mati Wax, USA
Meir Feder, ISRAEL
Michael C. Wicks, USA
Michael D. Zoltowski, USA
Michael T. Orchard, USA
Michael Unser, SWITZERLAND
Miguel Angel Lagunas, SPAIN
Moeness G. Amin, USA
Mohamed Najim, FRANCE
Neil J. Bershad, USA
P. P. Vaidyanathan, USA
Patrick Dewilde, NETHERLANDS
Peter Willett, USA
Petre Stoica, SWEDEN
Phillip A. Regalia, FRANCE
Pierre Duhamel, FRANCE
Pierre Moulin, USA
Pramod K. Varshney, USA
Rabab Kreidieh Ward, CANADA
Robert M. Gray, USA
Rolf Unbehauen, GERMANY
Ronald W. Schafer, USA
Rui J. P. Figueiredo, USA
Russell M. Mersereau, USA
Sadaoki Furui, JAPAN
Shun-Ichi Amari, JAPAN
Simon Haykin, CANADA
Soo-Chang Pei, CHINA
Soura Dasgupta, USA
Stefan L. Hahn, POLAND
Steven Kay, USA
Takao Hinamoto, JAPAN
Takashi Matsumoto, JAPAN
Tapio Saramaki, FINLAND
Tariq S. Durrani, U.K.
Thomas F. Quatieri, USA
Thomas L. Marzetta, USA
Thomas S. Huang, USA
Thomas W. Parks, USA
Uri Shaked, ISRAEL
V. John Mathews, USA
Vladimir Cuperman, USA
William A. Pearlman, USA
Wolfgang Fichtner, SWITZERLAND
Wu-Sheng Lu, CANADA
Yaakov Bar-Salom, USA
Yingbo Hua, USA
Yong Ching Lim, SINGAPORE
Yoram Bresler, USA
Zhi Ding, USA
A. A. Goldenberg, CANADA
Angel Rodriguez-Vasquez, SPAIN
Erol Gelenbe, USA
F. L. Lewis, USA
Harry Wechsler, USA
Howard C. Card, CANADA
Lei Xu, P. R. CHINA
Leon O. Chua, USA
Marco Gori, ITALY
Narasimhan Sundararajan, SINGAPORE
Sankar K. Pal, India
Tamas Roska, USA
A. Stephen Morse, USA
Alberto Isidori, USA
Ali Saberi, USA
Andrew R. Teel, USA
Antonio Vicino, ITALY
Anuradha M. Annaswamy, USA
Benjamin Melamed, USA
Bruce H. Krogh, USA
David D. Yao, USA
Donald Towsley, USA
Eduardo D. Sontag, USA
Edward J. Davison, CANADA
G. George Yin, USA
Giorgio Picci, ITALY
Graham C. Goodwin, AUSTRALIA
Han-Fu Chen, CHINA
Harold J. Kushner, USA
Hidenori Kimura, JAPAN
Ian Postlethwaite, UK
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, trojan 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
# Table of Contents

Plenary Lecture 1: Modeling and Solution for Micro/nano Scale Gas Flow and Heat Transfer  
*Tiantian Zhang*  
14

Plenary Lecture 2: Machine Learning of Human Faces: Global versus Local Face Recognition  
*Adnan Khashman*  
15

Plenary Lecture 3: Knowledge Reuse: Promises of Web-Based Service  
*Hung-Jen Yang*  
16

Plenary Lecture 4: High Level Architecture (HLA) Principles for Distributed Simulation in Industry: A Framework for Controlling Federations over a WAN  
*Roberto Revetria*  
17

Plenary Lecture 5: Military Path Planning for Unmanned Autonomous Agents  
*Manoj K. Jha*  
18

Enhanced K-Means Clustering for Patient Reported Outcome  
*M. S. Anbarasi, K. M. Mehata*  
19

Semantic Multicast Notifications: Increasing Information Timeliness and Efficiency With Ad-Hoc Mapping of Operational Events and Organizational Data  
*Zamir Dika, Visar Elmazi*  
27

Industrial Experiences of Developing Quality Gates for Software Development Process  
*Pasi Ojala*  
33

Towards Increased Trustworthiness in IT-Based Service-Oriented Organizations  
*Kassem Saleh*  
38

Integrating Back-Office & Retail Store Management in ERP Through Simulation Models  
*Francesco De Maria, Chiara Briano, Matteo Brandolini, Enrico Briano, Roberto Revetria*  
44

Semantic Classification of Verbs in CROVALLEX  
*Nives Mikelic Preradovic*  
53

A New Genetic Coding for Job Shop Scheduling Problem Considering Geno Type and Pheno Type  
*Masaya Yoshikawa, Hideto Nishimura, Hidekazu Terai*  
59

Color Image Segmentation to the RGB and HSI Model Based on Region Growing Algorithm  
*Yas A. Alsultanny*  
63

Comparative Analysis of High Frequency Characteristics for DDR and DAR IMPATT Diodes  
*Alexander Zemliak, Santiago Cabrera*  
69
A Data Modeling Example of File Permission Management Using the Cellular Data System
Toshio Kodama, Toshiyasu L. Kunii, Yoichi Seki

90

Identifying Mechanical Characteristics of Materials with Non-Linear Behavior Using Statistical Methods
Gilbert-Rainer Gillich, Polidor Bratu, Doina Frunzaverde, Daniel Amariei, Vasile Iancu

96

Image Segmentation of Blood Cells in Leukemia Patients
Adnan Khashman, Esam Al-Zgoul

104

Dynamic Service Selection Capability for Load Balancing in Enterprise Service Bus
Aimrudee Jongtaveesataporn, Shingo Takada

115

Computational Geometric Analysis of Physically Allowed Quantum Cloning Transformations for Quantum Cryptography
Laszlo Gyongyosi, Sandor Imre

121

An Algorithm to Fill Out a Bloc with Pseudorandom Binary Data
Juan Manuel Garcia Garcia

127

Using 2D and 3D Modeling and Simulation for Emergency Situations Management
Enrico Briano, Claudia Caballini, Roberto Mosca, Roberto Revetria, Alessandro Testa

131

Survey on Early Aspects Approaches: Non-Functional Crosscutting Concerns Integration in Software Systems
Denise Lazzeri Gastaldo Bombonatti, Selma Shin Shimizu Melnikoff

137

Liveness and Spoofing in Fingerprint Identification: Issues and Challenges
Mojtaba Sepasian, Cristinel Mares, Wamadeva Balachandran

150

Graphical Microcontroller Programming Tool Based on Extended S-System Petri Net
Ng Kok Mun, Zainal Alam Haron

159

Analysis of a Urban Route Traffic Flow Exploiting the System Dynamic Model
Lucia Cassettari, Francesca Dagnino, Marco Mosca, Roberto Revetria

164

Personalization of Web-Based Systems Based on Computational Intelligence Modeling
Tricia Rambharose, Alexander Nikov

170

Modelling and Assessment of Pollutant Impact on Marine Environments
M. Psaltaki, H. Florou, G. Trabidou, N. C. Markatos

176
The Application of Computer in Vessel Computation and Manufacturing
Wei-Yuan Dzan, Hung-Jen Yang, Hsiao-Chih Lin

A Military Path Planning Algorithm Using Visualization and Dynamic GIS
Manoj K. Jha, Gautham A. Karri, Min-Wook Kang

Determination of Robot Drop Location for Military Path Planning Using GIS Application
Min-Wook Kang, Manoj K. Jha, Gautham Karri

Virtual Reality Applications with User Interface for Dynamic Content Development
Nikolaos Papastamatiou, Theofanis Alexandridis, Konstantinos Tsergoulas, Alex Michopoulos, Nikolaos V. Karadimas

Considering Intersection Performance in Road Network Flow Optimization Using User Equilibrium Approach
Avijit Maji, Manoj K. Jha

The Effect of Urban Form on Traffic Accident Incidence
Diane Jones, Manoj K. Jha

Steps to Smart Grid Realization
Shahram Javadi, Shahriar Javadi

Fostering Online Communities of Practice in Vocational Education
Lesley S. J. Farmer

Authors Index
Plenary Lecture 1

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

Dr. Tiantian Zhang
School of Mechanical & Electronic Control Engineering
Beijing Jiaotong University
Beijing, 100044
P.R. China
E-mail: 04121310@bjtu.edu.cn

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
Founder and Head of Intelligent Systems Research Group (ISRG)
Faculty of Engineering, Near East University
Nicosia
N. Cyprus
E-mail: amk@neu.edu.tr

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
Taiwan
E-mail: hungjen.yang@gmail.com

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.
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 Intelligence 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 successfully 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 researcher, 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.
Military Path Planning for Unmanned Autonomous Agents

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."
## Authors Index

<table>
<thead>
<tr>
<th>Authors</th>
<th>Page(s)</th>
<th>Authors</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alexandridis, T.</td>
<td>201</td>
<td>Khashman, A.</td>
<td>85, 104</td>
</tr>
<tr>
<td>Alsultanny, Y. A.</td>
<td>63</td>
<td>Kodama, T.</td>
<td>90</td>
</tr>
<tr>
<td>Al-Zgoul, E.</td>
<td>104</td>
<td>Kunii, T. L.</td>
<td>90</td>
</tr>
<tr>
<td>Amariei, D.</td>
<td>96</td>
<td>Lin, H.-C.</td>
<td>181</td>
</tr>
<tr>
<td>Anbarasi, M. S.</td>
<td>19</td>
<td>Maji, A.</td>
<td>207</td>
</tr>
<tr>
<td>Balachandran, W.</td>
<td>150</td>
<td>Mares, C.</td>
<td>150</td>
</tr>
<tr>
<td>Bombonatti, D. L. G.</td>
<td>137</td>
<td>Markatos, N. C.</td>
<td>176</td>
</tr>
<tr>
<td>Brandolini, M.</td>
<td>44</td>
<td>Mehat, K. M.</td>
<td>19</td>
</tr>
<tr>
<td>Bratu, P.</td>
<td>96</td>
<td>Melnikoff, S. S. S.</td>
<td>137</td>
</tr>
<tr>
<td>Briano, C.</td>
<td>44, 131, 143</td>
<td>Mosca, M.</td>
<td>164</td>
</tr>
<tr>
<td>Briano, E.</td>
<td>44</td>
<td>Mosca, R.</td>
<td>131</td>
</tr>
<tr>
<td>Caballini, C.</td>
<td>131, 143</td>
<td>Mun, N. K.</td>
<td>159</td>
</tr>
<tr>
<td>Cabrera, S.</td>
<td>69</td>
<td>Nikov, A.</td>
<td>170</td>
</tr>
<tr>
<td>Carstea, C. G.</td>
<td>80, 110, 85</td>
<td>Nishimura, H.</td>
<td>59</td>
</tr>
<tr>
<td>Cassettari, L.</td>
<td>164</td>
<td>Ojala, P.</td>
<td>33</td>
</tr>
<tr>
<td>Dagnino, F.</td>
<td>164</td>
<td>Papastamatiou, N.</td>
<td>201</td>
</tr>
<tr>
<td>David, N.</td>
<td>85, 110</td>
<td>Paraschivescu, A. O.</td>
<td>76, 80</td>
</tr>
<tr>
<td>De Maria, F.</td>
<td>44</td>
<td>Patrascu, L.</td>
<td>76, 80, 85</td>
</tr>
<tr>
<td>Dika, Z.</td>
<td>27</td>
<td>Patrascu, L.</td>
<td>110</td>
</tr>
<tr>
<td>Dzan, W.-Y.</td>
<td>27</td>
<td>Preradovic, N. M.</td>
<td>53</td>
</tr>
<tr>
<td>Elmazi, V.</td>
<td>229</td>
<td>Psaltaki, M.</td>
<td>176</td>
</tr>
<tr>
<td>Farmer, L. S. J.</td>
<td>176</td>
<td>Radu, F.</td>
<td>76, 80</td>
</tr>
<tr>
<td>Florou, H.</td>
<td>96</td>
<td>Rambharose, T.</td>
<td>170</td>
</tr>
<tr>
<td>Frunzaverde, D.</td>
<td>127</td>
<td>Ratiu, I.-G.</td>
<td>76, 80, 85</td>
</tr>
<tr>
<td>Garcia, J. M. G.</td>
<td>143</td>
<td>Ratiu, I.-G.</td>
<td>110</td>
</tr>
<tr>
<td>Gillich, G.-R.</td>
<td>121</td>
<td>Revetria, R.</td>
<td>44, 131, 143</td>
</tr>
<tr>
<td>Giribone, P.</td>
<td>159</td>
<td>Revetria, R.</td>
<td>164</td>
</tr>
<tr>
<td>Gyongyosi, L.</td>
<td>96</td>
<td>Saleh, K.</td>
<td>38</td>
</tr>
<tr>
<td>Haron, Z. A.</td>
<td>96</td>
<td>Seki, Y.</td>
<td>90</td>
</tr>
<tr>
<td>Iancu, V.</td>
<td>121</td>
<td>Sepasiar, M.</td>
<td>150</td>
</tr>
<tr>
<td>Imre, S.</td>
<td>223</td>
<td>Takada, S.</td>
<td>115</td>
</tr>
<tr>
<td>Javadi, Shahram</td>
<td>223</td>
<td>Terai, H.</td>
<td>59</td>
</tr>
<tr>
<td>Jha, M. K.</td>
<td>188, 194, 207</td>
<td>Testa, A.</td>
<td>131</td>
</tr>
<tr>
<td>Jha, M. K.</td>
<td>212</td>
<td>Trabidou, G.</td>
<td>176</td>
</tr>
<tr>
<td>Jones, D.</td>
<td>212</td>
<td>Tsergoulas, K.</td>
<td>201</td>
</tr>
<tr>
<td>Jongtaveesaporn, A.</td>
<td>115</td>
<td>Yang, H.-J.</td>
<td>181</td>
</tr>
<tr>
<td>Kang, M.-W.</td>
<td>188, 194</td>
<td>Yoshikawa, M.</td>
<td>59</td>
</tr>
<tr>
<td>Karadimas, N. V.</td>
<td>201</td>
<td>Zemliak, A.</td>
<td>69</td>
</tr>
<tr>
<td>Karri, G. A.</td>
<td>188, 194</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>