COMPUTATIONAL METHODS AND INTELLIGENT SYSTEMS

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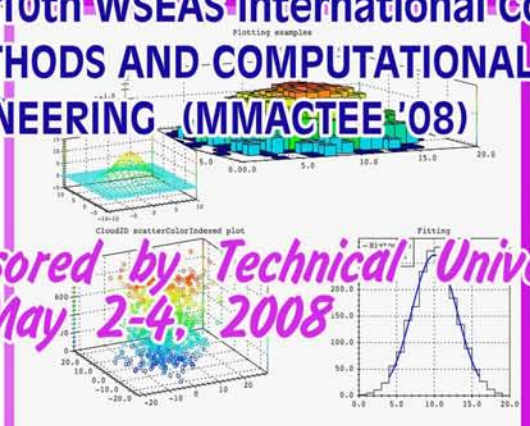
Proceedings of the 10th WSEAS International Conference on MATHEMATICAL METHODS AND COMPUTATIONAL TECHNIQUES IN ELECTRICAL ENGINEERING (MMACTEE '08)



Hosted and Sponsored by Technical University of Sofia
Sofia, Bulgaria, May 2-4, 2008

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Preface

This book contains proceedings of the Proceedings of the 10th WSEAS International Conference on MATHEMATICAL METHODS AND COMPUTATIONAL TECHNIQUES IN ELECTRICAL ENGINEERING (MMACTEE '08) which was held in Sofia, Bulgaria, May 2-4, 2008.

The reader can read state-of-the-art academic papers, high quality contributions and some breakthrough works on computational methods and intelligent systems from all over the world. Nice applications related to European and International industrial projects decorate a truly important panorama on computational methods and intelligent systems and their modern applications in our real life.

We thank the Technical University of Sofia for the sponsorship and the support. This conference aims to disseminate the latest research and applications in the Evolutionary Computing. The friendliness and openness of the WSEAS conferences, adds to their ability to grow by constantly attracting young researchers. The WSEAS Conferences attract a large number of well-established and leading researchers in various areas of Science and Engineering as you can see from **http://www.wseas.org/reports**. Your feedback encourages the society to go ahead as you can see in **http://www.worldses.org/feedback.htm**

The contents of this Book are also published in the CD-ROM Proceedings of the Conference. Both will be sent to the WSEAS collaborating indices after the conference: **www.worldses.org/indexes**

In addition, papers of this book are permanently available to all the scientific community via the WSEAS E-Library.

Expanded and enhanced versions of papers published in these conference proceedings are also going to be considered for possible publication in one of the WSEAS journals that participate in the major International Scientific Indices (Elsevier, Scopus, EI, ACM, Compendex, INSPEC, CSA .... see: www.worldses.org/indexes) these papers must be of high-quality (break-through work) and a new round of a very strict review will follow. (No additional fee will be required for the publication of the extended version in a journal). WSEAS has also collaboration with several other international publishers and all these excellent papers of this volume could be further improved, could be extended and could be enhanced for possible additional evaluation in one of the editions of these international publishers.

Finally, we cordially thank all the people of WSEAS for their efforts to maintain the high scientific level of conferences, proceedings and journals.

We are sure that this volume will be source of knowledge and inspiration for other academicians, scholars, advisors and industrial practitioners and will be considered as one more brilliant edition of the WSEAS related with a brilliant conference sponsored by Technical University of Sofia.

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Plenary Lecture I

Use of Intelligent Evolutionary Agents in the Analysis of Genomic Signals

Professor Paul Dan Cristea
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Abstract: Surprising regularities in the distribution of nucleotides and pairs of nucleotides along the genomes of both prokaryotes and eukaryotes become evident when converting nucleotide sequences from symbolic to digital form. These regularities make the structure of a genome be less like that of a "plain text", which simply conveys a semantics in accordance to a grammar, and more like that of a "poem", which obeys additional structural rules that give "rhythm" and "rhyme". Direct applications of the rules satisfied by nucleotide sequences are (1) objective evaluation of sequencing process quality, (2) prediction of nucleotides sequences similarly to time series, (3) revealing of genome ancestral structure, (4) analysis of pathogen variability. Intelligent Evolutionary Agents are used to track pathogen variability, specifically to identify drug resistance mutations, without the need of the conventional lengthily and expensive phenotypic clinical studies that request pathogen culture.

Brief Biography of the Speaker: Paul Cristea graduated the Faculty of Electronics and Telecommunications of the University "Politehnica" of Bucharest (UPB) in 1962, the Faculty of Physics of the University of Bucharest in 1969, and got a Ph.D. in Technical Physics in 1970. Since then his research and teaching activities covered an extended area of Electrical Engineering and interdisciplinary domains including topics like Genomic Signals, Digital Signal and Image Processing, Neural and Evolutionary Systems, Evolutionary Intelligent Agents, Intelligent e-Learning Environments, a.o. He is the author or co-author of more then 130 published papers, 11 patents, and has contributed to more then 20 books in these fields. Currently, he is the director of the Bio-Medical Engineering Center of PUB, director of the Romanian Bioinformatics Society, and an associated member of the Romanian Academy.

Plenary Lecture II

Some IP Security Issues

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Abstract: IP security (IPsec) is a suite of protocols for searing Internet Protocol (IP) communications by authenticating and or encrypting each IP packet in a data stream. IP packets do not have any inherent security. As a result there is no guarantee that a received IP packet is from the claimed sender contains original data that the sender put in it or was not sniffed during transit. IPsec provides a method to protect IP datagrams and is commonly used in Virtual Private Networks (VPNs). It defines a method for specifying the traffic to protect, how that traffic is to be protected and to whom the traffic is sent. From thee point of view of multimedia networks, security is important to be recognized for current and future users and implements. In response to IP security issues, Internet Architecture Board (IAB) included authentication and encryption as necessary security features in the next-generation IP, which has been used as IPv6. Fortunately, these security capabilities were designed to be usable both with the current IPv4 and the IPv6. Following an introduction, this presentation begins by introducing Internet Key Exchange (IKE) protocol. The goal of thus protocol is to establish and maintain shared security parameters and authenticable keys between the two IPsec end points. For both IPv4 and IPv6 the choice of Encapsulating Security Payload (ESP) protocol and Authentication Header (AH) is offered. The IP ESP provides confidentiality, along with optional (but strongly recommended) authentication and integrity protection. The IP AH provides integrity and authentication and integrity protection.
The next parts of this lecture cover frameworks for basic security concepts and security technology. The IP security architecture uses the concept of a security association as the basis for building security function into IP. A security association is simply the bundle of algorithms and parameters (such as keys) that is being used to encrypt and authenticate a parameter flow in one direction. In bi-directional traffic, the flows are secured by a pair of security associations. Security technology is a term that relates to the technical methods used to realize security requirements (cryptographic mechanisms, hash schemes, key management methods). Next part of this presentation covers infrastructure for future mobile networks because they will be open to different services and service providers. Also, five seacurity features groups (network access security, network domain security, user domain security, application domain security, visibility and configurability of security) are analyzed. Finally, infrastructure security definitions, requirements and security context together with network operator's security requirements, requirements from user's, network's as well as service's perspective are enclosed.

Brief Biography of the Speaker: Zoran S. Bojkovic received the Diploma in electrical engineering and the M.S. and Ph.D. degree all from the Faculty of electrical engineering, University of Belgrade, Serbia. He is a professor of Electrical Engineering at the University of Belgrade. He is the co-author of the books "Introduction to Multimedia Communications" (Wiley 2006), "Multimedia Communications Systems" (Prentice-Hall 2002) and "Packet Video Communications over ATM Networks" (Prentice-Hall 2000), all with prof. K. R. Rao from the University of Texas at Arlington, USA. He has published in international peer-reviewed journals and participated in many scientific and industrial projects. He is Editor-in-chief for the WSEAS Transactions on Communications and WSEAS Transaction Science and Applications. He is IEEE Senior member and EURASIP member.

Plenary Lecture II

An Integrating View on DNA Computing and Membrane Computing

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Abstract: In the area of molecular computing, the two fields of DNA computing and membrane computing are dealing with different operations and objects, yet both based on biological processes. In this paper, the similaritiesbetween these two approaches are considered from a theoretical point of view, and the possibilities to transfertheoretical results from one area to the other one are exhibited.

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