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Recent Advances in Computer Science and Networking

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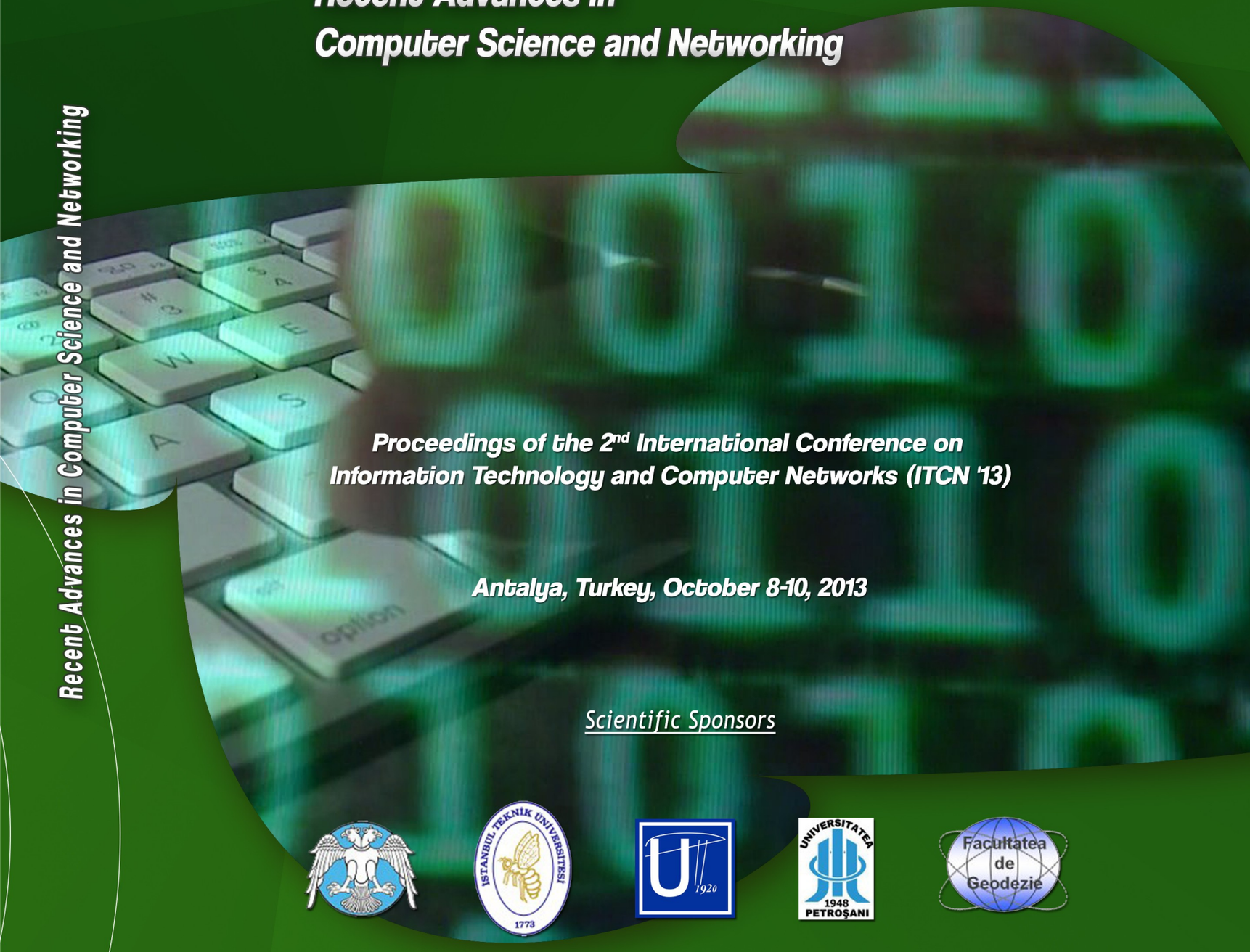

Proceedings of the 2nd International Conference on Information Technology and Computer Networks (ITCN '13)

Antalya, Turkey, October 8-10, 2013

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Preface

This year the 2nd International Conference on Information Technology and Computer Networks (ITCN '13) was held in Antalya, Turkey, October 8-10, 2013. The conference provided a platform to discuss software design and development, algorithms, artificial intelligence, computer networking, operating systems, knowledge and data-base systems, software engineering 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 is published in this Book that will be sent to international indexes. They will be also available in the E-Library of the WSEAS. Extended versions of the best papers will be promoted to many Journals for further evaluation.

Conferences such as these 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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Keynote Lecture 1

Energy & Environmental Problems Facing India and Turkey and their Probable Solutions

Dr. D. P. Kothari
Director General, JB Group of Institutions, Hyderabad
Former Director General, RGI, Nagpur
Former Director General, VITS Indore
Former Vice Chancellor, VIT Vellore
Former Director I/c IIT Delhi
India
E-mail: dpk0710@yahoo.com

Abstract: It briefly discusses some important energy problems facing India and Turkey and presents the current electric generation scenario in most of the developing countries with facts and figures in respect of India. It is hoped that, with systematic, advance planning, through measures like co-generation, energy management, and energy conservation, the electric energy supply scenario of AD 2020 will be free of the perennial problems of power shortages, voltage fluctuations etc.

Brief Biography of the Speaker: D.P.Kothari is, presently, Director General of J B Group of Institutions ,Hyderabad. He obtained his BE (Electrical) in 1967, ME(Power Systems) in 1969 and Ph.D in 1975 from the Birla Institute of Technology & Science(BITS) Pilani, Rajasthan. Prior to assuming charge as DG, JBI ,Hyderabad, he served as DG RGI , DG VGI, Indore, Vice Chancellor, VIT, Vellore, Director in-charge and Deputy Director (Administration) IIT Delhi as well as Head in the Centre of Energy Studies at Indian Institute of Technology, Delhi and as Principal, Visvesvaraya Regional Engineering College, Nagpur.
He was Visiting Professor at the Royal Melbourne Institute of Technology, Melbourne, Australia, during 1982-83 and 1989 for two years. He was also NSF Fellow at Purdue University, USA in 1992. He is fellow of Indian National Academy of Engineering (INAE), Indian National Science Academy (FNASc), Institution of Engineers, India (IEI) and Institute of Electrical and Electronics Engineers (FIEEE).He has authored /co-authored/more than 725 papers in International/National Journals/Conferences & 30 books including Power System Engineering, 2e Electric Machines, 4e Electric Machines (Sigma Series), 2e and Basic Electrical Engineering, 3e. His fields of specialization are Optimal Hydrothermal Scheduling, Unit Commitment, Maintenance Scheduling, Energy Conservation (loss minimization and voltage control), Power Quality and Energy System Planning and Modeling.

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Keynote Lecture 2

Confirming the Power of Probabilistic Evolution Approach: A Concrete Application to Get the Analytical Solution

Professor Metin Demiralp
Istanbul Technical University
Informatics Institute
Istanbul, TURKEY
E-mail: metin.demiralp@gmail.com

Abstract: The last three years accumulated a great pile of information about the Probabilistic Evolution Approach (PEA) which is under construction in the Group for Science and Methods of Computing (Demiralp's group) studies. Until now, the skeleton and the roof of the theory has been constructed and many details, as if muscles and other organs, have also been revealed. Now we know how to convert a given set of explcit first order ordinary differential equations accompanied by appropriate initial conditions to an infinite first order, linear, homogeneous set of ordinary differential equations with a denumerably infinite constant coefficient matrix; accompanied by a denumerably infinite initial vector value imposition. We could be able also to obtain Kronecker power series solution when the descriptive function (right hand side function) vector has a conical structure. Even we could have been able to get finitely many term involving analytic results for rather specific ODE structures. However we have never intended to perform a resummation over the Kronecker power series obtained in Probabilistic Evolution Approach applications even though the issue has been reduced to kernel separability where the telescope and monocular matrices are in use.
In this presentation first we focus on simplest first order explicit ordinary differential equation and its accompanying initial condition, where the right hand side function does not depend on the independent variable (time variable in the dynamical system terminology) of the considered ODE and has a second degree polynomial structure in the unknown function of the ODE under consideration. If there are certain commutativity relations exist in the descriptive function coefficient matrices then it is possible to produce a matrix algebraic analytic structure for the solution. To this end a very recently developed approach we have called "Constancy Added Space Extension (CASE) " can be used. This extends the state space of the ODE from one dimension to two dimension and makes it possible to get pure quadraticity at the descriptive function. Then, by using certain very fruitful properties of the Kronecker products and powers, it becomes to generate an analytical solution if the coefficient matrix appearing in the quadratic structure of the descriptive function has certain symmetry conditions and also commutativity conditions. The presentation aims to focus on these issues as the time permits.

Brief Biography of the Speaker: Metin Demiralp was born in Türkiye (Turkey) on 4 May 1948. His education from elementary school to university was entirely in Turkey. He got his BS, MS degrees and PhD from the same institution, ˙Istanbul Technical University. He was originally chemical engineer, however, through theoretical chemistry, applied mathematics, and computational science years he was mostly working on methodology for computational sciences and he is continuing to do so. He has a group (Group for Science and Methods of Computing) in Informatics Institute of ˙Istanbul Technical University (he is the founder of this institute). He collaborated with the Prof. Herschel A. Rabitz's group at Princeton University (NJ, USA) at summer and winter semester breaks during the period 1985-2003 after his 14 month long postdoctoral visit to the same group in 1979-1980. He was also (and still is) in collaboration with a neuroscience group at the Psychology Department in the University of Michigan at Ann Arbour in last three years (with certain publications in journals and proceedings).
Metin Demiralp has more than 100 papers in well known and prestigious scientific journals, and, more than 230 contributions together with various keynote, plenary, and, tutorial talks to the proceedings of various international conferences. He gave many invited talks in various prestigious scientific meetings and academic institutions. He has a good scientific reputation in his country and he was one of the principal members of Turkish Academy of Sciences since 1994. He has resigned on June 2012 because of the governmental decree changing the structure of the academy and putting politicial influence possibility by bringing a member assignation system. Metin Demiralp is also a member of European Mathematical Society. He has also two important awards of turkish scientific establishments.
The important recent foci in research areas of Metin Demiralp can be roughly listed as follows: Probabilistic Evolution Method in Explicit ODE Solutions and in Quantum and Liouville Mechanics, Fluctuation Expansions in Matrix Representations, High Dimensional Model Representations, Space Extension Methods, Data Processing via

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Multivariate Analytical Tools, Multivariate Numerical Integration via New Efficient Approaches, Matrix Decompositions, Multiway Array Decompositions, Enhanced Multivariate Product Representations, Quantum Optimal Control.

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Plenary Lecture 1

Future Emergency Vehicles' ICT Services

Professor Jyri Rajamaki
Laboratory of Data Networks
Service Innovation and Design (SID) Leppävaara
Laurea University of Applied Sciences
Finland
E-mail: jyri.rajamaki@laurea.fi

Abstract: Public Protection and Disaster Relief (PPDR) responders' emergency vehicles are packed with ICT facilities. This lecture shows that vehicles' ICT systems can be simplified by dividing ICT architecture into certain layers (e.g. vehicle infrastructure and power generation layer, communications layer, common services for all PPDR actors' layer, specific services layer) that have standardised interfaces. PPDR vehicles' communications needs can be divided into long distance communications (e.g. TETRA/TETRAPOL, 2/3/4G, FM, GPS, WiMAX), local area networks (CAN, LAN, WLAN, ad-hoc –communications between vehicles) and accessory communications. Furthermore, each category is scaled from light to heavy. ICT solutions have to be robust, easy to install and a special attention has to be paid to information security. Different encryption methods between different kinds of systems bring their own challenges. In addition, different PPDR actors have their own requirements how to implement the information security into their vehicles' systems. The standardised communication layer for all PPDR organisations enables co-operation between authorities, e.g. via common talk groups. The next harmonising pitch will be the common services for all PPDR actors' layer. This includes a field command system for all PPDR actorsbeing a complete solution that integrates different applications into one easy-to-use interface. The same technology and application can beapplied by all PPDR responders.

Brief Biography of the Speaker: Dr. Jyri K. Rajamaki received his M.Sc. degree in electrical engineering from Helsinki University of Technology (HUT), Finland in 1991, and Lic.Sc. and D.Sc. degrees in electrical andcommunications engineering from HUT in 2000 and 2002 respectively. From 1986 he works for Telecom Finland.From 1996 he was with the Safety Technology Authority of Finland where his main assignment was to make theFinnish market ready for the European EMC Directive. Since 2006 he has been with Laurea University of AppliedSciences, Espoo, Finland, where he serves as a head of Laurea's Data Networks Laboratory. Dr.Rajamaki had 17years experienced in electro technical standardization, e.g. being 7 years the Secretary of Finnish national committeeon EMC, and 10 years the Chairman of Finnish Advisory Committee on EMC. He has been a member of several ECworking groups, e.g. EMC-ADCO, EMC Working Party. His research interests are electromagnetic compatibility(EMC) as well as ICT systems for private and public safety and security services. He has been scientist in charge forseveral research projects funded by EURESCOM, CELTIC or the Finnish Funding Agency for Technology and Innovation.E.g., he has been the Scientific Supervisor and Director of the following research projects: SATERISK (focusing onrisks and challenges of satellite tracking in cross-border operations), Rescuing Intelligence and Electronic CoreApplications RIESCA (risks analysis of essential CIIP systems and a method to minimize risks in new system),MACICO (develops a concept for interworking of security organisations dealing with cooperation of securityorganisations that do not use the same radio network in their day-to-day job, but in some missions could benefit frominfrastructure sharing) and Mobile Object Bus Interaction MOBI (enhances ICT integration of emergency vehicles andcreates a base for an emergency vehicle concept suitable for export.) He is author of more than 70 papers publishedin international journals and conference proceedings.

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Plenary Lecture 2

Texts and Natural Language Processings in Information Retrieval

Professor Tengku Mohd T. Sembok
Kulliyyah Information and Communication Technology
International Islamic University Malaysa
Malaysia
E-mail: tmts@iium.edu.my

Abstract: The levels-of-processing theory proposes that there are many ways to process and code information. The level of processing adopted will determine the quality of the representation used to store the information in the computer memory or storage. The levels-of-processing applied in information retrieval can be classified as follows: string processing, morphological processing, syntactic processing and semantic processing. These level-of-processing are imbedded into various models of information retrieval. Conventional information retrieval models, such as Boolean and vector space models, rely on an extensive use of keywords, as independent strings, and their frequencies in storing and retrieving information. Thus string processing and morphological processing are mainly adopted in these models. It is believed that such an approach has reached its upper limit of retrieval effectiveness, and therefore, new approaches should be investigated for the development of future systems that will be more effective. With current advances in programming languages and techniques, natural language processing and understanding, and generally in the fields of artificial intelligence and cognitive science, there are now attempts made to include knowledge representation and linguistic processing into information retrieval systems. We also focus our research on the application of certain techniques on specific languages. Besides English, we focus the application of certain techniques especially on Malay and Arabic. In this paper we will highlight some of the research done in the area of information retrieval at the various levels of processing, and also expound the current research we are doing and the future direction that we would like to undertake.

Brief Biography of the Speaker: Prof. Tengku Mohd Tengku Sembok has over thirty years of experience in various fields of Information and Communication Technology. He has taught undergraduate and postgraduate programs and managed numerous R&D and consultancy projects successfully. He had supervised more than 30 PhD students successfully to completion. He obtained his B.Sc.(Hons) in Computer Science from Brighton Polytechnic in 1977, MS from Iowa University in 1981, and PhD from Glasgow University in 1989. His last appointment was as Deputy Vice Chancellor (Academic and International Affairs) in the National Defence University of Malaysia. He currently holds a chair of senior professor in Computer Science at International Islamic University of Malaysia and the Dean of Kulliyyah of ICT . He has held several academic posts at Universiti Kebangsaan Malaysia prior to his recent assignments. He is a Fellow of Academy of Sciences Malaysia, a Fellow of British Computer Society, and a fellow of Malaysian Science Association. Currently he chairs the Engineering and Computer Science Discipline of the Academy of Sciences Malaysia. He is also the Chairman of Malaysian Society of Information Retrieval and Knowledge Management.

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