Recent Advances in Telecommunications, Signals and Systems

Editor
Andreas Kanarachos

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- *Proceedings of the 12th International Conference on Data Networks, Communications, Computers (DNCOCO '13)*
- *Proceedings of the 12th International Conference on Non-Linear Analysis, Non-Linear Systems and Chaos (NOLASC '13)*
- *Proceedings of the 9th International Conference on Dynamical Systems and Control (CONTROL '13)*
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Preface

This year the 12th International Conference on Data Networks, Communications, Computers (DNCOCO '13), the 12th International Conference on Non-Linear Analysis, Non-Linear Systems and Chaos (NOLASC '13), the 9th International Conference on Dynamical Systems and Control (CONTROL '13), the 6th International Conference on Sensors and Signals (SENSIG '13) and the 6th International Conference on Visualization, Imaging and Simulation (VIS '13) were held in Lemesos, Cyprus, March 21-23, 2013. The conferences provided a platform to discuss data networks, communications, computers, non-linear systems in science and engineering, chaos and chaotic behavior, dynamical systems, control, sensors, signal processing, imaging sensors, image acquisition, cognitive vision, visualization, illumination models etc with participants from all over the world, both from academia and from industry.

Their 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 these conferences are 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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Plenary Lecture 1

Ranking WebPages Using Web Structre Mining Concepts

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Abstract: With the rapid growth of the Web, users get easily lost in the rich hyper structure. Providing relevant information to the users to supply to their needs is the primary goal of the owners of the websites. Web mining was categorized into three categories such as web content mining, web usage mining and web structure mining. Web structure mining plays an important role in this approach. Two page ranking algorithms such as PageRank and Hyperlink-Induced Topic Search (HITS) are commonly used in web structure mining. Both algorithms treat all links equally when distributing rank scores. Comparisons between both algorithms were discussed in this paper.
Ranking is important as it assists the user look for highly ranked pages that are relevant to the query. Different metrics have been proposed to rank web pages according to their quality, and we briefly discuss two of the prominent ones.

Brief Biography of the Speaker: He received his Ph.D. in Computer Science in 2002 from Debrecen University in Hungary, he is an Associate Professor since 2010. Dr. Zubi, served his university under various administrative positions including the Head of Computer Science Department 2003-2005. He was also the head of the technical and cultural afire office at the university and sign out many academic MOU with a number of international university world wide. He was a member of the Libyan Tempus team in Libya. He was the postgraduate study coordinator in Computer Science Department. He was also the postgraduate study coordinator for the Faculty of Science for one academic year 2004-2005. He is also an undergraduate and postgraduate lecturer in the computer science department and supervised several research work and thesis in several Libyan universities. He publishes a great number of papers and researches in many scientific and international proceedings and journals world wide.
He is a reviewer of many scientific journals such as Word Scientific and Engineering Academy and Society (WSEAS) , Journal of Software Engineering and Applications (JSEA), Member of the International Association of Engineers (IAENG), Journal of Engineering and Technology Research (JETR) , World Academy of Science Engineering and Technology (WASET) journal, an Associate Editor in the Journal of the WSEAS Transactions on Information Science and Applications and more local journals in Libya. He is a member of the Association for Computing Machinery society (ACM), a member of IEEE society, a member of the Word Scientific and Engineering Academy and Society (WSEAS). He published as authors and a co-author in many researches and technical reports in local and international journals and conference proceedings.

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Plenary Lecture 2

Internet of Things Technology Shaping the Future of Wireless Multimedia Communication Services

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Abstract: The term Internet of Things (IoT) was coined more than ten years ago, when in parallel the concepts of ambient intelligence and ubiquitous computing has been developped. Since then, there have been considerable developments in both academia and industry. Generally speaking, IoT represents intelligent end -to- end systems that enable smart solutions and , as such, it covers a diverse range of technologies including sensing, communications, networking, computing, information processing and intelligent control technologies. IoT is composed of a huge number of nodes. This invokes scalability requirements on any proposed solution for IoT. Nodes may differ from one to another. Therefore, any proposed approach must effectively deal with heterogeneity. Solutions issues must be open and enable interactions with systems based on different technical solutions. This is a difficult task, given that most nodes in the IoT will have scarce capacity in terms of both energy and processing capabilities. Mobile management is another interesting investigation..Things are moving and the system should be able to locate them whenever nedeed. The major difficulties are related to the number of mobile nodes in the IoT, which has an impact on scalability. Next, research issue to be addressed is the characterization of the traffic that will traverse the IoT. Such traffic will have different features from the today Internet traffic. Nemely, most of them will be generated and directed to machines that communicate in a different way from humans.Energy constraints and the specific features of the IoT communication environment will be the stimulus for modelling and design of protocols at both network and transport layers.
This work starts with mobile crowdsensing characteristics including architecture of applications, security and data integrity. Semantic sensor WEB will be presented. After that, IP-based wireless sensor network approach to the IoT is emphasized. Machine-to- machine as a promizing technology for development of IoT communications platforms with high potential to enable a wide range of applications in different domains will be described, too. Nanotechnology applications with the future challenges in the IoT area conclude the presentation.

Brief Biography of the Speaker: Prof. Dr. Zoran Bojkovic (http://www.zoranbojkovic.com/) is a Full Professor of Electrical Engineering, the University of Belgrade, Serbia, and a permanent Visiting Professor at the University of Texas at Arlington, UTA, TX, USA; EE Department, Multimedia System Lab. He was a visiting professor in more than 20 Universities worldwide and has taught a number of courses in the field of digital signal processing, communication and computer networks as well as multimedia communications. Prof.Bojkovic is the co-author of 6 international books/monographies , published by Prentice Hall, Wiley, CRC Press, Taylor&Francis Group, WSEAS Press,etc. Also, he is the co- author in 19 Chapter of the international books, published by Springer, Elsevier, Alinea Editrice, WSEAS Press, Norwegian University of Science and Technology NTNU Trondheim, Tampere International Center for Signal Processing TICSP, Finland.
Prof. Bojkovic is co-editor in 75 International Books and Conference Proceedings. He has published more than 450 papers in peer-reviewed journals, conference proceedings and publications. He served as Editor-in- Chief in 2 International Journals and Asssociate Editor in 3 International Journals. Prof.Bojkovic has conducted many keynote/plenary lectures, workshops/tutorials,seminars and participated in many international scientific and industrial projects. He is a Senior Member of IEEE and WSEAS, Member of EURASIP and IASTED, Member of SERC Korea,,expert of IAMSET, full member of Engineering Academy of Serbia and a member of Serbian Scientific Society.

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Plenary Lecture 3

On the Rigid Body Chaotic Transitional Dynamics

Professor Jan Awrejcewicz
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Abstract: The integral model of dry friction components is built with assumption of classical Coulomb friction law and with specially developed model of normal stress distribution coupled with rolling resistance for elliptic contact shape in order to model a rigid body contact problem. In order to avoid a necessity of numerical integration over the contact area at each the numerical simulation step, few versions of approximate models are developed and then tested numerically. In the numerical experiments the simulation results of the Celtic stone with the friction forces modelled by the use of approximants of different complexity (from no coupling between friction force and torque to the second order Pad? approximation) are compared to results obtained from model with friction approximated in the form of piecewise polynomial functions based on the Taylor series with Hertzian stress distribution. The coefficients of the corresponding approximate models are found by the use of optimization methods as in identification process using the real experiment data.

We show how in the beginning wobbling without slipping and without energy loss have been assumed in a process of modelling and dynamic analysis of the Celtic stone. Then we explore a few paradigm shifts in physics theory aimed at understanding and reliable modelling of the Celtic stone bifurcation and chaotic dynamics: (i) various linearization procedures keeping linear dependence of friction and velocity of a contact point between two bodies; (ii) research through the theory of bifurcation and chaos to explain stability and scenarios of transition between regular and chaotic transitional stone dynamics; (iii) application of the perturbation/asymptotic approaches to study local stone dynamics; (iv) key role of coupling between friction forces and torques assuming a circle contact including both aerodynamic damping and rolling friction factors.

Developments and trends of the state-of-the art of the performed literature survey exhibit importance of the coupling between friction force and torque, which play an essential role in the dynamics of some mechanical systems. If the contact between two bodies is very small (the point contact) the sliding friction force opposes the sliding relative velocity and can be successfully modelled by the use of classical one-dimensional Coulomb friction law. In this case the friction torque (drilling friction) and its influence on sliding friction force can be neglected (since the contact point cannot transmit a torque). Spurious effects observed during the Celtic stone dynamics are also exhibited by a billiard ball, Thompson top, and electric polishing machine, and they cannot be mathematically modelled or explained by the use of the assumption of one-dimensional dry friction model.

Brief Biography of the Speaker: J. Awrejcewicz has been graduated from the Technical University of Lodz in 1977 (Mechanics) and from the University of Lodz in 1978 (Philosophy). He obtained PhD (Habilitation) in 1981 (1990), and he became a Full Professor in 1997. Now he is a chair person of Department of Automation and Biomechanics, a head of a 4-year PhD Study on Mechanics, and a head of the Mechatronics Study at the Technical University of Lodz. His research is focused on Nonlinear Mechanics. J. Awrejcewicz authored and/or co-authored: monographs-42; textbooks-2; edited books-9; editor conference proceedings-12; journal papers-287; conference papers-333; chapters in books-18. He served as an editor of 9 books, and as an Guest-Editor of 15 journal special issues. He supervised 19 PhD theses. He served in Editorial Boards of 33 journals, gave 60 seminars at international universities, delivered 26 plenary/keynote lectures, actively participated at 265 international and 68 national conferences, as well as he was a member of scientific committees of 116 conferences. He spent 10 years abroad carrying out research at University of California, Berkeley, USA (2001); University of Illinois, Urbana Champaign, USA (1999/2000); Tokyo University, Japan (1990-1992); University of Carolo Wilhelmina in Braunschweig, Germany (1987-1990, 1993); ENTPE, Lyon, France (1995, 2005); Central European University, Budapest, Hungary (2003/2004); Waikato University, Hamilton, New Zealand (1996/1997). J. Awrejcewicz obtained the Humboldt Research Award, Germany, 2011; MASTER Grant Award, Foundation for Polish Science, 2010-2012; Golden Lamp Award (PGNiG) in Technical Sciences, Poland, 2006; awards of the Ministry of Science and Education for monographs in 1996, 2004, 2006, 2008.

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Plenary Lecture 4

Recent Advances in the Study of How Diseases Affect Interacting Populations

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Abstract: Diseases are a fact in nature. Up to twenty years ago in biomathematics the stress has always been focused on researches either in epidemiology, trying to assess the spread of infectious diseases, but with no or scant relation with the underlying demographics, or on population models, e.g. food chains, in which possibly infected and healthy animals were treated alike.
The research effort of the author has shown that instead diseases have an impact on the demographics of interacting populations. Some recent results will be illustrated.

Brief Biography of the Speaker: Ezio Venturino is Professor of Mathematics, Dipartimento di Matematica, Universita' di Torino, via Carlo Alberto 10, 10123 Torino, Italy. He received the Laurea in Matematica, Universita' di Torino, Italy in 1997 with honors. M. Sc. in Applied Mathematics, SUNY at Stony Brook, 1981, Ph. D. in Applied Mathematics, SUNY at Stony Brook, 1984. His research interests concern numerical analysis: (quadrature formulae for singular integrals, methods for singular integral equations, lacunary interpolation problems) and mathematical modelling (biological population theory, ecoepidemiolgy and socioeconomic applications). He authored about forty research papers in numerical analysis and hundred in mathematical modelling. Taken part in more than one hundred international conferences, chairing and organizing special sessions. He held positions at: Medical Department of the Brookhaven National Laboratory; University of Iowa; Visiting Researcher, Universities of Adelaide and of Tasmania, Australia; Visiting Associate Professor, University of Leeds, UK; Visiting Researcher, University of Huddersfield, UK; Associate Professor, University of Catania; Associate Professor, Polytechnic of Torino. Visited several other International Research Institutions around the world. He is Associate Editor of the Electronic Proceedings of WSEAS Conference on Mathematics and Computers in Biology and Chemistry 2004 (MCBC 2004), Venice, Nov. 15-17, 2004. Guest Editor for the WSEAS Transactions on Biology and Biomedicine vol. 1, n. 4, October 2004. Area Editor Simulation Practice and Theory (Elsevier), Advisory Editor, Mathematical Methods in the Applied Sciences, Wiley. Editorial Boards of: Network Biology (ISSN 2220-8879), Computational Ecology and Software (ISSN 2220-721X), Shekhar(New Series) International Journal of Mathematics, Associate Editor of the Proceedings CMMSE 2008, CMMSE 2009, CMMSE 2010, CMMSE 2011, CMMSE 2012, Co-Editor of the Proceedings DWCAA 2009, Associate Editor of Contemporary Mathematics and Statistics, Columbia International Publishing, ISSN: 2163-1204 (Online) since 2012. Co-Editor, special issue "Epidemiology", of Mathematical Modelling of Natural Phenomena, 7 (03), 2012. He co-authored the books: R.J. Hosking, E. Venturino, (Editors), Aspects of Mathematical Modelling, Birkh¨auser, 2008, 374 pp. H. Malchow, S. Petrovskii, E. Venturino, Spatiotemporal patterns in Ecology and Epidemiology, CRC, 2008, 442 pp.

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Plenary Lecture 5

Incorporating Knowledge about Model Structure in Identification of Gaussian-Process Models

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&
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Abstract: Dynamic system identification with Gaussian-process prior model is a probabilistic, nonparametric modelling method for identification. Gaussian-process models provide, besides the prediction, also the information about prediction uncertainty based on the availability or uncertainty of the data used for the modelling. An advantage of this kind of model is a small number of training parameters, a facilitated structure determination and the possibility to include various sorts of prior knowledge into the model. One of possibilities is to include block-structure knowledge like Hammerstein model structure. The identification procedure of Gaussian-process model with Hammerstein model structure will be presented and illustrated with an example.

Brief Biography of the Speaker: Juš Kocijan received the doctorate in electrical engineering from the Faculty of Electrical Engineering, University of Ljubljana, Slovenia. He is currently a senior researcher at the Department of Systems and Control, Jozef Stefan Institute and Professor of Electrical Engineering at the School of Engineering and Management, University of Nova Gorica, Slovenia. His other experience includes: running a number of international and domestic research projects, serving as editor and on editorial boards of research journals, serving as a member of IFAC Technical committee on Computational Intelligence in Control. His main research interests are: applied nonlinear control and multiple model and probabilistic approaches to modelling and control. He is a Senior member of IEEE, Control Systems Society, a member of SLOSIM – Slovenian Society for Simulation and Modelling and Automatic control society of Slovenia.

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Plenary Lecture 6

The Role of Modeling and Model Processing in Supporting Content-Driven Layout

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Abstract: Mobile devices are significant part of our daily life, we use them to reach and consume digital data. According to different surveys the role of the tablet devices is already quite relevant and they are going to determine the close future of the mobile devices. A reasonable part of online documents have a fixed layout, like Adobe's Portable Document Format (PDF). This inflexibility leads to a poor online reading experience, since the size and resolution of monitors and mobile devices require readers to scroll around in order to read a page. The diversity of mobile platforms and the device capabilities requires providing automatic layout solutions for online newspapers and magazines. The challenge is to automatically adapt the whole digital magazine content, text and graphics, in order to articles look as good on tablet displays of any size as they do in printed media. To improve the limitations of current online reading experience, we need adaptive layout solutions that support automatic layout preparation for a wide range of displays.

Brief Biography of the Speaker: László Lengyel received his PhD degree in 2006. He is Associate Professor at Department of Automation and Applied Informatics of the Budapest University of Technology and Economics. His research field is metamodelling, domain-specific modeling, graph rewriting-based software model transformation, model-driven development, constraint validation, validated model transformation, aspect-oriented techniques, adaptive layout and content-driven layout. He leads the Visual Modeling and Soft-ware Design research group that has 6 researchers and currently 8 PhD students. He has published several papers at international conferences and in journals on software engineering, software modeling, model processing, adaptive layout and content-driven layout. The most important milestones in his professional carrier are Bolyai János professorship (2006-2010), Siemens Excellence Award (2008) and Kemény János Award (2012).

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Plenary Lecture 7

Thermo Vision Systems with Laser Range Finder for Combined Temperature and Distance Measurements of Objects in Thermal Images

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Abstract: The main purpose of thermo vision systems is the visualization and processing of thermal images captured from thermo or infrared cameras. The visualization is the simplest way to use human observation for analysis of thermal pictures, but it suffers from subjective decision. Therefore, the methods for thermal image processing are in general automatic and give objective results for temperature analysis of the objects in thermal or infrared images. There exists wide range of applications in which simultaneously with temperature analysis of the objects in thermal images is very important to known the localization of these objects. For example the most common mobile robots applications of thermal or infrared cameras are for detecting thermal objects in fire situations or for defense and security purposes. This paper describe thermo visual or infrared systems in which the detection of thermal objects is extended with combined temperature and distance measurement of the detected thermal objects. It is proposed to arrange the distance measurements with a precise laser range finder and add this distance information to the temperature of detected object, which is done by thermo visual processing. This gives a more detailed and complete description of thermal objects in a thermo visual system, when it is from superior importance, for example in thermal robotic applications like the task of a mobile robot to find, locate and track thermal objects, moving in direction of their position.

Brief Biography of the Speaker: Born in 1944, Plovdiv, Bulgaria. He received M.S. degree in Communications in 1969 in Technical University, Sofia. Ph. D in Television and Image Processing in 1975, Assoc. Prof. since 1987 in the same University. Proffesor since 2010 in Technical University-Sofia University.Vice-Dean of Faculty on Life-Long Learning Center since 2005, Vice-Dean of French Language Faculty of Electrical Engineering since 2006. The author over 212 research papers in Image Processing Systems, Pattern Recognitions, Neural Networks etc. Currently the leader of courses in Basic of Television, Television Systems, Theory of Coding, Digital Signal Processors etc. His scientific iterests encompass Video and Audio Processing, Digital TV, Neural Networks, Artificial Intelligence in Video and Audio, Artificial Intelligence Programming Languages Lisp Prolog, Expert Systems, Robotics Camera Eye and Microphone Arrays, Signal Processors, Embedded Systems, Microcontrollers, Programming Languages C++, Java, Matlab etc.

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