INTERNATIONAL CONFERENCES ON

ICT, SOCIETY, AND HUMAN BEINGS 2016

WEB BASED COMMUNITIES AND SOCIAL MEDIA 2016

BIG DATA ANALYTICS, DATA MINING AND COMPUTATIONAL INTELLIGENCE 2016

and

THEORY AND PRACTICE IN MODERN COMPUTING 2016

part of the

MULTI CONFERENCE ON COMPUTER SCIENCE AND

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ICT, SOCIETY, AND HUMAN BEINGS 2016

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Ajith P. Abraham
Jörg Roth

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FOREWORD

These proceedings contain the papers of the International Conferences on ICT, Society, and Human Beings 2016, Web Based Communities and Social Media 2016, Big Data Analytics, Data Mining and Computational Intelligence 2016 and Theory and Practice in Modern Computing 2016, which were organised by the International Association for Development of the Information Society, from 2 - 4 July, 2016. These conferences are part of the Multi Conference on Computer Science and Information Systems 2016, 1 - 4 July, which had a total of 606 submissions.

The Network period in the evolution of computer technology is very much based on the convergence and integration of three main technologies; computer technology, tele technology and media technology. Telecommunication technology is playing a more and more dominant role in this convergence, especially internet and web technology. Embedded (ubiquitous) computer technology is making the process invisible, and media technologies converge within itself (multimedia and cross media). The convergence process is enforced all the time by smaller, cheaper, and more powerful components.

ICT and its applications are interacting with environments, roles, and processes which can also be modelled by converging circles. The process of social and psychosocial change and ICT from a global perspective is described graphically in the convergence model in figure 1 (Bradley 2006 Routledge) with concepts and their interrelations. Both "convergence" and "interactions" are important features in the model. Read from the left hand side in the model for the titles of some main tracks of the conference:

- Globalisation and ICT: When technology, economy, norms/values and labour market are converging on a global level, what are the hard questions? When the geographical space in the future will be both global and beyond – including virtual reality (VR) what is the state of art in research? (see the list of key words under ´globalisation´)
- Information and Communication Technology (ICT), next cluster of circles to the left in the figure, what applications contribute to desirable goals in the society?
- When Work Environment, Home Environment, and Public Environment are converging and the work and public issues tend to merge into the private sphere of our homes – what main changes in peoples Life Environment occur?.
- If the Professional Role (Work Life), Private Role (Private Life) and Citizen's Role (Public Life) converge forming a Life Role, what are the main social-psychologial changes?
- Four circles representing Virtual Reality (VR) are marked with dotted lines and are surrounding the set of converging circles. These circles reflect our participation in cyberspace on various levels. To the left part in figure we could talk about Virtual Worlds on the global level. Within the concept of ICT, the steps taken by applied Embedded and ubiquitous technology make technology more hidden to the individual and society as a whole.
  Virtual Environments are already a common concept. Finally we could talk about Virtual Human Roles, which could in more extreme forms be another personality that you play e g avatars. The converging circles are forming a Life Role and new life styles are being shaped.

• Effects on humans become more multi faceted and complex. Research focusing upon the individual is crucial i. e. research on how the use of ICT interacts with and impacts identity, social competence, creativity, integrity, trust, dependency etc. A compass rose (card) for "Effects on Humans" (to the right) is used as a metaphor reminding us of the importance to keep the direction towards desirable human and societal goals and qualities at the development and use of ICT.

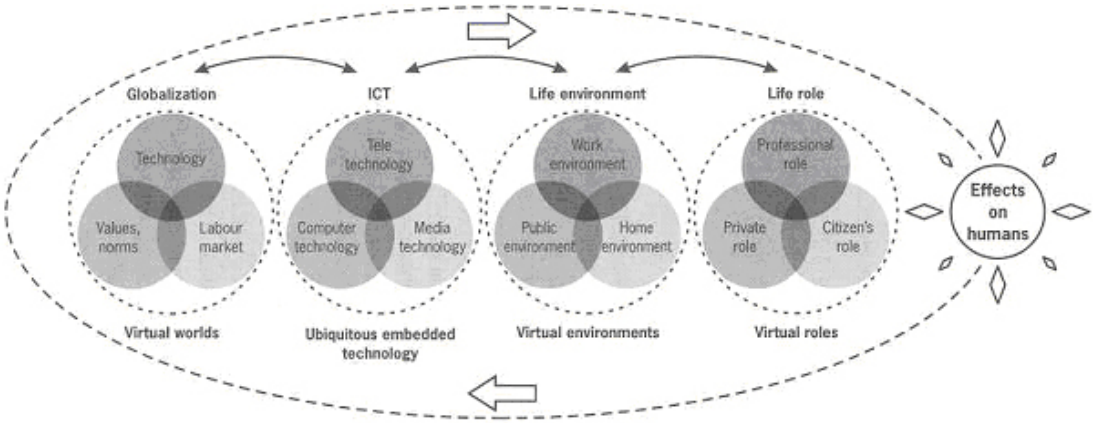

Figure 1. Convergence Model on ICT and Psychosocial Life Environment (Source: Bradley, 2005, 2006)

ICT can provide tools for promoting sustainability (environmental, economic, and social sustainability) but can also be a threat for sustainability. Sustainability as a guiding principle involves system perspective, holism, human aspects, bottom up approach, common good, and equality. A change in focus regarding research and development is taking place. Analysis and design increasingly address both the work process and management connected to the sphere of production life and people's life environment. Analysis and design of ICT and societal systems both at local level and globally become important. What research in the field exists or is needed?

Community research in a broad sense comes to the fore – both physical and virtual communities. There is also a requirement to involve new and additional actors at the deeper and broader integration of ICT in the society (children, elderly, and consumer organisations). Educational programs on Community Informatics and Social Informatics are appearing in many academic institutions. Can a new infrastructure of the society be identified?

The effects of ICT on human beings as well as the interaction between ICT, individuals, and society are all within the focus of this conference. Both analyses of interactions and effects are important. Changes in behaviour, perspectives, values, competencies, human and psychological aspects and feelings are all of interest. Reflections on past, present, and future challenges – especially planning for handling the latter – are encouraged.

Today, computer science and ICT-related disciplines are working more and more together with various behavioural and social sciences including child psychology and developmental psychology. For this reason, the conference pays attention to societal changes, global and more local organisational and institutional changes, changes in values and in lifestyles, as well as individual cognitive effects and changes, motivational and emotional changes. It also appeals to solution-building in terms of desirable goals and actions for reaching a Good Information Society.

In general all types of research strategies are encouraged, and especially cross-disciplinary and multi-disciplinary studies. Case studies, broader empirical field studies, theoretical analyses, cross-cultural studies, scenarios, ethnographic studies, epistemological analyses may all be presented.

The ICT, Society and Human Beings (ICT) conference addresses in detail seven main aspects:
- Globalization and ICT
- Life environment and ICT
- Life role and ICT
- ICT and effects on humans
- Perspectives on ICT
- Desirable goals and ICT
- Actions for reaching the Good Information Society

The World Wide Web has migrated from information space into opportunities for social communication. Social Media are growing rapidly and play an increasingly important role in the development of Online Communities. They are all about identity, reputation, presence and relationships. Web based communities announce themselves both in your professional and private life through several new media such as LinkedIn, Twitter, Plaxo, etc. In order to keep you up to date with the pace of these new technological developments this Conference offers a dedicated overview and informative discussion on today's most relevant issues in new media for social life on the web.

Social Media are growing rapidly and play an increasingly important role in the development of Online Communities. Social Network Sites and Web-based communities announce themselves both in your professional and private life through new media such as Facebook, LinkedIn, Twitter, Plaxo, etc. Social media allow more dynamic roles in participation, virtual presence and online communities. These new ways to communicate via online social media have great societal effects and are motivating the creation of best practices to help individuals, corporations and authorities to make the best of it. It raises the awareness of the growing impact of social media and the influence of web based communities in today's users / consumers behavior; many organizations spend an increasing share of their budget in online social marketing strategies.

The mission of the Web Based Communities and Social Media (WBC) conference is to publish and integrate scientific results and act catalytically to the fast developing culture of web communities, while helping to disseminate and understand the latest developments social media and their impact.

Submissions were accepted under the following 6 main topics:
- The History, Architecture and Future of Virtual Communities
- Cyborgs, Teleworking, Telemedicine, Art Games and Learning Communities
- Virtual Communities for People with Special Needs
- Group Processes and Self-Organization
- Expanding Markets through Virtual Communities
- Collaborative Technologies
- Social Media

The growth of data both structured and unstructured will present challenges as well as opportunities for industries and academia over the next few years. With the explosive growth of data volumes, it is essential that real-time information that is of use to the business can be extracted to deliver better insights to decision-makers, understand complex patterns etc. Computational Intelligence tools offer adaptive mechanisms that enable the understanding of data in complex and changing environments. The main building blocks of computational intelligence involve computational modelling of biological and natural intelligent systems, multi-agent systems, hybrid intelligent systems etc. The conference is expected to provide an opportunity for the researchers to meet and discuss the latest solutions, scientific results and methods in solving intriguing problems in the fields of Big Data Analytics, Intelligent Agents and Computational Intelligence. The conference programme will include workshops, special sessions and tutorials, along with prominent keynote speakers and regular paper presentations in parallel tracks.

The aim of BigDaCI'16 is to serve as a forum to present current and future work as well as to exchange research ideas in this field.

BigDaCI'16 invites authors to submit their original and unpublished work that demonstrate current research using big data analytics, computational intelligence and other intelligent computing techniques and their applications in science, technology, business and commerce.
Submissions were accepted under the following areas and topics:
- Big Data Algorithms and Architectures
- Computational Intelligent Frameworks for Big Data Processing
- Data Mining Topics and Applications
- Big Data Applications
- Multi-Agent Systems: Models, Architectures and Applications

The International Conference on Theory and Practice in Modern Computing (TPMC 2016) provides a forum for research and developments in the field of computing foundations and technology. Modern computing comes not only with efficient concepts and their application, but also it often addresses networking and mobility topics. Hence, the view in TPMC ranges from fundamentals like new or improved algorithms to very recent and modern applications like ubiquitous scenarios or even everyday computing.

Complementary to these technically-oriented contents, TPMC also shall serve as discussion platform about ethics and social impact of those technologies. In its main focus, this scientific conference aims to attract research reports on efficient application and realization of simple algorithmic methods, new architectures in design and data structures, new and improved communication protocols, and synthesis of known computing concepts and approaches.

Submissions were accepted under the following main areas and topics:
- Design Foundations
- Realization Aspects
- Mobility Communication and Services
- Networking and Grid Approaches

These conferences received 169 submissions from more than 32 countries. Each submission has been anonymously reviewed by an average of five independent reviewers, to ensure that accepted submissions were of a high standard. Consequently only 25 full papers were approved which means an acceptance rate of 15%. A few more papers were accepted as short papers, reflection paper and posters. An extended version of the best papers may be published in the IADIS International Journal on Computer Science and Information Systems (ISSN: 1646-3692) and/or in the IADIS International Journal on WWW/Internet (ISSN: 1645-7641) and also in other selected journals, including journals from Inderscience.

Besides the presentation of full papers, short papers, reflection paper and posters, the conferences also included two keynote presentations from internationally distinguished researchers. We would therefore like to express our gratitude to Professor Emerita Gunilla Bradley (Informatics, School of ICT, Royal Institute of Technology (KTH), Stockholm, Sweden) and Professor Alfred Inselberg (Senior Fellow San Diego Supercomputing Center & Computer Science and Applied Mathematics Departments, Tel Aviv University, Israel) for accepting our invitation as keynote speakers.

This volume has taken shape as a result of the contributions from a number of individuals. We are grateful to all authors who have submitted their papers to enrich the conference proceedings. We wish to thank all members of the organizing committee, delegates, invitees and guests whose contribution and involvement are crucial for the success of the conference.

Last but not the least, we hope that everybody has a good time in Madeira, and we invite all participants for the next edition of these conferences.

Piet Kommers, University of Twente, The Netherlands
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Ulrich Thiel, Fraunhofer, Germany
Vanessa Dennen, Florida State University, USA
Vassilis Kollias, University of Thessaly, Greece
Violeta Vidacek-Hains, University of Zagreb, Croatia
Vladimir Bures, University of Hradec Kralove, Czech Republic
Witold Abramowicz, Poznan University of Economics, Poland
Zinayida Petrushyna, RWTH Aachen University, Germany

BIG DATA ANALYTICS, DATA MINING AND COMPUTATIONAL INTELLIGENCE

COMMITTEE MEMBERS

Abdel-Badeeh Salem, Ain Shams University, Egypt
Abderrafiaa Koukam, Université de Technologie de Belfort-Montbeliard, France
Albertas Caplinskas, Vilnius University, Lithuania
Alessandro Giuliani, University of Cagliari, Italy
Alexander Gelbukh, Instituto Politécnico Nacional, Mexico
Alla Anohina-Naumeca, Riga Technical University, Latvia
Alvaro Luis Bustamante, Universidad Carlos III de Madrid, Spain
Ambra Molesini, Università di Bologna, Italy
Andrei Mogos, University Politehnica of Bucharest, Romania
Andrew Kusiak, University of Iowa, USA
Anirban Kundu, West Bengal University of Technology, India

Antonio J. Reinoso, Universidad Rey Juan Carlos, Spain
Archil Maysuradze, Lomonosov Moscow State University, Russia
Audrone Lupeikiene, Vu Institute of Mathematics And Informatics, Lithuania
Boris Kovalerchuk, Central Washington University, USA
Carson K. Leung, University of Manitoba, Canada
Christos Kalloniatis, University of The Aegean, Greece
Christos Makris, University of Patras, Greece
Claude Moulin, University of Technology of Compiègne, France
Costin Badica, University of Craiova, Romania
Daniel Pop, University of The West Timisoara, Romania
Daniela Briola, Università degli Studi di Milano Bicocca, Italy
Daniela Zaharie, UVT, Romania
Dariusz Krol, Wrocław University of Technology, Poland
Dimitris Liparas, Information Technologies Institute, Greece
Domenico Talia, Università della Calabria, Italy
Efstathios Stamatatos, University of The Aegean, Greece
Egons Lavendelis, Riga Technical University, Latvia
Fikret Gurgen, Bogazici University, Turkey
Francesco Folino, ICAR-CNR, Italy
Franck Gechter, Université de Technologie de Belfort-Montbéliard, France
George Tambouratzis, Institute For Language And Speech Processing, Greece
Gerard Murray, Embrapa Recursos Genéticos e Biotecnologia, Brazil
Gianni Costa, ICAR-CNR, Italy
Haralambos Mouratidis, University of Brighton, UK
Hyung-Jeong Yang, Chonnam National University, South Korea
Igor Bernik, University of Maribor, Slovenia
Igor Kotenko, Russian Academy of Sciences, Russian Federation
Ingrid Fischer, University of Konstanz, Germany
Irina Mocanu, University Politehnica of Bucharest, Romania
Jaime Ramirez, Universidad Politecnica de Madrid, Spain
Jaya Thomas, Stony Brook University, USA, and SUNY Korea, South Korea
Joergen Villadsen, Technical University of Denmark, Denmark
John Easton, University of Birmingham, UK
Jose Molina Lopez, Universidad Carlos III de Madrid, Spain
José Antonio Iglesias Martínez, Carlos III University of Madrid, Spain
Jose Luis Verdegay, University of Granada, Spain
Justin Dauwels, Nanyang Technological University, Singapore
Ki Chan, Hong Kong University of Science and Technology, Hong Kong
Laurentiu Vasiliu, Peracton Ltd., Ireland
Leonardo Garrido, Tecnologico de Monterrey, Mexico
Luca Cagliero, Politecnico di Torino, Italy
Marco Villani, University of Modena and Reggio Emilia, Italy
Maria Salamo Llorente, Universitat de Barcelona, Spain
Marian Cristian Mihaescu, University of Craiova, Romania
Maricela Quintana, Centro Universitario UAEM Valle de México, Mexico
Marius Silaghi, Florida Institute of Technology, USA
Martin Drlik, Constantine The Philosopher University in Nitra, Slovakia
Matjaz Gams, Jozef Stefan Institute, Slovenia
Matteo Casadei, Alma Mater Studiorum – Università di Bologna, Italy
Michael Hahsler, Southern Methodist University, USA

Michael Vassilakopoulos, University of Thessaly, Greece
Mirjana Ivanovic, University of Novi Sad, Serbia
Mohamed Ben Halima, REGIM-Lab: REsearch Groups in Intelligent Machines, Tunisia
Nina Rizun, Alfred Nobel University, Dnipropetrovs'k, Ukraine
Nizar Rokbani, ISSAT, University of Sousse, Tunisia
Paolo Garza, Politecnico di Torino, Italy
Pedro P. Alarcón, Universidad Politecnica de Madrid, Spain
Rafael Leon, Universidad Politécnica de Madrid, Spain
Riccardo Ortale, ICAR-CNR, Italy
Robert Leskovar, University of Maribor, Slovenia
Sebastian Rodriguez, Universidad Tecnológica Nacional, Argentina
Shruti Kohli, University of Birmingham, UK
Stefanos Vrochidis, Information Technologies Institute, Greece
Sviatoslav Braynov, University of Illinois, USA
Tatiana Tambouratzis, University of Piraeus, Greece
Tianming Hu, Dongguan University of Technology, China
Tomonobu Ozaki, Nihon University, Japan
Vadim Strijov, Russian Academy of Sciences, Computing Centre, Russia
Vincent Hilaire, Université de Technologie de Belfort-Montbeliard, France
Wai-keung Fung, Robert Gordon University, UK
Yannis Manolopoulos, Aristotle University, Greece
Yolanda Escudero Martin, Universidad de Alcala, Spain
Yuan Jiang, Nanjing University, China
Zahid Akhtar, University of Udine, Italy

THEORY AND PRACTICE IN MODERN COMPUTING

COMMITTEE MEMBERS

Abdel-Badeeh M. Salem, Ain Shams University, Egypt
Abdelghani Benharref, Sap Research Labs, Canada
Alex Galis, University College London, UK
Alexander von Bodisco, University of Applied Sciences Augsburg, Germany
Al-Sakib Khan Pathan, Southeast University, Bangladesh, and Islamic University, KSA
Angel Moreno, Universidad de Alcala, Spain
Antonio Martins, Universidade Estadual Paulista Júlio de Mesquita Filho, Brazil
Antonio Ruiz Martínez, University of Murcia, Spain
Apostolos Gkamas, University Ecclesiastical Academy of Vella of Ioan, Greece
Atilla Elci, Aksaray University, Turkey
Basilis Mamalis, Technological Educational Institute of Athens, Greece
Byoung Uk Kim, U.S. Air Force Research Laboratory , USA
Carlos Serrao, ISCTE/DCTI, Portugal
Cesar Vargas-Rosales, Tecnologico de Monterrey, Mexico
Cheng-Yuan Chang, National United University, Taiwan
Chih-Chieh Hung, Tamkang University, Taiwan
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Colette Johnen, Université Bordeaux, France
Cristiano da Costa, University of Vale do Rio dos Sinos, Brazil
Cristina Alcaraz, University of Malaga, Spain

Cyril Onwubiko, Research Series, UK
Djamal Benslimane, Lyon 1 University, France
Dongkyun Kim, Korea Institute of Science and Technology Information, South Korea
Edgar Weippl, Sba Research , Austria
Elad Michael Schiller, Chalmers University of Technology, Sweden
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Felix Strohmeier, Salzburg Research, Austria
Felix J. Garcia, University of Murcia, Spain
Felix J. Garcia Clemente, University of Murcia, Spain
Fernando Pereñiguez García, University of Murcia, Spain
Fernando Zacarias Flores, Benemerita Universidad Autonoma de Puebla, Mexico
Francesca Lonetti, CNR, Italy
Francesca Martelli, Institute of Informatics and Telematics of CNR, Italy
Francesco Maiorana, University of Catania, Italy
Francois Siewe, de Montfort University, UK
George Gravvanis, Democritus University of Thrace, Greece
Giuseppe Mangioni, DIEEI – University of Catania, Italy
Grammati Pantziou, Technological Educational Institute of Athens, Greece
Guu-Chang Yang, National Chung Hsing University, Taiwan
Gyu Myoung Lee, Liverpool John Moores University, UK
Hakima Chaouchi, Telecom Sud Paris, France
Humberto Razente, Universidade Federal de Uberlandia, Brazil
Ion Tutanescu, University of Pitesti, Romania
Isabel Muench, BSI, Germany
J. Paul Gibson, Télécom Sud Paris, France
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Janos Mohacsi, NIIF/Hungarnet, Hungary
Jean-louis Boulanger, CERTIFER, France
Jitender Grover, Maharishi Markandeshwar University, India
Jorge Barbosa, University of Vale do Rio dos Sinos (UNISINOS), Brazil
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Kiran Patil, GM Global R&D, General Motors India, India
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Mary Grammatikou, Ntua Netmode, Greece
Michal Choras, Institute of Telecommunications and Computer Science, Poland
Nadine Akkari, Telecom Paristech, France
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Pascal Lorenz, University of Haute-Alsace, France
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Ratvinder Grewal, Laurentian University, Canada
Raul de Lacerda, Supélec, France
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Robert Burduk, Wroclaw University of Technology, Poland
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Ryosuke Saga, Osaka Prefecture University, Japan
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Sanguthevar Rajasekaran, University of Connecticut, USA
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Serap Sahin, Izmir Institute of Technology, Turkey
Sergio Ilarri, University of Zaragoza, Spain
Sergio Kofuji, Universidade de Sao Paulo, Brazil
Shachi Sharma, Ibm India Research Lab, India
Siegfried Benkner, University of Vienna, Austria
Sim-Hui Tee, Multimedia University, Malaysia
Stanislaw Ambroszkiewicz, Polish Academy of Sciences, Poland
Stefanos Gritzalis, University of The Aegean, Greece
Stephane Maag, Telecom SudParis, France
Tiberiu Stefan Letia, Technical University of Cluj-Napoca, Romania
Tomasz Kubik, Wroclaw University of Technology, Poland
Uwe Roth, Luxembourg Institute of Science and Technology, Luxembourg
Vasos Vassiliou, University of Cyprus, Cyprus
Wei-Peng Chen, Fujitsu Laboratories of America, Inc., USA
Wojciech Kmiecik, Wroclaw University of Technology, Poland
Zbigniew Kokosinski, Cracow University of Technology, Poland
Zoubir Mammeri, Irit – Universite Paul Sabatier, France

KEYNOTE LECTURES

SOCIAL AND PSYCHOLOGICAL CHANGES IN THE ICT SOCIETY – ABOUT VISIONS AND WISDOM

Gunilla Bradley, Professor Emerita, Royal Institute of Technology (KTH) Stockholm

ABSTRACT

What is Quality of Life in the ICT society? Important contributing and hindering factors. Convergence and acceleration are main processes at the interplay between technology, societal structure, organizational design, and human roles in the society. Risks and opportunities in the 21st Century ICT society. What is the Good ICT society? Where are the "energy centers" that can activate and create changes towards "The Good Information Community" and "The Good Information Society"? How can wisdom be extracted – wisdom on various levels of analysis? Actions towards a good and sustainable society? Who are strategic stakeholders – active, passive, silent?

Keywords

Convergence Theory, ICT, Quality of Life, Human Beings, Identity, Stress, Power, Wisdom, Actions.

TED-talk on YouTube http://tedxtalks.ted.com/video/Understanding-the-Change-of-Hab (Bradley, G. 2015)

VISUALIZATION AND DATA MINING FOR HIGH DIMENSIONAL DATA

Professor Alfred Inselberg, Senior Fellow San Diego Supercomputing Center & Computer Science and Applied Mathematics Departments, Tel Aviv University, Israel

ABSTRACT

A dataset with M items has 2M subsets anyone of which may be the one satisfying our objectives. With a good data display and interactivity our fantastic pattern-recognition can cut great swaths searching through this combinatorial explosion unlocking surprising insights. That is the core reason for data visualization. With parallel coordinates the search for relations in multivariate data is transformed into a 2-D pattern recognition problem. The knowledge discovery process is illustrated on several real multidimensional datasets. There is also a geometric classification algorithm with low computational complexity providing the classification rule explicitly and visually. The minimal set of variables required to state the rule, features, is found and ordered by their predictive value. A complex system is modeled as a hypersurface enabling interactive exploration of its functions, sensitivities, trade-offs, impact of constraints and more. An overview of the methodology provides foundational understanding; learning the patterns corresponding to various multivariate relations. These patterns are robust in the presence of errors and that is good news for the applications. The parallel coordinates methodology has been applied to collision avoidance and conflict resolution algorithms for air traffic control (3 USA patents), computer vision (USA patent), data mining (USA patent) and elsewhere.