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Recent Advances in Electrical Engineering and Electronic Devices

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Plenary Lecture 1

A Probabilistic Approach to Low-power Context-Aware Systems for Smartphone

Professor Sung-Bae Cho
Department of Computer Science
Yonsei University
Seoul, Korea
E-mail: sbcho@cs.yonsei.ac.kr

Abstract: The recent proliferation of smartphones leads to developing a large variety of applications and investigating on the use of various sensors through context-awareness. However, the battery capacity of smartphone is still behind the development of service application, and it is a critical issue how to reduce the battery consumption for the context-awareness in smartphone.In this talk, Ipresent a low-power context-aware system using a probabilistic approach. Bayesian network can recognize contexts in uncertain situations or from incomplete data, but the probabilistic model generally has high complexity. It causes the high consumption for context-awareness in smartphone. I propose a tree-structure learning method to reduce the time complexity. Experiments with the real data collected from several users show the usefulness of the method, leading to the accuracy of 94.13% with a half of energy consumption compared with the conventional method.

Brief Biography of the Speaker: Sung-Bae Cho received the Ph.D. degree in computer science from KAIST (Korea Advanced Institute of Science and Technology), Taejeon, Korea, in 1993. He was an Invited Researcher of Human Information Processing Research Laboratories at Advanced Telecommunications Research(ATR) Institute, Kyoto, Japan from 1993 to 1995, and a Visiting Scholar at University of New South Wales, Canberra, Australia in 1998. He was also a Visiting Professor at University of British Columbia, Vancouver, Canada from 2005 to 2006, and at King Mongkut's University of Technology Thonburi, Bangkok, Thailand in 2013. Since 1995, he has been a Professor in the Department of Computer Science, Yonsei University, Seoul, Korea.

His research interests include hybrid intelligent systems, soft computing, evolutionary computation, neural networks, pattern recognition, intelligent man-machine interfaces, and games.He has published over 230 journal papers, and over 680 conference papers.

Dr. Cho has been serving as an associate editor for several journals including IEEE Transactions on CI and AI on Games (2009-present) and IEEE Transactions on Fuzzy Systems (2013-present). He was also the chair of Games Technical Committee, IEEE CIS (2009-2010), and Student Games-based Competition Subcommittee, IEEE CIS (2011-2012). He is a member of Board of Government (BoG) of Asia Pacific Neural Networks Assembly (APNNA) (2011-present), and a member of three technical committees in IEEE CIS such as Emergent Technologies, Computational Finance and Economics, and Games.

Dr. Cho has been awarded several best paper prizes from IEEE Korea Section (1990), Korea Information Science Society (1993, 2005), International Conference on Soft Computing (1996, 1998), World Automation Congress (1998), International Conference on Information Networking (2001), and International Conference on Hybrid AI Systems (2011). He was also the recipient of the Richard E. Merwin prize from IEEE Computer Society in 1993.

Plenary Lecture 2

Novel Statistical Modeling Approaches to Cybersecurity

Professor Demetrios Kazakos, IEEE Life Fellow
Texas Southern University
Houston, TX
USA
E-mail: kazakosd@tsu.edu

Abstract: One main aspect of Cybersecurity is the design and enabling of protection and defense strategies against organized intrusion attacks. One important approach is the development of robust techniques for intrusion detection. The fundamental approach is to design algorithms that will quickly detect anomalies and react by blocking such attacks. The fundamental approach that several researchers have been pursuing is to use statistical modeling. In particular, the author has used statistical change detection to quickly identify and compensate for faults in communication networks. In this talk, we present the use of powerful statistical change detection algorithms, and the development of enhanced, novel statistical modeling methodology that results in the creation of more effective countermeasures to cybersecurity attacks.

Brief Biography of the Speaker: Dr. Demetrios Kazakos received his Diploma in Electrical and Mechanical Engineering from the National Polytechnic University of Greece. He then started graduate his graduate studies in the United States. He received a Master of Arts degree in Electrical Engineering from Princeton University and a Doctor of Philosophy degree from the University of Southern California, specializing in Statistical Communication Theory. In 1980, he joined the Electrical Engineering Department of the University of Virginia,where he stayed until 1993. In 1992, he was elevated to the grade of Fellow of IEEE, for his research in two areas: Enhanced Algorithms for Multiuser Multiaccess Networks and Statistical Pattern Recognition. In 2009, he was elevated to the grade of IEEE Life Fellow. In 1993 he accepted the position of Head of the Electrical and Computer Engineering of the University of Southwestern Louisiana. At the same time he has always been a very active participant in IEEE conference organizing and editorial activities. He was Editor of the IEEE Transactions on Communications for 5 years, Technical Program Chair for two major IEEE Conferences, and member of the Technical Program Committee for several IEEE and other conferences. In 1983 he started a new company named HITEC, INC, which undertook several Research and Development projects in Information Technology, funded by the U.S. Department of Defense and the European Community. In 2001, he undertook the position of Professor and Chair of the Electrical Engineering and Computer Science Department at the University of Toledo. In 2004, he moved to the University of Idaho, as Professor and Chair of the Electrical and Computer Engineering Department. From 2006 to 2008, he was Dean of the College of Science and Technology at Texas Southern University. From September 2009 to September 2011, he was at the National Science Foundation in the position of Program Director responsible for the Program: "Centers of Research Excellence in Science and Technology". Overall, he has published about 165 refereed journal papers, book chapters and conference proceeding papers, as well as two books.

Plenary Lecture 3

Signal Processing for Augmented Reality in Historical Architecture

Professor Lamberto Tronchin
DIN-CIARM
University of Bologna
Italy
E-mail: Lamberto.tronchin@unibo.it

Abstract: Signal processing could strongly enhance the possibility to increase virtual reality application in architecture. Both visualisation and auralisation are strongly utilised to recreate ancient environments or architectures, or modify existing room or natural environments.
The possibilities given by recent application on signal processing and measurements allows to recreate augmented reality in a number of significant spaces, among all the UNESCO architectural sites. In this plenary lecture, the applications of new methods of capturing visual and aural information in environments are shown in a couple of significant spaces. The possibility to increase the subjective perception of the architecture (including lighting and sounds) will be shown and commented.

Brief Biography of the Speaker: Dr Lamberto Tronchin is Associate Professor in Environmental Physics from the University of Bologna and is recognised internationally as a leading authority on the subject of sound and acoustics. A pianist himself, with a diploma in piano from the Conservatory of Reggio Emilia, Dr Tronchin's principal area of research has been musical acoustics, room acoustics and signal processing. He is Associate Editor of the Journal of AES, and the author of more than 190 papers and was Chair of the Musical Acoustics Group of the Italian Association of Acoustics from 2000 to 2008. Dr Tronchin is a member of the Scientific Committee of the CIARM, the Inter- University Centre of Acoustics and Musical research, has chaired sessions of architectural and musical acoustics during several international symposiums, been a referee for a number of International journals and is Chair of Organising and Scientific Committees of IACMA (International Advanced Course on Musical Acoustics).
He was a visiting researcher at the University of Kobe in Japan, a visiting professor at the University of Graz in Austria and Special honored International Guest at the International Workshop, ‘Analysis, Synthesis and Perception of Music Signals', at Jadavpur University of Kolkata, India in 2005. He has chaired the International Advanced Course on Musical Acoustics (IACMA), organised with the European Association of Acoustics, which was held in Bologna, in 2005. In 2008 and 2009 he gave plenary lectures at International Congresses on Acoustics in Vancouver, Prague, Bucharest, Santander, Kos, Malta, Paris and Cambridge (UK). He designed theatres and other buildings, as acoustic consultant, in collaboration with several Architects, among them Richard Meier and Paolo Portoghesi.