



**International Conference on
Arts, Culture, New Media, and Entertainment 2013
(EITA-New Media 2013) or (EITA-EITC 2013)**

"New Media in Art, Technology, and Heritage"

Conference Proceedings

**Barry Lam Hall, College of EECS
National Taiwan University
Taipei, Republic of China (Taiwan)**

Saturday-Sunday, November 23-24, 2013

Table of Contents

<i>Table of Contents</i>	2
<i>Conference Themes</i>	4
<i>Planning Committee</i>	5
<i>Conference Program</i>	8
<i>Abstracts and Biographies</i>	9
<i>Day 1 (November 23, 2013)</i>	9
Opening Session	9
Plenary Session (1).....	11
Plenary Session (2).....	14
Technical Session D1-W1-T1: Digital Media, Culture, and Society.....	17
Technical Session D1-W2-T1: Broadband and Wireless Computing, Network Technologies, Services and Applications.....	21
Technical Session D1-W3-T1: New Media/Multimedia, Machine Learning, Web, and Entertainment Technology.....	27
Technical Session D1-W4-T1: Ubi/Cloud Computing, High Performance Computing (HPC)/Data Center, Cyber Security, and Digital Forensics	34
Technical Session D1-W1-T2: Digital Media, Culture, and Society.....	40
Technical Session D1-W2-T2: Broadband and Wireless Computing, Network Technologies, Services and Applications.....	48
Technical Session D1-W3-T2: New Media/Multimedia, Machine Learning, Web, and Entertainment Technology.....	54
Technical Session D1-W4-T2: Ubi/Cloud Computing, High Performance Computing (HPC)/Data Center, Cyber Security, and Digital Forensics	61
<i>Day 2 (November 24, 2013)</i>	68
Special Presentations.....	68
Technical Session D2-W1-T1: Digital Media, Culture, and Society.....	70
Technical Session D2-W2-T1: Broadband and Wireless Computing, Network Technologies, Services and Applications.....	76
Technical Session D2-W3-T1: New Media/Multimedia, Machine Learning, Web, and Entertainment Technology.....	83
Technical Session D2-W4-T1: Ubi/Cloud Computing, High Performance Computing (HPC)/Data Center, Cyber Security, and Digital Forensics	90
Technical Session D2-W1-T2: Digital Media, Culture, and Society.....	95
Technical Session D2-W2-T2: Broadband and Wireless Computing, Network Technologies, Services and Applications.....	102

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Technical Session D2-W3-T2: New Media/Multimedia, Machine Learning, Web, and Entertainment Technology.....	107
Technical Session D2-W4-T2: Ubi/Cloud Computing, High Performance Computing (HPC)/Data Center, Cyber Security, and Digital Forensics	113
Technical Session D2-W1-T3: Digital Media, Culture, and Society.....	118
Technical Session D2-W2-T3: Broadband and Wireless Computing, Network Technologies, Services and Applications.....	124
Technical Session D2-W3-T3: New Media/Multimedia, Machine Learning, Web, and Entertainment Technology.....	132
Technical Session D2-W4-T3: Ubi/Cloud Computing, High Performance Computing (HPC)/Data Center, Cyber Security, and Digital Forensics	137
Technical Session D2-W1-T4: Digital Media, Culture, and Society.....	142
Technical Session D2-W2-T4: Broadband and Wireless Computing, Network Technologies, Services and Applications.....	148
Technical Session D2-W3-T4: New Media/Multimedia, Machine Learning, Web, and Entertainment Technology.....	154
Technical Session D2-W4-T4: Ubi/Cloud Computing, High Performance Computing (HPC)/Data Center, Cyber Security, and Digital Forensics	160

Conference Themes

"New Media in Art, Technology, and Heritage"

The EITA-New Media 2013 consists of following workshops:

- **Workshop 1 (W1):** Digital Media, Culture, and Society
- **Workshop 2 (W2):** Broadband and Wireless Computing, Network Technologies, Services and Applications
- **Workshop 3 (W3):** New Media/Multimedia, Machine Learning, Web, and Entertainment Technology
- **Workshop 4 (W4):** Ubi/Cloud Computing, High Performance Computing (HPC)/Data Center, Cyber Security, and Digital Forensics

Planning Committee

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Sy-Yen Kuo	(郭斯彥)	National Taiwan University
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Pei-Cheng Ku	(古培正)	University of Michigan at Ann Arbor
Woei-Jyh (Adam) Lee	(李偉智)	University of Maryland, College Park
Jia-Yu (Tim) Pan	(潘家煜)	Google Inc.

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Program Committee

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Workshop 1: Digital Media, Culture, and Society

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Workshop 2: Broadband and Wireless Computing, Network Technologies, Services and Applications

Li-Chun Wang	(王蒞君)	National Chiao-Tung University
Pei-Cheng Ku	(古培正)	University of Michigan at Ann Arbor

Workshop 3: New Media/Multimedia, Machine Learning, Web, and Entertainment Technology

Sheng-Tzong Cheng	(鄭憲宗)	National Cheng-Kung University
Jia-Yu (Tim) Pan	(潘家煜)	Google Inc.

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Conference Program:

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Conference Proceedings:

Alvin Wei-Cheng Wong	(翁唯城)	University of Texas at Dallas
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On-Site Registration

<TBD>

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- Emerging Information and Technology Association (新興資訊科技協會)
- College of Electrical Engineering and Computer Science, National Taiwan University (臺灣大學電機資訊學院)

Co-Organizing Associations

- The National Science Council, R.O.C. (Taiwan) (行政院國家科學委員會)
- Ministry of Economic Affairs, R.O.C. (Taiwan) (經濟部)
- Ministry of Education, R.O.C. (Taiwan) (教育部)
- Ministry of Culture, R.O.C. (Taiwan) (文化部)
- National Palace Museum (國立故宮博物院)
- National Taiwan University (國立臺灣大學)
- National Tsing Hua University (國立清華大學)
- National Cheng Kung University (國立成功大學)
- National Chiao-Tung University (國立交通大學)
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- Investment & Trade Office, Taipei Economic & Cultural Representative Office in the U.S. (駐美投資貿易服務處)

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- Ministry of Education, R.O.C. (Taiwan) (教育部)
- Department of Electrical Engineering, National Taiwan University (國立臺灣大學電機工程學系)

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Conference Program

Abstracts and Biographies

Day 1 (November 23, 2013)

Opening Session

Opening Speech and General Conference Chair

Sy-Yen Kuo

Distinguished Professor, Department of Electrical Engineering
Dean, College of Electrical Engineering and Computer Science
National Taiwan University
(台灣大學電資學院院長暨電機工程學系郭斯彥特聘教授)

BIOGRAPHY



Opening Session

Welcome Remarks

Pan-Chyr Yang

President
National Taiwan University
(臺灣大學校長楊泮池博士)
<Invited>

BIOGRAPHY



Plenary Session (1)

Session Chair

Sy-Yen Kuo

Distinguished Professor, Department of Electrical Engineering
Dean, College of Electrical Engineering and Computer Science
National Taiwan University

(台灣大學電資學院院長暨電機工程學系郭斯彥特聘教授)

BIOGRAPHY



Plenary Session (1)

Plenary Speaker

**New Waves at the National Palace Museum: From Applying Digital
Technologies to Creating Digital Art**

Ming-Chu Fung

Director, National Palace Museum
Republic of China (Taiwan)
(國立故宮博物院馮明珠院長)

ABSTRACT

BIOGRAPHY



Plenary Session (1)

Plenary Speaker

How Art Schools May Improve upon Creative Industry

Yung-Cheng Hsieh

President, National Taiwan University of Arts
(臺灣藝術大學校長謝顯丞教授)

ABSTRACT

With the development of cultural industries in Taiwan in recent years, training creative talents and improving quality of creative industries has become an important issue for the government to tackle with. However, it still requires meticulous planning to create a proper environment for new talents and elevate creative industry to a new level. Universities serve as a vital link in education system for training personnel available for various professions, and students of art schools provide important personnel for future development of creative industry. In order to secure such valuable human assets, universities have to maintain an impeccable training environment which incorporates talents training, industry merging, and sustainable management in order to conduct industrial clustering and expand domestic and international markets by through university.

BIOGRAPHY



Plenary Session (2)

Session Chair

Sy-Yen Kuo

Distinguished Professor, Department of Electrical Engineering
Dean, College of Electrical Engineering and Computer Science
National Taiwan University

(台灣大學電資學院院長暨電機工程學系郭斯彥特聘教授)

BIOGRAPHY



Plenary Session (2)

Plenary Speaker

Feng-Tyan Lin

Professor and Dean, College of Planning and Design
National Cheng Kung University
(成功大學都市計劃學系兼規劃與設計學院院長林峰田教授)

ABSTRACT

BIOGRAPHY



Plenary Session (2)

Plenary Speaker

Dr. Li-Chun Wang

Distinguished Professor and Chairman, Department of Electrical and Computer Engineering
National Chiao-Tung University
(交通大學電信工程研究所兼電機工程學系系主任王蒞君特聘教授)
<Invited>

Technical Session D1-W1-T1: Digital Media, Culture, and Society

Workshop Co-Chair and Session Chair

Jieh Hsiang

Distinguished Professor in Computer Science and Director, Research Center for Digital
Humanities

National Taiwan University

(台灣大學資訊工程學系暨數位典藏中心主任項潔特聘教授)

BIOGRAPHY



Nien-Hsuan Fang

Associate Professor, Department of Journalism
National Chenchi University
(政治大學新聞學系方念萱教授)

ABSTRACT

BIOGRAPHY



Technical Session D1-W1-T1: Digital Media, Culture, and Society

Huichuan Liu

Associate Professor, Department of Information and Communication
CEO, Center for Cultural and Creative Industries
Tamkang University

(淡江大學資訊傳播學系兼文化創意產業中心執行長劉慧娟教授)

ABSTRACT

BIOGRAPHY



The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Technical Session D1-W1-T1: Digital Media, Culture, and Society

Shun-Tzu Tsai

Associate Professor, the Department of Information and Communications
Shih Hsin University
(世新大學資訊傳播學系蔡順慈教授)

ABSTRACT

BIOGRAPHY



The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Technical Session D1-W2-T1: Broadband and Wireless Computing, Network Technologies,
Services and Applications

Workshop Co-Chair and Session Chair

Li-Chun Wang

Distinguished Professor and Chairman, Department of Electrical and Computer Engineering
National Chiao-Tung University

(交通大學電信工程研究所兼電機工程學系系主任王蒞君特聘教授)

BIOGRAPHY



Broadband Semiconductor Optical Amplifiers & Tunable Semiconductor Lasers

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ABSTRACT

Conventional semiconductor optical amplifiers (SOAs) have around 30 nm of bandwidth in the optical-communication spectral range. This spectral is much narrower than the available window of optical fiber, which covers from around 1300 nm to 1600 nm. As a result, the tunable semiconductor lasers using SOAs only give around 30 nm tuning range. Here we apply multiple quantum wells (MQWs) of different widths and different compositions to extend the spectral bandwidth. Although each well has only about 30 nm of bandwidth, as we stack them together and properly design each central wavelength, we are able to achieve broad bandwidth. On the other hand, the carrier distribution among those MQWs is not generally uniform. To achieve the uniform carrier distribution for broadband purpose, carrier dynamics is also important. In this presentation, we will discuss the design of MQWs and carrier dynamics therein to achieve broadband emission bandwidth that covers nearly from 1300 nm to 1600 nm. The tunable semiconductor lasers using such SOAs have given the record tuning range as large as 275 nm and tunable dual wavelengths with record spectral separation range from a few nm to 190 nm are achieved. Also, simultaneous generation of 8 channels with approximately 20 nm channel spacing, spanning from 1367 nm to 1527 nm is demonstrated.

BIOGRAPHY



Prof. Ching-Fuh Lin obtained the B.S. degree from National Taiwan University in 1983, and the M.S. and Ph.D. degrees from Cornell University, Ithaca, NY, in 1989 and 1993, respectively, all in electrical engineering.

He is now the Director of Innovative Photonics Advanced Research Center (i-PARC) and a joint professor in the Graduate Institute of Photonics and Optoelectronics, Graduate Institute of Electronics Engineering, and Department of Electrical Engineering at National Taiwan University. His major research area is in photonics, including organic-inorganic composite thin-film solar cells and optoelectronic devices, single-crystal Si thin-film solar cells, Si-based photonics, and physics in broadband semiconductor lasers and optical amplifiers.

He is a Fellow of IEEE, a Fellow of SPIE, Member of Asia-Pacific Academy of Materials, and a member of OSA. He has published 160 journal papers and 430 conference papers and holds 50 patents. He is also the sole author of two books, "Optical Components for Communications: Principles and Applications", published by Kluwer Academic Publishers (USA 2004), and "光學與光電導論"(Optics and Photonics: Fundamentals and Applications), published by 五南圖書出版股份有限公司(Taiwan, 2012) and co-authors a book, "Organic, Inorganic and Hybrid Solar Cells –Principles and Practice", published by John Wiley & Sons, Inc. and IEEE Press, 2012. He had obtained the Distinguished Research Award and several Class A Research Awards from National Science Council of Taiwan, ROC, and the Outstanding Electrical Engineering Professor Award from the Chinese Institute of Electrical Engineering. He and his students had also been granted the 18th Acer Research Golden Award, 18th Acer Research Excellent Award, 14th Acer Research Excellent Award, Collins Thesis Awards for years of 1998, 2001, 2002, 2004, 2007, 2009, 2010, and 2012. Prof. Lin has served in the International Scientific Committee of 27th & 28th European Photovoltaic Solar Energy Conference and Exhibition and as the Chair of IEEE LEOS Chapter Taipei Section, the Board member of the 17th IEEE Taipei Section, and the Council member of the 10th Optical Engineering Society of ROC and Taiwan Photonics Society.

Bidirectional Lightwave Transport Systems Based on Optical Free-Space Transmission Scheme

Po-Yi Wu, Yi-Ping Lin, Chun-Yu Lin, Ming-Chou Chen, Hai-Han Lu*

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ABSTRACT

A novel bidirectional lightwave transport system employing phase modulation (PM) scheme and light injection-locked distributed feedback laser diode (DFB LD) as a duplex transceiver for passive optical network (PON); as well as employing laser pointer lasers (LPLs) with directly modulating data signals for wavelength-division-multiplexing (WDM) visible light communication (VLC) is proposed and experimentally demonstrated. Impressive and low bit error rate (BER) operation is achieved for PON integration with VLC application. Such bidirectional PON integration with VLC system has been successfully demonstrated, which can not only present its advancement in PON/VLC application but also reveal its simplicity and convenience to be installed. Whereby, our proposed system is suitably applicable to the PON in combination with VLC system in wire and wireless transmission.

BIOGRAPHY



Hai-Han Lu received the MS and Ph.D. degrees from the Institute of Electro-Optical Engineering, National Central University, Taiwan, in 1991 and 2000, respectively. He joined the Department of Electro-Optical Engineering, National Taipei University of Technology as an Associate Professor in 2001, as well as promoted to Professor and Distinguish Research Professor in 2003 and 2006, respectively. He was the Chair of the Department of Electro-Optical Engineering at NTUT (8/2005-7/2008). He has temporarily transferred to the Tungnan University as a Vice President from 2011 (2011-2013). His research interests include visible light communications (VLC), radio-over-fiber (RoF) and fiber optics CATV transport systems.

Professor Lu is currently a Fellow of the IET (Institution of Engineers and Technology), a Senior Member of the IEEE (Institute of Electrical and Electronics Engineers), a Senior of the OSA (Optical Society of America), and a Senior Member of the SPIE (International Society for Optical Engineers). He was a Membership Committee of the SPIE (2004-2005). He has awarded the Outstanding Engineering Professor Prize of CIE (Chinese Institute of Engineers, 2013), ETRI (Electronics and Telecommunications Research Institute) Journal Paper of the Year (SCI, 2007), Outstanding Research Prize of NTUT (2004), and Outstanding Research Prize of EECS in NTUT (2007) for his significant technical contributions to VLC, RoF and fiber optics CATV transport systems.

GaN Nanostructures and Applications to Communications and Display

Pei-Cheng Ku

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ABSTRACT

Nitride semiconductors (GaN, AlN, InN) exhibit many unique properties typically not found in silicon or other III-V semiconductors. They possess a large bandgap that can easily access visible and ultraviolet wavelengths. Their exciton binding energies are at least one order of magnitude larger than that in GaAs or InP. Their strained heterostructures exhibit a very large and anisotropic piezoelectric field. Some of these properties have enabled important applications in LEDs and power electronics. Some have presented challenges to the device performance. Some have not been fully exploited. In this work, we investigated the above properties in nitride semiconductor nanostructures including quantum dots, dot-in-wire structures, and plasmonic structures. We found that these nanostructures can fully harness the unique properties of nitride semiconductors and potentially lead to new applications in quantum cryptography and displays.

BIOGRAPHY



P.C. Ku is the associate professor of electrical engineering and computer science at the University of Michigan. He received all his degrees in electrical engineering including a BS from the National Taiwan University and a PhD from the University of California at Berkeley. Dr. Ku has a long career in the field of optoelectronics, starting in 1995 when he joined the lab of Professor Ching-Fuh Lin of the National Taiwan University as a research assistant. After two years of military service as a Navy ensign, he became a full-time student again in 1998 under the guidance of Professor Connie Chang-Hasnain at the University of California Berkeley. His doctoral dissertation is on semiconductor slow light devices. He was among the first to show that the speed of light can be significantly reduced in a specially designed semiconductor structure. As a result of his PhD research, he was awarded the Ross Tucker Memorial Award in 2004. During his PhD study, Dr. Ku was the recipient of the Berkeley Fellowship. After receiving his PhD, Dr. Ku spent two years both as a postdoctoral researcher for the DARPA Center for Optoelectronic Nanostructured Semiconductor Technology and as a senior engineer for Intel. His research shifted from telecommunication devices to optical lithography and phase-change memory. It was during this time Dr. Ku conceived the idea that advanced lithography technology can be revolutionary to optoelectronic devices. In 2006, he returned to academia as an assistant professor of electrical engineering and computer science at the University of Michigan. His research has since been focused on creating impacts for optoelectronic devices in the emerging

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

areas of energy, quantum, and biomedical science. He has worked on a variety of projects funded by NSF, DARPA, and DOE including LEDs, solar cells, nanoscale lasers, biosensors, and single photon sources. He received the DARPA Young Faculty Award in 2010.

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Technical Session D1-W3-T1: New Media/ Multimedia, Machine Learning, Web, and Entertainment Technology

Session Chair

I-Chen Wu

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BIOGRAPHY



I-Chen Wu received the B.S. degree in electronic engineering and the M.S. degree in computer science from the National Taiwan University (NTU), Taipei, Taiwan, in 1982 and 1984, respectively, and the Ph.D. degree in computer science from Carnegie Mellon University, Pittsburgh, PA, USA, in 1993. He is with the Department of Computer Science, at National Chiao Tung University and also serves as the director in the Institute of Multimedia Engineering. His research interests include artificial intelligence, Internet gaming, volunteer computing and cloud computing.

Dr. Wu introduced the new game, Connect6, a kind of six-in-a-row game, in 2005. Since then, Connect6 has become a tournament item in Computer Olympiad. He led a team developing various game playing programs, winning over 20 gold medals in international tournaments, including Computer Olympiad. He wrote over 80 papers, and served as chairs and committee in over 30 academic conferences and organizations, including Games Technical Committee of IEEE Computational Intelligence Society.

Emotion Recognition from Multimedia Information

Chung-Hsien Wu

Distinguished Professor, Department of Computer Science and Information Engineering
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(成功大學資訊工程學系兼電資學院副院長吳宗憲特聘教授)

ABSTRACT

Intact perception and experience of emotion is vital for communication in the social environment. Emotion recognition is the ability to identify what you are feeling from moment to moment and to understand the connection between your feelings and your verbal/non-verbal expressions. When you are aware of your emotions, you can think clearly and creatively; manage stress and challenges; communicate well with others; and display trust, empathy, and confidence. Technologies for processing daily activities including facial expression, speech and language have expanded the interaction modalities between humans and computer-supported communicational artifacts, such as robots, iPad, and mobile phones. In this talk, I will present theoretical and practical work offering new and broad views of the latest research in emotion recognition from multimedia information including facial expression, speech and language. I will talk about several parts spanning a variety of theoretical background and applications ranging from salient emotional features, emotional-cognitive model, to emotional information processing on these modalities.

BIOGRAPHY



Dr. Chung-Hsien Wu was born on June 12 1959, in Tainan, Taiwan. He received the B.S. degree in electronics engineering from National Chiao Tung University, Hsinchu, Taiwan, in 1981, and the M.S. and Ph.D. degrees in electrical engineering from National Cheng Kung University (NCKU), Taiwan, in 1987 and 1991, respectively.

Since 1991, he has been with the Department of Computer Science and Information Engineering, NCKU, Taiwan. He became professor and distinguished professor in 1997 and 2004, respectively. He also worked at Computer Science and Artificial Intelligence Laboratory of Massachusetts Institute of Technology (MIT), Cambridge, MA, in summer 2003 as a visiting scientist. Currently, he is the Deputy Dean of the College of Electrical Engineering and Computer Science, NCKU. He is currently the associate editor of IEEE Trans. Audio, Speech and Language Processing, IEEE Trans. Affective Computing, ACM Trans. Asian Language Information Processing, and the Subject Editor on Information Engineering of Journal of the Chinese Institute of Engineers (JCIE). His research interests include affective computing, expressive speech synthesis, and spoken language processing.

Professor Wu received the Outstanding Research Award of National Science Council in 2010

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

and the Distinguished Electrical Engineering Professor Award of the Chinese Institute of Electrical Engineering in 2011, Taiwan. He is a senior member of IEEE and a member of International speech communication association (ISCA). He was the President of the Association for Computational Linguistics and Chinese Language Processing (ACLCLP), Taiwan, in 2009~2011. He was the Chair of IEEE Tainan Signal Processing Chapter and has been the Vice Chair of IEEE Tainan Section since 2009.

**UbiTablet: A Portable Camera-Projector System To Transform Any Flat
Surface Into A Touchable Display**

Jiung-yao Huang

Professor, Department of Computer Science and Information Engineering
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ABSTRACT

After the concept of Tangible User Interface (TUI) was presented in 1997, different user interfaces intending to directly and seamlessly communicate information with physical environment are proposed over the years. Among them, only Camera-Projector System(CPS) actually goes to the market. The most well-known CPS product is Microsoft Surface Table. However, the traditional CPS researches require a fixed location, an expensive camera and projectors peripheral to hinder its popularity. Although Microsoft proposed a mobile version of CPS in 2005, their solution had many restrictions and did not support multiple hand gesture operation.

The research of CPS for TUI can be broadly classified into two categories: hand/object recognition and gesture inference. The previous studies mostly focused on hand/object recognition and supported simple finger touch reasoning only. In order to enable the CPS to become a practical TUI, gesture inference is very important and is tightly related to the mechanism of hand recognition. Furthermore, the issue of one hand blocking the image of the other hand during multiple gesture operation is a major problem of hand recognition as well as gesture inference.

The talk presents a true portable version of CPS system, called UbiTablet, that can transform any flat surface into a touchable display. UbiTablet uses a pico projector to project the computer display onto the flat surface, and an infrared webcam to capture user's hand gestures on the projected computer display.

This talk will discuss the approach of hand recognition and multiple hand gesture inference adopted by UbiTablet. The solution to the obstacle issue of multiple hand gestures will be explored also. Different from the previous CPS researches, UbiTablet allows users to arbitrarily place it on the desk and begin to manipulate the projected computer display with multi-touch gestures immediately.

BIOGRAPHY

Jiung-yao Huang received his MS degree in Computer Science from Tsing-Hua University, Taiwan, 1988, and his BS degree from the Department of Applied Mathematics in Chung-Hsing University, 1983, Taiwan. He further earned his PhD degree in Electrical and Computer Engineering from the University of Massachusetts in Amherst, USA, in 1993.

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)



Currently he is a Professor in the Department of Computer Science and Information Engineering in National Taipei University, San Shia District, New Taipei City, Taiwan. Previously, he taught in the Department of Communication Engineering in National Chung Cheng University, Taiwan between 2003 to 2006. Before that, he served in the Department of Computer Science and Information Engineering in Tamkang University, Taiwan. He also has actively served as the director of Advanced Digital Research Section in the Information Processing Center, and the Executive Editor of the Tamkang Journal of Science and Engineering in Tamkang University, Taiwan, from August 2001 through July 2003.

Prof. Huang has been a member of IEEE and ACM since 1990. His research interests include pervasive computing, context-awareness, wearable computing, 3D computer graphics and networked virtual reality

Technical Session D1-W3-T1: New Media/ Multimedia, Machine Learning, Web, and Entertainment Technology

The Bridge between Art and Technology in Visual Media

Shih-Wei Sun

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ABSTRACT

In this talk, based the observation point of image recording, we will review the cave painting, building and sculpture, to the optical camera developing, and the digital image from hand held cameras. We will discuss the technologies in computer vision (CV), computer graphics (CG), and artistic representation point of view, bringing the psychological experiences to the human subjects. In addition to the brief introductions of image recording for art and technologies, the extending animation and film making industries, creative artistic representation, and the contemporary new media arts works and technical art works will be introduced.

BIOGRAPHY



Shih-Wei Sun received the B.S. degree in Electrical Engineering from Yuan-Ze University, Taiwan, in 2001, and received the Ph.D. degree in Electrical Engineering from National Central University, Taiwan, in 2007. From 2007 to 2011, he was a post-doctoral research fellow at the institute of information science, Academia Sinica. Since 2012, he is an Assistant Professor at the Department of New Media Art, Taipei National University of the Arts, Taiwan. He is currently the director of the Ultra-Communication Vision Laboratory (ucVision Lab) in Center for Art and Technology (CAT) in Taipei National University of the Arts, Taiwan. He served as a guest editor for the special issue on Advances in Multimedia for Journal of Computers. He published more than 20 international journal papers and conference papers. He serves as the reviewers for many international journals and conferences.

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Technical Session D1-W3-T1: New Media/ Multimedia, Machine Learning, Web, and Entertainment Technology

Sheng-Tzong Cheng

Professor, Department of Computer Science and Information Engineering
National Cheng-Kung University
(成功大學資訊工訊系鄭憲宗教授)

BIOGRAPHY



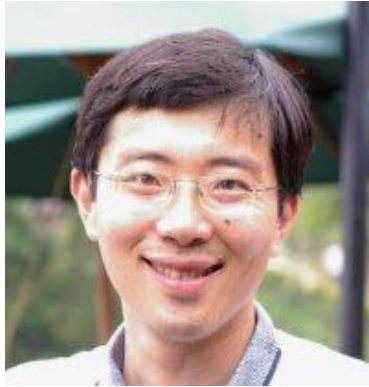
Technical Session D1-W4-T1: Ubi/ Cloud Computing, High Performance Computing (HPC)/ Data Center, Cyber Security, and Digital Forensics

Workshop Co-Chair and Session Chair

S. (Shyhtsun) Felix Wu

Professor, Department of Computer Science
University of California, Davis
(加州大學戴維斯分校計算機科學系吳士駿教授)

BIOGRAPHY



Event Knowledge-based Demand Profiling and Prediction for Cloud Application Performance Management

Yeali S. Sun

Professor, Department of Information Management
Chief Director, Computer and Information Networking Center
National Taiwan University

(台灣大學資訊管理學系暨研究所兼台灣大學計算機及資訊網路中心主任孫雅麗教授)

ABSTRACT

The class of popular Internet live event such as sports games broadcast service can greatly benefit from the cloud technology employing resource pooling and rapid elasticity in resource allocation and management. Their external demands tend to be unpredictable and exhibit high degree of burstability. To sustain good viewing experience to the users, an important QoS support for this class of applications is the peak load management in the presence of unpredictable demand. It relies on a close grasp of the demand behavior characteristics and accurate prediction model of it. In this work, we firsts analyze live sports event broadcast service workloads from a commercial Internet service provider. Our results show that popularity follows a 2-mode Zipf distribution. We observe some significant characteristics of the demand behavior. The demand behavior may differ significantly between games. Popular events tend to exhibit high varying behaviors in time, volume and the change rate during the course. And, the demand variation highly correlates with certain event-specific time points. To address the problem, we propose a learning-based temporal behavior profiling model and a run-time prediction algorithm to support accurate forecast of the external demand for Internet live event broadcast service. This work is of fundamental importance in the design, operations and evaluation of Internet content delivery systems. The results show that our proposed model and method can well capture the dynamics and unpredictability of the workload to provide advantageous support for accurate demand prediction in application performance management.

BIOGRAPHY



evaluation.

Yeali S. Sun received her B.S. from the Computer Science and Information Engineering department of National Taiwan University in 1982, and M.S. and Ph.D. degrees in Computer Science from the University of California, Los Angeles (UCLA) in 1984 and 1988, respectively. From 1988 to 1993, she was with Bell Communications Research Inc. In August 1993, she jointed National Taiwan University and is currently a professor of the Department of Information Management, and the chief director of the Computer and Information Networking Center of National Taiwan University. Her research interests are in the area of Internet security and forensics, Quality of Service (QoS), cloud services, and performance modeling and

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Technical Session D1-W4-T1: Ubi/ Cloud Computing, High Performance Computing (HPC)/ Data Center, Cyber Security, and Digital Forensics

Deron Liang

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Professor, Department of Computer Science and Information Engineering
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ABSTRACT

BIOGRAPHY



The Study of Efficient and Secure Roaming Payment Protocols with Delegation and Group Signatures

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ABSTRACT



Communication distance limitation has been eliminated by the outstanding technology provided by the mobile communication or portable communication systems (PCSs). With the development of many kinds of mobile devices, such as smart phones, PDAs and mobile tablets, the mobile payment issue has been highly noticed and discussed in the near future. Since the resource constraint is needed for the lightweight mobile devices, to balance the efficiency and security is a challenge to the practice of e-commerce applications in the mobile communication environment.

Roaming service provides an extension of the connectivity for a mobile user who is in the foreign area different from his register location. The agent of the foreign area (or called visitor location register, VLR) has no enough information to directly identify the mobile user, and further may be untrusted. In this situation, the security considerations such as authentication, anonymity, privacy and confidentiality should be paid more attention to and some secure e-commerce protocols for roaming also should be developed.

This talk introduces two kinds of solutions in roaming payment to avoid some malicious attacks such as repudiation, linkability and denial of service (DoS), and decrease the communication costs by using delegation and group signatures. The proposed payment system can support the functionalities of multiple-vendors and small amounts of money by adopting the unbalanced one-way binary tree (UOBT) and PayWord-based micropayments. Moreover, both anonymity and untraceability can also be achieved to avoid privacy disclosure in the roaming payment environment.

BIOGRAPHY

Chih-Hung Wang was born in Kaohsiung, Taiwan in 1968. He received the B.S. degree in information science from Tunghsi University and M.S. degree in information engineering from National Chung Cheng University, Taiwan in 1991 and 1993, respectively. He received the Ph.D. degree in information engineering from National Cheng Kung University, Taiwan in 1998.

He is presently an Associate Professor of Department of Computer Science and Information

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Engineering, National Chiayi University, Taiwan, and he has been elected as the Director of Chinese Cryptology and Information Security Association (CCISA) since 2009.

Dr. Wang's research interests include cryptography, information security and data compression. He has authored more than twenty journal papers in these topics and served on the program and organizing committees of various international conferences and workshops.

Secured Outsourcing of Frequent Itemset Mining to Cloud Environments

Hana Chih-Hua Tai

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ABSTRACT

Data mining is the technique of analyzing data to discover implicit information in large databases. Recent years it has shown its great promise in wide fields, such as business, advertising, bioinformatics, network analysis, to name a few. Nowadays, the rise of cloud computing even allows everyone to take the advantages of data mining by outsourcing. Data privacy, however, is always a concern in outsourcing. How to find the balance between data privacy and the accuracy of mining results thus attracts a lot of attention.

This talk focuses on the outsourcing of frequent itemset mining, which is to discover what patterns usually happen together from large databases. The risk of outsourcing frequent itemset mining to cloud environments is that everyone, including the mining service provider, could be a malicious data hacker. These hackers may even possess some domain knowledge regarding the outsourced data. The talk first discusses the challenges of secured outsourcing of frequent itemset mining, and presents a protecting model for this problem afterward. The protecting model can limit the probability of privacy leaks with moderate storage overhead.

BIOGRAPHY



Chih-Hua Tai received her B.S. degree in Computer Science from National Chengchi University (NCCU), Taipei, Taiwan, and Ph.D. degree from Department of Electrical Engineering, National Taiwan University (NTU), Taipei, Taiwan. She is now an assistant professor in Department of Computer Science and Information Engineering, National Taipei University, New Taipei City, Taiwan. She was a postdoctoral researcher at Research Center for IT innovation from August 2011 to July 2012, and a lecturer at Department of Computer Science and Information Engineering, National Taiwan University of Science and Technology (NTUST), Taipei, Taiwan. Her research interests include database and data mining, especially on privacy preserving data sharing and analysis, social computing, and big data mining on cloud environments.

Technical Session D1-W1-T2: Digital Media, Culture, and Society

Workshop Co-Chair and Session Chair

Yuh-wen Wang

Associate Professor and Director of the Graduate Institute of Musicology
National Taiwan University

(臺灣大學音樂學研究所所長王育雯教授)

BIOGRAPHY



Shuengit Natasha Chow

Visiting Associate Professor, Graduate Institute of Animation and Film Art
Tainan National University of the Arts
(臺南藝術大學動畫藝術與影像美學研究所周旋捷教授)

ABSTRACT

Machinima is the use of real-time computer graphics engines to create a cinematic production. Most often, video games are used to generate the computer animation. My interest and creations in the virtual world has a main focus of bringing ancient Chinese culture through New Media platforms. In this paper, I will present two to three main types of Machinimas, and within each type a range of graphic inventiveness and specific purpose for various audiences. The First is an online Virtual World Platform, Secondlife - which has no predetermined gaming elements, it has a blank volume for users to create their world. It provides storage and the Graphic Engine itself with building tools and scripts - in real time. The Second type would be the artistic deployment of Video Game engines to record the graphic display as films. This would include regular game play and also creative, inventive use of the characters in the game platform as "talents" in the film.

I begin first with a Machinima documentary film of the functional aspects of a Virtual World. This demonstrates why for certain real life problems, a Virtual World is a breakthrough and proven to be useful in a unique way which is not possible with other forms of solutions.

Then, I will present the various types of artistic Machinimas, for animation film making and esthetic enjoyment purpose.

Lastly, I will show the current state of Machinima in the economic-business world and the applications of computer animation using video games graphics for commercial purpose.

full text with video::

<http://swannbb.blogspot.tw/2013/11/machinima-eitc-conference-paper.html>

BIOGRAPHY



Dr.Shuen-git Natasha Chow 周旋捷 ;
Shuengit / Swann Jie : MicroTotal Art, Monumental Sculpture,
virtual world, film review

My current projects are:

1. creation of a prototype of Guqin using a FabLab type small series
production. See details here:

<http://swannbb.blogspot.tw/search?q=xyz+Leiden>

<http://swannbb.blogspot.tw/2013/03/xyz-qin-march-almost-finished.html>

<http://swannbb.blogspot.tw/2013/10/xyz-qin-1-testing-tuning-and-re-tuning.html>

2. Machinima of Chinese Ancient Culture in a Virtual World.

3. Monumental sculptures

<http://swannbb.blogspot.tw/2011/09/brainpickings.html>

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Research Interests: Virtual World Research-Creation, Digital Guqin Museum, Story telling. Film Reviews. Cross-idisciplinary Arts: Monumental Sculptures, Design, Painting.

Education :: Dr. of Arts and Sciences of Art, University of Paris 1, Pantheon-Sorbonne.
Speciality: Visual Arts, Cinema and television, audio visual. Paris, France.
Bachelor of Architecture, University of Toronto, Canada

Teaching: Visiting Associate Professor, Tainan National University of the Arts, Tainan, Taiwan.
Graduate Research Institute of Animation and Film Arts; and Graduate Research Institute of Plastic Arts, Sculpture. 2011-2013

電影的奇觀想像 - 奇觀電影和 S3D 立體電影

Chi-Fang Ting

Assistant Professor, Department of Motion Picture
National Taiwan University of Arts
(臺灣藝術大學電影學系丁祈方教授)

ABSTRACT

電影本質上從來沒有脫離對於視覺奇觀的展現意圖，這種奇觀化原則更是成為當前電影創作或訴求的重要特徵，因此視覺性奇觀也為電影敘事媒介所特有的一種美學表現形態。電影中的奇觀不僅是一種視聽感受，更是一種心理體驗，也造成了形式上一定的意義，因為電影中透過影像(聲音)，以情感能量刺激觀眾。

電影的奇觀特性在商業性和藝術性上，對於奇觀的文本特性是相同的。在形式美上，電影奇觀文本的視覺核心就是創造視覺快感，而且必須是非傳統常態電影的那種快感，是一種極端的，帶有碎片化的感觀刺激。當前電影中的奇觀，多經由數位技術所輔助或生成，更是把想像的框架超越了現實，實現在現實無法呈現的想像基礎上。在當代奇觀電影作為一種主要的電影形式，已經越來越多地反映出視覺文化的轉向以及景觀社會的特點。電影提供了允許觀眾在想像中對影像中的人或物發洩或延伸我們的本能情緒。基本上，這種環境是電影的科技力量所建構出來的。

另外，S3D 電影所創建的奇觀，也是在歷經了 1950、1980 等二次短暫的發展，因為無法突破的技術之限制而沒落。進展到 2009 年時越趨純熟的數位技術，讓電影的視覺文化進入到了 3D 元年。S3D 影像的完成想像端靠著正負視差來完成，也因為這種正負視差的調整和控制，呼應了電影作者所想要創造的敘事空間的內在關係。但是電影的特效通常也都存在有噱頭的意味，使得眾多電影作家重新反思使用 S3D 電影的本意。

本文將在電影的奇觀特性上的潮流，梳理國內外電影在視覺奇觀上的轉變風向，並以幾部重要的 S3D 電影來歸納其立體影像的表現特性，嘗試找出奇觀電影和 S3D 電影的現代意義，以供為電影創作上的參考方向。

關鍵字: 奇觀、電影奇觀、S3D 立體電影

BIOGRAPHY



主要研究領域為電影表現與製作、製片管理、產業與資金。編導作品有《再見新樂園》、數位電影《平行圓》、擔任製片統籌有短篇電影《Overnight, A Rose》、《H2O》、《杏歡》與長片輔導金《戀戀海灣》。製作協調與監製作品有紀錄片《海を渡る新幹線》、《海を渡った新幹線、その苦闘に挑んだ男達》、《最高時速 300km/h! 臺灣新幹線》、《H2O》、《杏歡》、《母親》、《給未來的元氣》等。作品曾獲多項獎項。

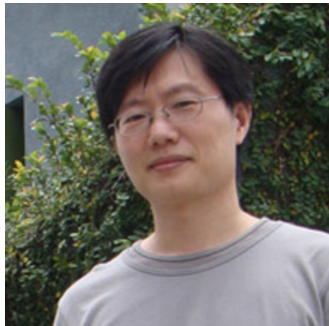
Technical Session D1-W1-T2: Digital Media, Culture, and Society

Hao-Hsiu Chiu

Assistant Professor, Department of Architecture
Tunghai University
(東海大學建築系邱浩修教授)

ABSTRACT

BIOGRAPHY



The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Technical Session D1-W1-T2: Digital Media, Culture, and Society

Jia-haur Liang

Assistant Professor, Department of Crafts and Design
National Taiwan University of Arts
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ABSTRACT

BIOGRAPHY



Visualization of Dance Movements by Thermography and Fluid Simulation

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ABSTRACT

In this talk, we address several works around digital performance. We review motioncapturebased performances such as Merce Cunningham's BIPED, Bill T. Jones' Ghostcatching, as well as kinectbased performances. Some projects concerning recording or notating choreography are introduced as well. Inspired by EtienneJules Marey's fluids photography, we are interested in making details visible by using new technologies with apt visualization. In the recent work, we are focusing on the relationships between body temperature and dance movement. At the first level, human body temperature is observed with help of infrared camera. At the second level, applying information visualization methods to thermal images facilitates understanding of both largescale and smallscale features of dance movement. By means of an appropriate visualization, we expect that dancer's body state may emerge in accordance with body temperature. Furthermore, we are interested in perceiving a current of body temperature. We initiate fluid simulation according to thermal conditions creatively without boundary of physical body. In other words, physical body becomes liquefiable in coordination with the distribution of body temperature. We describe our technical schema and artistic concept to debate whether fluid/deformable/morphed figure can help to perceive both movement and body state.

BIOGRAPHY



Chi-Min Hsieh received his Master of Fine Art from the National Taiwan University of Arts in 2002 and received his Master in Computer Mathematics from the Grenoble Institute of Technology (Grenoble INP) in France in 2004. He received his Ph.D. in Art, Science and Technologies from Grenoble INP in 2007. Currently he is an Assistant Professor, a faculty member of Institute of Applied Arts, National Chiao Tung University. His research integrates computer animation, interactive arts, and information visualization into digital performing art and dance notation. Dr. Hsieh was awarded the special funds from the Taiwan Government for doctoral research, awarded the NTUA distinguished alumni, awarded the best presentation from Doctoral School EDISCE and the laureate of digital dance from Monaco Dance Forum 2006. His interdisciplinary collaboration includes: Nutcracker(2009), Hui An Endless Labyrinth(2011), Hui A Reverberated Labyrinth(2012), Body Platform (Festival d'Avignon Off 2013), etc.

Workshop Co-Chair and Session Chair

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BIOGRAPHY



P.C. Ku is the associate professor of electrical engineering and computer science at the University of Michigan. He received all his degrees in electrical engineering including a BS from the National Taiwan University and a PhD from the University of California at Berkeley. Dr. Ku has a long career in the field of optoelectronics, starting in 1995 when he joined the lab of Professor Ching-Fuh Lin of the National Taiwan University as a research assistant. After two years of military service as a Navy ensign, he became a full-time student again in 1998 under the guidance of Professor Connie Chang-Hasnain at the University of California Berkeley. His doctoral dissertation is on semiconductor slow light devices. He was among the first to show that the speed of light can be significantly reduced in a specially designed semiconductor structure. As a result of

his PhD research, he was awarded the Ross Tucker Memorial Award in 2004. During his PhD study, Dr. Ku was the recipient of the Berkeley Fellowship. After receiving his PhD, Dr. Ku spent two years both as a postdoctoral researcher for the DARPA Center for Optoelectronic Nanostructured Semiconductor Technology and as a senior engineer for Intel. His research shifted from telecommunication devices to optical lithography and phase-change memory. It was during this time Dr. Ku conceived the idea that advanced lithography technology can be revolutionary to optoelectronic devices. In 2006, he returned to academia as an assistant professor of electrical engineering and computer science at the University of Michigan. His research has since been focused on creating impacts for optoelectronic devices in the emerging areas of energy, quantum, and biomedical science. He has worked on a variety of projects funded by NSF, DARPA, and DOE including LEDs, solar cells, nanoscale lasers, biosensors, and single photon sources. He received the DARPA Young Faculty Award in 2010.

Technical Session D1-W2-T2: Broadband and Wireless Computing, Network Technologies,
Services and Applications

Reconfigurable Multi-Wavelength Optical Cross-Connect using Fiber Bragg Gratings

Shien-Kuei Liaw

Distinguished Professor Chair of Optoelectronic Technology Center
National Taiwan University of Science and Technology
(台灣科技大學光電科技中心主任廖顯奎特聘教授)

ABSTRACT

BIOGRAPHY



Shien-Kuei Liaw received the B.S.E.E. degree from National Taiwan University, Taiwan, the M.S.E.E. degree from National Tsing-Hua University, Taiwan, and the Ph.D. degree from National Chiao-Tung University, Taiwan, in 1988, 1993, and 1999, respectively.

In 1993, he joined the Telecommunication Laboratories, Ministry of Transportation and Communications, Taiwan. In 1996, he was a visiting researcher at Bellcore (now Telcordia), NJ, USA and an visiting Professor at University of Oxford, UK from September 2011 to Dec 2011. He is now a distinguished Professor and the Director of Optoelectronics Research Center of National Taiwan University of

Science and Technology, Taiwan. He has authored and co-authored 190+ international journal articles and conference presentations. His research interests include optical communication, fiber devices and fiber sensing. He has been actively contributing the technical programs for numerous international conferences as a TPC, session chair and/or organized committee member. He is an Associate Editor for Fiber and Integrated Optics and the Vice Chair of IEEE Photonic Society Taipei Chapter.

Optical Communication Researches at NCTU

Yinchieh Lai

Professor, Department of Photonics and Institute of Electro-Optical Engineering
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ABSTRACT

This talk is an overview of the optical communication researches recently conducted at National Chiao Tung University (NCTU) in Taiwan, R.O.C.. The emphases will be on the 60GHz OFDM transmission studies, long-reach fiber access networking techniques, visual light communication progresses, as well as the development of mode-locked fiber laser technologies. Some research highlights include: (1) Demonstration of high capacity 60GHz OFDM fiber-wireless transmission (50Gb/s at BER=10⁻³ with 4 m wireless distance); (2) Demonstration of a cost-effective EAM-based OFDM-IMDD system (a 40-Gbps OFDM PON system based on 10-GHz EAM and 10-GHz direct-detection PIN); (3) Demonstration of energy efficient VCSEL + Multimode Fiber OFDM optical interconnect transmission (106 fJ/(bit·km) with 2-km transmission distance at 17.8 Gb/s bit-rate); (4) High bit rate visual light communication based on lighting LEDs (1.1 Gb/s at BER=10⁻³); (5) Stable high repetition rate active/passive ultra-short-pulse mode-locked fiber lasers (100GHz-250GHz high repetition rates).

BIOGRAPHY



Prof. Yinchieh Lai received his B.S. degree from the Department of Electrical Engineering, National Taiwan University, Taiwan, R.O.C., in 1985. He got his M.S. degree in 1989 and Ph.D degree in 1991, both from the Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology (MIT), U.S.A.. He joined the Institute of Electro-Optical Engineering, National Chiao Tung University (NCTU), Taiwan, R.O.C., in 1991 immediately after his graduation from MIT and has been a professor at NCTU since then. In 1999-2001, he was on-leave to Industrial Technology Research Institute (ITRI), Taiwan, for a period of two years, as the group leader for the Optical Communication Group in the Opto-Electronics & Systems Research Laboratories.

The research area that Prof. Yinchieh Lai has been concentrated on include: (1) Quantum Nonlinear Optics; (2) Mode-locked Fiber Lasers; (3) Fiber Optics. He has contributed significantly to the development of quantum soliton theories (continued from his Ph.D studies at MIT), and the theoretical/experimental investigation for new types of mode-locked fiber lasers and novel fiber devices. He has been one of the main project leaders for optical communication researches at NCTU since 2000 and has helped establish the NCTU research group on optical communication to conduct excellent researches. Prof. Yinchieh Lai was the winner for the Tin Ka Ping Young Researcher Award by Taiwan Photonics Society in 1995. He was elected to become the OSA fellow in 2012. He has also been the technical committee member for many international conferences including OSA Nonlinear Optics Conference 2002

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

and 2004; OptoElectronics and Communications Conference (OECC) 2006, 2008, 2011, and 2013; Conferences of Lasers and Electro-Optics/Pacific Rim (CLEO/PR) 2011; and Asia-Pacific Optical Fiber Sensors Conference (APOS) 2012.

Compact Multi-band Bandpass Filters in Wireless Communication Systems

Shih-Kun Liu

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(高雄應用科技大學光電與通訊研究所劉世崑教授)

ABSTRACT

Recently, there has been a fast-growing demand for multi-service technology in wireless communication systems. In the system, a multi-band bandpass filter (BPF) served in the radio frequency (RF) front end is required to remove unwanted frequencies and to obtain the desired signals. The major challenge of the BPFs is large in size as one of the passive devices in the circuit. Several building blocks such as ring resonator, uniform impedance resonator (UIR), defected ground structure (DGS), crossed resonator, stepped impedance resonator (SIR) and stub-loaded resonator (SLR) are popular for the design of compact multi-band BPFs.

In this talk, we introduce a simple method using SIRs to design several compact BPFs. Two coupled half-wavelength SIRs and tapped input/output lines are used to implement a BPF with multispurious suppression. By using the SIRs in the multilayered structure, a dual-band BPF having wide and narrow bands simultaneously is obtained. For the first time, a compact tri-band BPF is constructed by two direct-coupled SIRs with open stubs. The simulated results of those BPFs as well as the experimental ones are also included.

BIOGRAPHY



Shih-Kun Liu was born in Taoyuan, Taiwan, R.O.C., on March 25, 1969. He received the B.Eng. degree in electronic engineering from the Feng Chia University (FCU), Taichung, Taiwan, R.O.C., in 1991, the M.S. degree in electrical engineering from the Syracuse University (SU), Syracuse, New York, U.S.A., in 1999, and the Ph.D. degree in electrical engineering from the University of Florida (UF), Gainesville, Florida, U.S.A. in 2005.

From October 1991 to August 1993, he was a Corporal with the Military Police Force of the R.O.C. In the following three years, he was a full-time Teaching Assistant for the first two years with the Department of Electronic Engineering, FCU, and the last year with the Department of Electrophysics, National Chiao Tung University (NCTU). From August 2005 to July 2006, he was an Assistant

Professor with the Department of Electrical Engineering, I-Shou University. Since 2006, he has been joined the faculty of the Institute of Photonics and Communications, National Kaohsiung University of Applied Sciences (KUAS), Kaohsiung, Taiwan, R.O.C., where he is currently an Associate Professor. His current research interests include radio-frequency planar circuits,

optoelectronic devices, fiber optics, and laser applications.

Dr. Liu and his multidisciplinary teams have won one bronze medal in the 2012 Inventeco International Invention Show held at Italy. He has authored nine journal papers and served as a peer reviewer of two international journals. He has also served on the program and organizing committees of various domestic workshops and conferences.

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Technical Session D1-W3-T2: New Media/ Multimedia, Machine Learning, Web, and Entertainment Technology

Workshop Co-Chair and Session Chair

Sheng-Tzong Cheng

Professor, Department of Computer Science and Information Engineering
National Cheng-Kung University
(成功大學資訊工訊系鄭憲宗教授)

BIOGRAPHY



Generic Job-Level Search and Its Applications

I-Chen Wu

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(交通大學資訊工程系暨多媒體工程研究所所長吳毅成教授)

ABSTRACT

This talk introduces an approach, called generic job-level search, to leverage the programs which are already written and encapsulated as jobs. The programs can be game-playing programs in the computer game applications or search programs in optimization and machine learning applications. Such an approach is well suited to a distributed computing environment, since these jobs are allowed to be run by remote processors independently.

In this talk, we present and focus on a Job-Level Proof Number Search (JL-PNS), a kind of generic job-level search for solving computer game search problems, and apply JL-PNS to solving automatically several Connect6 positions including some difficult openings. This talk also presents a method of postponed sibling generation to generate nodes smoothly, and some policies, such as virtual-win, virtual-loss, virtual-equivalence, flagging, or hybrids of the above, to expand the nodes. Our experiment compared these policies and the results showed that the virtual-equivalence policy, together with flagging, performed the best against other policies. Finally, this talk also presents the prospective applications based on this technology.

BIOGRAPHY



I-Chen Wu received the B.S. degree in electronic engineering and the M.S. degree in computer science from the National Taiwan University (NTU), Taipei, Taiwan, in 1982 and 1984, respectively, and the Ph.D. degree in computer science from Carnegie Mellon University, Pittsburgh, PA, USA, in 1993. He is with the Department of Computer Science, at National Chiao Tung University and also serves as the director in the Institute of Multimedia Engineering. His research interests include artificial intelligence, Internet gaming, volunteer computing and cloud computing.

Dr. Wu introduced the new game, Connect6, a kind of six-in-a-row game, in 2005. Since then, Connect6 has become a tournament item in Computer Olympiad. He led a team developing various game playing programs, winning over 20 gold medals in international tournaments, including Computer Olympiad. He wrote over 80 papers, and served as chairs and committee in over 30 academic conferences and organizations, including Games Technical Committee of IEEE Computational Intelligence Society.

Smart Eye Masks for Sweet Sleep

Sheng-Fu Liang

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ABSTRACT

Human beings spend approximately one-third of their lives on sleeping. Sleep analysis is not only helpful in diseased conditions but also in several psychophysiological analyses. In this talk, a smart eye mask for comfortable sleep monitoring is presented. The eye mask can sense the user's electrooculogram (EOG) and wirelessly transmit the recordings to the computation platform. An EOG-based automatic sleep monitoring method is proposed based on the machine learning technology and integrated with a friendly user interface. Compared to the conventional polysomnogram (PSG) or electroencephalogram (EEG) recordings, the smart eye mask has the advantage of easy placement and can be used by the user individually. This system has been applied for continuous all night sleep monitoring and smart wake-up for the nap sleep to demonstrate valid measurements of sleep cycles with good usability and reliability. Such convenient design can also be applied for sleep environment control to make the user's sleep quality healthier and more comfortable.

BIOGRAPHY



Sheng-Fu Liang received the B. S. and M. S. degrees in control engineering from the National Chiao Tung University (NCTU), Taiwan, in 1994 and 1996, respectively, and the Ph.D. degree in electrical and control engineering from NCTU, in 2000.

From 2001 to 2005, he was a Research Assistant Professor in Electrical and Control Engineering, NCTU. He joined the Department of Biological Science and Technology, NCTU, in 2005 and joined the Department of Computer Science and Information Engineering (CSIE) and Institute of Medical Informatics (IMI), National Cheng Kung University (NCKU), Tainan, Taiwan, in 2006. Currently, he is an Associate Professor in CSIE and IMI, NCKU. He is also a collaborative researcher of Biomedical Electronics Translational Research Center

(BETRC), NCTU.

Dr. Liang's current research interests are neural engineering, biomedical engineering, biomedical signal/image processing, machine learning, and medical informatics. He has published 45 journal papers and own 2 US and 5 Taiwan patents in the related fields.

Technical Session D1-W3-T2: New Media/ Multimedia, Machine Learning, Web, and Entertainment Technology

Shih-Ching Yeh

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ABSTRACT

BIOGRAPHY



**Toward a theoretical framework for the form and content of animation in
digital age**

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ABSTRACT

The form of animations has evolved dramatically in the last few decades because of the rapid development of digital tools. The computer technology has dominated the film production processes and blurred the boundary between animation and live-action films, which were separated neatly before digital age. Animation investigators and scholars have proposed theoretical models to describe the tendencies to categorize types of animations (and live-action films). Animations produced by Disney with traditional celluloid techniques were considered as a standard process and look of the media of animation because this visual form and the way of narrative have been successful for so long. It was asserted as a type of orthodox (Wells 1998). Other types were unavoidable to be compared with Disney's orthodox. A continuum of mimesis and abstraction to include animation and live-action films has also been proposed (Furniss 1998).

This study rethinks and proposes a theoretical framework for the form and content of animation (and live-action film) with the consideration digital technology. A new circular spectrum model for moving images including both animated and live-action film is built. Two opposite tendencies: main stream and avant-garde of films are described in terms of form and content in this model. The boundary between animation and live-action films is blurred in two regions of this model. One is located at the region of the main stream films with enormous production budget and heavy digital processes. The other is located at the region of the avant-garde films which is remained similar to the films produced in the very early stage of film history.

BIOGRAPHY



Yen-Jung Chang was born in Taipei, Taiwan in January, 1972. He graduated in 2004 with a MFA degree in the School of Film and Animation in Rochester Institute of Technology, USA. From 2006, Yen-Jung was granted a scholarship from the Ministry of Education, Republic of China (Taiwan) to study for the PhD degree in the School of Creative Media, RMIT University, Australia and graduated in 2009.

Before he studied in the field of animation, he worked as a process engineer in Mosel, a semiconductor company. During the time he was in USA, he worked as an animator in Buffalo and Los Angeles.

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

After obtaining the PhD in 2009, he went back to Taiwan and taught in Yuan Ze University. He is now teaching in the Graduate Institute of Animation and Multimedia Design, National University of Tainan, Taiwan. One recent published Journal article is: A Feminine Journey with Dream-like Quality in Satoshi Kon's Millennium Actress (2001) (Animation: An Interdisciplinary Journal, Sage, 2013). His major research interest is animation aesthetics and visual storytelling.

Dr. Chang has accomplished four animated short films as a film director. His animated works have been selected in more than ten animation festivals in counties including USA, Australia, Japan and Brazil etc. From 2012, he cooperated with lecturers who are teaching animation in universities in adjacent area to host animation exhibitions. He also concerns the development of animation in both industry and art in Taiwan.

CUT: Community Detection and Tracking in Dynamic Social Networks

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ABSTRACT

Social network exhibits a special property, the community structure. There have been many clustering methods used to detect the community structure on a static network. However, in real-world, social networks are usually dynamic, and community structures always change over time. In this work, we propose Community Update and Tracking algorithm, CUT, to efficiently update and track the community structure in dynamic social networks. When the social network has some variations, we track the seeds of community and update the community structure instead of recalculating all relations between nodes and edges in the network. The seeds of community is the base of community, which are a group of nodes connecting to one another tightly. These nodes have high potential to become communities. By tracking only seeds of community in the dynamic social network, CUT can update and track the community structures easily and efficiently.

BIOGRAPHY



Jen-Wei Huang received the BS and PhD degree in electrical engineering from National Taiwan University, Taiwan in 2002 and 2009 respectively. He was a visiting scholar in IBM Almaden Research Center from 2008 to 2009 and was an assistant professor in Yuan Ze University from 2009 to 2012. He is now an assistant professor in the Department of Electrical Engineering, National Cheng Kung University, Taiwan. He majors in computer science and is familiar with data mining. His research interests include data mining, mobile computing, and bioinformatics. Among these, social network analysis, progressive mining, mining time series, and multimedia data mining are his special interests. In addition, some of his research are on data broadcasting, privacy preserving data mining, e-learning and bioinformatics.

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Technical Session D1-W4-T2: Ubi/ Cloud Computing, High Performance Computing (HPC)/ Data Center, Cyber Security, and Digital Forensics

Workshop Co-Chair and Session Chair

Deron Liang

Director, Software Research Center and
Professor, Department of Computer Science and Information Engineering
National Central University

(中央大學資訊工程系教授兼軟體研究中心主任梁德容教授)

BIOGRAPHY



Balancing Data Utility and Privacy Protection in the Socially Aware Data Cloud

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ABSTRACT

The social Web is a set of relationships that link people together over the Web. Current social networking sites on the Web are walled gardens that limit themselves to relationships between people with accounts on a single site. Four major problems of the social network site silos experienced by the end user are: data portability, identity authentication, data linkability, and privacy protection. These limitations of existing social networking sites motivated us to consider a decentralized social Web. We describe a way of re-architecting an open and distributed social Web so its applications are separated from the socially aware data cloud. Social network services are developed by different service providers and trusted by the users. Furthermore, these services are run by the users and analytics by accessing data on many social network sites on the users' behalf.

Personal Identifiable Information (PII) are acquired in the trusted data aggregator from socially aware data cloud and stored as anonymized microdata in a statistical database for analytics. Given a statistical disclosure control (SDC) method, big data analysis and protection are enacted by users' authorized services with the outsourcing data sources from the socially aware data cloud. We flexibly glean data utility to achieve effective data-driven decision-making through social network data analysis. However, we still have to comply with the privacy protection principles while applying social network big data analytics.

In this presentation, we propose three types of semantics-enabled policies for controlling access, handling data, and releasing data to balance data utility and privacy protection in the decentralized social Web. Social network PII data are transformed and tagged with semantic metadata so that semantics-enabled policy can be enabled for direct processing and interpretation. Socially aware data cloud is modeled as Hadoop and MapReduce distributed framework. In addition, one of the Hadoop and R integration paradigms is introduced to provide deep analytics of social network PII data. Finally, we demonstrate how to balance data utility and protection with these types of semantics-enabled policies, combined with various statistical disclosure control methods.

BIOGRAPHY

Dr. Yuh-Jong Hu was born at Chung-Li, Taiwan on February 27th 1957. He received B.S. in applied mathematics at National Chengchi University in 1980. In 1984, he received M.S. in operation research and system analysis (ORSA) at University of North Carolina, Chapel Hill. In 1991, he received Ph.D. in computer science at University of Missouri-Rolla.



He was Assistant Researcher at Network Planning Department, Directorate General of Telecommunication (DGT), Taiwan, August/1984-July/1987. From January/1991 to July/1993, he was Associate Professor at Department of MIS, National Chengchi University. He was one of the co-founders of Department of Computer Science and served as department chair from August/1999 to July/2002. In August/2002, he was promoted as full professor of the same department. He is in charge of the Emerging Network Technology (ENT) Lab. He had done several important works on software agent's trust, authentication, authorization, and delegation through digital certificates management in the agent-oriented public key infrastructure (APKI). Recently, he is interested in the semantics-enabled policy's representation and enforcement for balancing data utility and privacy protection in the distributed socially aware data cloud. He is also interested in multidisciplinary research for privacy protection from technology and legal perspectives.

Prof. Hu has been a member of ACM since 1993. He also has been a member of Taiwan AI society, TAAI, since 1994. He was a member of IEEE in Computer Society from 1993 to 2005 and was a member of the New York Academy of Sciences in 1993. Prof. Hu was listed in Marquis Who's Who in the World 1995.

Most recent publications are shown as follows:

- Hu, Y. J., et al., "Crafting a balance between big data utility and protection in the semantic data cloud", International Conference on Web Intelligence, Mining and Semantics (WIMS'13), June 12-14, 2013, Madrid, Spain, ACM.
- Hu, Y. J., et al., "Semantic legal policies for data exchange and protection across super-peer domains in the cloud", Special Issue: "Semantic Interoperability and Knowledge Building", Future Internet (ISSN 1999-5903), MDPI, Oct. 2012.
- Hu, Y. J., et al., "Towards law-aware semantic cloud policies with exceptions for data integration and protection ", International Conference on Web Intelligence, Mining and Semantics (WIMS'12), June 13-15, 2012, Craiova, Romania, ACM.

Clock Skew based Client Device Identification by Cloud Servers

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ABSTRACT

Along with the growth of cloud computing and mobile devices, the importance of client device identification over cloud environment is emerging. This talk will introduce a lightweight yet reliable method for device identification based on clock skew, the difference of clocking speed between two nodes over network. Currently, people often subscribe cloud services through personal devices such as mobile phones, tablets, and laptop computers. Therefore, it is reasonable to associate user identity to these personal devices. Device identification in the cloud can be useful in detecting unauthorized account access and locating stolen devices, among others. This talk will also explain the methods to measure precise enough yet stable clock skews over either wired and wireless network channels, and how multiple cloud servers can be deployed to measure the clock skews of client devices while keeping the measured results consistent.

BIOGRAPHY



Dr. Wei-Chung Teng is born in Taipei city, 1970. He started his Ph.D. research at the research center for advanced science and technology, University of Tokyo at 1997, and received his Doctor of Engineering degree in 2001.

He ever served in military as a Second Lieutenant for two years. He worked as a Manager in R&D division of Box Solutions Corp. for one and a half years. In 2003, he joined the faculty of Dept. of Computer Science and Information Engineering, National Taiwan University of Science and Technology as an Assistant Professor. His research interests include human computer interaction focusing on remote robot manipulation, network communication protocols of time synchronization, and network security.

Dr. Wei-Chung Teng:

- Professional Member of ACM, Sep. 2008-present.
- Member of IEEE, Mar. 2009-present.
- Member of USENIX, Aug. 2009-present.
- Life Member of Institute of Information Computing Machinery since Jun. 2007.
- Life Member of Chinese Cryptology and Information Security Association since Apr. 2012.

Member of Virtual Reality Society of Japan, 1997-2010.

Selected publications:

1. Ding-Jie Huang, Wei-Chung Teng*, "A Defense Against Clock Skew Replication Attacks in Wireless Sensor Networks," Journal of Network and Computer Applications, DOI:10.1016/j.jnca.2013.04.003, 2013.
2. Wei-Chung Teng, Chi-Hong Wang, Kai-Hsiang Yang, Pei-Jui Wang, "Development of an Interactive Dynamic Motion Editing Toolkit for Biped Humanoid Robots," The 43rd International Symposium on Robotics (ISR 2012), Taipei, August 29-31, 2012.
3. Ding-Jie Huang, Kai-Ting Yang, Chien-Chun Ni, Wei-Chung Teng*, Tien-Ruey Hsiang, and Yuh-Jye Lee, "Clock Skew Based Client Device Identification in Cloud Environments," The 26th IEEE International Conference on Advanced Information Networking and Applications (IEEE AINA-2012), Fukuoka, Japan, March 26-29, 2012. (acceptance ratio: 126/445)
4. Ding-Jie Huang, Kai-Jie You, and Wei-Chung Teng*, "Secured Flooding Time Synchronization Protocol," 8th IEEE International Conference on Mobile Ad-hoc and Sensor Systems (IEEE MASS 2011), Valencia, Spain, pp. 620-625, Oct. 17-22, 2011.

Implementation of Software Defined Network in an Education Cloud

Mon-Yen Luo

Assistant Professor, Department of Computer Science and Information Engineering
National Kaohsiung University of Applied Sciences
(高雄應用科技大學資訊工程系羅孟彥教授)

ABSTRACT

Cloud computing, in particular its system spread across several data centers, poses a unique set of networking challenges and management problems. This talk presents our design, implementation, and experience in tackling these challenges by using the concepts and technologies of software-defined network (SDN). We define a network abstraction to incorporate the physical and virtual data plane within a datacenter. We propose a new network primitive to address the interconnection issues among multiple datacenters. A policy plane consolidating these mechanisms provides a programmable interface to enable a wide range of policies and new networking mechanisms. Our current implementation and deployment has supported several research projects and applications, including cloud federation, international testbed interconnection, and network/security research experiments over production networks. We will present some performance result based on real deployments over the production networks. The experience and initial performance results demonstrate that the SDN is a promising solution to cloud networking.

BIOGRAPHY



Mon-Yen Luo received a B.S. degree in Physics, and a M.S. degree in Computer Science, and a Ph.D. in Computer Science from the National Sun Yat-Sen University, Taiwan, Republic of China. He is currently an assistant professor at the Department of Computer Science & Information Engineering in National Kaohsiung University of Applied Sciences, Taiwan. His research interests are in the areas of cloud computing, Internet technology, network/system management, and E-Learning System.

Social media mining for trending topic analysis

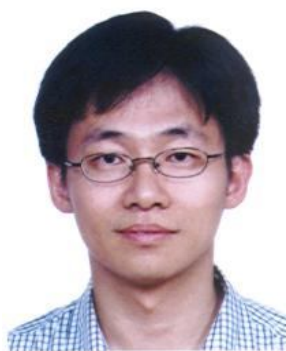
Jenq-Haur Wang

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(台北科技大學資訊工程系王正豪教授)

ABSTRACT

Social media has become a popular platform for content sharing and opinion expression. Huge volumes of very short microblog messages usually contain diverse contents that make it difficult to detect interesting topics. In this talk, we briefly describe an opinion aggregation approach based on message influence and hot topic detection in microblogs. First, message popularity is estimated from the content features and structural statistics. Then, hot topics are identified from popular messages and opinion orientations are accumulated from the corresponding responses. In our experiments, the aggregated opinions on 2012 Taiwan Presidential Election showed a high accuracy of 98.74%. This shows the potential of social media mining for trending topic analysis. Further investigation is needed for applying the proposed approach to other domains.

BIOGRAPHY



Dr. Jenq-Haur Wang was born in Kaohsiung, Taiwan in 1972. He received the B.S. and Ph.D degrees in computer science and information engineering from National Taiwan University, Taiwan, in 1994 and 2002, respectively.

From Oct. 2002 to Feb. 2007, he was a postdoctoral fellow in Institute of Information Science, Academia Sinica, Taiwan. Since Mar. 2007, he is an assistant professor at the Dept. of Computer Science and Information Engineering, National Taipei University of Technology, Taiwan. His research interests include social Web mining and knowledge discovery, network and information security, peer-to-peer retrieval and cloud computing.

Dr. Wang is a member of the ACM and IEEE. He has authored more than 40 papers in major international conferences and journals and served on the program committee and reviewers of various international conferences and journals.

Day 2 (November 24, 2013)

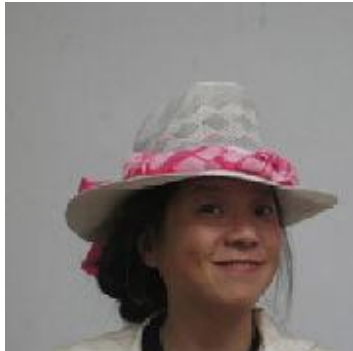
Special Presentations

Session Chair

Shuengit Natasha Chow

Visiting Associate Professor, Graduate Institute of Animation and Film Art
Tainan National University of the Arts
(臺南藝術大學動畫藝術與影像美學研究所周旋捷教授)

BIOGRAPHY



Special Presentations: Digital Media, Culture, and Society

The First-ever Social Gaming Platform for a MOOC

Ping-Cheng Yeh

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Associate Director, Center for Teaching and Learning Development
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(台灣大學電機工程學系葉丙成教授)

ABSTRACT

Coursera Blog – Why one professor created the first-ever social gaming platform for a MOOC
<http://blog.coursera.org/post/64423209807/why-one-professor-created-the-first-ever-social-gaming>

BIOGRAPHY



Session Chair

Digital Games and Language Learning

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BIOGRAPHY



Jie-Chi Yang received his Ph.D. (2000) in Department of Human System Science from the Tokyo Institute of Technology, Japan. He is currently the Professor and the Head of the Graduate Institute of Network Learning Technology at the National Central University, Taiwan. His research interests include computer assisted language learning, digital game-based learning, mobile learning, web-based learning, natural language processing, and multimedia technologies. He is working on the design, development, and evaluation of interactive learning environments by using advanced technologies, aiming to enhance language learning and science learning. He has authored more than thirty peer-reviewed journals on these topics and served on the program and organizing committees of various international workshops and conferences. He received the Ta-You Wu Memorial Award (Young Outstanding Researcher Award) from the National Science Council, Taiwan in 2009, and the Outstanding Research Award from the National Central University in 2009 and 2010. He was also appointed as Distinguished Professor at the National Central University in 2010.

Personalized Interactive Storytelling in 3D Environments[1]

Tsai-Yen Li

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ABSTRACT

Interactive storytelling opens a world of possibilities for narrative creation on multimedia platforms, allowing a more compelling and immersive experience compared to traditional narratives. With the emergence of new storytelling technologies, the authoring of such narratives in complex virtual environments becomes an issue critical in the domain of multimedia storytelling platforms: How can we design a flexible framework to allow user control over the story content and structure based on characteristics such as length, complexity, plot line, and genre?

In order to address these issues, we propose the design of an interactive storytelling platform with models for authoring, story generating based on user or narrative theory constraints, and simulation in virtual environments. In the platform the author can specify characteristics (such as plot, length, narrative structure, time sequence, and etc.) on story fragments in order to generate variations of interactive stories. An algorithm we devise will filter and recombine story fragments from these characteristics, generating a high-level interactive script that satisfies all authorial and structural constraints.

This mechanism provides sufficient abstraction from the technical implementation in that it is platform independent. To implement the results of the story generation and demonstrate the abstraction from the virtual environment, we simulate the generated interactive narrative both in text form and in the 3D environment The Theater. The Theater platform is complete with autonomous character animation, simple interaction methods, and automatic camera planning.

Through this implementation, our expected contributions are to design a flexible framework for authoring interactive narratives that is system independent, and also provide story generating tools that allow easy reuse and recombining of existing story fragments. Moreover, the filtering and selection process provides high-level control over the story content and structure, thus enforcing the authorial control as well as ensuring the generated stories have a basis in narrative theory. Finally, through the experience of building this platform, we hope to suggest design principles for authoring tools and interfaces of interactive narratives.

BIOGRAPHY

Tsai-Yen Li received his B.S. (1986) in agricultural machinery engineering from National Taiwan University in Taiwan. He received his M.S. (1992) and Ph.D. (1995) from Stanford University in computer science and mechanical engineering, respectively. Currently he is the director of Intelligent Media Laboratory and a Professor in the Computer Science Department of

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
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National Chengchi University. His research interests include motion planning, character animation, agent-based simulation, intelligent user interface, and interactive storytelling. He has authored more than 100 journal and conference papers and served on the program and organizing committee of several international workshops and conferences. Dr. Li is a member of ACM, IEEE, TAAI, and IICM.



[1] This is a joint work with Hui-Yin Wu and Marc Christie at Rennes 1 University and INRIA in France.

Developing Digital Collections in a Cultural Context

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(臺灣大學圖書資訊學系暨臺灣大學圖書館副館長陳光華教授)

ABSTRACT

National Taiwan University Library (NTUL) as the largest academic library in Taiwan has to fulfill tasks of collection development not only in academic perspectives but also in cultural perspectives. The efforts for developing digital collections in a cultural context, especially regional culture, will make an academic library unique. In general, the identity of a library is shaped by constructions of special collections and dissemination of these special collections via network in Internet era. That is to say, identifying special collections and making them easily available in Internet are indispensable. NTUL has been constructing digital contents for a long time. More than one million of digital objects, which are related to Taiwan in temporal and spatial dimensions, have been created since 1998. These collections have been accessed by numerous researchers and general public and then been used as research and learning materials. As a result, NTUL has won her reputation in researches of Digital Libraries, and then built an image of important cultural data center of Taiwan-related researches. This presentation will talk about digital collections development, strategies of digital collections development, and achievements of digital collections development in the context of regional culture.

BIOGRAPHY



Kuang-hua Chen was born in Taipei, Taiwan, R.O.C. He received B.S. degree in 1986, master degree in 1991, and Ph.D. of Computer Science in 1996, all from National Taiwan University. His research interests are information retrieval and evaluation, citation analysis and evaluation, natural language processing, digital library, and intelligent information systems.

He joined Department of Library and Information Science at National Taiwan University in 1996. Currently, he is a professor and the Associate University Librarian of National Taiwan University. He has been a visiting scholar of National Institute of Informatics at Japan in 2005. In addition, he provides professional services for government agencies. He has published more than 100 research papers, 4 book titles, 5 patents, and other publications.

Dr. Chen is the member of Library Association of Republic of China (Taiwan), Association for Computational Linguistics and Chinese Language Processing, Chinese Association of Library & Information Science Education, and Institute of Information & Computing Machinery.

Please visit <http://www.lis.ntu.edu.tw/~khchen/> for detailed information.

Technical Session D2-W1-T1: Digital Media, Culture, and Society

Jason S. Chang

Professor, Department of Computer Science
National Tsing Hua University
(清華大學資訊工程學系張俊盛教授)

ABSTRACT

BIOGRAPHY



3D Reconstructions and Its Applications in Cultural Heritage Preservation

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(高雄大學資訊工程學系陳佳妍教授)

ABSTRACT

Research in 3D technology has received increasing attention in recent decades. Primarily due to the advancement in the available hardware technology, 3D applications which were not possible previously have become feasible and increasingly popular.

In this presentation, I will provide a brief introduction of some of the commonly seen 3D reconstruction methods. Selected reconstruction methods include computer vision based approaches such as photometric stereo, structured lighting and binocular stereo, which perform 3D reconstruction using 2D images, as well as methods that use specialized devices to capture 3D information, such as the LiDAR and the CMM.

Some recent research findings from our laboratory will also be presented, including work related to 3D scene reconstruction. In addition, I will provide some possible applications of reconstructed 3D models and future prospects of the research area.

BIOGRAPHY



Chia-Yen Chen received her B.Sc. (1996) and M.Sc. with First Class Honours (1999), as well as Ph.D. degrees (2004) from the Department of Computer Science, at the University of Auckland, New Zealand

She has been a Lecturer in the Department of Computer Science at the University of Auckland from 2002 to 2006, an Assistant Professor in the Department of Electrical Engineering at National Chung Cheng University from 2006 to 2007. Since 2007, she has been an Assistant Professor in the Department of Computer Science and Information Engineering at National University of Kaohsiung, in Taiwan. Dr. Chen's research interests include 3D reconstructions, computer vision, as well as augmented reality and related applications. She has received and directed more than 10 projects related to computer vision and 3D reconstructions, from the National Science Council of Taiwan, since 2007.

Dr. Chen has received the Best Poster Award from IVCNZ 2009 conference, the Excellent Paper Awards from ITOAI 2013 and IPPR CVGIP 2013 conferences.

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Technical Session D2-W2-T1: Broadband and Wireless Computing, Network Technologies,
Services and Applications

Workshop Co-Chair and Session Chair

Li-Chun Wang

Distinguished Professor and Chairman, Department of Electrical and Computer Engineering
National Chiao-Tung University

(交通大學電信工程研究所兼電機工程學系系主任王蒞君特聘教授)

BIOGRAPHY



Cooperative Video Streaming over the Hybrid VANET: Perspectives and Challenges

Chung-Ming Huang

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ABSTRACT

Next-generation vehicles can connect with each other using different kinds of wireless technologies. Two types of vehicle communication networking are (1) vehicle-to-infrastructure (V2I) and (2) vehicle-to-vehicle (V2V). Many novel applications and services are being designed and provided for both V2I and V2V vehicular networks, e.g., driving safety support, traveler information, and in-vehicle infotainment. Recently, video streaming service has become one of the most popular network services. With the rapid development of the vehicular networks, users can watch videos in vehicles through 3G/3.5G/4G networks anytime and anywhere on the road. With regard to multimedia streaming services, a user in a moving vehicle may not have good QoS of video streaming using a single 3G/3.5G/4G wireless interface. The cooperative video streaming concept can be adopted in the vehicle network to improve the QoS of video streaming. For example, when a number of persons, e.g., a family or a group of friends, drive their vehicles for a trip together, e.g., from Taipei to Kaohsiung, they can form a fleet of vehicles and share their network resources during the trip. Let one member, which is called requester, want to watch video from the Internet. He may not have good video quality due to his limited 3G/3.5G bandwidth to the Internet through his moving vehicle. The cooperative video streaming concept can be adopted to allow the requester to ask other members, which are called helpers, of the same fleet to download video cooperatively. In other words, other members can help download part of the video from the Internet through their 3G/3.5G networks and then forward the downloaded video data to the requester hop by hop through the DSRC-based ad-hoc network. In this talk, the scenarios and classification about how to cooperate with each other among neighboring vehicles for improving the quality of video streaming over the vehicular network are identified and discussed. Then, main technical issues and challenges of the cooperative video streaming service over the vehicular network are given.

BIOGRAPHY

Chung-Ming Huang received the B.S. degree in electrical engineering from National Taiwan University on 1984/6, and the M.S. and Ph.D. degrees in computer and information science from The Ohio State University on 1988/12 and 1991/6 respectively.

He is currently a Distinguished Professor in Dept. of Computer Science and Information Engineering, National Cheng Kung University, Taiwan, R.O.C. He is also the Director of the Promotion Center for Network Applications and Services Platform Technology Consortium, Ministry of Education (MOE), Taiwan, R.O.C. He was (i) Chair of Dept. of Computer Science and Information Engineering and Director of Institute of Medical Informatics, National Cheng



Kung University, Taiwan, R.O.C., (ii) the Director of the Promotion Center for the Telematics Consortium (PCTC), Ministry of Education (MOE), Taiwan, R.O.C., and (iii) Principal Project Reviewer of Industrial Development Bureau and Department of Industrial Technology, Ministry of Economic Affairs (MOEA), Taiwan, R.O.C. He edited the world's 1st Telematics book - "Telematics Communication Technologies and Vehicular Networks" that was published by Information Science Reference (IGI Global) on 2010. He has published more than 250 referred journal and conference papers in wireless and mobile communication protocols, interactive multimedia systems, audio and video streaming and formal modeling of communication protocols. His research interests include wireless and mobile network protocol design and analysis, media processing and streaming, green computing and communication, and network applications and services.

Prof. Huang is a senior member of IEEE and a senior member of ACM. He was the Guest-Editor of some special issues published by IET (IEE) Proceedings on Communications, Computer Communications, Journal of Information Science and Engineering, International Journal of Ad Hoc and Ubiquitous Computing (IJAHUC), and Journal of Internet Technology (JIT). He was the General Chair of 2009 International Symposium on Pervasive Systems, Algorithms, and Network (I-SPAN 2009); he also served as Program Chair or Vice Program Chair of some international conferences.

Energy-Aware and Delay-Bounded Transmission Scheduling in Mobile Devices

Jenn-Wei Lin

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ABSTRACT

In this paper, energy-saving and delay-bounded transmissions are studied for efficiently transmitting packets in mobile devices. We propose a new transmission scheduling mechanism. Unlike previous approaches, the proposed mechanism considers multiple characteristics of mobile applications. The running applications have different delay constraints. In addition to the downstream packets, the upstream packet transmissions of applications also consume a non-trivial energy cost. The wireless bandwidth capacity of a mobile device is limited. We utilize the delay transmission concept to estimate the transmission interval of each packet. Before transmitting a packet p , we also adopt the accompanied transmission method to involve more other packets to be transmitted with packet p . The selection of accompanied packets can be mapped into the well-known combinational problem: knapsack. With the NP-hard property for the combinational problem, we also propose greedy algorithm for efficiently selecting accompanied packets. Finally, simulation experiments are performed to demonstrate the effectiveness of the proposed transmission scheduling mechanism.

BIOGRAPHY



Jenn-Wei Lin received the Ph.D. degree in electrical engineering from National Taiwan University, Taipei, Taiwan, in 1999. He is a Professor in the Department of Computer Science and Information Engineering, Fu Jen Catholic University, Taiwan. He was a researcher at Chunghwa Telecom Co., Ltd., Taoyuan, Taiwan from 1993 to 2001. His current research interests are cloud computing, mobile computing and networks, distributed systems, and fault-tolerant computing.

**Telematics Enabled Maritime Intelligent Transportation System-Progress
and Prospects in Taiwan Waters**

Shwu-Jing Chang

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(台灣海洋大學通訊與導航工程學系主任張淑淨教授)

ABSTRACT

Stemmed from the combination of telecommunications and informatics, Telematics generally refers to a communication system for collecting, processing and distributing information. Intelligent Transportation Systems (ITS), also called Transport Telematics, rely on integrated and cooperating telematic applications to contribute to transportation efficiency, safety, energy conservation and environmental protection. In the maritime domain which involves international shipping, Automatic Identification System (AIS) is considered the core element for the implementation of a worldwide interoperable maritime ITS.

AIS is a wireless communication system for ship/ship and ship/shore information exchange. It is made mandatory by Safety of Life At Sea Convention (SOLAS) for vessels to carry and operate such equipment. Ship-borne AIS station broadcasts their dynamic (e.g. position, course, speed) as well as static (e.g. ship particulars, cargo, and voyage related) reports at adaptive intervals using Self-Organized Time Division Multiple Access protocol on two VHF channels. AIS standards also provide mechanisms for broadcast or addressed binary application-specific messages. With these features, AIS opens up great opportunities for maritime ITS.

This talk gives an overview of the AIS technology, and then presents the progress and perspectives of AIS-enabled maritime ITS in Taiwan waters. It covers the services and applications delivered in a 4-year government research project on Maritime ITS and related ongoing projects aimed to enhancing the marine transportation efficiency, safety, energy conservation and environmental protection in Taiwan.

BIOGRAPHY



Shwu-Jing Chang received her B.S. (1986) degree in Electronics Engineering from National ChiaoTung University, Hsinchu, Taiwan, M.S. (1989) degree in EE from University of Southern California, US, and Ph.D. (1993) degree in EE from NCTU, Taiwan. In 1993, she joined National Taiwan Ocean University, Keelung, Taiwan. From 1993 to 2000, she was an Associate Professor of Navigation and served as the department chair for three years. She joined the Department of Communications, Navigation and Control Engineering in 2000 and became the department chair since 2012. In 2003, she set up the Electronic Chart Research Center at NTOU and led the center since then.

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Her research interests include integrated application of information and communication technologies in marine navigation, maritime intelligent transportation system, and mobile location-based services. Prof. Chang has successfully implemented several systems at national level, including fishing vessel monitoring system, electronic navigational chart services and coastal network of Automatic Identification System. She is a member of the Council of Marine Affairs Advancement, Executive Yuan, a task force for maritime affairs, since 2004.

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Technical Session D2-W2-T1: Broadband and Wireless Computing, Network Technologies,
Services and Applications

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ABSTRACT

BIOGRAPHY



The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Technical Session D2-W3-T1: New Media/ Multimedia, Machine Learning, Web, and Entertainment Technology

Workshop Co-Chair and Session Chair

Sheng-Tzong Cheng

Professor, Department of Computer Science and Information Engineering
National Cheng-Kung University
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BIOGRAPHY



3D Video Processing with Disparity Optimization

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ABSTRACT

3D video has become very popular due to the emergence of 3D movie and 3D TV in recent years. The quality of 3D video content plays a very critical role to the success of the 3D TV industry. The post-processing of 3D video content can improve its visual quality and provide more satisfactory perception experiences. A number of 3D video post-processing tasks require advanced 3D computer vision techniques, such as stereo matching, depth estimation and processing, view synthesis, etc.

In this talk, I will present some recent works on 3D video processing in my group in National Tsing Hua University. I will briefly describe our proposed algorithms for depth reconstruction from stereo videos, multi-view synthesis from stereo videos, and disparity optimization for stereo video processing. Experimental results will also be shown to demonstrate the performance of the proposed algorithms.

BIOGRAPHY



Shang-Hong Lai (M'95-) received the B.S. and M.S. degrees in electrical engineering from National Tsing Hua University, Hsinchu, Taiwan, and the Ph.D. degree in electrical and computer engineering from University of Florida, Gainesville, in 1986, 1988 and 1995, respectively. He joined Siemens Corporate Research in Princeton, New Jersey, USA, as a member of technical staff in 1995. Since 1999, he returned to Taiwan to be a faculty member in the Department of Computer Science, National Tsing Hua University, Taiwan. He is currently a professor in the same department and the director of the Computer and Communication Center in the university. In 2004, he was a visiting scholar with Princeton University. Dr. Lai's research interests include computer vision, visual computing, pattern recognition, medical imaging, and multimedia signal processing. He has authored more than 200 papers published in the related international journals and conferences. Dr. Lai has been a member of program committee of several international conferences, including CVPR, ICCV, ECCV, ACCV, ACM MM, ICPR, PG, PSIVT and ICME. He has been an associate editor for Journal of Signal Processing Systems since 2010. Moreover, he also served as a guest editor for special issues in Journal of Visual Communication and Image Representation as well as Journal of Signal Processing Systems.

Dark Chesses

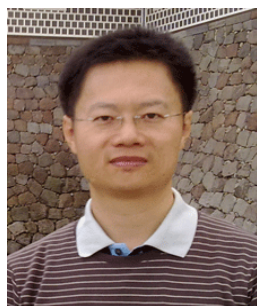
Shi-Jim Yen

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ABSTRACT

Dark chess (Chinese dark chess) is an old and very popular game in Chinese culture sphere. This game is chess-like with symmetric partially observable information. Unlike other imperfect information games such as Poker, Kriegspiel, and Phantom Go, where players hide information from each other. I will review the traditional methods for dark chess programs. Then introduce how to apply Monte Carlo Tree Search on dark chess. Finally, I will introduce and analyze a modified version of dark chess, called Double King dark chess (雙將暗棋).

BIOGRAPHY



Shi-Jim Yen received his B.S. in Computer Science and Information Engineering from Tamkang University, M.S. in Electrical Engineering from National Central University, and Ph.D. degree in Computer Science and Information Engineering from National Taiwan University, in 1991, 1993 and 1999, respectively. He is currently a Professor in the Department of Computer Science and Information Engineering at the National Dong Hwa University, Hualien, Taiwan. He has specialized in artificial intelligence and computer games. In these areas, he has published over 100 papers in international journals or conference proceedings. He is a 6-dan Go player. He served as a Program Chair of the 2015 IEEE Conference on Computational Intelligence and Games, and a Workshop Chair of 2010-2013 Conference on Technologies and Applications of Artificial Intelligence. He served as a Workshop Cochair of 2011 IEEE International Conference on Fuzzy Systems. He is the Chair of the IEEE Computational Intelligence Society (CIS) Emergent Technologies Technical Committee (ETTC) Task Force on Emerging Technologies for Computer Go since 2009. His team develops many strong board game programs including Go, Chinese chess, Dark chess, Connest6, and many puzzle games. These programs won the gold and other medals many times in Computer Olympiad, TAAI tournaments and TCGA tournaments since 2001. He got the Excellent Junior Researcher Project Award from Taiwan National Science Council in 2012 and 2013.

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Technical Session D2-W3-T1: New Media/ Multimedia, Machine Learning, Web, and Entertainment Technology

Shing-Min Liu

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National Chung Cheng University
(中正大學資訊工程學系暨研究所劉興民教授)

ABSTRACT

BIOGRAPHY



The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Technical Session D2-W3-T1: New Media/ Multimedia, Machine Learning, Web, and Entertainment Technology

Hsing-Kuo Kenneth Pao

Associate Professor, Department of Computer Science and Information Engineering
National Taiwan University of Science & Technology.
(臺灣科技大學資訊工程系鮑興國教授)

ABSTRACT

BIOGRAPHY



Legitimate Users Identification for Facebook Account

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ABSTRACT

Account authentication only can prevent those login tries the usernames and passwords are mismatched. Once the account is accessed via a validate username and password the system will allow all actions that done by current user. However, it can be a big security hole. For example, image that someone peeps at your Facebook account when you leave your desktop after login in your Facebook account. This kind of risk is getting bigger and bigger, especially when the smartphone getting popular.

In this work, we will focus on discriminating the legitimate user, that is the account owner, and non-owner users, that can be treated as a binary classification problem. We utilize machine learning algorithms including feature selection and support vector machines to build a continual stealthy usage-detecting model based on the user behavior. Our proposed system will log all the Facebook user's actions from the HTTP/HTTPS requests as a list with timestamps. We generate 137 features from the action list to describe the user behavior. We apply the 1-norm SVM to generate a candidate feature subset out of 137 features. The 1-norm SVM's result will filter out the redundant noise features and ranks the importance of the features for the discriminating purpose. It will help us to run the forward feature selection to find a good feature subset for the final detecting model that is generated by the smooth support vector machine (SSVM). Our experimental result shows that we can achieve 89.60% accuracy with 91.54% AUC for discriminating the legitimate user and non-owner users. Our proposed framework could apply to other social networking sites. We argue that from security point of view, account authentication is not enough. Embedding a continual monitoring mechanism to identify legitimate user will become an important way to protect account security.

BIOGRAPHY



Dr. Yuh-Jye Lee received the PhD degree in Computer Science from the University of Wisconsin-Madison in 2001. He is an Associate Professor of Department of Computer Science and Information Engineering at National Taiwan University of Science and Technology. He also serves as a principal investigator at the Intel-NTU Connected Context Computing Center. His research is primarily rooted in optimization theory and spans a range of areas including network and information security, machine learning, data mining, big data, numerical optimization and operations research. During the last decade, Dr. Lee has developed many learning algorithms in supervised learning, semi-supervised learning and unsupervised learning as well as linear/nonlinear dimension reduction. His recent major research

is applying machine learning to information security problems such as network intrusion detection, anomaly detection, malicious URLs detection and legitimate user identification. Currently, he focus on online learning algorithms for dealing with large scale datasets, stream data mining and behavior based anomaly detection for the needs of big data and machine to machine communication security problems.

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

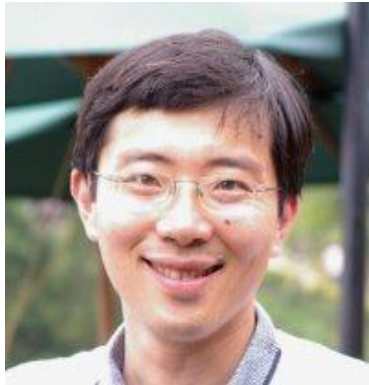
Technical Session D2-W4-T1: Ubi/ Cloud Computing, High Performance Computing (HPC)/ Data Center, Cyber Security, and Digital Forensics

Workshop Co-Chair and Session Chair

S. (Shyhtsun) Felix Wu

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BIOGRAPHY



The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Technical Session D2-W4-T1: Ubi/ Cloud Computing, High Performance Computing (HPC)/ Data Center, Cyber Security, and Digital Forensics

Gwan-Hwan Hwang

Professor and Chair, Department of Computer Science and Information Engineering
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(台灣師範大學資訊工程學系兼系主任黃冠寰教授)

ABSTRACT

BIOGRAPHY



Technical Session D2-W4-T1: Ubi/ Cloud Computing, High Performance Computing (HPC)/ Data Center, Cyber Security, and Digital Forensics

Case Study of Building a Data Center: A Integrated and Vertical Approach

Shih-Wei Liao

Associate Professor, Department of Computer Science and Information Engineering
National Taiwan University
(臺灣大學資訊工程學系廖世偉教授)

ABSTRACT

This talk will provide an industry veteran's perspective on building a data center. We present an approach that works.

BIOGRAPHY



Dr. Liao received his BS degree from National Taiwan University and MS and PhD degree from Stanford University. He had been in Bay Area for 22 years and is now on the faculty of National Taiwan University's Computer Science department, where he did his undergraduate in the 80's. While in Bay area, he worked at Google and Intel.

Grid, Cloud and Big Data: Experience in Application of High Energy Physics Research

Jhen-Wei Huang

Grid Computing Team Lead, Academia Sinica Grid Computing Centre
Academia Sinica
(中央研究院)

ABSTRACT

Worldwide Large Hadron Collider Computing Grid (WLCG) is the largest big data analytics project on particle physics, which demonstrates the efficiency and reliability of the new generation research infrastructure by running over 1.5 million jobs per day and 100PB data mobilized a year. Nearly 40 countries are joining this global collaboration project. Academia Sinica Grid Computing Centre (ASGC) acts as the WLCG Tier-1 Centre since 2005, supporting over 23PB WLCG data access and about 10% data processing in the past three years. Through the WLCG, users could make use of various resources, with the well-designed data model, from hundreds of resource centers around the world over the Internet. How to provide a reliable computing and storage environment combined with heterogeneous resources is complex and difficult. How to reduce the cost of exploiting research infrastructure and minimize the effort of data and IT management for the distributed computing infrastructure is also a big challenge.

ASGC is developing DiCOS (Distributed Cloud Operating System) to support data-intensive researches. By using such distributing computing system, we can move and process big data efficiently.

BIOGRAPHY



Mr. Jhen-Wei Huang is the team leader of ASGC Grid computing team, who is managing WLCG Tier-1 center for two LHC experiments ATLAS and CMS. Besides grid and cloud service operations, he is also responsible for the design and build Grid and Cloud infrastructure to support research institutions in Academia Sinica as well as AMS-02 production and analysis. He has been involved in various global collaborations with CERN to develop the middleware for distributed computing.

Bugs as a Backdoor(BaaB)

Shih-Kun Huang

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(交通大學資訊技術服務中心黃世昆副教授)

ABSTRACT

Software crash is inevitable and the most common type of software failures. This type of failures is characterized in software testing, reliability, and quality assurance, but not in the cyber security. We have studied the software crash behaviors by constructing symbolic failure models, and automatically produce software attacks through the manipulation of the symbolic model. This work has revealed a severe cyber security threats against software quality. That is, software crash failures introduced by bugs are able to be automatically exploited. If bugs are exploited and attacked, arbitrary code can be executed and a backdoor channel will be built. That is the concept and talk title of Bugs as a Backdoor.

If a backdoor channel is built by embedding bugs in the system, former research on Trojan horse identification will be reduced to the finding of software bugs, still an intractable problem in software engineering, and programming languages.

In this talk, we will introduce the development of exploitable crash detection and the process of automatic exploits (attack input) generation. The generation process has been improved and 7,000 times faster than our initial attempt. If attacks are generated by tools from software crashes, Bugs as a Backdoor is feasible without writing an explicit Trojan horse in the system. A programmer or the software vendor can leave bugs in the system, as unintended features and deniable trapdoors.

BIOGRAPHY



Shih-Kun Huang received his B.S. (1989), M.S. (1991) and Ph.D. (1996) in Computer Science and Information Engineering from the National Chiao Tung University, and was an assistant research fellow at the Institute of Information Science, Academia Sinica between 1996 and 2004. Currently he is the deputy director of Information Technology Service Center, and an associate Professor of Department of Computer Science, National Chiao Tung University. Dr. Huang's research integrates software engineering, and programming languages to study cyber security and software attacks. He has authored sixty peer-reviewed book chapters, conferences and journals on these topics and served on the program and organizing committees of various workshops and conferences. He is the Principal Investigator of the NSC project on Exploitable Software Crash (CRAX and CRAXweb).

Technical Session D2-W1-T2: Digital Media, Culture, and Society

Workshop Co-Chair and Session Chair

Yuh-wen Wang

Associate Professor and Director of the Graduate Institute of Musicology
National Taiwan University

(臺灣大學音樂學研究所所長王育雯教授)

BIOGRAPHY



Digital Games and Language Learning

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ABSTRACT

Recently, there have been a number of studies applying game-based learning supported by technology into English language learning. Claims have been made that games could increase students' learning motivation, which is the key to succeed in learning a foreign language. With its main feature of online interactions with the gaming system and the avatars of other players, enabling collaborative exchanges of thoughts, emotions, and ideas among the game players, massively multiplayer online role-playing games (MMORPGs) have been applied into educational environments, particularly in English language learning.

Learner characteristics and cognitive learning outcomes have been identified as the key factors in research on the implementation of games in educational settings. Although previous studies have examined the potential of applying MMORPGs into educational settings, a small number of in-depth studies, investigating the relationship between prior ability and learner cognitive learning outcomes, are reported in the literature regarding English language learning.

This talk presents a virtual learning environment by utilizing an MMORPG-based instruction in an English lesson. It was to examine how the learners' prior ability, naming different levels of online gaming experience, affected learners' cognitive learning outcomes. The purpose of this study was to investigate the learning effectiveness of knowledge acquisition after playing the proposed game and to discover whether there are significant differences in the effectiveness of learning with the game between experienced learners and inexperienced learners with regard to online gaming experience.

BIOGRAPHY



Jie-Chi Yang received his Ph.D. (2000) in Department of Human System Science from the Tokyo Institute of Technology, Japan. He is currently the Professor and the Head of the Graduate Institute of Network Learning Technology at the National Central University, Taiwan. His research interests include computer assisted language learning, digital game-based learning, mobile learning, web-based learning, natural language processing, and multimedia technologies. He is working on the design, development, and evaluation of interactive learning environments by using advanced technologies, aiming to enhance language learning and science learning. He has authored more than thirty peer-reviewed journals on these topics and served on the program and organizing committees of various international workshops and conferences. He

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

received the Ta-You Wu Memorial Award (Young Outstanding Researcher Award) from the National Science Council, Taiwan in 2009, and the Outstanding Research Award from the National Central University in 2009 and 2010. He was also appointed as Distinguished Professor at the National Central University in 2010.

Interaction Beyond the Individual: An Overview of User-Centered Collaborative and Social Computing Research

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ABSTRACT

The prevalence of computer-mediated communication tools, such as instant messaging, microblogging and social networking sites, has extended the scope of possible relationships between people and computers. Moving beyond the classic “one person interacting with one machine” paradigm in human-computer interaction (HCI), the emerging phenomenon of using computers as communication media to enable distributed collaboration and online communities requires researchers to explore a different set of theories, methods, ideas, and research and design practices. This talk aims to provide a sketch of the design and research space of collaborative and social computing in ACM SIGCHI, a leading research community for HCI. To effectively conduct research on related topics, I note that understanding the trajectory, rationale and value behind is as important as catching up trendy topics. The talk aims to contribute to the reflection and discussion around the benefits and challenges in growing this area in the local academic, industrial and cultural contexts.

BIOGRAPHY



Hao-Chuan Wang is an Assistant Professor at the Department of Computer Science and the Institute of Information Systems and Applications of National Tsing Hua University since February 2012. He received his Ph.D. in Information Science from Cornell University in 2011, M.S. in Computer Science from National Chengchi University in 2004 and B.S. from National Taiwan Normal University in 1999. He also studied and worked at the School of Computer Science, Carnegie Mellon University (2006-2008) and the Institute of Information Science, Academia Sinica (2004-2006) previously. Prof. Wang's main research interest lies in the collaborative and social aspects of human-computer interaction (HCI). He's also interested in applied machine learning, language technologies and educational technologies. His work is characterized by the close integration of computing research and behavioral and social sciences for problem solving and value creation. His recent projects include designing and evaluating tools for supporting group creativity and cross-lingual communication, using motion sensors to study human communication and supporting language learning with visualization and mobile devices. He has published his work in premier conferences of related areas, such as ACM CHI and ACM CSCW. He is an active participant of international and regional HCI communities. Some prominent community roles that he recently serves on include the Program Co-Chair for Chinese CHI 2014, the Program Committee Associate Chairs for CHI 2014 and CSCW 2013, and the Demonstrations Co-Chair for CSCW 2014. More information can be found at his website <http://www.cs.nthu.edu.tw/~haochuan>.

Detecting Emotions from Short Messages for Personal Ambient Creation

Lun-Wei Ku

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ABSTRACT

Emotion analysis is included in the research domain of sentiment analysis. It has attracted much attention and become more and more important for several reasons: as emotion is a subjective state of people, it is a good reference to know user preferences and further to provide suitable recommendations; emotion reflects people's feelings, so it is very helpful in the design of human-computer interface; emotional expressions have powerful influence on readers, and therefore extracting them are critical for reputation management of people, companies, brands and products; emotions are related to both mental and physical health, hence psychologists and medical groups have also joined this research domain.

The talk will begin from the introduction of IlluMe, a software tool pack which creates a personalized ambient using the music and lighting. IlluMe includes an emotion analysis software, the small space ambient lighting, and a multimedia controller. The software analyzes emotional changes from short messages and corresponds the detected emotion to the best sound and light settings. The ambient lighting can sparkle with different forms of light and the smart phone can broadcast music respectively according to different atmosphere. All settings can be modified by the multimedia controller at any time and the new settings will be feedback to the emotion analysis software. The IlluMe system provides a link between residential situation and personal emotion. It works in a Chinese chatting environment to illustrate the language technology in life.

An overview of how to detect emotions for IlluMe comes next. Sentences containing emoticon from the articles in Yahoo! blogs were utilized to automatically detect user's emotions from messenger logs. Four approaches, topical approach, emotional approach, retrieval approach, and lexicon approach, will be introduced in this talk. Forty emoticon classes found in Yahoo! blog articles were used for experiments and two experiments will be described. The first experiment classified sentences into 40 emoticon classes by calculating emotional scores of words. The second experiment took the Yahoo! and MSN messenger logs collected from users as the experimental materials, classified them into 40 emoticon classes by proposed approaches, and mapped 40 emoticon classes to 6 emotion classes to tell the user's emotion. The best performance of the mentioned approaches for user emotion detection was achieved by the topical approach and its micro-average precision 0.48 was satisfactory. Natural language processing techniques such as normalization, part of speech tagging, word bigram utilization, and sentiment dictionaries lookup were further incorporated to achieve better performance and will also be introduced. The experiments results will be shown and discussed, from which we find the performance satisfactory. At last, several future research directions will conclude this talk.

BIOGRAPHY



Lun-Wei Ku received her B.S. M.S., and Ph.D. degree in Computer Science and Information Engineering from National Taiwan University, Taipei, Taiwan, in 1998, 2000, and 2009 respectively. Then she joined the Department of Computer Science and Information Engineering, National Yunlin University of Science and Technology (Yuntech), Taiwan, as an assistant professor in 2011. Since Aug. 2012, she joined the Institute of Information Science, Academia Sinica as an assistant research fellow. Previously, she was a postdoctoral researcher at the Department of Computer Science and Information Engineering, National Taiwan University, Taipei, Taiwan, between Aug. 2009 and Jul. 2010, working on the project “Machine learning methods for ranking problems in multilingual information retrieval”. Her research interests include natural language processing, sentiment analysis, information retrieval, and computational linguistics. She has been working on Chinese sentiment analysis since year 2005 and was the co-organizer of NTCIR MOAT Task (Multilingual Opinion Analysis Task, traditional Chinese side) from year 2006 to 2010. Below are the other professional international activities she involved: Organizer, AFNLP SIG SocialNLP, Publication Co-Chair, The 6th International Joint Conference on Natural Language Processing (IJCNLP 2013), Nagoya, Japan (2013/10); Publicity Chair, The Twenty-fourth Conference on Computational Linguistics and Speech Processing (Rocling 2012), Taiwan (2012/09); Secretary, International Conference on Information Security and Intelligence Control (ISIC 2012), Taiwan (2012/08); Finance Chair, The Sixth Asia Information Retrieval Societies Conference (AIRS 2010), Taiwan (2010/12); Session Chair, The 21nd Conference on Computational Linguistics and Speech Processing (ROCLING 2009), Taiwan (2009/09).

Knowledge Integration for Improving Performance in Large Vocabulary Continuous Speech Recognition

Chen-Yu Chiang

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ABSTRACT

This talk presents a knowledge integration framework to improve performance in large vocabulary continuous speech recognition. Two types of knowledge sources, manner attribute and prosodic structure, are incorporated. For manner of articulation, six attribute detectors trained with an American English corpus (WSJ0) are utilized to rescore hypothesized phones in word lattices obtained by a baseline ASR system. For the prosodic structure, models trained with an unsupervised joint prosody labeling and modeling (PLM) technique using WSJ0 are used in lattice rescoring. Experimental results on the American English WSJ word recognition task of the Nov92 test set show that the proposed approach significantly outperforms the baseline system that does not use articulatory and prosodic information. The results also demonstrate the effectiveness and usefulness of the PLM technique in constructing prosodic models for American English ASR.

BIOGRAPHY



Chen-Yu Chiang was born in Taipei, Taiwan, in 1980. He received the B.S., M.S., Ph.D. degrees in communication engineering from National Chiao Tung University (NCTU), Hsinchu, Taiwan, in 2002, 2004, and 2009, respectively. In 2009, he was a Postdoctoral Fellow at the Department of Electrical Engineering, NCTU, where he primarily worked on prosody modeling for automatic speech recognition and text-to-speech system, under the guidance of Prof. Sin-Horng Chen. In 2012, he was a Visiting Scholar at the Center for Signal and Image Processing (CSIP), Georgia Institute of Technology, Atlanta. Currently he is an assistant professor in the Department of Communication Engineering, National Taipei University. His main research interests are in speech processing, in particular prosody modeling, automatic speech recognition and text-to-speech systems.

Technical Session D2-W2-T2: Broadband and Wireless Computing, Network Technologies,
Services and Applications

Workshop Co-Chair and Session Chair

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BIOGRAPHY



P.C. Ku is the associate professor of electrical engineering and computer science at the University of Michigan. He received all his degrees in electrical engineering including a BS from the National Taiwan University and a PhD from the University of California at Berkeley. Dr. Ku has a long career in the field of optoelectronics, starting in 1995 when he joined the lab of Professor Ching-Fuh Lin of the National Taiwan University as a research assistant. After two years of military service as a Navy ensign, he became a full-time student again in 1998 under the guidance of Professor Connie Chang-Hasnain at the University of California Berkeley. His doctoral dissertation is on semiconductor slow light devices. He was among the first to show that the speed of light can be significantly reduced in a specially designed semiconductor structure. As a result of

his PhD research, he was awarded the Ross Tucker Memorial Award in 2004. During his PhD study, Dr. Ku was the recipient of the Berkeley Fellowship. After receiving his PhD, Dr. Ku spent two years both as a postdoctoral researcher for the DARPA Center for Optoelectronic Nanostructured Semiconductor Technology and as a senior engineer for Intel. His research shifted from telecommunication devices to optical lithography and phase-change memory. It was during this time Dr. Ku conceived the idea that advanced lithography technology can be revolutionary to optoelectronic devices. In 2006, he returned to academia as an assistant professor of electrical engineering and computer science at the University of Michigan. His research has since been focused on creating impacts for optoelectronic devices in the emerging areas of energy, quantum, and biomedical science. He has worked on a variety of projects funded by NSF, DARPA, and DOE including LEDs, solar cells, nanoscale lasers, biosensors, and single photon sources. He received the DARPA Young Faculty Award in 2010.

Energy-Efficient Downlink Resource Allocation for Mobile Devices in Wireless Systems

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ABSTRACT

Mobile users have become increasingly addicted to multimedia applications which are extremely downlink-intensive. We observed that conventional objectives, like rate adaptive and margin adaptive, adopted for radio resource allocation may lead to unnecessary energy consumption of mobile devices, which is adverse to the development of mobile multimedia applications. This talk will focus on an alternative objective, called energy adaptive, and formulate the energy-efficient downlink resource allocation problem. The objective is to minimize the total energy consumption of mobile devices for data reception while satisfying data rate requirements of users and available transmit power of base station. We prove that the target problem is NP-hard and propose an efficient heuristic algorithm to solve the problem. The results of simulations conducted to evaluate the efficacy of the proposed algorithm agree with our observation on the conventional objectives, as well as providing some useful insights into the design of energy-efficient downlink resource allocation for wireless systems.

BIOGRAPHY



Ai-Chun Pang received the B.S., M.S. and Ph.D. degrees in Computer Science and Information Engineering from National Chiao Tung University, Taiwan, in 1996, 1998 and 2002, respectively. She joined the Department of Computer Science and Information Engineering (CSIE), National Taiwan University (NTU), Taiwan, in 2002. Currently, she is a Professor in CSIE and the Director of Graduate Institute of Networking and Multimedia of NTU. Her research interests include wireless networking, mobile computing, and performance modeling. She is a senior member of the IEEE.

When P2P Meets SIP: A Globally Overlaid Hierarchical P2P-SIP Architecture

Huei-Wen Ferng

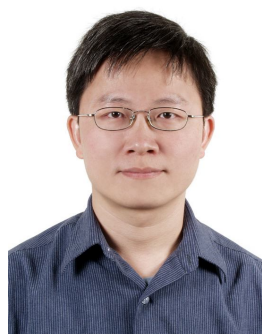
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ABSTRACT

P2P (Peer-to-Peer) is a distributed network service model, while SIP (Session Initiation Protocol) is a well-known signaling protocol suitable for a centralized network. What will happen if P2P meets SIP. This makes the talk possible.

In this talk, a three-level P2P-SIP architecture employing SIP servers for the overlay network is discussed. This architecture achieves global overlay and has the capability of solving the triangular routing problem for the domain-based P2P-SIP architecture to reach route optimization. Demonstrated by the numerical results, this architecture can exhibit its superiorities over the closest related architectures in the literature in terms of message rate, latency, and physical hops count.

BIOGRAPHY



Huei-Wen Ferng received the B.S. degree in electrical engineering from the National Tsing Hua University, Hsinchu, Taiwan, in 1993 and the Ph.D. degree in electrical engineering from the National Taiwan University, Taipei, in 2000. His research interests include wireless networks, mobile computing, high-speed networks, design of fair scheduling, teletraffic modeling, queuing theory, and performance analysis.

He joined the Department of Computer Science and Information Engineering, National Taiwan University of Science and Technology, Taipei, Taiwan as an assistant professor in August 2001. From February 2005 to January 2011, he was an associate professor. Since February 2011 and June 2012, respectively, he has been a professor and a distinguished professor. Funded by the Pan Wen-Yuan Foundation, Taiwan, he spent the summer of 2003 visiting the Department of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor.

He was a recipient of the research award for young researchers from the Pan Wen-Yuan Foundation, Taiwan, in 2003 and was a recipient of the Outstanding Young Electrical Engineer Award from the Chinese Institute of Electrical Engineering (CIEE), Taiwan, in 2008. He is a senior member of the IEEE.

**Networked Sensing and Control for Pervasive Healthcare Applications:
A Case Study on Chronic Obstructive Pulmonary Disease**

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ABSTRACT

Exercise training is a crucial component of pulmonary rehabilitation for patients with chronic obstructive pulmonary disease (COPD). Based on fuzzy logic control and wireless sensor networking, we develop an approach with calibration, rehabilitation, artifact/safety monitoring and endpoint decision (CRASE) to perform adaptive subject exercise training and monitoring. This study investigates an exercise training model with overload principle and safety concern. In order to depict the correctness and effectiveness of the proposed protocol, the system performance is examined via case studies, simulation analysis, and prototype implementation. Furthermore, the performance difference in training-sensitivity zone (%) between the conventional incremental shuttle walking test (ISWT) and the proposed CRASE is presented and discussed. The experimental results show that the proposed CRASE scheme has better capability to adjust the exercise training level and is promising to efficiently put exercise training into practice for home-based rehabilitation.

BIOGRAPHY



Chih-Yu Wen received the B.S.E.E. and M.S.E.E. degrees in electrical engineering from National Cheng Kung University, Tainan, Taiwan in 1995 and 1997, respectively. He also received the M.S.E.E. degree and the Ph.D. degree in electrical engineering from the University of Wisconsin-Madison, USA, in 2002 and 2005, respectively.

He served the ROTC in the R.O.C. Marine Corps at the rank of second lieutenant from 1997 to 1999. He joined the Department of Electrical Engineering at National Chung Hsing University, Taichung, Taiwan in 2006, where he is now Associate Professor. His current research interests include wireless communications, biomedical signal processing for health monitoring, software-defined radio, and distributed networked sensing and control. He has held five Taiwanese invention patents in pervasive healthcare.

Prof. Wen is a member of IEEE Communication Society, a member of IEEE Signal Processing Society, and a member of Chinese Institute of Engineers. He received the Excellent Teaching Award – Department of Electrical Engineering in 2008 and the Outstanding Young Investigator Award – College of Engineering, National Chung Hsing University in 2012.

Effective Use of Small-Cell to Offload Mobile Data Traffic

Hung-Chin Jang

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ABSTRACT

With the explosion of mobile data traffic, how to use small-cell to offload mobile data traffic is a big issue faced by global telecom operators and mobile network equipment suppliers. However, the cost of small-cell deployment and maintenance (including equipment, circuits, manpower and maintenance & operation expenses) is huge given no strict screening plan for deployment.

The aim of this research is to establish a user behavior based seek point model of small-cell (WiFi) in order to effectively find the right locations to deploy small-cells. This model would help to achieve performance advantage of mobile data offload and largely reduce network operation cost. The seek point model is used to find transportation strongholds, public spots, residential and office locations. The performance evaluation of seek point model will be based on throughput, deployment cost, and 3G data offload effectiveness.

As to the experiment, we used some real data from local telecom operator to have a simulation, experiment, and analysis. The experiment was performed at 200 spots around Kaohsiung Arena district in Taiwan during off-peak hours (5:00-7:00) and peak hours (20:00-22:00), respectively. The experiment results show that the downlink throughput improvement ratio of with and without small-cell seek point model during 5:00-7:00 and 20:00-22:00 are 1.06 and 2.1, respectively. The deployment cost can be reduced by 137% using seek point model. As to 3G data offload effectiveness, 3G data traffic can be offloaded to WiFi by 84.6%.

BIOGRAPHY



Hung-Chin Jang received his BS in Applied Mathematics from National Chengchi University, Taiwan, in 1984, MS in Mathematics, Statistics, and Computer Science, and Ph.D. in Electrical Engineering and Computer Science from University of Illinois at Chicago, U.S.A., in 1988 and 1992, respectively. He was an associate professor in Applied Mathematics, the Chair of Department of Computer Science, National Chengchi University, Taiwan. Currently, he is the Chief Executive Officer of Mater Program in Computer Science for Professional Education, the associate professor in Computer Science, the Director of Mobile Computing and Communication Lab. of Computer Science, National Chengchi University. His current research interests include WLAN, Vehicular Ad Hoc Network (VANET), Machine to Machine (M2M), WiMAX, LTE, cloud computing and mobile learning.

Technical Session D2-W3-T2: New Media/ Multimedia, Machine Learning, Web, and Entertainment Technology

Session Chair

3D Video Processing with Disparity Optimization

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BIOGRAPHY



Shang-Hong Lai (M'95-) received the B.S. and M.S. degrees in electrical engineering from National Tsing Hua University, Hsinchu, Taiwan, and the Ph.D. degree in electrical and computer engineering from University of Florida, Gainesville, in 1986, 1988 and 1995, respectively. He joined Siemens Corporate Research in Princeton, New Jersey, USA, as a member of technical staff in 1995. Since 1999, he returned to Taiwan to be a faculty member in the Department of Computer Science, National Tsing Hua University, Taiwan. He is currently a professor in the same department and the director of the Computer and Communication Center in the university. In 2004, he was a visiting scholar with Princeton University. Dr. Lai's research interests include computer vision, visual computing, pattern recognition, medical imaging, and multimedia signal processing. He has authored more than 200 papers published in the related international journals and conferences. Dr. Lai has been a member of program committee of several international conferences, including CVPR, ICCV, ECCV, ACCV, ACM MM, ICPR, PG, PSIVT and ICME. He has been an associate editor for Journal of Signal Processing Systems since 2010. Moreover, he also served as a guest editor for special issues in Journal of Visual Communication and Image Representation as well as Journal of Signal Processing Systems.

Automatic Domain-Specific Sentiment Lexicon Construction

Hung-Yu Kao

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(成功大學資訊工程學系高宏宇教授)

ABSTRACT

Nowadays, the advance of social media has led to the explosive growth of opinion data. Therefore, sentiment analysis has attracted a lot of attentions. Currently, sentiment analysis applications are divided into two main approaches, the lexicon-based approach and the machine-learning approach. However, both of them face the challenge of obtaining a large amount of human-labeled training data and corpus. There have many existing benchmark sentiment lexicons, but they cannot cover all the meanings from diverse domains. Thus, the automatic generation of a domain-specific sentiment lexicon becomes an important task. In this paper, we propose a framework to automatically generate sentiment lexicon. First, we determine the semantic similarity between two words in the entire unlabeled corpus. We treat the words as nodes and similarities as weighted edges to construct several word graphs. A graph-based semi-supervised label propagation method finally assigns the polarity to unlabeled words. Experiments conducted on the microblog data, Twitter, show that our approach leads to a better performance than baseline approaches and general-purpose sentiment dictionaries.

BIOGRAPHY



Size Does Matter: How Does Image Display Size Affect Aesthetic Perception?

Wei-Ta Chu

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ABSTRACT

An image's content determines how people assess the image's aesthetic level. Previous works have shown that image contrast, saliency features, and the composition of objects may jointly decide whether an image looks good or not. In addition to the "content" of an image, however, the way an image is "presented" to viewers may also affect how much it is appreciated.

In this talk we devote to describe how an image's resolution (pixels) and physical dimension (inches) affect how much viewers appreciate this image. Based on a large-scale aesthetic assessments of 100 images displayed in a variety of resolutions and physical dimensions, we show that an image's display size significantly affects its aesthetic rating in a complicated way; normally a picture looks better with a bigger display size, but it may look relatively worse depending on its content. We develop a set of regression models to predict a picture's absolute and relative aesthetic levels at a given display size based on its content and compositional features, and, simultaneously, we analyze the essential features that lead to the size-dependent property of image aesthetics.

BIOGRAPHY



Wei-Ta Chu was born in 1978, Nantou, Taiwan. He received B.S. and M.S. degrees in Computer Science from National Chi Nan University, Nantou, Taiwan, in 2000 and 2002, and received Ph.D. degree in Computer Science from National Taiwan University, Taipei, Taiwan, in 2006. His research interests include digital content analysis, multimedia indexing, digital signal process, and pattern recognition.

He was a postdoctoral researcher in National Taiwan University from 2006 to 2007. He joined as an Assistant Professor in Department of Computer Science and Information Engineering, National Chung Cheng University, Taiwan, from Aug. 2007. He is currently an Associate Professor in the same institute. He has published more than fifty academic articles in pioneering conferences and journals.

Prof. Chu is a member of IEEE, ACM, IICM, CIEE, and IPPR. He won the Best Full Technical Paper Award in ACM Multimedia 2006. He was awarded the K. T. Li Young Researcher Award presented by Institute of Information & Computing Machinery in 2012, the Young Faculty Awards presented by National Chung Cheng University in 2011. He was a visiting scholar at

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Digital Video & Multimedia Laboratory, Columbia University, from July to August 2008. He serves as an editorial board member for Journal of Signal and Information Processing and the lead guest editor a special issue in Advances in Multimedia.

The New Web Language: HTML 5

Garry Jyh-Chian Chang

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ABSTRACT

HTML5 is the fifth revision of the HTML standard, and, just like its ancestors are, is a markup language used for constructing and presenting content for the World Wide Web and a major technology of the Internet. It is a candidate recommendation of the World Wide Web Consortium in December 2012 and planned to be a stable HTML5 Recommendation by the end of 2014. Its core aims have been to improve the language with support for the latest multimedia while keeping it easily readable by humans and consistently understood by computers and web browsers. HTML5 is intended to subsume not only HTML 4, but also XHTML 1 and DOM Level 2 HTML.

This talk will introduce several new features of HTML 5, which include Markup, New APIs, XHTML5, and Error handling.

BIOGRAPHY



Prof. Jyh-Chian Chang received his BSAE degree from National Cheng Kung University, Taiwan in 1983, the MS degree in Weapon System Engineering from Chung Cheng Institute of Technology, Taiwan in 1986, and the PhD degree in Electrical Engineering and Computer Science (EECS) from Northwestern University, Evanston, Illinois, USA, in 1995.

He was with Chung Shan Institute of Science and Technology as an ASSOCIATE RESEARCHER from 1995 to 2004. He also worked as a RD MANAGER in TrendMicro and Synopsys from 2004 to 2006. Currently, he is an ASSOCIATE PROFESSOR in the Department of Computer Science & Information Engineering of Chinese Culture University, Taipei, Taiwan. His research interests include image processing, computer vision, biometric information, and digital contents.

Prof. Chang is an editor of International Journal of Intelligent Information Processing (IJIIP).

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Technical Session D2-W3-T2: New Media/ Multimedia, Machine Learning, Web, and Entertainment Technology

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ABSTRACT

BIOGRAPHY



The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Technical Session D2-W4-T2: Ubi/ Cloud Computing, High Performance Computing (HPC)/ Data Center, Cyber Security, and Digital Forensics

Workshop Co-Chair and Session Chair

Deron Liang

Director, Software Research Center and
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National Central University

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BIOGRAPHY



The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Technical Session D2-W4-T2: Ubi/ Cloud Computing, High Performance Computing (HPC)/ Data Center, Cyber Security, and Digital Forensics

James Ching-Nung Yang

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National Dong Hwa University
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ABSTRACT

BIOGRAPHY



Fully Exploiting Modification Directions Data Hiding

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ABSTRACT

Due to the rapid growth of network and smart phone technology, a lot of private image information such as digital photos or videos communicates in Internet. Thus, people can be shared the happy or unhappy things each other, immediately. However, there are many attacks such as illegal duplication, forgery and spoofing when digital multimedia is transmitted through this public channel. Therefore, how to protect the digital data security has become very important. A smart way to solve this problem is to hide personal data behind a meaningful image such that an unintended observer will not be aware of the existence of the hidden secret message.

Recently, to improve stego image data hiding capacity from 1bpp to 4.5bpp, many data hiding schemes based on fully exploiting modification directions (FEMD) have been proposed. In this talk, we will review these literatures and then introduce a general FEMD data hiding scheme which can directly be used to represent the existing FEMD-type data hiding schemes. According to the simulation results, we can show that the proposed scheme not only builds a general form of FEMD-type data hiding scheme but also retains all FEMD-type data hiding scheme characteristics such as good embedding capacity and stego image quality.

BIOGRAPHY



Wen-Chung Kuo He received the B.S. degree in Electrical Engineering from National Cheng Kung University and M.S. degree in Electrical Engineering from National Sun Yat-Sen University in 1990 and 1992, respectively. Then, He received the Ph.D. degree from National Cheng Kung University in 1996. Now, he is an associate professor in the Department of Computer Science and Information Engineering, National Yunlin University of Science & Technology, Douliou, Yunlin, Taiwan. His research interests include steganography, cryptography, network security and signal processing.

Programming in the Cloud Era

Yuan-Liang Tang

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ABSTRACT

Programming has evolved since its very beginning. From text-based programming, to graphical user interface, to HTML and CSS, to Web programming, and finally to Apps programming. Some of them are still the main programming types currently, and some of them may decline in the future. This talk will briefly review the evolution of the types of programming and then discuss how programming will evolve in the cloud era.

BIOGRAPHY



About the speaker

Name: Yuan-Liang Tang
Date of birth: May 2, 1964
Birth place: Yunlin County, Taiwan

Education:

Ph.D. of computer engineering, 1994
The Pennsylvania State University, USA

Field of study:

Cloud computing, Google Apps, Google App Engine, Python, computer vision, image processing, information hiding, digital watermarking

Yuan-Liang Tang received the M.S. and Ph.D. degrees in Electrical Engineering and Computer Engineering from The Pennsylvania State University, USA, in 1991 and 1994, respectively. He is currently an associate professor at the Department of Information Management, Chaoyang University of Technology, Taiwan. His research interests include Cloud computing, Google Apps, Google App Engine, Python, computer vision, image processing, information hiding, digital watermarking.

GamingAnywhere: An Open Cloud Gaming System

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ABSTRACT

Cloud gaming is probably one of the most recognized killer applications of the rapidly expanding cloud computing infrastructure. Existing cloud gaming systems, however, are closed-source with proprietary protocols, which raise the bars to setting up testbeds for experiencing cloud games. In this paper, we present a complete cloud gaming system, called GamingAnywhere, which to our best knowledge, is the first open cloud gaming system. On top of its openness, we design GamingAnywhere for high extensibility, portability, and reconfigurability. We implement GamingAnywhere on Windows, Linux, and OS X, while its client can be readily ported to other OSes, including iOS and Android. We conduct extensive experiments to quantify the performance of GamingAnywhere, and compare it against two state-of-the-art cloud gaming systems: OnLive and StreamMyGame. Our experimental results indicate that GamingAnywhere is efficient and achieves high responsiveness and video quality. For example, GamingAnywhere leads to a per-frame processing delay of 41 ms, which is 4+ and 8+ times smaller compared to other cloud gaming systems, respectively. Our experiments also reveal that all these performance gains are achieved without the expense of higher network loads: in fact, GamingAnywhere incurs less network traffic. The proposed GamingAnywhere can be employed by the researchers, game developers, service providers, and end users for setting up cloud gaming testbeds, which, we believe, will stimulate more research projects on cloud gaming systems.

BIOGRAPHY



Chun-Ying Huang received his B.S. in Computer Science from National Taiwan Ocean University in 2000 and M.S. in Computer Information Science from National Chiao Tung University in 2002. He received his Ph.D. in Electrical Engineering Department from National Taiwan University in 2007. Since then he took the one-year compulsory military service as a second lieutenant. He joined the Computer Science and Engineering department at National Taiwan Ocean University in August 2008 and is currently an Associate Professor. Dr. Huang's researches focus on computer network and network security areas, including traffic measurement and analysis, peer-to-peer networking, high performance network algorithm design and implementation, malicious behavior analysis and detection, and multimedia networking systems. Dr. Huang is a member of ACM, CCISA, IEEE, and IICM.

Session Chair

Alvin Wen-Yu Su

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BIOGRAPHY



Dr. Alvin Wen-Yu Su was born in Kaohsiung, Taiwan, 1964. He received his M.S. degree and Ph.D. degree from NYU-POLY, Brooklyn New York U.S.A., both in electrical engineering, 1993.

He was a visiting scholar in CCRMA, Stanford University, California, U.S.A from 1993 to 1994. He was an engineer of IRTI, Taiwan from 1994 to 1995. From 1995 to 1999, he was an associate professor of CSIE, Chung-Hwa University, Hsin-Chu Taiwan. Since 2000, he is with CSIE, National Cheng-Kung University, Tainan, Taiwan. He is currently a professor and also the director of SCREAM Lab. His research interests include multi-core architecture design, music signal analysis/synthesis, and physiology signal recognition.

Music and Language: To Acquire or To Learn

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ABSTRACT

Most people who speak a foreign language fluently learned as children. I did not. Most people who play a musical instrument learned as children. I did not. The common belief is that adults are too old to learn new tricks—language and music—which must be acquired as young age, in their critical period. After puberty we as adults are unlikely to succeed. In this talk I would like to share my experiences and research findings in language acquisition and music learning, and my views on foreign language education. I tried to pick them up in my 40s. I find that it's never too late; adults' brain remains plastic. Adults can do what children do, and adults can do well as children do. I will also share about learning through technology: a simple technology to facilitate learning or an advanced technology to block learning?

BIOGRAPHY



Herng-Yow Chen, born in 1969, Taipei, Taiwan, received his B.S. degree from TamKang University in 1989 and his Ph.D. degree from National Taiwan University in 1996, both in Computer Science. He has been living in Puli and teaching at National Chi Nan University since 1996 and is now a full-time professor at the Department of Computer Science and Information Engineering. He has also been a joint professor at the Graduate Institute of Teaching Chinese as a Second/Foreign Language and Graduate Institute of Curriculum Instruction and Technology since 2010.

Dr. Chen is passionate about how human beings acquire and learn language and music, and how technology can help. His research interests include learning psychology, technology in music and language education, brain science, music processing, language acquisition, and multimedia. He visited Indiana University, 2005-2006, as a visiting professor at Language Education Department, to explore knowledge in language. He served as the Director of Language Teaching and Research Center, National Chi Nan University, 2004-2012. He decided to learn music at his 43. He picked up Cello and Violin in 2010 and then Piano in 2012, and started to join Young Artist Orchestra (playing cello) in Puli, 2012, where he could meet musicians weekly and discover interesting ideas. His lab focuses on music and language technology.

**New Media, New Idea:
Music Compositional Concepts Influenced by Modern Technologies**

Chia-Lin Pan

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ABSTRACT

Discoveries in physics and science unveil the compositional elements of sounds and introduce new sound technologies for creating new sounds. These advances in science and technology also provide composers new thoughts, sources and tools while composing new music. New concepts of processing sound, such as Musique Concrète, Synthesis Theory, Spectrum Theory and Digital Sound Processing...etc. established and highly developed, which has become the main streams of compositional theories since the middle of Twentieth Century. Those new theories and thoughts influence and change the aesthetic, concepts and techniques in music composition. This presentation will summarize the new things that composers discovered from technologies, and also the new compositional concepts brought by those explorations.

The latest compositions of Chia-Lin Pan will be demonstrated with pieces by Ligeti, Grisey and others, as examples to illustrate how modern technologies influence the compositional concepts during the presentation. The subjects of “how” and “what” techniques were adopted in those compositions will also be discussed. The theoretical audio signal processing techniques, not just only creates the rigid sound texture, but also are powerful tools, when combined with a composer’s delicate thoughts and skills, can create a musical art work that is warm, heartfelt, full of Humanism.

BIOGRAPHY



Chia-Lin Pan received her Doctor of Music in Composition from Northwestern University, Evanston, IL. U.S.A., and earned both her Bachelor and Master degrees from National Taiwan Normal University, Taipei, Taiwan. She is currently an Associate Professor at the University of Taipei (formerly known as the Taipei Municipal University of Education), Taipei, Taiwan.

Chia-Lin is an active composer and her music has been selected to several music festivals, including Hong-Kong Chinese Composers’ Festival (in 2013), Asian Composers’ League Music Festivals (in 1998, 2000, 2009-2012) and the International Society of Contemporary Music World Music Days (in 2010). Recently she works closely with the members of many contemporary music ensembles such as Pacifica String Quartet, The Eighth Blackbird, The Bugallo-Williams Piano Duo, Duo Diorama, NU Contemporary Music Ensemble, Chia Found Music Workshop, Taipei Symphony Orchestra, Taipei Music Forum Ensemble, Ju Percussion Group and National Symphony Orchestra (Taiwan). Her works have been performed

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

internationally in countries including Australia, Canada, Hong-Kong, Israel, Japan, Korea, Taiwan and U.S.A.

Dr. Pan has received many commissions from National Cultural and Arts Foundation, National Chiang Kai-Shek Cultural Center, Taiwan Wind Ensemble, Taipei Music Forum, Little Giant Chinese Chamber Orchestra, etc. She is also a board member of the International Society of Contemporary Music and Asian Composers' League, Taiwan Section.

Sound recording technology and its impacts on music making and listening

Szu-Wei Chen

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ABSTRACT

The arrival of recording technology in the late 19th century makes it possible for human beings to store and retrieve sound, which is not a thing but a transient and ungraspable experience. Audio storage and retrieval devices developed over time turn music into products in various formats that can be distributed, sold and consumed. Although we have been enjoying recorded musical sounds for more than a century, we seldom realise that recording has also profoundly changed the way we make and listen to music.

We believe that recording devices would faithfully document sounds around us, but how faithful a recording is? Actually the sound is changed at the very beginning of a recording session, not to mention how it can be adjusted during the so-called post-production period. Through recounting a succinct history of recording technology and contemporary music production practices, this presentation will explore how the way in which we produce, distribute and consume music has been, and is still, shaped through the development of sound recording technology, as well as how live performance is now taking centre stage in an era when physical record sales decrease.

BIOGRAPHY



Szu-Wei Chen received his bachelor's degree in botany and MBA degree with a specialty in accounting in 1995 and 1997 respectively at National Taiwan University. After serving two years as a military police officer and one year in Andersen as a staff auditor, he moved to Scotland to pursue academic career in music. Under Professor Simon Frith's supervision in the Department of Film and Media Studies at University of Stirling, he completed his doctoral thesis on popular music in 1930s and 1940s Shanghai and was awarded a PhD degree in 2007.

He has been teaching as an adjunct assistant professor at National Taiwan University since spring 2008. His acclaimed 'Musical Cultures Around the Globe' was awarded as 'Distinguished General Education Course' at National Taiwan University for three times in 2009, 2010 and 2012. His research interests include recording industry, world music, Mandopop and the musical exchanges in East Asia in the age of the 78s. A book on the production of Mandopop and record industry in 1950s and 1960s Taiwan, *Musical Recollection in Formosa: The Legend of Zhou Lan-Ping and Four Seas Records* (寶島回想曲：周藍萍與四海唱

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

片), he co-authored has just been published by National Taiwan University Library earlier this year.

Dr. Chen hosts a radio programme of Mandopop oldies and composes advertising jingles for commercial films and soundtracks for documentaries at leisure. He also collects 78rpm gramophone records as a hobby and uses his collections in academic research.

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Technical Session D2-W2-T3: Broadband and Wireless Computing, Network Technologies,
Services and Applications

Workshop Co-Chair and Session Chair

Li-Chun Wang

Distinguished Professor and Chairman, Department of Electrical and Computer Engineering
National Chiao-Tung University

(交通大學電信工程研究所兼電機工程學系系主任王蒞君特聘教授)

BIOGRAPHY



Resource Management and Interference Coordination for LTE/LTE-A Networks

Kai-Ten Feng

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ABSTRACT

The long term evolution (LTE) and LTE-Advanced (LTE-A) systems are developed by the third generation partnership project (3GPP) as mobile communication standards which are also referred as 4G technologies. The mobile broadband networks are realizable based on LTE/LTE-A specifications, which enables mobile users to experience higher data rate with lower transmission latency. In this talk, we will present advanced research works on resource management and interference coordination for LTE-A networks. The architectures and techniques compliant to the LTE/LTE-A standards will be introduced, including heterogeneous networks with small cells, multiple-input and multiple-output (MIMO), carrier aggregation, femtocell clustering, and handover mechanisms. Several fundamental issues in LTE/LTE-A systems will firstly be described; while the solutions to the associated problems will be proposed. The targets of the proposed algorithms are either to promote system throughput or to increase energy efficiency.

BIOGRAPHY



Kai-Ten Feng received the B.S. degree from the National Taiwan University, Taipei, Taiwan, in 1992, the M.S. degree from the University of Michigan, Ann Arbor, in 1996, and the Ph.D. degree from the University of California, Berkeley, in 2000.

Between 2000 and 2003, he was an In-Vehicle Development Manager/Senior Technologist with OnStar Corporation, a subsidiary of General Motors Corporation, where he worked on the design of future Telematics platforms and in-vehicle networks. Since August 2011, he has been a full Professor with the Department of Electrical and Computer Engineering, National Chiao Tung University (NCTU), Hsinchu, Taiwan, where he was an Associate Professor and Assistant Professor from August 2007 to July 2011 and from February 2003 to July 2007, respectively. From July 2009 to March 2010, he was a Visiting Scholar with the Department of Electrical and Computer Engineering, University of California at Davis. He has also been the Convener of the NCTU Leadership Development Program since August 2011. Since October 2011, he has been serving as the Director of the Digital Content Production Center at the same university. His current research interests include broadband wireless networks, cooperative and cognitive

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

networks, smart phone and embedded system designs, wireless location technologies, and intelligent transportation systems.

Dr. Feng received the Best Paper Award from the Spring 2006 IEEE Vehicular Technology Conference, which ranked his paper first among the 615 accepted papers. He also received the Outstanding Youth Electrical Engineer Award in 2007 from the Chinese Institute of Electrical Engineering and the Distinguished Researcher Award from NCTU in 2008, 2010, and 2011. He has served on the technical program committees in various international conferences.

A Mixed-Signal Precoding Processor for Millimeter Wave MIMO Systems

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ABSTRACT

A millimeter wave (mmWave) communication system provides multi-Gbps data rate in the short-distance transmission. Due to the small wavelengths of millimeter waves, the transceiver is able to use large antenna arrays to alleviate the serious signal attenuation. Furthermore, the link performance can be improved by adopting precoding technology in the multiple data stream transmission. However, the complexity of radio frequency chains (RF) grows even higher with large antenna arrays in the mmWave system. To reduce the hardware cost, the precoding circuit can be jointly designed in both the analog and digital domains and realized by simpler circuits. The challenges of precoding for mmWave systems are much different from those of traditional microwave systems. In microwave systems, signal processing is often to be performed at baseband circuits which control both the phase and amplitude of incoming signals. Nevertheless, more signal processing at the baseband increases the resolution requirements of analog front-end circuits between baseband and radio frequency (RF) circuits. Since the number of mmWave RF chains is limited by high transceiver complexity and power consumption, precoding is likely to be done by both of the digital- and analog-domain signal processing. With the assistance of the baseband precoding circuits, the RF precoding can be implemented with fewer lower-complexity components, and the resultant performance degradation is still negligible. That is to say, a mixed-signal precoding architecture is preferable to reduce the power consumption and dynamic range requirements of the baseband circuitry in mmWave systems. The proposed precoder reconstruction algorithm is designed and implemented by using TSMC 90nm UTM CMOS technology. The proposed precoder reconstruction processor supports the transmissions of 1 to 4 data streams for 8x8 mmWave MIMO systems. The operating frequency of this chip is 167 MHz and power consumption is 29.6 mW when supply voltage is 1 V. The core area of post-layout result is about 3.94 mm².

BIOGRAPHY

Yuan-Hao Huang received the B.S. and Ph.D. degrees in Electrical Engineering from National Taiwan University, Taipei, Taiwan, R.O.C., in 1995 and 2001, respectively. Then, Dr. Huang was the Research and Development Manager with VXIS Technology Corporation, Hsin-Chu, Taiwan from 2001 and 2005, when he and his team developed and produced TV demodulation IC for both analog (NTSC/PAL) and digital (DVB-T) television broadcasting systems. Since 2005, he has been with the Department of Electrical Engineering and the Institute of Communications Engineering, National Tsing-Hua University, Taiwan, where he is currently an Associate Professor. His research includes baseband signal processing, MIMO detector, positioning systems for wireless communications. He received National SOC Project Award in 2009 for the good performance in the project "Video Transmission for Super HDTV". He has



also received best chip design awards of Chip Implementation Center (CIC), Taiwan, in 2011, 2012 and 2013. In 2012, He received the Best Paper Award in 2012 VLSI/CAD Symposium. He has published 10 journal papers and 38 conference papers and owns 5 U.S patents and 6 Taiwan patents. The published technical papers are in IEEE SAP, JSSC, TCAS-I, TCAS-II, and T-VLSI. He has served as referee of many IEEE journals including IEEE Trans. on CAS-II, VLSI systems, Signal Processing, Audio and Speech Processing, Image Processing. Since 2010, he serves as a TC member in IEEE Signal Processing Society, Design and Implementation of Signal Processing Systems (DISPS) Track. In 2011, he organized the 2011 IEEE Signal Processing Society Summer School on 3D and High Definition/High Contrast Video Processing Systems. In 2012, organized the 2012 IEEE Signal Processing Society Summer School on Compressive Sensing and MIMO Signal Processing Systems.

A Machine-to-Machine (M2M) Communication Platform for Internet of Things (IoT)

Chun-Ting Chou

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(台灣大學電機工程學系周俊廷教授)

ABSTRACT

Internet of things (IoT) is expected to drive the growth of wireless communications in the post-smartphone era. According to Ericsson's recent prediction, more than 50 billions of machines will be interconnected via IoT by 2020. Such a huge amount of machines, if powered by cloud computing, will enable a wide range of applications including smart homes, remote health care, building automation, and even intelligent transportation systems (ITS). Although the requirements of IoT applications are very diverse, most of them require reliability, scalability, and energy efficiency. In this talk, I will present an M2M platform to address the three general requirements of IoT applications. The platform is composed of three functional blocks including reliable broadcast, low-duty cycle operation and multi-channel communication. A test bed composed of 120 nodes based on the platform will also be demonstrated. The test bed supports real-time fire detection and location-based notification in the Barry Lam Hall of National Taiwan University. Through the real deployment, we are able to demonstrate the feasibility of the platform and its robustness in dealing with real-world issues such as asymmetric links and co-channel interference.

BIOGRAPHY



Prof. Chun-Ting Chou received the B.S. and M.S. degrees from National Taiwan University in 1995 and 1997, respectively, and the Ph.D. degree from University of Michigan, Ann Arbor, in 2004, all in Electrical Engineering. From 2004 to 2007, he was a senior member research staff in Philips Research North America, where he designed various medium access control (MAC) protocols for WiMedia Ultra Wide Band (UWB), IEEE 802.15.5 mesh network, Ecma-368 and Ecma-387 wireless short-range transmission standards.

He has been an assistant professor in Graduate Institute of Communication Engineering, National Taiwan University since 2008. His research interests include dynamic spectrum access (DSA), medium access control (MAC) design, wireless and mobile communications, machine-to-machine networks, and applications. He has published various papers in international conferences and journals including IEEE Infocom, IEEE Globecom, IEEE Transactions of Mobile Computing, IEEE/ACM Transactions on Networking, IEEE Transactions on Wireless Communications, and IEEE Journal on Selected Areas in Communications. He is also a recipient of the Young Oversea Scholar Awards and has more than 20 patents in wireless communication system and applications.

Ultra-Low Power Wake-Up-Receiver in Energy Efficient Wireless Sensor Networks

Kuang-Wei Cheng

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ABSTRACT

Low power consumption is always of the essence for the main challenge faced in Wireless sensor network (WSN) applications. In order to reduce power consumption, sensor nodes in low-activity-rate systems are typically heavily duty-cycled, spending most of the time in a low power sleep mode. However, this introduces a challenge for synchronization in order to simultaneously activate the wireless communication of two neighboring nodes. The transmitter must send the wake-up request many times and the receiver should listen more often in order to guarantee the communication coincides in time. An always-on wake-up receiver (WuRx) can break this trade-off between power consumption and system latency.

Energy autonomous sensors that could harvest ambient energy from sources such as light, heat, vibration and radiation are promising solutions to provide long-term self-sustaining sensor operations without battery replacement. However, either the inefficiency of the energy harvesting or the power-hungry radio in the sensor node make autonomous sensors still unpractical.

This talk will introduce a 10mW WuRx with a sensitivity of -50 dBm at 100kb/s data rate, operating in 900 MHz, 2.4 GHz and 5.8 GHz ISM band, with a RF envelop detector to reduce the power in RF amplifiers and LO generators. With such low power consumption of only 10 μ W, infinite standby time can be achieved by ambient energy harvesting in wireless sensor nodes.

BIOGRAPHY



Kuang-Wei Cheng received the B.S. and M.S. degrees from the National Taiwan University, Taipei, Taiwan, in 2000 and 2002, respectively, and the Ph.D. degree from the University of Washington, Seattle, in 2009, all in electrical engineering.

From 2002 to 2004, he was with MediaTek Inc., Hsinchu, Taiwan. In 2010, he worked at Institute of Microelectronics, A*STAR, Singapore as a Senior Research Engineer and later became the Principal Investigator of Biomedical IC Group in Integrated Circuits & Systems Laboratory. He is currently an assistant professor at National Cheng Kung University, in Tainan, Taiwan, where he is focusing on low power analog / RF IC design for wireless communications and biomedical systems.

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Dr. Cheng was a recipient of the Best Student Paper Award of IEEE Radio Frequency Integrated Circuits (RFIC) symposium in 2009 and Analog Devices Outstanding Student Designer Award in 2008.

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Technical Session D2-W3-T3: New Media/ Multimedia, Machine Learning, Web, and Entertainment Technology

Workshop Co-Chair and Session Chair

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BIOGRAPHY



Garment Detectives: Discovering Clothes and Its Genre in Consumer Photos

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ABSTRACT

Clothing image analysis has shown its potential for use in a wide range of applications such as personalized clothing recommendation. Given a consumer photo, this talk addresses the problem of finding clothes and recognizing the genre of that clothes. This problem is very challenging due to large variations of uncontrolled realistic imaging conditions. In order to tackle these challenges, we formulate a novel framework by integrating local features of multimodality as the instances of the price-collecting Steiner tree (PCST) problem to discover clothing regions, and exploiting visual style elements to discover the clothing genre. The experimental results show that our fully automatic approach is effective to identify irregular shape of clothing region, and it significantly improves the accuracy of clothing genre recognition for images taken in unconstrained environment.

BIOGRAPHY



Kai-Lung Hua received the B.S. degree in electrical engineering from National Tsing Hua University in 2000, and the M.S. degree in communication engineering from National Chiao Tung University in 2002, both in Hsinchu, Taiwan. He received the Ph.D. degree from the school of electrical and computer engineering, Purdue University, West Lafayette, IN, in 2010

Since 2010, he has been with National Taiwan University of Science and Technology, Taipei, Taiwan, where he is currently an assistant professor in the department of computer science and information engineering. His current research interests include digital image and video processing, computer vision, and multimedia networking.

Prof. Hua is a member of Eta Kappa Nu and Phi Tau Phi, as well as a recipient of MediaTek Doctoral Fellowship. He served as a guest editor for IEEE MMTC R-Letters in 2012. He also chaired the Multimedia Computing and Communications (MCC) symposium at IEEE International Conference on Computing, Networking and Communications (ICNC) in 2013. He co-organized a special session at Asia-Pacific Signal and Information Processing Association (APSIPA) on Emerging Technologies in Multimedia Communications in 2013. He contributed as a tutorial speaker on Recent Advances in Sensing Techniques of Visual Semantics at The Pacific-Rim Conference on Multimedia (PCM), 2013.

Introduction to Iris Recognition

Yung-Hui Li

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ABSTRACT

In the last few decades, biometric recognition has drawn significant attention due to the vast applications in the field of law enforcement, surveillance, border control and national security. In 2011, IBM predicted that biometric technology would be one of the five big things that impact human lives in the next five years. In September 2013, Apple ships the first iPhone that has a built-in fingerprint sensor which is able to verify the user's identity without using password. Such device, combined with the emergence of mobile e-commerce, may greatly enhance the user experience and further bring a revolution on commercial behavior of both customer and retailer.

There exists many modalities of biometric recognition, including face, fingerprint, voice, signature ...etc. Among all the usable characteristics for biometric recognition, the pattern of iris texture is one of the few characteristics believed to be the most distinguishable among different people. In fact, according to what Prof. J. Daugman published in 2004 on IEEE Transaction, the probability of false matching rate of iris recognition can achieve to the order of 10⁻¹⁰. Such high precision makes iris recognition useful for large scale deployment for real world problem. In fact, it has been deployed in immigration checkups in airport in one of the middle-east countries for several years.

Most of the iris recognition system follows the basic framework built by Prof. J. Daugman in 2004. In this talk, I will briefly review the standard process (stages) of iris recognition. Currently, less constrained and long range iris recognition starts to get more attentions in both academia and industry. There are new challenges that the researchers and engineers are facing today for less constrained iris recognition system. The optical design of such system needs to be re-considered. New image processing technique has been developed. Such issues will also be addressed in this talk.

BIOGRAPHY

Yung-Hui Li received his BS degree from Department of Electrical Engineering in National Taiwan University (NTUEE) in Taipei, Taiwan (R.O.C) in 1995, MS degree from Department of Computer and

Information Science in University of Pennsylvania (UPenn) in 1998, and PhD degree from Language Technology Institute, School of Computer Science in Carnegie Mellon University (CMU) in 2010. He is currently an assistant professor in Department of Computer Science and



Information Engineering, National Central University, Taoyuan, Taiwan (R.O.C).

His research focused on issues about long-range iris recognition, including extended DOF for iris image acquisition, blur iris image segmentation, iris mask generation, and iris image super-resolution. Other research topics include face recognition, computer vision, pattern recognition and machine learning. He has authored one paper in IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), more than 10 conference papers and co-authored 5 book chapters in this field.

Assisting Digital Content Creation: from a Computer Graphics Perspective

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ABSTRACT

Computer graphics (CG) techniques have been a driving force for digital entertainment in recent years. They have been applied to computer animation, computer games, special effects, virtual reality, visualization, etc. Among these applications, CG content authoring plays an important role and many commercial tools have been developed. These tools are great, but may not be user-friendly for artists or novice users because special training is usually required or/and the designing process may not be intuitive. In this talk, I'll introduce some preliminary attempts in my research group that aim to assist artists creating CG content, including interactive lighting design, artist-friendly material design, generating pointillism paintings from photos, and physics-based cosmetic rendering.

BIOGRAPHY



Wen-Chieh Lin received the BS and MS degrees in control engineering from National Chiao Tung University, Hsinchu, Taiwan, in 1994 and 1996, respectively, and the PhD degree in robotics from Carnegie Mellon University, Pittsburgh, in 2005. He joined the Department of Computer Science, National Chiao Tung University in 2006 and is an associate professor now. Dr. Lin's research interests include computer graphics, computer animation, and computer vision. In recent years, he works on physics-based animation, perception-based graphics, real-time rendering, non-photorealistic rendering, and visualization. He is a member of the IEEE and the ACM and also a founding member of Taipei ACM SIGGRAPH.

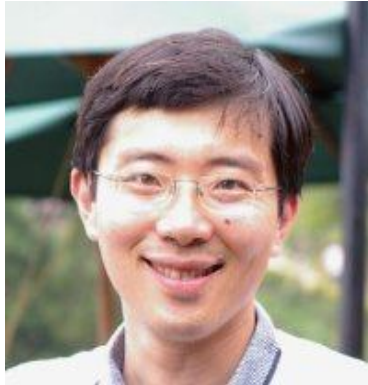
Technical Session D2-W4-T3: Ubi/ Cloud Computing, High Performance Computing (HPC)/ Data Center, Cyber Security, and Digital Forensics

Workshop Co-Chair and Session Chair

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BIOGRAPHY



Optimally Placing Replicas in Chord Peer-to-Peer Networks

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ABSTRACT

Peer-to-peer (P2P) overlay networks are widely employed in distributed systems. Particularly, the number of hops required by a node for searching an object is the fundamental search cost of a P2P network. Hence, since placing replicas can efficiently reduce such a cost of the whole system, how to deploy replicas to reduce it as much as possible becomes a critical problem of P2P networks. In the literature, most existing replica placement strategies arrange replicas at nodes near the node containing the considered object. In this paper, we formally demonstrate that for the deterministic structured P2P network Chord, we can allocate replicas at those nodes that are closest to the target node in the identifier space to reduce the most the total number of hops required by all nodes to reach a copy of the object during the courses routing to the target node.

BIOGRAPHY



Jichiang Tsai received his BS degree in electrical engineering from National Taiwan University, Taipei, Taiwan in 1991. Then he started his graduate study at the same university, and received the PhD degree in electrical engineering in 1999. He served as a postdoctoral research fellow in the Institute of Information Science, Academia Sinica, Taipei, Taiwan from 1999 to 2001. In 2002, he joined the Department of Electrical Engineering, National Chung Hsing University, Taichung, Taiwan, as an assistant professor, and then was promoted to associate professor in 2005. His current research interests include parallel and distributed systems, dependable computing, embedded systems, security and computer networks.

Mutual Assistant Networks (MAN): Connecting People and Machines

Ren-Song Ko

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ABSTRACT

The proliferation of social networks and Internet-enabled mobile devices has allowed people to stay in touch with friends, and thus open up the potential of many novel human-centric applications. This talk presents one such application called Mutual Assistant Network (MAN). MAN allows people to ask for assistance from other people in a specific region, and share the local and timely information that cannot be obtained in time from the Internet. In addition, this talk describes the design and implementation of MAN on the Android platform. In order to minimize the necessity of installing software on mobile devices, inquirers submit their queries in web pages which repliers may use any web browsers to view and respond.

This talk also presents the Mobile Device Web Access Framework (MDWAF) that allows a web page to access underlying hardware for repliers to create responses. MDWAF provides a richer SAAS (software as a service) framework that allows programmers to develop the web applications that are currently not allowed due to the security reasons. MAN is still an undergoing project that may promote social interaction and thus extend the senses of human beings to a normally inaccessible location via knowledge sharing.

BIOGRAPHY



Ren-Song Ko received BS and MS degrees in electrical engineering from National Taiwan University in 1990 and 1992, respectively, and MS and PhD degrees in computer science from Michigan State University in 1998 and 2003, respectively. In 2003, he joined the Department of Computer Science and Information Engineering at National Chung Cheng University, Taiwan, where he is currently an associate professor. His research interests include computation complexity, distributed systems, mobile computing, and sensor networks.

Dr. Ko has published several journal papers on massively-dense sensor routing problems and conducted several software development project on combining sensor and social networks, i.e., connecting people and machines.

Near-Duplicate Subsequence Matching for Video Streams

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ABSTRACT

We study the efficiency problem of video stream near-duplicate monitoring in a large-scale repository. Existing stream monitoring methods are mainly designed for a short video to scan over a query stream; they have difficulty being scalable for a large number of long videos. We present a simple but effective algorithm called incremental similarity update to address the problem. That is, a similarity upper bound between two videos can be calculated incrementally by leveraging the prior knowledge of the previous calculation. The similarity upper bound takes a lightweight computation to filter out unnecessary time-consuming computation for the actual similarity between two videos, making the search process more efficient. We integrate the algorithm with inverted indexing to obtain a candidate list from the repository for the given query stream. Meanwhile, the algorithm is applied to scan each candidate for locating exact near-duplicate subsequences. We implement several state-of-the-art methods for comparison in terms of accuracy, execution time, and memory consumption. Experimental results demonstrate the proposed algorithm yields comparable accuracy, compact memory size, and more efficient execution time.

BIOGRAPHY



Chih-Yi Chiu received the B.S. degree in information management from National Taiwan University, Taiwan, in 1997, and the M.S. degree in computer science from National Taiwan University, Taiwan, in 1999, and the Ph.D. degree in computer science from National Tsing Hua University, Taiwan, in 2004.

From January 2005 to July 2009, he was with Academia Sinica as a Postdoctoral Fellow. In August 2009, he joined National Chiayi University, Taiwan, as an assistant professor in the Department of Computer Science and Information Engineering. He is currently an associate professor. His research interests include multimedia retrieval and human-computer interaction.

Dr. Chiu is a member of IEEE. In 2003 and 2008, he received the good paper awards of the Image Processing and Pattern Recognition (IPPR) Society of Taiwan. In 2009, he received the excellent paper award of National Computer Symposium (NCS), and excellent patent award of Industrial Technology Research Institute of Taiwan (ITRI).

Technical Session D2-W4-T3: Ubi/ Cloud Computing, High Performance Computing (HPC)/ Data Center, Cyber Security, and Digital Forensics

Reliable Transmissions in Large Scale Sensor Networks for Intensive-Data Medical Monitoring Applications

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ABSTRACT

Sensor network technologies, such as Zigbee and Bluetooth, are expected to have an explosive growth in medical monitoring applications because these technologies possess the advantages of low cost, safe power strength and easy deployment. However, as the demand of medical monitoring applications grows, these applications require much more reliable transmissions carrying intensive sensor data deployed in large scale of monitoring areas, especially for life-critical medical data like Electrocardiography (ECG). We first propose new solutions improving Zigbee Stack without modifying IEEE 802.15.4 and medical applications. The new solutions resolve the bottleneck problem of Zigbee Coordinator and also provide backup node for real-time recovery of Coordinator failure. Second, we propose a new mesh routing services for sensor networks, including Zigbee and Bluetooth, and this services can optimize data flows for the whole network in real time. In addition, we implement the new solutions in embedded systems and NS2 simulation, and test them by using recorded real medical data, such as Electrocardiography (ECG). We implement medical applications and demonstrate that the new solutions can deliver intensive medical data from the large scale sensor network and display them in real time. The experiment results show our proposed solutions can provide reliable large area medical data monitoring services, which cannot be delivered by original sensor technologies.

BIOGRAPHY



Chinyang Henry Tseng received the Ph.D. degree in computer science from University of California, Davis, CA, in 2006. He is currently an Assistant Professor with the Department of Computer Science and Information Engineering, National Taipei University, Taipei, Taiwan. Before joining NTPU, he worked as Senior Software Engineer at Cisco Systems Inc. in San Jose CA, USA, and Senior Research Scientist at Telcordia, Taipei, Taiwan. His current research interests include wireless ad hoc and sensor networks, intrusion detection, network routing, web application security, and botnet detection. His major related publication is: Chinyang Henry Tseng, "Coordinator Traffic Diffusion for Data-Intensive Zigbee Transmission in Real-time Electrocardiography Monitoring", IEEE Transactions on Biomedical Engineering, to appear.

Technical Session D2-W1-T4: Digital Media, Culture, and Society

Workshop Co-Chair and Session Chair

Yuh-wen Wang

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BIOGRAPHY



Separation, Improvisation and Creation Using Signal Processing Tools

Alvin Wen-Yu Su

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ABSTRACT

Many music lovers might want to know how David Oistrach played in his recording of Beethoven violin concerto, and what distinguishes him from Wolfgang Schneiderhan. Many jazz music lovers may be attracted by John Coltrane's saxophone playing, but might also want to know if there are more possibilities of improvisation in some of his recordings. For Guqin music, styles and expressions can be freely determined by the players.

All the above require lots of digital audio signal processing tools. In this talk, I will introduce some useful tools developed by SCREAM lab. A note separation method is applied to separate violin part from a concerto recording. A source filter model is used for sound re-synthesis. A Guqin Jien-Tzu Pu and synthesis iOs APP will be shown. Some interesting sound demos can also be heard.

BIOGRAPHY



Dr. Alvin Wen-Yu Su was born in Kaohsiung, Taiwan, 1964. He received his M.S. degree and Ph.D. degree from NYU-POLY, Brooklyn New York U.S.A., both in electrical engineering, 1993.

He was a visiting scholar in CCRMA, Stanford University, California, U.S.A from 1993 to 1994. He was an engineer of IRTI, Taiwan from 1994 to 1995. From 1995 to 1999, he was an associate professor of CSIE, Chung-Hwa University, Hsin-Chu Taiwan. Since 2000, he is with CSIE, National Cheng-Kung University, Tainan, Taiwan. He is currently a professor and also the director of SCREAM Lab. His research interests include multi-core architecture design, music signal analysis/synthesis, and physiology signal recognition.

New interface Designed for Innovative Musical Expression

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ABSTRACT

The advance of digital technology opens a vista of unlimited possibilities in the development of musical instrument, interface, and controller. Research group from Music Technology Lab at National Chiao Tung University has been dedicated to novel interface design for musical expression and artistic performance since 2009.

Live interactive electronic music performance could be achieved by iPad swaying, by performer's Bain wave, by elastic band manipulating, or by ball throwing.

Based on various musical purposes and needed, a series of newly minted interfaces and controller were then invented including SurrSound, Swing Synth, Elastic Interface Synthesizer, Technical Recorder, iPad-Controlled Multi-Channel Mixing System, EEG-Based performing Interface, Smelting, Magxer, SPMC, SDCC1, Sound Low Fun, and Light Sensor Piano.

This paper will introduce some interfaces developed at MT Lab.NCTU, examine the musical roll and functions of those interfaces, and discuss the perceptual and cognitive issues in the design of musical interfaces.

BIOGRAPHY



Yu-Chung Tseng, D.M.A., associate professor of computer music composition, director of music technology master program and laptop orchestra at National Chiao Tung University. His music has been awarded prizes from Pierre Schaeffer International Computer Music Competition- 1st Prize in 2003, 3rd Prize in 2007, Musica Nova International Electroacoustic Music Competition- 1st Prize in 2010. Other international recognitions include Bourges Competition, Città di Udine Composer Competition, Metamorphoses Competition, ICMA Asia-Oceania Regional Composition Competition. He has received many commissions from Taipei City Chinese Orchestra, Dance Forum, National Chiang Kai-Shek Cultural Center, and Taipei Dance Circle..etc.

His works have been performed at countries including Australia, Austria, Singapore, Dusseldorf, U.K., Korea, U.S.A., China, Japan, Belgium, Czech, Israel, Slovenia, Italy. His music can be heard on 12 labels including Electroacoustic Music of Yu-chung Tseng (ISCM-Taiwan), CDCM (U.S.A.), Discontact iii(Canada), Pescara(Italy), Contemporanea (Italy), Metamorphoses labels(Belgium), SEAMUS (USA), KECD2 (Demark), Musica Nova (Czech), and ICMA.

Principles of Designing Interactive Electroacoustic Music System

Chien-Wen Cheng

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ABSTRACT

The development of real-time audio analysis and synthesis, and the need for better synchronization between live acoustic instrument and computer-generated sound, brings forth interactive music performance in which the computer interprets a live performance and generates its responses in real-time. Since Philippe Manoury's Jupiter (1987), the earliest example of interactive music in such sense, most works in this genre that make use of pitch-based score follower, take wind instruments as the live input because of the more stable results in pitch tracking. For polyphonic instruments, different strategies regarding events triggering should be adopted to ensure better synchronization.

In this lecture, "Chrysanthemum in the Rain" for marimba and interactive music system with Max/MSP (2013), the latest interactive composition of Chien-Wen Cheng, will be used as an example to demonstrate the design principles and basic structures of interactive music systems as well as to present some other possibilities of synchronization and interaction between live input and computer in addition to pitch-based score following. Topics of audio analysis, musical gesture detection, sound effects, playback, mixing, and recording modules will be covered regarding interactive music performance. In addition, issues of music gesture detection to meet the timbre quality of different instruments will also be discussed.

BIOGRAPHY



Chien-Wen Cheng, born in 1972, received the Doctor of Musical Arts degree in Music Composition at the University of North Texas in 2007, specializing in interactive computer music composition. Currently he works as a full-time assistant professor in the Graduate Institute of Interactive Media Design at the National Taipei University of Technology in Taiwan. Besides, he also teaches adjunctively in the Music Department at Taipei University of Education.

He has won numerous composition awards and honors including: selected work in the 2013 NTSO commission competition (Taiwan); selected work in 2012 TMC international Composition Competition (Taiwan); third prize in 2011 NTSO orchestral composition competition (Taiwan); first prize in the "2007 Voices of Change Young Composers Competition" (USA); second prize in the "2006 Fine Arts Creation Award" (Taiwan); fourth prize in "The 3rd Percussion Music Composing Competition" (Taiwan, 2005); selected work in the 2002 orchestral call-for-scores competition in "Tune in to Taiwan – Taiwan Composers Series";

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

fourth prize in the “2000 Hakka Vocal Music Composition Contest” (Taiwan); first prizes (2005, 2006) and second prize (2007) in the On-line Art Creativity Competitions (Taiwan); ICMC 2008 Regional Composition Prize (UK); honorary mention in 2011 Musica Nova International Competition of Electroacoustic Music (Czech), and finalists in 2010 Musica Nova International Competition of Electroacoustic Music (Czech), 2010 Città di Udine International Composition Competition of Electroacoustic Music (Italy), 2009 Bourge International Composition Competition (France), and VI Concurso Internacional de Miniaturas Electroacusticas 2008 (Spain). His electroacoustic works were selected to be included in ICMC, SEAMUS, and MIT Computer Music Journal DVD and CD releases.

Dr. Cheng started to expand his research and creative works in interdisciplinary performing arts projects since 2007, programming and composing for interactive dance performance projects, such as Nexus (sponsored by Digital Arts Center), Nexus II (sponsored by Council of Cultural Affairs), and Thinking of the Past (sponsored by Ministry of Culture). He has been selected as one of the committee members to evaluate the sponsored technology and performing arts projects in 2013 by the Ministry of Culture. In addition, he is a member of council for Taiwan Computer Music Association. His rich performance record has made him won the ASCAP Plus Award annually from 2006 to 2013. For more information about Dr. Cheng’s research and creative works, visit his website: <http://cw-cheng.blogspot.tw/>

Emotion-based Music Analysis and Beyond

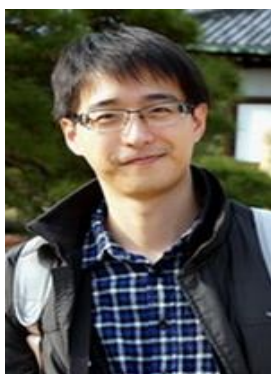
Yi-Hsuan (Eric) Yang

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Research Center for IT Innovation (CITI)
Academia Sinica
(中央研究院資訊科技創新研究中心楊奕軒博士)

ABSTRACT

Automatic recognition of the perceived emotion of music allows users to retrieve and organize their music collections in a fashion that is content-centric and intuitive. A typical approach to music emotion recognition categorizes emotions into a number of classes and applies machine learning techniques to train a classifier. This approach, however, faces a granularity issue that the number of emotion classes is too small in comparison with the richness of emotion perceived by humans. In this talk, I would introduce some research that takes a very different perspective and views emotions as points in a 2-D space spanned by two latent dimensions: valence (how positive or negative) and arousal (how exciting or calming). In this approach, music emotion recognition becomes the prediction of the valence and arousal values of a song corresponding to a point in the emotion plane. This way, the granularity and ambiguity issues associated with emotion classes no longer exist since no categorical class is needed. Moreover, because the 2D plane provides a simple means for user interface, new emotion-based music organization, browsing, and retrieval can be easily created for mobile devices that have small display area.

BIOGRAPHY



Yi-Hsuan Yang received the Ph.D. degree in Communication Engineering from National Taiwan University, Taiwan, in 2010. Since 2011, he has been affiliated with the Research Center for IT Innovation, Academia Sinica as a tenure-track Assistant Research Fellow. He is the leader of the Music and Audio Computing Lab in Academia Sinica. His research interests include music information retrieval, affective computing, and machine learning. He was awarded the 2011 IEEE Signal Processing Society (SPS) Young Author Best Paper Award, the 2012 ACM Multimedia Grand Challenge First Prize and the 2012 Academia Sinica Career Development Award. He is a co-author of the book 'Music Emotion Recognition' (CRC Press 2011) and a tutorial speaker on music affect recognition in the International Society for Music Information Retrieval Conference (ISMIR 2012). His work on context-aware music recommendation was awarded the Project for Excellent Junior Research Investigators by the National Science Council of Taiwan in 2013.

Technical Session D2-W2-T4: Broadband and Wireless Computing, Network Technologies, Services and Applications

Workshop Co-Chair and Session Chair

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BIOGRAPHY



P.C. Ku is the associate professor of electrical engineering and computer science at the University of Michigan. He received all his degrees in electrical engineering including a BS from the National Taiwan University and a PhD from the University of California at Berkeley. Dr. Ku has a long career in the field of optoelectronics, starting in 1995 when he joined the lab of Professor Ching-Fuh Lin of the National Taiwan University as a research assistant. After two years of military service as a Navy ensign, he became a full-time student again in 1998 under the guidance of Professor Connie Chang-Hasnain at the University of California Berkeley. His doctoral dissertation is on semiconductor slow light devices. He was among the first to show that the speed of light can be significantly reduced in a specially designed semiconductor structure. As a result of

his PhD research, he was awarded the Ross Tucker Memorial Award in 2004. During his PhD study, Dr. Ku was the recipient of the Berkeley Fellowship. After receiving his PhD, Dr. Ku spent two years both as a postdoctoral researcher for the DARPA Center for Optoelectronic Nanostructured Semiconductor Technology and as a senior engineer for Intel. His research shifted from telecommunication devices to optical lithography and phase-change memory. It was during this time Dr. Ku conceived the idea that advanced lithography technology can be revolutionary to optoelectronic devices. In 2006, he returned to academia as an assistant professor of electrical engineering and computer science at the University of Michigan. His research has since been focused on creating impacts for optoelectronic devices in the emerging areas of energy, quantum, and biomedical science. He has worked on a variety of projects funded by NSF, DARPA, and DOE including LEDs, solar cells, nanoscale lasers, biosensors, and single photon sources. He received the DARPA Young Faculty Award in 2010.

Technical Session D2-W2-T4: Broadband and Wireless Computing, Network Technologies,
Services and Applications

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ABSTRACT

BIOGRAPHY



Geographic Routing with Enhanced Local Information for Wireless Networks

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ABSTRACT

Geographic routing relies on position information for making routing decisions. Among various approaches, greedy forwarding, traditionally viewed as a locally optimal strategy, utilizes only local position information to bring a packet closer to destination at each hop. However, it may fail and stop at a node of local minimum where no neighboring node is closer to the destination than the node itself. On this occasion, the popular solution is face routing on a planar graph, which also utilizes only local position information with some memory of one anchored node/position and edge visited previously. Thus, greedy forwarding combined with planar graph routing is able to achieve reliable packet delivery in wireless networks without suffering the overheads for routing table maintenance or route discovery processes, typically raised by network address based routing. However, it is at the expense of path hop counts particularly when network nodes are sparse, an unappealing factor for time-sensitive traffic.

Proposed in our early study, the strategy of quasi-greedy forwarding only requires an extra complexity at each node to compute a representative angle that characterizes the node and to interchange with neighborhood nodes the angle information in addition to position information needed normally. It reduces path hop length and outperforms the greedy one through utilizing the angle information to partition the set of candidate relay nodes into two subsets and operating in the two subsets with discrimination.

This talk presents our recent results. With thoroughly exploiting information on the representative angles, our novel routing scheme not only selects the next relay node more judiciously than the quasi-greedy one but also allows face routing to walk on a virtually trimmed planar graph. Consequently, routing path length significantly shortens as compared to GPSR.

BIOGRAPHY

Jung-Tsung Tsai (S' 94 - M' 95) received his B.S., M.S., and Ph. D. degrees from the National Tsing-Hua University, the National Taiwan University, and the University of California, San Diego, in 1985, 1987, and 1995, respectively, all in electrical engineering. He served in Taiwan Marine Corps from 1987 to 1989. He taught in the Department of Electronic Engineering, Kuang-Wu Institute of Technology, Taipei, from 1989 to 1991. He was a Teaching Assistant from 1992 to 1993 and a Research Assistant from 1993 to 1995 and a Postdoctoral Researcher from 1995 to 1996 in the Department of Electrical and Computer Engineering, University of



California at San Diego, La Jolla. He worked in the Industrial Technology Research Institute (ITRI), Hsinchu, Taiwan as a researcher developing web-based network management tools from 1996 to 1997. He joined the faculty of National Taiwan Normal University in 1997, where he is currently an associate professor in the department of computer science and information engineering. Dr. Tsai's research interests are in the areas of opportunistic scheduling, routing, mobility management, and power control.

Packet Scheduling for Multiuser MIMO Systems

Chih-Wei Huang

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ABSTRACT

Multiuser multi-antenna technology (MU-MIMO) is one of key enabling features to future wireless networks. It allows the spatial multiplexing gain at the base station to be obtained without the need for multiple antenna terminals, while power saving and cost is kept on the infrastructure side. In fact, the long-studied packet scheduler will have to deal with new challenges such as MU-MIMO user pairing and single-user vs. multiuser mode selection for the best performance in terms of, for instance, overall throughput. As a comprehensive downlink transmission scheduling structure, we have to consider QoS scheduling, grouping performance prediction, MIMO mode switching, and grouping optimization.

In this talk, we will highlight the key issues toward advanced packet schedulers, a general scheduling structure, and mode switching evaluation in LTE-A settings.

BIOGRAPHY



Chih-Wei Huang received the B.S. degree from National Taiwan University, Taipei, in 2001, the M.S. degree from Columbia University, New York, in 2004, and the Ph.D. degree from University of Washington, Seattle, in 2009, all in electrical engineering.

He joined the Department of Communication Engineering, National Central University, Jhongli, Taiwan, in 2010. He is currently an Assistant Professor heading the Information Processing and Communications (IPC) Laboratory. From 2006 to 2009, he was an intern researcher at Siemens Corporate Research and Microsoft Research. He is the author of papers in a broad range of areas, including wireless networking, multimedia communications, digital signal processing, and information retrieval.

The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Technical Session D2-W2-T4: Broadband and Wireless Computing, Network Technologies,
Services and Applications

Li-Chun Wang

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BIOGRAPHY



The EITA-New Media 2013, Saturday-Sunday, November 23-24, 2013
National Taiwan University, Taipei, R.O.C. (Taiwan)

Technical Session D2-W3-T4: New Media/ Multimedia, Machine Learning, Web, and Entertainment Technology

Jia-Yu (Tim) Pan

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BIOGRAPHY



Mobile Collaborative Learning and Cognitive Style Grouping

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(中央大學網路學習科技研究所陳攸華講座教授)

ABSTRACT

Mobile devices are widely applied to support learning. Student learning is being shifted from individual learning to collaborative learning. In other words, mobile collaborative learning is a current trend in educational settings. On the other hand, students have various characteristics, among which cognitive styles play an important role. This study aims to investigate how member grouping affects students' reactions to mobile collaborative learning from a cognitive style perspective. The results suggest that there is a need to provide Serialists with additional help when they use mobile collaborative learning. Furthermore, the findings indicate that the heterogeneous groups show more positive reactions to the mobile collaborative learning, demonstrate better learning performance and use more effective learning strategies than the homogeneous groups. The students' learning performance is consistent with their behavior and perceptions.

BIOGRAPHY



Dr. Sherry Y. Chen is currently a Chair Professor at Graduate Institute of Network Learning Technology, National Central University, Taiwan and a Visiting Professor in the School of Information Systems, Computing and Mathematics at Brunel University, UK. In May 2010, she was granted an Outstanding Scholar Award (傑出人才講座) from the Foundation for the Advancement of Outstanding Scholarship (FAOS, 傑出人才發展基金會). Her PhD, which was obtained from the University of Sheffield, UK in 2000, examined relationships between individual differences and hypermedia learning. Her main research interest follows her PhD work to investigate how to develop individualized information space that can accommodate users' individual differences, including collaborative learning, digital libraries, game-based learning, mobile learning, and web-based learning. She has more than 100 publications in these areas.

Designing Tangible User Interfaces With Multitouch Mobile Devices

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ABSTRACT

Tangible user interfaces (TUIs) enable users to interact with digital information by directly interacting with physical objects. Multi-touch interface, another type of direct manipulation interface, can be combined with tangible user interface to provide intuitive interaction for the masses. In this talk, I will introduce a range of TUI applications from tabletops to tablets. And then, I will introduce TUIC, a technology that enables tangible interaction on capacitive multi-touch displays without requiring any hardware modifications. I will introduce the design of TUIC-2D, TUIC-frequency, and the two-way TUIC tag to support bidirectional tangible interaction. The discussion will then converge on a rough sketch of future works for natural user interface on mobile devices.

BIOGRAPHY



Dr. N.H. Yu is an Assistant Professor at the Department of Computer Science, National Cheng Chi University, Taipei, Taiwan. He received his Ph.D. degree from National Taiwan University in 2011. His research concerns natural user interface on tabletop systems and mobile platform. Further information can be found at <http://www.cs.nccu.edu.tw/~jonesyu>.

An Example-based Approach for Face photo-sketch synthesis

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ABSTRACT

Automatically synthesizing the facial sketches of a facial image is highly challenging since facial images typically exhibit a wide range of poses, expressions and scales, and have differing degrees of illumination and/or occlusion. When the facial sketches are to be synthesized in the unique sketching style of a particular artist, the problem becomes even more complex. This study develops an automatic facial sketch synthesis system based on a novel direct combined model (DCM) algorithm carrying three major advantages: First, DCM approach takes account of both the local details of each facial feature and the global geometric structure of the face, and thus the synthesized sketches more accurately mimic the caricatures drawn by the artist. Second, although the training database contains only full-frontal facial images with a neutral expression, sketches with a wide variety of facial poses, gaze directions and facial expressions can be successfully synthesized. Third, previous synthesizing proposals are heavily reliant on the quality of the texture reconstruction results, which in turn are highly sensitive to occlusion and lighting effects in the input image. DCM approach accurately produces lifelike synthesized facial sketches without the need to restore the texture information lost as a result of such unfavorable conditions.

BIOGRAPHY



Dr. C. T. Tu is an Assistant Professor at the Department of Computer Science, Tamkang University, Taipei, Taiwan. She received the Ph.D. degree from National Cheng Kung University, Tainan, Taiwan 2010. Her interests include digital image processing, computer vision, and pattern recognition.

NPR Illustrations of Natural Flows in Oriental Painting

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ABSTRACT

Rivers and falls are important elements in oriental paintings. They are generally illustrated using strokes to illustrate water flow. The dispersion of ink can help highlight the surface spray in order to express smooth water lines and coherent diffusion. However, it is not trivial to simultaneously consider flow physics and animate temporally and spatially consistent strokes among consecutive frames. In this paper, we propose an interactive system with which artists can generate images that not only have the appearance of the oriental paintings but also with spatially and temporally coherent illustrations of water flows in the scene. Our system provides an intuitive user interface to construct a virtual world with mountains, plains, rocks, rivers, waterfalls, and other representative objects typically seen in oriental paintings. The artist can also specify flow patterns of the water, and the system automatically computes a smooth flow field according to water boundaries and obstacles in the water as well as user-specified flow patterns. Strokes respecting the flow field are placed in a spatially and temporally coherent fashion. The main contributions lies in the integration of the Navier-Stokes equations and field smoothing techniques for the creation of an oriental painting flow animation. The Navier-Stokes equations is used to simulate the water flow to create physically correct flow fields and the field is smoothed with a tensor field smoothing technique and a Laplacian smooth operator for reducing the possible field inconsistencies and rendering artifacts when multiple flow patterns are specified. Finally, the constructed field would be used to animate strokes in an oriental painting with smoothness and temporal coherence. The interactive system can be used to quickly create an oriental painting world containing animated rivers and falls drawn with spatial and temporal coherence. The overall flow animation is pleasant and delivers the natural, endless and balanced spirit without the flickering artifacts commonly existing in a stroke-based non-photorealistic rendering (NPR) animation.

BIOGRAPHY



Yu-Chi Lai received the B.S. from National Taiwan University, Taipei, R.O.C., in 1996 in Electrical Engineering Department. He received his M.S. and Ph.D. degrees from University of Wisconsin—Madison in 2003 and 2009 respectively in Electrical and Computer Engineering and his M.S. and Ph.D. degrees in 2004 and 2010 respectively in Computer Science.

He is currently an assistant professor in NTUST and his Research interests are in the area of graphics, vision, and multimedia. The following is the representative publications: 3D video communications.

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Technical Session D2-W4-T4: Ubi/ Cloud Computing, High Performance Computing (HPC)/ Data Center, Cyber Security, and Digital Forensics

Workshop Co-Chair and Session Chair

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(中央大學資訊工程系教授兼軟體研究中心主任梁德容教授)

BIOGRAPHY



**On Design and Implementation of E-Invoice/E-Receipt Delivery
Specification for B2C transactions in Physical Stores: Take Taiwan
Uniform e-Invoice as Example**

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ABSTRACT

To simplify redundant transaction procedures, to shorten transaction time, and to reduce paper wasting, several countries have begun to promote e-invoicing recently. The major scenarios of invoices can be classified into B2B, B2G, and B2C based on types of invoice receivers. This study focuses on the e-invoices delivery for B2C transactions in physical channels. In this case, a seller may request a customer to show a carrier while the customer checks out. Then, the seller can use the identity of the carrier to represent the buyer of an e-invoice. However, a customer may still need a paper-based receipt to confirm the accuracy of services and goods charged. The receipts contradict the paper wasting reduction objective of e-invoicing. In light of this, this study proposes a scheme and associated e-invoice specification for a seller to deliver a B2C e-invoice to a customer in physical channel with technologies for nearby devices communications. The proposed scheme enables customers to ensure the authenticity of the sellers that issue the received e-invoices. Customers can further keep the e-invoices as receipts rather than print the receipts out.

The proposed scheme has been adopted by Taiwan as the e-invoices exchange specifications for consumers and registers in physical stores. Therefore, this study can hopefully contribute to share the Taiwan experiences in promoting B2C e-invoice delivery in physical channel and realize the objective of paper consumption reduction of e-invoicing for B2C transactions.

This study further implements the proposed with SNEP, which is a standard for NFC P2P communication. Based on the results of experiment, a customer can use smart phones on the shelf to receive an NDEF message with an e-invoice in reasonable time. Therefore, the study also contributes to provide implications for NFC e-payment and e-ticketing applications provision.

BIOGRAPHY

Shi-Cha Cha received his B.S. and Ph.D. in information management from the National Taiwan University in 1996 and 2003. He is currently an associate professor at the Department of Information in the National Taiwan University of Science and Technology, where he has been a faculty member since 2006.

From 2003~2006, he worked at PricewaterhouseCoopers, Taiwan. When he left



PricewaterhouseCoopers in 2006, he was a Senior Manager in the department of Performance Improvement. He helped several major Taiwan organizations to establish their information security management systems in those years. In addition to publishing several papers about information security risk management, NFC security, and privacy enhancing technologies. He engaged in several big projects in Nation Taiwan University of Science and Technology recently. Major projects include establishing Web application source codes security inspection service for the TaiWan Information Security Center (TWISC@NTUST) and designing security specifications for Taiwan e-invoicing. His current research interests are in the area information security management, identity management, e-invoicing, and NFC security.

Prof. Cha is a certified PMP, CISSP, CSSLP, and CISM and a member of ACM, IEEE, and IEICE.

EagleEye: Towards Mandatory Security Monitoring in Virtualized Datacenter Environment

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ABSTRACT

Virtualization is a generic approach to achieve system-level consolidation in datacenter environments. It brings together systems running diverse applications and transforms a datacenter into a so-called virtualized datacenter (VDC). A VDC naturally inherits all the security threats faced by each of the hosted systems. In addition, the diverse composition of systems in a VDC implies a high likelihood of inconsistent and/or ineffective security policy implementation, which makes it difficult to ascertain if a given security threat has indeed be ruled out per the built-in security isolation mechanism at the VDC infrastructure layer. It is therefore important that a VDC operator should remain vigilant of the security threats at all times and have the ability to apply security monitoring on critical systems in the environment as a means to track and deter the threats that could jeopardize the operation of the VDC.

Security monitoring in VDC environment can be intuitively implemented through deploying security monitors such as anti-virus scanners within each virtual machine (VM) (also referred to as a guest system) hosted by the VDC. However, with thousands or even more number of customized VMs in a VDC, it will be a quite expensive process for a VDC operator to deploy and manage security monitors in each of the VMs. In addition, VMs in a large-scale VDC are often managed by individual tenants and not by the datacenter operator. One will have to rely on individual tenants to deploy and manage the security monitors in their respective VMs. Obviously, this approach is problematic since a negligent tenant can inadvertently disable the security monitor, and a malicious tenant may even attempt to tamper with the security monitor.

Motivated by the above difficulties, we propose the EagleEye mandatory security monitoring approach for VDC environment. In the approach, security monitors are placed externally with respect to the guest VMs. There is no requirement for installing guest components in the VMs. It requires no attention or cooperation from the VM tenants. The approach also allows automated deployment and management of security monitors in a VDC environment. To demonstrate the feasibility of the proposed approach, we built a prototype on-access malware detection system for guest VMs in a VDC.

BIOGRAPHY

Yu-Sung Wu received B.S. in electrical engineering from National Tsing Hua University, Hsinchu, Taiwan in 2002, M.S. and Ph.D. in electrical and computer engineering from Purdue University, West Lafayette, Indiana in 2004 and 2009.

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In 2009, he joined National Chiao Tung University in Hsinchu, Taiwan, where he is currently an assistant professor of the computer science department and is in charge of Laboratory of Security and Systems. Previously, he had worked at Purdue CERIAS research center conducting research on the design of automated response system for distributed applications. He had also worked at Avaya Labs in New Jersey developing prototypes of intrusion detection system for VoIP environment. Prof. Yu-Sung Wu is a member of IEEE and ACM. He had served on the program committees of several conferences including DSN, ICDCS, SERE, and etc.

Detecting and Patching Web Application Vulnerabilities

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ABSTRACT

Web application security becomes a critical issue as more and more web applications appear and serve common life and business routines in recent years. It is known that web applications are vulnerable due to software defects. Open to public users, vulnerable websites may encounter lots of malicious attacks from the Internet. We present a new web service platform where system developers can detect and patch potential vulnerabilities of their web applications online. Taking advantage of static string analysis techniques, our analysis ensures that the patched programs are free from vulnerabilities with respect to given attack patterns. Specifically, we integrate the service front end with program visualization techniques, developing a 3D interface/presentation for users to access and view the analysis result under visualization environment with the aim of improving users' comprehension on programs, especially how vulnerabilities get exploited and patched. We report our analysis result on several open source applications, finding and patching various unknown/known vulnerabilities.

BIOGRAPHY



Fang Yu is the Assistant Professor of the Department of Management Information Systems, National Chengchi University. He received his Ph.D. Degree in Computer Science from University of California, Santa Barbara in June 2010. His research interests broadly span software verification, security, formal methods, automata theory, and mobile and cloud computing. Fang Yu received his Bachelor's Degree in 1998 and Master's Degree in 2000 from the Department of Information Management at the National Taiwan University. From 2000 to 2005, he worked in the Verification Automation Lab of the Institute of Information Science at Academia Sinica, Taiwan.

Technical Session D2-W4-T4: Ubi/ Cloud Computing, High Performance Computing (HPC)/ Data Center, Cyber Security, and Digital Forensics

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ABSTRACT

BIOGRAPHY

