

## SKIMA 2016 Abstract

The 10th International Conference on Software, Knowledge, Information Management and Application (SKIMA 2016) is going to be held from 15 to 17 December 2016 in Chengdu, China. The conference aims to bring together researchers and experts in Knowledge Management, Software Engineering and Information Systems to share their ideas, experiences and insights.

This conference series was started in an international collaboration context between research professionals in Western and Asian countries in Chiang Mai, Thailand 2006. Subsequently, the next SKIMA conferences were organized in Kathmandu, Nepal in 2008; Fez, Morocco in 2009; Paro, Bhutan in 2010; Benevento, Italy in 2011, Chengdu, China in 2012, Chiang Mai, Thailand in 2013, Dhaka, Bangladesh in 2014, Kathmandu, Nepal 2015. With the technical co-sponsorship of IEEE Chengdu Section, all the accepted conference papers will be submitted for acceptance into IEEE Xplore so EI indexed.

We welcome researchers and practitioners from research institutions, R&D enterprise services and governmental organizations to exchange innovative contributions around the conference topics. It will feature plenary speeches, industrial panel sessions, funding agency panel sessions, interactive sessions, and invited special sessions. Contributions are expected from academia, industry and government funding councils.

The conference is sponsored by the following EU projects.



And the following universities

1. Chengdu University of Information Technology, China
2. Chengdu University, China
3. Zhongyuan University of Technology, China
4. Bournemouth University, UK

## Organisation Committee

### Advisory Members

Prof Abdelaziz Bouras (Qatar University)  
Dr Nopasit Chakpitak (ChiangMai University, Thailand)  
Prof Keshav Dahal (University of West Scotland, UK)  
Prof Alamgir Hossain (Anglia Ruskin University, UK)  
Prof Yun Li (Glasgow University, UK)  
Prof Yacine Ouzrout (University of Lyon II, France)  
Prof Rameshwar Rijal (Kantipur Engineering College, Nepal)

### General Chair

Prof Hongnian Yu (Bournemouth University, UK)

### General Co-chairs

Prof Jiliu Zhou (Chengdu University of Information Technology, China)  
Prof Qinyuan Wang (Chengdu University, China)  
Prof Dongyun Wang (Zhongyuan University of Technology, China)

### Program Co-chairs

Dr Shuang Cang (Bournemouth University, UK)  
Prof S A Hossain (Daffodil International University, Bangladesh)

### Local Arrangement Chairs

Prof He Jia (Chengdu University of Information Technology, China)  
Prof Yuson Ou (Chengdu University, China)

### Special Session Chairs

Prof Luigi Vladareanu (Romania Academy, Romania)  
Dr Erfu Yang (University of Strathclyde, UK)  
Prof Zhonglai Wang (University of Electronic Science & Technology of China)  
Dr Aicha Sekhari (University of Lyon II, France)  
Prof Sergei Silvestrov (Mälardalen University, Sweden)

**Publication Chairs**

Prof John Mo (RMIT University, Australia)

Dr Zoltán Szabó (Corvinus Uni. of Budapest, Hungary)

Dr Amir Qayyum (Mohammad Ali Jinnah University, Pakistan)

**Awards Chairs**

Dr Nauman Aslam (Northumbria University, UK)

Dr Dr Aihui Wang (Zhongyuan University of Technology, China)

**Publicity Chairs**

Dr. Ingrid Rügge (University of Bremen, Germany)

Prof RK Choudhary (APIIT, Inida)

**Exhibition Chairs**

Dr Leo Chen (Dongguan Uni. of Technology, China)

Prof Nikola Benin (University of Ruse, Bulgaria)

Dr Fangnian Lang (Chengdu University, China)

**Registration Chairs**

Dr Shuang Cang (Bournemouth University, UK)

**Students Activity Chairs**

Prof Chaobang Gao (Chengdu University)

Prof Teresa Goncalves (University de Évora, Portugal)

Prof Chowdhury Mofizur Rahman (United International University, Bangladesh)

Dr Haiquan Wang (Zhongyuan University of Technology, China)

## 10th International Conference on Software, Knowledge, Information Management & Applications - Program

### Wednesday 14 December 2016

14:00-16:30 Registration (Shang Xiang Hang Kong Hotel)

### Thursday 15 December 2016

8.00 - 9.00 Registration and Tea/Coffee (Shang Xiang Hang Kong Hotel)

9.00 - 10.00 Opening Session (Conference co-chairs) (International conference room)

10.00-11.00 General Session - EU Erasmus Mundus collaborations and opportunities (International conference room)

11.00-11.20 Tea/Coffee Break - networking

11.20-12.20 **Keynote Talk:** Mechanism Design and Real Time Control of Parallel-Parallel 6-Legged Robots by Prof Feng Gao (International conference room)

**12.20 - 13.30 Lunch** (Shang Xiang Hang Kong Hotel)

#### 13:30-15:30 15/12/2016 Parallel Sessions

Time	S-1 Signal, image, and video processing Venue: conference room 1 Chair: Prof Alamgir Hossain & Dr Néjib Moalla	S-2 Business intelligence, supply chain, and logistics Venue: conference room 6 Chair: Prof John Mo & Dr Edward Apeh
13:30-13:50	<b>86:</b> Tinggui Yan, Shaohua Hu, Xinhua He and Yongyong Duan Moving Object Detection and Shadow Removal in Video Surveillance	<b>8:</b> Mohammad Hanif Gharanai In the Digital Future: Revitalizing informationManagement Systems in Afghan Settings through Not Only SQL (MongoDB) Technology
13:50 - 14:10	<b>82:</b> Anjum Shaikh, Antesar Shabut and Alamgir Hossain A Literature Review on Phishing Crime, Prevention Review and Investigation of Gap	<b>18:</b> Blanka Láng and Zsolt Tivadar Kardkovács Solving Exercise Generation Problems by Diversity Oriented Meta-Heuristics
14:10-14:30	<b>27:</b> Yao Li and Zhiliang Kang A Hyperspectral Imaging Technology Based Method for Identifying the Variety of Mengding Mountain Tea	<b>15:</b> Mingxing Zhang, Jiaming Zhang, Guangquan Cheng Fire scheduling for multiple weapons cooperative engagement
14:30-14:50	<b>51:</b> Andreas Stiegler, Claudius Messerschmidt, Johannes Maucher and Keshav Dahal Hearthstone Deck-Construction with a Utility System	<b>97:</b> Allen Z.J. Chen and John P.T. Mo Modelling of UAV Deliveries in Populated Urban Areas for Risk Management using 3D cameras array

14:50-15:10	<b>90:</b> Marzia Tania, K. T. Lwin & M. A. Hossain Computational Complexity of Image Processing Algorithms for an Intelligent Mobile Enabled Tongue	<b>79:</b> Chao Yang, Donghua Zhu and Xuefeng Wang SAO-Based Core Technological Components' Identification
15:10-15:30	<b>46:</b> Antesar Shabut, Khin Lwin and M.A. Hossain Cyber Attacks, Countermeasures, and Protection Schemes– A Comprehensive Survey	<b>53:</b> John P.T. Mo and William Lorchirachoonkul Gesture interpreter for randomised supply chain operations using 3D cameras array

**15:30-15:50 Tea/Coffee Break-Networking**

**15:50-17:30 15/12/2016 Parallel Sessions**

Time	<b>S-1 Future internet, IOT, and industry 4.0</b> Venue: conference room 1 Chair: Prof Yacine Ouzrout & Dr Noppon Choosri	<b>S-2 Information management</b> Venue:conference room 6 Chair: Prof Yahaya Yusuf & Prof Akhilesh Upadhyay
15:50-16:10	<b>100:</b> Alfredo Alan Flores Saldivar, Yun Li, Cindy Goh, Hongnian Yu and Chen Y Attribute identification and predictive customisation using fuzzy clustering and genetic search for Industry 4.0	<b>94:</b> Yi Chen, Zhonglai Wang and Erfu Yang Pareto-Optimality Solution Recommendation Using Multi-objective Artificial Wolf-pack Algorithm
16:10-16:30	<b>35:</b> W. Chen, X. Wang, W. Sun & R. Yu The Design of PROFINET-MODBUS Protocol Conversion Gateway Based on the ERTEC 200P	<b>7:</b> Zoltan Balogh Data-mining behavioural data from the web
16:30-16:50	<b>101:</b> Jimeng Yang, Yun Li and Konstantinos Kontis Wind Tunnel Testing of Novel Wing Configurations for Design and Customisation in an Industry 4.0 Environment	<b>68:</b> Nan-Yun Jiang and Hong-Sen Yan Production Planning of Series-Parallel Hybrid Shop when Multi-users' Demand Exceeding Supply
16:50-17:10	<b>87:</b> Noppon Choosr, Krit Khwanngern, Hongnian Yu, Krid Thongbunjob, Rattasit Sukhahutab,f, Juggapong Natwichai, Pruet Boonma ICT framework for collaborative healthcare services: A case study of Cleft Lip/Palate treatment network in northern Thailand	<b>95:</b> Saqib Shamim, Shuang Cang and Hongnian Yu Influencers of information system usage among employees for knowledge creation
17:10-17:30	<b>99:</b> Ravi Limaye, Ramesh Kumar Smart Village Planning Framework Using Extenics Theory	<b>73:</b> Tahira Iqbal, Muhammad Asad and Muhammad Aihab Khan A Source Code Quality Analysis Approach

17:30-17:50	<b>70:</b> Rebecca Rogers, Edward Apeh and Christopher Richardson Resilience of the Internet of Things (IoT) from an Information Assurance (IA) Perspective	<b>56:</b> Xiaoying Shi, Quan Zhou, Xinyu Qu, Geng Liu and Zhaozhe Gong Understanding City Dynamics based on Public bicycle data: A case study in Hangzhou
-------------	--	---

### Friday 16 December 2016

8.00 - 9.00	Registration and Tea/Coffee (Shang Xiang Hang Kong Hotel)
09.00-10.00	<b>Keynote Talk:</b> Passive and Active Control for Rehabilitation Robots by Prof Zeng-Guang Hou (Conference room 1)
10.00-10.20	Tea/Coffee Break - networking

### 10:20-12:00 16/12/2016 Parallel Sessions

Time	S-1 Signal, image, and video processing Venue: conference room 1 Chair: Prof Luigi Vladareanu & Dr Aicha SEKHARI	S-2 Business intelligence, supply chain, and logistics Venue: conference room 6 Chair: DrIngrid Rügge & Dr Pradorn Surephong
10:20-10:40	<b>24:</b> Lei Zhang, Ying Huang, Yan Qi & Xuefeng Wang Research on Commercial Potential Evaluation of Newly & Emerging Technology: A Case Study	<b>88:</b> Supavas Sitthithanasakul and Noppon Choosri Using Ontology to Enhance Requirement Engineering in Agile Software Process
10:40-11:00	<b>36:</b> Hongbo Wang, Xuefeng He, Xiong Zhao, Jianye Niu, Yajun Zhang, Sai Lin and Luigi Vladareanu The fuzzy comprehensive evaluation of comfortability for patient transfer system	<b>85:</b> Tinggui Yan, Shaohua Hu, Xinhua He & Yongyong Duan Linear parameter-varying based tracking control of hypersonic flight vehicles with input saturation
11:00-11:20	<b>81:</b> Ikram Asghar, Shuang Cang and Hongnian Yu Software Based Assistive Technologies for People with Dementia: Current Achievements and Future Trends	<b>74:</b> Marcel Migdalovici, Luige Vladareanu, Gabriela Vladeanu, Daniela Baran, Said Broumi, Florentin Smarandache, Hongbo Wang and Feng Yonfei Some mathematical aspects on walking robots stable evolution
11:20-11:40	<b>63:</b> Said Broumi, Assia Bakali, Talea Mohamed Shortest Path Problem Under Triangular Fuzzy Neutrosophic Information	<b>64:</b> Nazia Hameed, Kamal Abu Hassan and M A Hossain A comprehensive survey on image-based computer aided diagnosis systems for skin cancer
11:40-12:00	<b>9:</b> Ping Liu, Qiang Zhang and Jürgen Pannek Capacity Adjustment of Job Shop Manufacturing Systems with RMTs	<b>67:</b> Dharini Krishnan, Xujuan Zhou, Subrata Chakraborty, Rashmi Gururajan and Raj Gururajan. Software Development for Managing Nutrition Intake for Type 2 Diabetes Mellitus

### 12:00-13:30 Lunch

### 13:30-15:10 16/12/2016 Parallel Sessions

Time	S-1 Robotics and computing	S-2 Cloud computing, sensor design,
------	----------------------------	-------------------------------------

	<b>Venue:conference room 1</b> <b>Chair: Dr Edward Apeh &amp; Dr Baudouin DAFLON</b>	<b>fusion</b> <b>Venue:conference room 6</b> <b>Chair: Prof Keshav Dahal &amp; Dr Anne-Sophie LELONG</b>
13:30-13:50	<b>84:</b> Pradorn Sureephong, Kitti Puritat et al. Enhancing user performance and engagement though gamification: Case study of Aqua Republica	<b>96:</b> Yan Wang, Shuang Cang and Hongnian Yu A review of sensor selection, sensor devices and sensor deployment for wearable sensor-based human activity
13:50-14:10	<b>11:</b> Chen Junxin, Peng Yonggang and Wei Wei Design of Smart Grid integrated interactive terminal	<b>26:</b> Maoyang Zou, Jia He and Qian Wu Multi-tenancy access control strategy for cloud services
14:10-14:30	<b>2:</b> Chaolong Zhang, Yuanping Xu, Jia He, Jun Lu, Li Lu and Zhijie Xu Multi-GPUs Gaussian Filtering for Real Time Large-Scale Data Processing	<b>49:</b> Feng Zhai, Wei Cen, Jia Zhao, Peng Xu and Yi Sun A User Peak Load Staggering Potential Assessment Method Based on Three-demarcation Analytic
14:30-14:50	<b>43:</b> Peng Huang, Zhiliang Kang, Chang Liu & F Lin ACO-Based Path planning Scheme in RWSN	<b>91:</b> Julija Naskova and Julija Naskova Dreamweaver on the Cloud; Web designers'
14:50-15:10	<b>47:</b> Tashi, Mohammad S Hasan and Hongnian Yu Design, Simulation, Prototyping and Experimentation of Planar Micro-strip Patch	<b>34:</b> Thepparit Sinthamrongruk and Keshav Dahal Route scheduling for HSSP using Adaptive Genetic algorithm with Constructive Scheduling technique

**15:10-15:30 16/12/2016 Tea/Coffee Break-Networking**

**15:30-17:30 16/12/2016 Parallel Sessions**

<b>Time</b>	<b>S-1 Smart tourism, and Marketing</b> <b>Venue: conference room 1</b> <b>Chair: Prof Yahaya Yusuf &amp; Dr Pathathai Na Lumpoon</b>	<b>S-2 Electronics</b> <b>Venue: conference room 6</b> <b>Chair: Prof Luige Vladareanu &amp; Dr Leo Chen</b>
15:30-15:50	<b>103:</b> Pathathai Na Lumpoon and Pree Thiengburanathum Effect of Integration a Mobile Game-based Learning Framework in Cultural Tourism	<b>39:</b> Linye Ma Lityium-ion Battery Life Evaluation Method Based on Fuzzy Nonlinear Accelerated Degradation Process
15:50-16:10	<b>35:</b> W. Chen, X. Wang, W. Sun & R. Yu The Design of PROFINET-MODBUS Protocol Conversion Gateway Based on the ERTEC 200P	<b>4:</b> Yu Jiang-feng, Wei Wei,Peng Yong-gang A real-time optimal energy dispatch for microgrid including battery energy storage
16:10-16:30	<b>59:</b> Xiaowen Liu, Na Lu and Jin Yu Towards Development a Travel Demand Negotiated Aggregation Model	<b>75:</b> Mihaiela Iliescu and Luige Vladareanu Multi-Axes Mechatronics System for Printing Ultrathin Layers of Perovskite Solar Cells

16:30-16:50	<b>12:</b> Damrongpol Kamhangwong, Gilles Neubert, Aicha Sekhari and Pradorn Sureephong Quantification of Freshness Loss and an optimization approach for managing fresh fruit exportation	<b>44:</b> Martins Olaleye, Keshav Dahal & Zeeshan Pervez Cognitive Radio Engine Learning Adaptation
16:50-17:10	<b>107:</b> Yahaya Yusuf, Emmanuel Olasanmoye, Masha Menhat and Wendy Auchterlounie External assurance and sustainability reporting practices amongst UK companies using GRI	<b>13:</b> Masud Rana Rashel, Andre Albino, Teresa C. F. Goncalves and Mouhaydine Tlemcani Sensitivity analysis of parameters of a photovoltaic cell under different condition
17:10-17:30	<b>109:</b> Roua Elchamaa, Baudouin Dafflon, Yacine Ouzrout and Franck Gechter Agent Based Monitoring for Smart Cities: Application to Traffic Lights	<b>72:</b> Md Sajib Ahmed, Teresa Gonçalves and Hasan Sarwar Improving Bangla OCR output through correction algorithms

**18:30-21:00 Gala Dinner-Conference banquet**

**Saturday 17 December 2016**

8.30-9.00

Tea/Coffee - networking

**9:00-10:20 Parallel Sessions**

Time	<b>S-1 Information management</b> Venue: conference room 1 Chair: Prof Akhilesh Upadhyay & Dr Poon Thiengburanathum	<b>S-2 E-Learning and technology enhanced learning</b> Venue:conference room 6 Chair: Prof Teresa Goncalves & Dr Shengjun Wen
9:00-10:20	<b>17:</b> Baolin Yi, Xiaoxuan Shen, Zhaoli Zhang, Jiangbo Shu and Hai Liu Expanded autoencoder recommendation framework and its application in movie recommendation	<b>92:</b> Roy Khristopher Bayot and Teresa Gonçalves Multilingual Author Profiling using Word Embedding Averages and SVMs
9:20-9:40	<b>104:</b> Orasa Tammasarangoon and Poon Thiengburanathum Study and implement delivery method for decision support systems of Chiang Mai urban transit	<b>16:</b> Huiting Wu, Yanshen Liu, Lin Qiu and Yi Liu Research on Network Learning Platform and Its Application in Teaching
9:40-10:00	<b>28:</b> Fatima Zohra Tanane, Jannik Laval and Vincent Cheutet Towards Assessment of information system agility	<b>71:</b> Saba Mohammed and Edward Apeh A Model for Social Engineering Awareness Program for Schools
10:00-10:20	<b>83:</b> Muhammad Hasnain Abbas Naqvi, Jiang Yushi, Mishal Hasnain Naqvi and Muneeb Abid Malik HOW DO TV PROMOTIONS AFFECT BUYING CONDUCT OF FEMALE: A STUDY CONDUCTED IN (LAHORE) PAKISTAN	<b>41:</b> Prakash Poudyal, Teresa Goncalves and Paulo Quaresma Experiments On Identification of Argumentative Sentences



**10:20-10:40 17/12/2016 Tea/Coffee Break-Networking**
**10:40-12:00 17/12/2016 Parallel Sessions**

<b>Time</b>	<b>S-1 Control ana Robotics applications Venue: conference room 7 Chair: Prof Zoltán Szabó &amp; Prof Hongbo Wang</b>	<b>S-2 Information system Venue: conference room 7 Chair: Professor Yun Li &amp; Prof Rameshwar Rijal</b>
10:40-11:00	<b>23:</b> Dongyun Wang, Aihui Wang Wang, Yiwen Fu, Junming Xiao and Huiqin Liu Robust Nonlinear Perfect Control for Semiconductor Refrigeration Device	<b>62:</b> Jinghua Hou Prospective Memory Aid Reminder System Design for Group Tasks
11:00-11:20	<b>102:</b> Xi Chen and Tao Wu Simulation as a Service through Controller Northbound Interface for SDN	<b>80:</b> Bassant Mohamed Elbagoury and Luige A Hybrid Real-Time EMG Intelligent Rehabilitation Robot Motions Control based on Kalman Filter
11:20-11:40	<b>10:</b> Dongyun Wang, Chenglong Jiang, Yongping Dan and Shengjun Wen Design of air quality monitoring system base on Internet of things	<b>78:</b> Tao Yan, Jin Wang, Qing Hu and Xiaodan Du TBDT: A New Trust-Based DDoS-Tolerant Model
11:40-12:00	<b>52:</b> Zhengxiang Ma, Tiejun Chen and Aihui Wang Robust Nonlinear Control Design of A Robot Arm with Micro-hand Using Operator Approach	<b>45:</b> Muhammad Hasnain Abbas Naqvi, Jiang Yushi, Mishal Hasnain Naqvi and Muneeb Abid Malik Attitudes Of Audience Towards Repeat Advertisements A Case Of Pepsi Ads
12:00-12:20	<b>21:</b> Siyuan Ma, Yong Zhang, Yuan Xu, Bin Wang, Jin Cheng and Qinjun Zhao An Indoor robot navigation by coupling IMU, UWB	<b>40:</b> Libo Zhang, Yihan Sun and Tiejian Luo. A framework for evaluating customer satisfaction

12:20-12:50 **Closing session + Best paper award**

12:30-13:30 **Lunch**

13:30-18:30 **Tour** (The conference will provide info only, it is the individual responsibility to arrange their own tour)

**Interactive session**

76: Go Sang, Lai Xu and Paul De Vrieze A Reference Architecture for Big Data Systems	3:Kehe Wu, Jianyong Xue and Yan Zhou A Risk Analysis and Prediction Model of Electric Power GIS Based on Deep Learning
77: Olaolu Sofela, Paul De Vrieze and Lai Xu Service Identification Requirements for Enterprise Information Systems	5:Wei Li, Hongyu Liu and Xiaoliang Zhang A Network Data Security Analysis Method Based On DPI Technology

93:Li Jie, Wang Tian-Zheng and Hu Fan ADAPTIVE NOISE REDUCTION ALGORITHM BASED ON GRADIENT IN WAVELET FEATURE DOMAIN	14:Jiali Dong, Xiaoyong Li and Binxing Fang A Recommendation System Based on Multi-attribute
6: Li Qiaoliang, Chen Zhewei and Qi Suwen Multi-view face detector using a single cascade classifier	19: Yi-Tao Liang, Kui-Bin Zhao, Meng Zhang Haze Image Moving Window Threshold Segmentation Algorithm Based on Contrast Enhancement
33:Maha Talaat Design and Implementation of a new hybrid defense mechanism against DoS attacks	20:Yi-Tao Liang, Kui-Bin Zhao, Lan Li and Jiang-Hui Hu Defogging Algorithm of Color Images Based on Gaussian Function Weighted Histogram Specification
66:Jiang Ge and Tang Xinhuai Q-Mon: An Adaptive SOA System with Data Mining	22:Xiangyang Lu, Qiang Guo, Fengge Wang. Control Information Flow with Transformation in Complex Networks
37:Li Zhang, Chang Liu and Xiujun Zhang Classification of Parkinson's disease and Essential Tremor Based on Structural MRI	30:Baudouin Dafflon and Madeleine El- Zaher An Agile development for platoon system based on Verification and Validation
98:Jinyun Liu, Dayou Li and Zuobin Wang A Developed Magnetic Force Microscope	48:Li Jie, Wang Tian-Zheng and Zhao Ya- Ning LOCATION MECHANISM FOR WIRELESS SENSOR NETWORKS IN MINE
50:Chunyan Hou, Jinsong Wang and Kai Shi Reliability Analysis of Web Server Cluster Systems based on Proportional Hazards Model	61: Su Yan A TDMA MAC Scheduling Protocol Algorithm for Wireless Mobile Ad Hoc Network and Its

## Keynote One

### Mechanism Design and Real Time Control of Parallel-Parallel 6-Legged Robots



Dr Feng Gao

Full Professor

School of Mechanical Engineering

Shanghai Jiao Tong University

800 Dong Chuan Road, Shanghai, China, 200240

Email: fengg@sjtu.edu.cn

Website at [http:// gf.sjtu.edu.cn](http://gf.sjtu.edu.cn)

## Biography

Feng Gao was born on Dec. 21, 1956 in Jiujiang City of Jiangxi Province, P. R. of China. He got his Ph.D. in mechanical engineering from the Beijing University of Aeronautics and Astronautics in 1991 and his Master in mechanical engineering from the Northeast Heavy Machinery Institute, China in 1982. From 1976 to 1979, he was a student in mechanical engineering at the Northeast Heavy Machinery Institute, China. From 1995 to 1997, he was a postdoctoral research associate in the School of Engineering Science at Simon Fraser University, Canada.

He was an assistant professor in mechanical engineering at the Northeast Heavy Machinery Institute, Qiqihaer, China from 1982 to 1985. He was an assistant and associate professor in mechanical engineering at Yanshan University, Qinhuangdao, China from 1986 to 1994. He was a full professor at Yanshan University from 1995 to 1999. He served first as Vice President then President of Hebei University of Technology from 2000 to 2004. Since 2004, he has been a full professor at Shanghai Jiao Tong University. From 2010 to 2014, he chaired the State Key Laboratory of Mechanical Systems and Vibration at Shanghai Jiao Tong University, and he also is the head of the Heavy Machinery Institute of Fundamental Research for the industrial corporation of the China First Heavy Industry Company.

He has been serving as an Associate Editor of Mechanism and Machine Theory and the ASME Journal of Mechanisms and Robotics since 2008 and the ASME Journal of Mechanical Design since 2012, and the General Member of the ASME Mechanisms and Robotics Committee since 2012. He gave the Keynote Speeches on the conferences of the ASME 2012 and IFToMM 2015, respectively. He won the 2013 China National Natural Science Award because of his contributions in parallel mechanism design and the 8 items of awards from the provincial science and technology invention prizes in China. 2014. Dr. Gao won 2014 ASME Leonardo Da Vinci Award for his invention of parallel manipulators.

His chief research domain is the parallel robots. The major achievements obtained include the design theory, invention and application of the parallel robots. In the theory aspect, he proposed the

GF Set Theory for the type synthesis of parallel robotic mechanisms, the evaluating performance criteria and the physical model of the solution space for dimensional designing of parallel robotic mechanisms. In the application aspect, he Invented and Designed many kinds of the robots and machines with parallel mechanisms for heavy load applications He published 3 books and 288 papers. The 96 invention patents of China were authorized and the 35 invention patents of China were applied.

### **Summary of the talk**

Research on the walking robots has been one of key topics in robotics for a long time. In recent years, many legged robots were developed in the world, which of them achieved great progress and received much attention from the robotic field. For the control of legged robots, one of the most important challenging issues is the human robot Interaction for the real time control of the legged robots. This speech will introduce our research on both mechanism design and real time control for the parallel-parallel 6-legged robots related to the human robot Interaction, which include the following issues: design process of type synthesis for legged robots by GF set theory, real-time operating system for legged robots, hexapod robot driven by motors: with 3km/h speed., hexapod robot walking on sandy slope, hexapod robot with 500kg payload, hexapod robot with safe riding capability, walking based on force sensing without force sensors., dynamic gait based on active compliant approach, reflection by human-robot interaction based on force sensing, control of 6-legged robots based on vision, obstacle avoidance with both vision and F/T sensor, escaping based on virtual obstacle memory, obstacle crossing based on vision, step climbing based on vision, walking upstairs by vision & downstairs by terrain memory, human-robot interactive assembly based on F/T sensor, manufacturing based on F/T sensor, locked door opening based on F/T sensor for legged robots, and so on.

### **Keynote Two**

#### **Passive and Active Control for Rehabilitation Robots**



Dr. Zeng-Guang Hou  
Professor & Deputy Director  
State Key Laboratory of Management & Control for Complex Systems  
Institute of Automation  
The Chinese Academy of Sciences  
P.O. Box 2728, Beijing 100190, CHINA

## **Biography**

Zeng-Guang Hou (SM'09) received the BE and ME degrees in electrical engineering from Yanshan University (formerly North-East Heavy Machinery Institute), Qinhuangdao, China, in 1991 and 1993, respectively, and the Ph.D. degree in electrical engineering from Beijing Institute of Technology, Beijing, China, in 1997. He is currently a full professor and deputy director of the State Key Laboratory of Management and Control for Complex Systems, Institute of Automation, Chinese Academy of Sciences.

Dr. Hou's research interests include robotics and intelligent control systems. He has been doing research on rehabilitation robots and vascular intervention robots for minimally invasive surgery. He was an associate editor of the IEEE Computational Intelligence Magazine and IEEE Transactions on Neural Networks. He is currently the Chair of Neural Network Technical Committee (NNTC) of Computational Intelligence Society. Dr. Hou is an Associate Editor of the IEEE Transactions on Cybernetics, and ACTA Automatica Sinica, etc. and an Editorial Board Member of Neural Networks.

He is a recipient of the Distinguished Young Scholar Fund of the National Natural Science Foundation of China in 2012 and the Outstanding Paper Award of IEEE Transactions on Neural Networks in 2013.

## **Summary of the talk**

Stroke, traumatic brain injury (TBI), and spinal cord injury (SCI) are most important reasons that cause nervous system damage, and thus lead to physical disabilities. Because of long process of nervous system recovery, the patients would suffer permanent disability without effective treatment and rehabilitation. For traditional exercise therapy, most hospitals still use simple cycling devices for passive training which is very limited because of single training mode and fixed training trajectory of such machines. Since the training process for patients of neurological damage is repetitive, it is expected to improve the current status of rehabilitation by using robotics, and also it would accelerate the rehabilitation process for patients and reduce therapists' labor intensity. We will mainly address the system design of a reclining type rehabilitation robot for lower limbs, and also studied the passive training, active training and assistance training control methods for the needs of neurological rehabilitation and motor function of lower limbs for SCI or stroke patients.

## S-1: Signal, image, and video processing

### 86: Tinggui Yan, Shaohua Hu, Xinhua He and Yongyong Duan Moving Object Detection and Shadow Removal in Video Surveillance

The automatic analysis of digital video scenes often requires the segmentation of moving objects from a static background. The most popular approach involves subtracting the current frame from the background image. How to correctly and efficiently model and update the background model and how to deal with shadows are two of the most distinguishing and challenging aspects of such approach. In order to solve these problems, we presented an adaptive background subtract method based on improved mixture Gaussian and an effective shadow removal algorithm based on shadow attributes. Experimental results with lots of video data and comparative analysis with recent adaptive object detection techniques show the strength of the proposed technique in eliminating noise, shadow, and trailing effect while maintaining better stability across variable operating speeds.

### 82: Anjum Shaikh, Antesar Shabut and Alamgir Hossain A Literature Review on Phishing Crime, Prevention Review and Investigation of Gap

A rapidly growing threat to internet users which is causing a damage of more than billions of dollars every year is called Phishing. Phishing is an unlawful activity which uses a group of social engineering and technology to collect an Internet user's sensitive information. The identification of phishing techniques can be performed in various methods of communications like email, instant messages, pop-up messages, or at web page level. Over the period, different scholars have come up with different techniques and approaches to tackle this threat but have failed to achieve 100% result. In this paper, we present a theoretical model of CRI to study this threat in a formal manner. This study places phishing on a literature framework analyzing phishing crime, reviewing various scholar's perspectives and approaches to handle this threat and investigated the research gap. In this sense, our literature review study is significant to generate attentiveness about phishing in order to boost thoughts and actions to improve the cyber security and gain internet users' confidence.

### 27: Yao Li and Zhiliang Kang A Hyperspectral Imaging Technology Based Method for Identifying the Variety of Mengding Mountain Tea

Aiming at disadvantages of labor and time consuming of traditional tea classification method, this paper proposes a tea variety classification algorithm that integrates spectral and image characteristics with Mengding Mountain Huangya tea, Zhuyeqing tea and Ganlu tea of Ya'an City, Sichuan Province as objects. It firstly collected the hyperspectral images of tea samples with "GaiaSorter" hyperspectral sorter. After performing relevant pretreatment, 18 spectral characteristic parameters including red-edge position, absorbing area and absorbing depth were extracted according to the spectral curves and 28 image characteristics including average gray scale, consistency and entropy were extracted according to the images. The confluent characteristics were carried out dimensionality reduction with PCA (principal component analysis) method before they are classified and identified with C-SVM algorithm. Experimental results showed that classification of three varieties of tea can be realized rapidly when the input principal component is selected as 3 and the accuracy rate of identification is up to 100%

### 51: Andreas Stiegler, Claudius Messerschmidt, Johannes Maucher and Keshav Dahal Hearthstone Deck-Construction with a Utility System

Trading Card Games are turn-based games involving strategic planning, synergies and rather complex gameplay. An interesting aspect of this game domain is the strong influence of their metagame: in this particular case deck-construction. Before a game starts, players select which cards from a vast card pool they want to take into the current game session, defining their available options and a great deal of their

strategy. We introduce an approach to do automatic deck construction for the digital Trading Card Game Hearthstone, based on a utility system utilizing several metrics to cover gameplay concepts such as cost effectiveness, the mana curve, synergies towards other cards, strategic parameters about a deck as well as data on how popular a card is within the community. The presented approach aims to provide useful information about a deck for a player-level AI playing the actual game session at runtime. Herein, the key use case is to store information on why cards were included and how they should be used in the context of the respective deck. Besides creating new decks from scratch, the algorithm is also capable of filling holes in existing deck skeletons, fitting an interesting use case for Human Hearthstone players: adapting a deck to their specific pool of available cards. After introducing the algorithms and describing the different utility sources used, we evaluate how the algorithm performs in a series of experiments filling holes in existing decks of the Hearthstone eSports scene.

**90: Marzia Tania, K. T. Lwin & M. A. Hossain**

### **Computational Complexity of Image Processing Algorithms for an Intelligent Mobile Enabled Tongue**

Tongue diagnosis is an auxiliary, effective and non-invasive technique to evaluate the condition of a patient's internal organ in traditional East Asian medicine. The diagnosis process relies on expert's opinion based on visual inspection of colour, substance, coating, form and motion of the tongue. This work explores the computational complexity of image processing techniques to analyse chromatic properties and textural features for tongue image segmentation. The dynamic and novel approach of this work involves consideration of skin colour covering various range of contrast diversity while image segmentation, making it distinct from existing works. The aim of this research is to seek for an algorithm with reduced computational complexity suitable to be implemented in an enhanced mobile enable solution. The algorithm for tongue image processing needs to be fast and less complex making the system apt for mobile devices executing automatic tongue diagnosis entailing clinical decision support system. Analysing the performance of different colour models, RGB was unveiled to have a better enactment than others. The performance of edge detection techniques were evaluated on images with close contrast difference based on segmentation result and processing time. The morphological processing showed better result to separate the tongue from its background which can be further employed for geometric shape based disease diagnosis.

**46: Antesar Shabut, Khin Lwin and M.A. Hossain**

### **Cyber Attacks, Countermeasures, and Protection Schemes– A Comprehensive Survey**

Thousands of cyber-attacks (fraudulent online activities to acquire user's sensitive information via email, during online transaction, live video streaming, online gaming and browsing) are launched every day, in contradiction of Internet users across the world. Massive fraud and data losses, privacy issues, information systems compromises, etc. is generated by this growing threat against both individuals and organisations. These cyber threats start to impact the users' confidence in purchasing online services and products. To prevent these threats and their countermeasures, researchers have responded with a number of protection systems. Currently, the way cyber-attackers use to conduct attacks is associated with exploiting humans. Such attacks are more recorded than before, and they are more challenging to control. Traditional security countermeasures are unable to prevent breaches targeting the human elements. This paper provides the state of the art of cyber security attacks, countermeasures, and protection tools related to everyday online activities. It also provides a useful cyber-attacks taxonomy and classification that help users involve in a protection process to identify attacks and measures of cyber security. Existing protection schemes that target the cyber threats and risks are evaluated against three of our criteria for an effective measures: resilience to cyber attacks' countermeasures, real-time support and need-based action, training and education materials to increase users' awareness of cybercrimes which represent the main aim of this paper.

## S-2 Business intelligence, supply chain, and logistics

**8: Mohammad Hanif Gharanai**

### In the Digital Future: Revitalizing information Management Systems in Afghan Settings through Not Only SQL (MongoDB) Technology

At the present, most of the organizations are dependent on predefined or structured databases such as Oracle, MySQL etc. However, when data increases, structured database systems cannot handle hug data efficiently and effectively. This study attempts to use unstructured database management system namely "MongoDB" to overcome the mentioned issue and replace the structured databases. We also compare CRUD operations based on key-value approach by No-SQL and SQL databases. Besides, we explain and present performance analysis of MongoDB. Meantime, this work also studies the importance of the sharding and replication in the MongoDB paradigm. Hopefully, this effort makes an environment for manageability, schema-less development, horizontal scalability etc. that the developer would be helped while taking decision wisely and leads to cover the weaknesses of MySQL.

**18: Blanka Láng and Zsolt Tivadar Kardkovács**

### Solving Exercise Generation Problems by Diversity Oriented Meta-Heuristics

Evolutionary algorithms used for multi-objective optimization mostly prioritize fitness over diversity to achieve a single optimum fast, or a region in the Pareto-front. In this paper, we argue on that diversity should be a primary objective as well, and we propose a novel approach called EGAL to solve a well-known problem: to generate very different exercises to test students' knowledge in a specific range of topics. We show that focusing on diversity and fitness at the same time result ina better quality of solutions in the resulting population.

**15: Mingxing Zhang, Jiaming Zhang, Guangquan Cheng**

### Fire scheduling for multiple weapons cooperative engagement

Under the circumstances of multiple weapons cooperative engagement, it is becoming more urgent and difficult to coordinate the launch sequential timing of different weapons and calculate all the weapons' launch timing fast. This paper sets a mixed integer programming model of multi-weapon and multi-target, and optimizes the last sequential timing to the minimum as the objective, in order to solve the problem of scheduling the launch sequential timing of multiple weapons cooperative engagement. This paper also designs a fast heuristic algorithm based on the priority of tasks, which may help commanders provide a launch sequential timing plan with the priority requirement. The paper formulates method to handle the trajectory crossing based on time dimension optimization, and presents the solving algorithm of launch timing and the feasible solution evolution strategy based on space compression. The paper sets a case study of 30 weapons to verify the model and the algorithm, and have a deep discussion on the feasibility of feasible solution evolution strategy. The results show the effectiveness of our method on such a problem.

**97: Allen Z.J. Chen and John P.T. Mo**

### Modelling of UAV Deliveries in Populated Urban Areas for Risk Management using 3D cameras array

In this study, UAV delivery system design and simulation will be presented to illustrate a complex framework of analysis using spatial modelling and analysis environment. To develop the STK model for analysis, the scenario has to be built from different 3D modelling software. Software including MATLAB and Lightwave have been used successfully in this project.



**79:**Chao Yang, Donghua Zhu and Xuefeng Wang  
SAO-Based Core Technological Components' Identification

Technologies play an important role in the survival and development of enterprises. Understanding and monitoring the core technological components (e.g., technology process, operation method, function) of a technology is an important issue for researchers to develop R&D policy and manage product competitiveness. However, it is difficult to identify core technological components from a mass of terms, and we may experience some difficulties with describing complete technical details and understanding the terms-based results. This paper proposes a Subject-Action-Object (SAO)-based method, in which (1) SAO structures are extracted from patents for describing the function, relationship and operation in specified topics; (2) a systematic method is built to extract and screen technological components from SAOs; and (3) we propose a "relevance indicator" to calculate the relevance of the technological components to requirements, and finally identify core technological components based on this indicator. An empirical study of graphene is performed to demonstrate the proposed method. The resulting knowledge may hold interest for R&D management and corporate technology strategies in practice.

**53:** John P.T. Mo and William Lorchirachoonkul  
Gesture interpreter for randomised supply chain operations using 3D cameras array

In today's supply chain management, products are being track by many technologies including barcode and RFID. Such technologies are rigid and often prone to errors. In this paper, we will examine the reciprocated picking processes that exist within the supply chain, from manufacturing to retail chains. Utilising an array of 3D cameras, a new method to capture the user's physical interaction and gesture within the picking environment has been developed. Unlike other technologies, this new method has no physical scanning performed by the users, since there are already relationship established between product and pick face's location. Since the item picked can be randomised without the utilisation of a pick slip, it is then possible for the new method to be incorporated as part of an automated checkout procedure for retail chain.

### S-3 Future internet, IOT, and industry 4.0

**100:** Alfredo Alan Flores Saldivar, Yun Li, Cindy Goh, Hongnian Yu and Chen Y  
Attribute identification and predictive customisation using fuzzy clustering and genetic search for Industry 4.0

Today's factory involves more services and customisation. A paradigm shift is towards "Industry 4.0" (i4) aiming at realising mass customization at a mass production cost. However, there is a lack of tools for customer informatics. This paper addresses this issue and develops a predictive analytics framework integrating big data analysis and business informatics, using Computational Intelligence (CI). In particular, a fuzzy c-means is used for pattern recognition, as well as managing relevant big data for feeding potential customer needs and wants for improved productivity at the design stage for customised mass production. The selection of patterns from big data is performed using a genetic algorithm with fuzzy c-means, which helps with clustering and selection of optimal attributes. The case study shows that the fuzzy c-means is able to assign new clusters when growing knowledge of customer needs and wants. The dataset has three types of entities: specification of various characteristics, assigned insurance risk rating, and normalised losses in use compared with other cars. The fuzzy c-means tool offers a number of features suitable for smart designs for an Industry 4.0 environment.

**35:** W. Chen, X. Wang, W. Sun & R. Yu  
The Design of PROFINET-MODBUS Protocol Conversion Gateway Based on the ERTEC 200P

Industrial Ethernet technology in the automatic control system is increasingly widespread, but many

industrial fieldbus networks coexist currently, and cannot form a unified network. The article designed a protocol conversion gateway, which can finish the mutual conversion task between MODBUS and PROFINET. Through reforming the original MODBUS communication protocol, the gateway can realize the function of the MODBUS device getting access to industrial Ethernet.

**101:** Jimeng Yang, Yun Li and Konstantinos Kontis  
Wind Tunnel Testing of Novel Wing Configurations for Design and Customisation in an Industry 4.0 Environment

Industry 4.0 calls for validated simulations for rapid customization and through-life designs. Wind tunnel experiments are widely used in validating flow-field simulations for aircraft design and manufacture. In this paper, we develop testing for simulating the NACA0015 model wings in various shapes and Angles of Attacks (AoA) through an anatomy wind tunnel. Particle traces are recorded during the tests and then analyzed with PIVlab and Tecplot for validating streamlines and vorticity distributions. The experimental results show that the wing shape with a relatively large angle of sweepback and an AoA ranging from +10 to +15deg possess good aerodynamic behaviors for an aircraft. We discuss future prospects of aircraft simulations in an Industry 4.0 context.

**87:** Noppon Choosr, Krit Khwanngern, Hongnian Yu, Krid Thongbunjob Rattasit Sukhahut, Juggapong Natwichai, Pruet Boonma  
ICT framework for collaborative healthcare services: A case study of Cleft Lip/Palate treatment network in northern Thailand

Sophisticated medical treatment often requires multidisciplinary and a number of follow ups. This can limit the opportunity of patient who live in the remoted area to access quality and proper treatment due to the fact that healthcare services in Thailand are relatively centralized by natures. The study proposes the corroborative framework to empower local healthcare cluster to service patient in their area more effectively to minimize patient referral to hub hospital. The study primarily investigates solution for Cleft-Lip/Palate treatment network in Northern Thailand

**99:** Ravi Limaye, Ramesh Kumar  
Smart Village Planning Framework Using Extenics Theory

Worldwide 1.3 billion people remain without access to electricity and 2.7 billion are still cooking on harmful and inefficient stoves. Many live in remote rural village communities, and until they have access to energy services, little progress can be made to develop and improve their lives. Smart villages capture many of the benefits of urban living while retaining valued aspects of rural life and ensuring balanced development at the national level. This enables villagers to attain healthy and fulfilling lives, achieve their development potential, earn a viable living and be connected to the wider world, giving them a real choice between the traditional route of migration to a city, or life in a smart village. Smart villages are an emerging global challenge. There is a gap in urban rural setup worldwide. Technology can be a level playing enabler if Smart Village Framework is made in holistic analytical manner. Besides Technology best practices, motivated teams can transform the villages. Extenics theory is a tool for evolving a framework for Smart villages, as it minutely identifies various elements as matter in different conditions, contexts and also assigns measurable attributes. In this paper the various attributes related to a Smart Village are being analyzed using Extenics and a Smart Village Planning Framework is suggested.

**70:** Rebecca Rogers, Edward Apeh and Christopher Richardson  
Resilience of the Internet of Things (IoT) from an Information Assurance (IA) Perspective

Internet infrastructure developments and the rise of the IoT Socio-Technical Systems (STS) have frequently generated more unsecure protocols to facilitate the rapid intercommunication between the plethoras of IoT devices. Whereas, current development of the IoT has been mainly focused on

enabling and effectively meeting the functionality requirement of digital-enabled enterprises we have seen scant regard to their IA architecture, marginalizing system resilience with blatant afterthoughts to cyber defence. Whilst interconnected IoT devices do facilitate and expand information sharing; they further increase of risk exposure and potential loss of trust to their Socio-Technical Systems. A change in the IoT paradigm is needed to enable a security-first mind-set; if the trusted sharing of information built upon dependable resilient growth of IoT is to be established and maintained. We argue that Information Assurance is paramount to the success of IoT, specifically its resilience and dependability to continue its safe support for our digital economy.

#### **S-4 Information management**

**94:** Yi Chen, Zhonglai Wang and Erfu Yang

Pareto-Optimality Solution Recommendation Using Multi-objective Artificial Wolf-pack Algorithm

In practical applications, the multi-objective optimisation is one of the most common problems engineers need to solve. The Pareto-optimal solution is the most widely used concept which is a set of optimal trade-offs between the conflicting objectives but without providing clear indication of solution recommendation for decision-making. In this paper, a fast approach of Pareto-optimal solution recommendation using the Pareto reliability index is proposed to recommend a list of optimal ranking for decision-makers. Besides, the mean average precision and the mean standard deviation are utilised to demonstrate the trend of the evolutionary process. A multi-objective artificial wolf-pack algorithm has been developed to handle the multi-objective problems using non-dominated sorting method(MAWNS). In a case study, the MAWNS is employed as the optimiser for the standard test problem ZDT6, and the results show that the proposed method can work valuably for the multi-objective optimisations.

**7:** Zoltan Balogh

Data-mining behavioural data from the web

In the online world the webpages have the opportunity to save the attributes of the software and hardware environment of their visitors and some of their behavioural aspects. This data might contain valuable information about them. In my research I have collected all the available data from the visitors of an online e-learning environment and used various data-mining techniques to reveal hidden rules. As a result, the intelligence and the life satisfaction traits of the visitors can be predicted, if some of the specific properties are available of the visitors.

**68:** Nan-Yun Jiang and Hong-Sen Yan

Production Planning of Series-Parallel Hybrid Shop when Multi-users' Demand Exceeding Supply

The optimal production planning of series-parallel hybrid shop (SPHS) was studied when the multi-user' demand is running ahead of production. Based on the investigation of the manufacturing system, relational structure of up-down streams for series-parallel hybrid shop was established. Without setting the priority, a nonlinear programming model of production planning with greatest production benefits for multi-users' demand was built up. Then the model was calculated by genetic algorithm (GA). Finally, three given simulation results indicated that this method is effective. Compared to other methods of setting the priority, this method is widely used in various situations when demand exceeds supply.

**95:** Saqib Shamim, Shuang Cang and Hongnian Yu

Influencers of information system usage among employees for knowledge creation

Knowledge management and information systems are discussed very frequently by researchers in last two decades. It is noticed that knowledge management is often confused with information management and information systems. In fact these are two different concepts, and number of recent studies reports that information systems facilitates knowledge management. Existing literature also discusses few of

the factors affecting the use of information system. Technology acceptance model (TAM) is the most discussed model. This study goes a step further by discussing the factors affecting the use of information system to create knowledge. It is not limited to the use of information system for routine work, but it focuses on the issue that why employees do or do not analyse information, available in the information system to create knowledge. As analysing and understanding the pattern of information leads to knowledge creation. For this purpose, this study integrates the existing literature with the logical beliefs to offer propositions and a view point that what are the factors having the potential of influencing the use of information system among employees, to analyse information for knowledge creation. Furthermore this study also categorizes the factors as individual and organizational factors. This study also provides a framework for future empirical research.

**73:**Tahira Iqbal, Muhammad Asad and Muhammad Aihab Khan  
A Source Code Quality Analysis Approach

Source code quality assessment is being used to analyze the quality of any written piece of code using various parameters. Such an assessment helps in improving the quality of a source code and also helps a programmer by providing better code writing guidelines. This paper proposes a method for measuring the quality of a source code based on attributes classified into various parameters including reliability, maintainability, testability, reusability, portability, understandability, readability, simplicity etc. Comparison is performed based on the parameters used by existing models in the literature for measuring source code quality.

**56:** Xiaoying Shi, Quan Zhou, Xinyu Qu, Geng Liu and Zhaozhe Gong  
Understanding City Dynamics based on Public bicycle data: A case study in Hangzhou

With the development of wireless communication and network technology, large amounts of public transportation data can be acquired and analyzed to discover the underlying city dynamics. In this paper, by using trip level data collected from Hangzhou public bicycle system(PBS), we visually analyze the changing of city pulse under different external conditions based on the heat map and conditional analysis method. According to the analysis results, we could not only find the city heart and understand people's travel purpose by cycling in different days, but also compare the changing of bicycle rental patterns and spatial distributions under different weather conditions and calendar properties in different time granularity.

## **S-5 Signal, image, and video processing**

**24:** Lei Zhang, Ying Huang, Yan Qi & Xuefeng Wang  
Research on Commercial Potential Evaluation of Newly & Emerging Technology: A Case Study

Rapidly increasing competition of technological revolution drive all participants in the market to pay attention to the prospect of New and Emerging Science & Technologies (NESTs), which are newly invented, fast changing and developing, and have relatively limited applications in the marketplace. Therefore, a systematic method to evaluate the commercial potential of these NESTs is essential for industrial community to win in the marketplace. Based on patent data, this paper proposes an evaluation framework that include technology maturity assessment, technology opportunities identification and competitive environment analysis. We demonstrate our approach with empirical analysis of Graphene. The results show that this study is beneficial to supporting policy-makers in making strategic technical decisions so as to enhance their technological innovation capability and international competitiveness.

**36:** Hongbo Wang, Xuefeng He, Xiong Zhao, Jianye Niu, Yajun Zhang, Sai Lin and Luigi Vladareanu  
The fuzzy comprehensive evaluation of comfortability for patient transfer system

In this paper, a new type of patient transfer system is presented, in which the patient transfer apparatus and walking device are separated. The patient transfer apparatus can move by itself, whose working space is not restricted and transfer process can be adjusted. The walking device is a highly adjustable stretcher vehicle, which can realize the function of supporting transfer apparatus. The fuzzy comprehensive evaluation method is used to evaluate the comfortability of patient transfer system. In evaluation process, we fully consider the man-machine engineering factors and the vibration of mechanical equipment. The comfortability index of patient transfer system is described and the evaluation experiment is carried out. The experiment results show that the fuzzy comprehensive evaluation method is feasible and the patient transfer system has better comfortability.

**81:** Ikram Asghar, Shuang Cang and Hongnian Yu  
Software Based Assistive Technologies for People with Dementia: Current Achievements and Future Trends

The growth in dementia population poses an imperative need of developing new technologies for the wellbeing of the people with dementia. This paper presents empirical results for the 51 software based assistive technologies (SWAT) for the people with dementia from literature and commercially available SWAT. Although software technology usage is not a new field but the usage of software technologies have been very low in dementia care. It has great potential to help the people with dementia, but a lot of research is needed to be done. The software and assistive technology concepts follow almost the same definitions; therefore their combination can yield better results for helping the people with dementia. We investigate what SWAT exists for the people with dementia and what type of functions usually such technologies perform. The SWAT can particularly restore the confidence of the people with dementia by providing them the cognitive, reminders, health monitoring, socialization, leisure, travel, dementia detection and prevention help etc. This paper also highlights five future research areas which still need extensive research efforts.

**63:** Said Broumi, Assia Bakali, Talea Mohamed  
Shortest Path Problem Under Triangular Fuzzy Neutrosophic Information

In this paper, we develop a new approach to deal with neutrosophic shortest path problem in a network in which each edge weight (or length) is represented as triangular fuzzy neutrosophic number. The proposed algorithm also gives the shortest path length from source node to destination node using ranking function. Finally, an illustrative example is also included to demonstrate our proposed approach

**9:** Ping Liu, Qiang Zhang and Jürgen Pannek  
Capacity Adjustment of Job Shop Manufacturing Systems with RMTs

With world competition and enhanced globalization, manufacturers are confronted with the challenge to satisfy customer demands quickly and flexibly. Moreover, it renders the production systems complex and dynamical. Capacity adjustment is an efficient approach to deal with the fluctuation in demand and improve competitiveness of manufacturer. In this work, we derive an extended mathematical model of a typical job shop manufacturing system by introducing Reconfigurable Machine Tools (RMTs) to analyze the impact of this new class of machine tools on the dynamic behavior of the system. To improve the ability of capacity adjustment, we include the operations of RMTs into the classical Proportional Integrate Derivative (PID) controller. Simulation results of a four-workstation job shop system demonstrate the efficiency of the proposed method and show the potential of RMTs in the context of Industry 4.0.

## S-6 Business intelligence, supply chain, and logistics

**88:**Supavas Sitthithanasakul and Noppon Choosri  
Using Ontology to Enhance Requirement Engineering in Agile Software Process

One of the most important factors to decide a success of agile software development process is the requirement engineering. Ontology is a well - known knowledge representation tool in knowledge management application. This paper contributes the investigation of its usage in a software development process. We propose the novel use of ontology to enhance requirement engineering in agile process to improve a communication between software development team and stakeholders.

**85:** Tinggui Yan, Shaohua Hu, Xinhua He & Yongyong Duan  
Linear parameter-varying based tracking control of hypersonic flight vehicles with input saturation

This paper is concerned with Linear parameter-varying based tracking control of hypersonic flight vehicles subject to parameter uncertainties, external disturbances and input saturation constraints. The overall design procedure is consisted of three parts, which includes system decomposition, model transformation, and LMI-based controller design. Specifically, the tracking problem is firstly reformulated as the robust  $H^\infty$  control for uncertain quasi-LPV error subsystems through variable decomposition and small gain theorem. Then, the tensor-product model transformation technique is used to transform the system matrices into convex polytopic forms, which has less computational load and more flexibility due to the system decomposition process. Since only the weighting functions are related to the system states, the controller can be obtained by solving finite number of LMIs corresponding the LTI vertex systems, instead of solving state-dependent Riccati equation on line at a high Hertz rate. Moreover, by defining the control gain matrix described as a convex polytopic form with the same weighting functions, the designed controller is time-varying and nonlinear. Simulation results demonstrate that the proposed control method can guarantee both good tracking and disturbances rejection performance.

**74:** Marcel Migdalovici, Luige Vladareanu, Gabriela Vladeanu, Daniela Baran, Said Broumi, Florentin Smarandache, Hongbo Wang and Feng Yonfei  
Some mathematical aspects on walking robots stable evolution

A survey of some author's concepts on the dynamic systems stability regions, in the general case of dynamic systems, that depend on parameters, is related in the paper. The property of separation of stable regions in the free parameters domain is assumed in the paper as an important property of the environment that is carry out and in the specified case of walking robot analyzed in the paper. The matrix that defines the linear dynamic system has the components of the matrix, assumed to be with real values, and the matrices that intervene in the exposure of the method are also, with real values of the components. We assumed that the matrices from the exposure have the complex values such that the real values are also taken into account as particular case of the complex values. This hypothesis assures a new method of analysis, in the complex domain, on the dynamic systems stability. Our theory on the stability control of the dynamic systems is applied here for specified walking robot model that depend on parameters. The critical position of the walking robot evolution is defined and analyzed on some cases of the walking robot leg, and possible application for robot walking up stairs is exposed. The further way of research is emphasized.

**64:** Nazia Hameed, Kamal Abu Hassan and M A Hossain  
A comprehensive survey on image-based computer aided diagnosis systems for skin cancer

Malignant melanoma is the deadliest form of skin cancer. In 2013 around 14,509 melanoma cases were found in the United Kingdom and the rate is increasing ever since. Melanoma can be easily treatable if detected in early stages. Clinical as well as automated methods are being used for melanoma diagnosis. Image-based computer aided diagnosis systems have great potential for early malignant melanoma detection. In this paper we review state of the art in computer aided diagnosis system and

examine recent practices in different steps of these systems. Statistics and results from the most important and recent implementations are analyzed and reported. We compared the performance of recent work based on different parameters like accuracy, dataset, computational time, color space, machine learning technique etc. and summarized them in table format for better understanding of emergent researchers in the field of computer aided skin diagnosis systems.

**67:** Dharini Krishnan, Xujuan Zhou, Subrata Chakraborty, Rashmi Gururajan and Raj Gururajan.  
Software Development for Managing Nutrition Intake for Type 2 Diabetes Mellitus

In this paper, we present the development and use of a nutrition assessment software namely Nutritracs for Type II Diabetes Mellitus (T2DM). We conducted a case study in India to understand how diet counselling impacts upon Type II Diabetes Mellitus (T2DM) management. We also highlight practical challenges in conducting such studies in developing countries and how we have addressed them, and the promising outcome in T2DM management - reduced the dependency on insulin as a management tool.

### S-7 Robotics and computing

**84:** Pradorn Sureephong, Kitti Puritat et al.

Enhancing user performance and engagement through gamification: Case study of Aqua Republica

implementing game-elements could be beneficial for both participant motivation and performance or outcome. Thus, several researches have argued that the value of gamification could come at a cost to experience or reliability of the task. However, there are only a few studies focusing on game elements and their effect on user performance. In our research, in a set of studies we examined the effects of cooperation, leader boards and awarding badges-basic elements of gamification- by the application of a serious game called Aqua Republica, developed in collaboration with the UNEP-DHI Centre. The experiment design was based on a performance comparison between a "Gamified" group and a "Non-Gamified" group playing Aqua Republica with different gamification environment settings. The indicators of the experiments directly measured the actual use in terms of numerical indicators and self-report. In addition, we have found that using leveling and achievement for the "Gamified" group resulted in a slightly higher performance compared to the "Non-Gamified" group. The overall performance was higher throughout the whole session in the "Gamified" group.

**11:** Chen Junxin, Peng Yonggang and Wei Wei

Design of Smart Grid integrated interactive terminal

With the development of smart grid, the interaction between the user and the power service agencies is becoming more and more important. In this paper, a Smart Grid integrated interactive terminal (IIT) was designed and the process of hardware design and software design are presented. Furthermore, based on the hardware PCB board of IIT, a Fully-automated demand response (ADR) model based on Open Automated Demand Response protocol (OpenADR) is established and remote monitoring with mobile terminal was achieved.

**2:** Chaolong Zhang, Yuanping Xu, Jia He, Jun Lu, Li Lu and Zhijie Xu

Multi-GPUs Gaussian Filtering for Real Time Large-Scale Data Processing

Gaussian filtering is the one of most important algorithm in surface metrology, and it has been recommended by GPS (Geometrical Product Specification and Verification) ISO 16610 and ASME B46 standards to establish a reference surface. However, the computing performance becomes a core bottleneck for Gaussian filtering algorithm based data processing, which is especially true for those large-scale data processing and real time applications. Although researchers tried to accelerate Gaussian filtering algorithm by using GPU (Graphics Processing Unit), single GPU can still not meet the

large-scale and real time requirements of surface texture micro- and nano-measurements due to its limited GPU memory and computing capability. Therefore, to solve this bottleneck problem, this paper proposes a single node multi-GPUs based computing framework to accelerate the 2D Gaussian filtering algorithm. This paper presents that the devised framework seamlessly integrated the multi-level spatial domain decomposition method and the CUDA stream mechanism to overlap the two main time consuming steps, i.e., the data transfer and GPU kernel execution, such that it can increase concurrency and reduce the overall running time. This paper also tests and evaluates the proposed computing framework with other three conventional solutions by using large-scaled measured data extracted from real mechanical surfaces, and the final results show that the proposed framework achieved higher efficiency. It also proved that this framework satisfies the real time and big data requirements in micro- and nano-surface texture measurement.

**43:** Peng Huang, Zhiliang Kang, Chang Liu & F Lin  
ACO-Based Path planning Scheme in RWSN

Traditional wireless sensor networks (WSNs) are consist of sensor nodes with limited battery energy power. Due to rapid development of wireless power transfer technology, sensors can be recharged when they are within limited charging ranges of mobile devices and we call this kind of network rechargeable WSN(RWSN). In RWSN, mobile chargers (MC) are employed to recharge the sensor nodes. However, since charging power, moving speed and total energy of one MC are limited, find the minimal MCs and how to schedule the MCs to complete the charging task of the sensor node become the major problem in such WRSNs. In this work, a novel path planning scheme, named ACO\_RP (Ant Colony System based path planning scheme), is proposed by modeling the path planning problem of the MC in rechargeable wireless sensor network. In ACO\_RP, virtual charge nodes are introduced to create the routes for MCs, and then the Ant Colony Optimization is employed to optimize these routes. The simulation results show that the ACO\_RP scheme achieves better performance than existing schemes.

**47:**Tashi, Mohammad S Hasan and Hongnian Yu  
Design, Simulation, Prototyping and Experimentation of Planar Micro-strip Patch

Passive radio frequency identification (RFID) system operating in the ultrahigh frequency (UHF) band ranging from 860 MHz to 960 MHz is getting considerable attention in the recent years as it provides a long reading range, high data rate, and small antenna size. However, the passive UHF RFID tag does not work when it is directly mounted on metal objects. The performance of the passive UHF RFID tag is becoming increasing important for tagging metallic objects, in particular, in the warehouse applications. In this paper, a micro-strip patch antenna is proposed for the passive UHF RFID systems to tag metallic objects. The proposed design of the micro-strip patch antenna is supplemented by simulation and reading range measurement results. The prototype antenna measurements show a maximum reading range of 4.5 m and a reliable reading range of 1.89 m on metallic objects. The experimental results show that the prototype micro-strip patch antenna works very well on the metallic objects.

## **S-8 Cloud computing, sensor design, fusion**

**96:** Yan Wang, Shuang Cang and Hongnian Yu  
A review of sensor selection, sensor devices and sensor deployment for wearable sensor-based human activity

Data preprocessing, feature selection as well as classification algorithms usually occupy the bulk of surveys on human activity recognition (HAR). This paper instead gives a brief review on the data acquisition step which is a critical stage of the wearable data-driven-based HAR . The review focuses



on the determination of sensor types, modality of sensor devices, sensor deployment as well as data collection. The work aims to provide a comprehensive and detailed guidance for the fundamental part in HAR, also to highlight the challenges related to the area reviewed.

**26:** Maoyang Zou, Jia He and Qian Wu  
Multi-tenancy access control strategy for cloud services

In the industrial world, the access control is still mostly based on traditional “Role-Based Access Control” for cloud services. Cloud Computing United. Open Laboratory in Chengdu University of Information Technology develops “the large virtualization infrastructure platform for cloud data center” which realizes access control strategy according to the characteristics of the multi-tenancy. Firstly, the main multi-tenancy access control technology is studied. Secondly, the paper describes the design for multi-tenancy access control strategy, including tags, authorization strategy and property update strategy. Finally, it discusses the implementation framework of multi-tenancy access control strategy.

**49:** Feng Zhai, Wei Cen, Jia Zhao, Peng Xu and Yi Sun  
A User Peak Load Staggering Potential Assessment Method Based on Three-demarcation Analytic

In the process of user load staggering allocation, there are difficulties in different degrees of distribution criteria uncertainty and mismatch between task and actual response. In order to allocate more accurately, and provide suggestions for implementing staggering power consumption for power grid enterprise, this paper evaluates the user peak load staggering potential by using three-demarcation analytic hierarchy process. Selecting indexes associated with staggering potential, building an index system of evaluation, allocating peak load staggering task base on evaluation result. And judging the accuracy of the evaluation according to the task completion. By means of simulation, the effectiveness of this method in peak load staggering potential evaluation is verified.

**91:** Julija Naskova and Julija Naskova  
Dreamweaver on the Cloud; Web designers'

Adobe Dreamweaver CC has introduced additional features and tools as part of its Cloud based functions. Most notable are the Device Preview, a new tool meant to help with responsive design preview across platforms and its integration with the social media tool Behance. While Adobe claims that its revamped tools revolutionize the web design process, designers are not rushing to adopt them. This paper analyses the ways Adobe tools incorporate responsive design and social media and also how designers respond to these changes. It also gives feedback as per what functions are used by designers and how they perceive the Cloud.

**34:** Thepparit Sinthamrongruk and Keshav Dahal  
Route scheduling for HSSP using Adaptive Genetic algorithm with Constructive Scheduling technique

Shortest path finding has been a challenging task in most of the complex multi-path scenarios. The complexity rises with the introduction of constraints to the scenarios. Healthcare service to the patient is one of the real world problems where travelling path has significant impact on the service time. The purpose of this research is to develop new approach to solve multiple travelling salesman problem (MTSP) for healthcare staff members offering healthcare services at patients homes travelling in different routes with the minimum total cost. The proposed approach uses Genetic Algorithm (GA) combined with Constructive Scheduling, Local Search, and Adaptive Technique to increase the efficiency. A case study with 45 patient task locations is generated according to referenced work. The result shows that the combined algorithms explore improved solution than that of the traditional GA. Constructive Scheduling using k-mean algorithm is applied to generate initial chromosome which provides improved results with acceptable computational time. Also, Adaptive GA shows a few different solutions to the traditional GA. All these approaches are beneficial to the traditional method in shortest path finding problems.

## S-9 Smart tourism, and Marketing

**103:**Pathathai Na Lumpoon and Pree Thiengburanathum  
Effect of Integration a Mobile Game-based Learning Framework in Cultural Tourism

Cultural activities such as visiting museums, galleries and historical sites have received much attention from tourists and researchers. Many existing works integrate location-based technologies as tools supporting the visit of historical and cultural sites. However, young visitors tend to be puzzled or bored as the mentioned technologies systems attempt automatically provide annotation contents according to only the current positions of the visitors. In this paper, we propose mobile game based learning framework applied to cultural tourism. The proposed framework which consists of mobile game racing, interactive map and etc is designed for helping young visitors learn history and culture better. The Walk Rally game is developed using the proposed framework to investigate young tourists's satisfaction and learning in history and cultural area in Chengdu city, China. The experimental results shows that the young tourists have a moderate level of satisfaction on the game content.

**35:** W. Chen, X. Wang, W. Sun & R. Yu  
The Design of PROFINET-MODBUS Protocol Conversion Gateway Based on the ERTEC 200P

Industrial Ethernet technology in the automatic control system is increasingly widespread, but many industrial fieldbus networks coexist currently, and cannot form a unified network. The article designed a protocol conversion gateway, which can finish the mutual conversion task between MODBUS and PROFINET. Through reforming the original MODBUS communication protocol, the gateway can realize the function of the MODBUS device getting access to industrial Ethernet.

**59:**Xiaowen Liu, Na Lu and Jin Yu  
Towards Development a Travel Demand Negotiated Aggregation Model

A new demand aggregation model is proposed in this paper by introducing the automatic negotiation technology into travel demand aggregation to achieve negotiated-type aggregation of fragmented travel demand. The fundamental concepts related to the model are presented in this paper. The architecture and key agents of the model are summarized. The process of demand negotiated aggregation and the aggregation strategy of the model are elaborated.

**12:**Damrongpol Kamhangwong, Gilles Neubert, Aicha Sekhari and Pradorn Sureephong  
Quantification of Freshness Loss and an optimization approach for managing fresh fruit exportation

An integrative view on logistics and product quality is one of keys to supply chain management for the fresh food industry. As it is difficult to define quality deterioration during distribution and incorporate it into logistics cost model, a quality loss assessment in term of freshness loss and a simple modelling approach to maximize net profit is proposed in this study. Export of Mangosteen from Thailand to China has been selected to be a case study and to develop the proposed model with varying environmental condition of storage and transportation, and quantity of supply and demand. The resulting model can be applied in an illustrative case study for the other fresh produce, and it can be used to plan and operate fruit exportation in term of production, distribution and inventory planning.

**107:**Yahaya Yusuf, Emmanuel Olasanmoye, Masha Menhat and Wendy Auchterlounie  
External assurance and sustainability reporting practices amongst UK companies using GRI

Assurance of sustainability reports is an increasing trend that strengthens the credibility of the reports. However, the reporting has long been a contentious subject. Organisations, as well as the assurance providers, are often thought of 'capturing' the assurance process, which is believed to be beneficial to the stakeholders. In view of this contention, we investigate the external assurance of sustainability reporting and stakeholder engagement among companies using GRI framework for reporting in the UK from 2012-2015 and examine the roles of stakeholders, the assurance providers, prior relationships between reporting organisations and assurance providers, the process for selecting the assurance providers, the interaction effects of company size as defined by both turnover and number of employees on the types of assurance providers used. This study adopts a quantitative approach. An electronic questionnaire was designed and sent out to 115 companies practising assurance reporting using GRI framework for reporting sustainability via email, out of which 65 responses were received, representing 56.5% of the total sample. Analysis of the data was conducted using SPSS. The results indicate increasing demand for assurance practice. Furthermore, managerial capture was also noticed due to lack of stakeholder's engagement. In addition, size of an organisation as defined by turnover was observed to be a criteria for selecting assurance providers and there was therefore a marked difference between SMEs and large enterprises. This study shows that involving stakeholders in assurance processes at all level will help to resolve the issue of managerial capture and also increases the confidence in sustainability reporting assurance

**109:**Roua Elchamaa, Baudouin Dafflon, Yacine Ouzrout and Franck Gechter  
Agent Based Monitoring for Smart Cities: Application to Traffic Lights

This paper proposes a decentralized model based on multi-agent systems (MAS) and complex event processing (CEP). The new control scheme aims to improve green light time in order to reduce the average waiting time of vehicles in front of the traffic light, especially if the road is empty, and to reduce congestion at crossroad. This improvement is provided by the observation of the intersection through Cyber Physical Systems (CPS). This paper propose an auto-adaptive model for smart regulation traffic lights. The developed model will be evaluated and analyzed using different metrics and scenarios so as to test their influence on system performance.

## S-10 Electronics

**39:** Linye Ma  
Lityium-ion Battery Life Evaluation Method Based on Fuzzy Nonlinear Accelerated Degradation Process

In engineering practice, restricted by time and expense of the test, we generally choose a small sample as the test object of accelerated degradation test. The size of the sample is so small that the parameters gotten from solving model will not precise enough, which will result in that the rationality of life evaluation results is not guaranteed. We think that this kind of uncertainty belongs to cognitive uncertainty. Through analyzing the mechanism of lithium-ion batteries, we select Wiener process, the most commonly used in degradation model, as the degradation model, and Arrhenius model, in which temperature is considered as the sensitive stress, as acceleration model. Fuzzy theory is used to fuzzify the activation energy of lithium-ion battery to quantify the cognitive uncertainty caused by sample size. Thereby we build a new accelerated degradation model in which the nonlinear degeneration, stochastic uncertainty and cognitive uncertainty of lithium-ion acceleration degradation process are all taken into account. Then we give out the statistical analysis method and evaluation process of fuzzy reliability and life assessment results. Finally, we use accelerate degradation simulated data of lithium-ion battery to illustrate the effectiveness of this method, and analyze the influence of cognitive uncertainty on

evaluation results.

**4:** Yu Jiang-feng, Wei Wei, Peng Yong-gang

A real-time optimal energy dispatch for microgrid including battery energy storage

Microgrid is an effective system for integrating distributed generations, energy storages, loads and some auxiliary devices. To improve the efficiency of the system, the optimal energy dispatch is an effective method that can control these kinds of sources and loads. A real-time optimal energy dispatch for microgrid is proposed in this paper, which can reduce the energy loss and enhance the economy. Compared with the conventional dispatch method, that is more useful because the real-time dispatch can avoid some predictive error accumulation and the battery energy storage in the microgrid can transfer energy from one scheduled period to another. First, the chance constraints model is used to set the rated capacity of batteries. Second, the object function of optimal energy dispatch is put forward and the constraints of microgrid are analyzed. Third, after the optimal model is established, the particle swarm optimization algorithm is adopted to search the optimal solution of the problem. At last, the optimal energy dispatch is verified by a simulation test and the result reveals this dispatch is effective and practical.

**75:** Mihaiela Iliescu and Luige Vladareanu

Multi-Axes Mechatronics System for Printing Ultrathin Layers of Perovskite Solar Cells

This paper presents main steps in design, develop and manufacture of a mechatronic system for printing ultrathin layers of perovskite solar cells. The innovation of this mechatronic system consists in its modular structure enabling the application of three different printing technologies. Some preliminary tests and results are also evidenced.

**44:** Martins Olaleye, Keshav Dahal & Zeeshan Pervez

Cognitive Radio Engine Learning Adaptation

Cognitive radio (CR) system being an intelligence-based communication device has been considered as the next generation emerging technologies to Wireless Communication Systems (WCS). This CR's embedded-intelligent agent is called Cognitive Engine (CE), and is responsible for the dynamic adaptation between WCS's environment and the radio operational parameters. As a result of CR's intelligence capability, the WCS's quality of service (QoS) and its connectivity operations get enhanced. In order to evaluate the CR engine performance in respect to its learning, timing, and its computational performances. This paper proposes an alternative state-of-the-art enhanced CR learning engine based on Random Neural Network (RNN). Unlike Artificial Neural Network (ANN) systems, RNN establishes strong data generalization, converges faster and produces relatively smaller levels of prediction errors. Subjected to similar environmental conditions, the simulation cumulative results show that the performance of the proposed RNN system is satisfactory and produces 36.895% performance improvement above the ANN learning engine.

**13:** Masud Rana Rashel, Andre Albino, Teresa C. F. Goncalves and Mouhaydine Tlemcani

Sensitivity analysis of parameters of a photovoltaic cell under different condition

A photovoltaic cell is the component which converts light energy to electrical energy. Different environmental parameters and internal parameters have great impact on a photovoltaic cell output. Irradiance and Temperature are two environmental components which have direct impact on a PV cell. Photocurrent, Diode saturation current, ideality factor, Series resistance and Shunt resistance are important parameters for estimating photovoltaic cell output. To identify the characteristics of a photovoltaic cell and estimate the output, well known Shockley diode equation is used. This equation contains all the parameters, environmental and internal. These parameters' properties of the photovoltaic cell are deeply analyzed and their sensitivity is identified. The sensitivity of the parameters is analyzed through making an error function. This Error function is used to understand the behavior of

parameters and their characteristics against the photovoltaic cell output. Error function and the parameters make different curve. These curves indicate the sensitivity of different parameters of the output of the photovoltaic cell. Using these results the impact of the parameters of the photovoltaic cell is clearly identified. White noise is included with the ideal values and simulation is also done with the white noise value. Without white noise and with white noise both systems are analyzed in this work. White noise is imposed with the ideal value for getting the real time environment flavor. Real time value is not used in this experiment, standard values and the standard values with white noise are analyzed for understanding the sensitivity of parameters.

**72:** Md Sajib Ahmed, Teresa Gonçalves and Hasan Sarwar  
Improving Bangla OCR output through correction algorithms

Bangla OCR (Optical Character Recognition) is a long deserving software for Bengali community all over the world. Numerous efforts suggest that due to the inherent complex nature of Bangla alphabet and her word formation process, development of high fidelity OCR producing a reasonably acceptable output still remains a challenge. Post Processing of OCR's output can improve the performance of OCR. A number of known algorithms, i.e., N-Gram, Edit Distance have been used to rectify misspelled words through replacement in language processing. In this work, we have, for the first time, used these algorithms to replace misrecognized words that are produced by Bangla OCR. The assessment is made on a set of fifty documents written in Bangla script and uses a dictionary of 541,167 words. The proposed correction model can correct several words lowering the recognition error rate by 2.87% and 3.18% for the character based n-gram and edit distance algorithms respectively. The developed system suggests a list of 5(five) close alternatives for a misspelled word. It is found that 33.82% cases, the correct word is the topmost suggestion of 5 words list for n-gram algorithm while in 36.31% cases the first word in the suggestion properly matches in case of Edit distance algorithm. This work will ignite rooms of thoughts for possible improvements in character recognition endeavor.

## S-11 Information management

**17:** Baolin Yi, Xiaoxuan Shen, Zhaoli Zhang, Jiangbo Shu and Hai Liu  
Expanded autoencoder recommendation framework and its application in movie recommendation

Automatic recommendation has become an increasingly relevant problem: it allows the user to discover items that match their tastes. In this paper, we propose an expanded autoencoder recommendation framework. The stacked autoencoders model is employed to extract the feature of input then reconstitution the input to do the recommendation. Then the side information of items and users is blended in the framework and the Huber function based regularization is used to improve the recommendation performance. The proposed recommendation framework is applied on the movie recommendation. Experimental results on a public database in terms of quantitative assessment show significant improvements over conventional methods.

**104:** Orasa Tammasarangoon and Poon Thiengburanathum  
Study and implement delivery method for decision support systems of Chiang Mai urban transit

This paper aims to promote the use of public transport in the city. The public transport system is essential for a lot of people in city. Especially persons with low income. However, because public transport is currently experiencing issues awareness routes, the duration of the trip and the waiting time at the park assist the decision support system (DSS) to use public transport as an alternative format to help facilitate the users. DSS can be used to reduce costs, energy consumption, pollution and traffic congestion on the roads. In this paper, we proposed a DSS framework based on object-oriented

database structure integrate with a user friendly web based application. A DSS provide user about the trip information such as geographical data, vehicle route and arrival time. The proposed decision consists of three modules including database system management, GPS module, and planning module to calculate the speed of travel along different paths, and the user interface to display the results back to user.

**28:**Fatima Zohra Tanane, Jannik Laval and Vincent Cheutet  
Towards Assessment of information system agility

Currently, the information systems agility and the satisfaction of the dynamic environment requirements is essential challenges for companies. The purpose of this paper is representing the existing approaches for achieving agility in software development as well as in production system. The objective is to identify the relevant metrics for evaluating information system agility. Then, we propose an analysis model that contains these agile metrics. In order to observe their combination in information system.

**83:**Muhammad Hasnain Abbas Naqvi, Jiang Yushi, Mishal Hasnain Naqvi and Muneeb Abid Malik  
HOW DO TV PROMOTIONS AFFECT BUYING CONDUCT OF FEMALE: A STUDY CONDUCTED IN (LAHORE) PAKISTAN

TV notice plays an imperative role in changing the buyer conduct. Now days, there is no necessity to visit some store or shopping precinct as people are able to get plenty of information about the features of new or prevailing product through TV commercial. TV commercials stimulus females purchasing conduct by approaching them to acquire the particular item for consumption through repeated advertising. It moreover changes their opinion toward the goods and administrations image and likewise rises the demand to increase the percentage of sales which incline to more revenue. The goal of this study is to check the watching behavior of TV notice, to find the impact of women's buying behavior while making decision of purchase and to check the influence of TV commercials on various dimensions of buying behavior. The information is composed from 100 female respondents involved of working females and household females via questionnaire survey. The verdicts of the study illustrate that a strong relationship between both variables exist which are TV notice and women purchasing conduct. Moreover, it also reveal the datum that female is sturdily motivated through the TV commercial and announce new product in their family which they came to know by viewing TV ads. The findings similarly show that convenience of the merchandise is additional factor which is vigorously influenced on females purchase choice.

## **S-12 E-Learning and technology enhanced learning**

**92:**Roy Khristopher Bayot and Teresa Gonçalves  
Multilingual Author Profiling using Word Embedding Averages and SVMs

This paper describes an experiment done to investigate author profiling of tweets in English and Spanish, particularly for cross genre evaluation. Profiling consists of age and gender classification. The training sets were from tweets while genres for evaluation come from blogs, hotel reviews, other tweets collected in a different time, as well as other social media. Comparisons were done between average of word vectors and tfidf as a baseline while using an SVM with a radial basis function with gamma as 100 and C as 100. Results show that using the average of word vectors outperforms that of tfidf in most cross genre problems in age and gender.

**16:**Huiting Wu, Yanshen Liu, Lin Qiu and Yi Liu  
 Research on Network Learning Platform and Its Application in Teaching

Aiming at the problem that students' learning autonomy is poor in the traditional course teaching and the teaching quality is not high. The network learning platform is put forward to assist the teaching. According to the knowledge system of practical courses, the corresponding teaching content is shared with the network learning platform through the five major practical teaching platforms. These digital teaching resources platforms make students arrange extra-curricular learning time freely and change the students' learning attitude from passive to initiative. And the learning mode is changed from a single classroom learning to the combination of internal and external learning. The experimental data shows that the blended learning model can greatly improve students' autonomous learning ability, learning interest, practical ability and innovation ability. The application of MOOCS platform and OJ system provides rich teaching resources for teachers so that the communication between teachers and students is more frequent and the quality of teaching can be substantially improved. Network learning platform and practice teaching organically, stimulated the students study interest, has received the moral teaching effect.

**71:** Saba Mohammed and Edward Apeh  
 A Model for Social Engineering Awareness Program for Schools

Advancements in security has over the years of technological growth been mainly focused on providing secured technological infrastructure. The developed security measures and counter-measures have played a major role in reducing the surge of cyber-attacks. However, hackers have continued to exploit vulnerabilities due to the human element to gain access into otherwise secured systems. Risks and potential for exploits are more so in schools where the human vulnerability is enhanced by young impressionable pupils. Social engineering, the art of manipulating people so they give up confidential information, is increasingly the approach of choice for hackers who exploit the human element. Social engineers bypass secured systems in schools by directing targeting and exploiting the human vulnerabilities of school's students and staff. Education through awareness campaigns are typically used in countering the threat from social engineering. Such awareness campaigns tend to however be too holistic in focus to lead to the significant and sustainable change in behaviour required to counter social engineering. This paper presents a model for designing and implementing social engineering awareness programmes aimed at fostering behaviour change in schools. It demonstrates the process of designing a social engineering awareness program to meet all types of learning styles by using different multiple communication methods. Evaluation and continuous reinforcement approaches are also presented. A pilot implementation of our proposed model for social engineering awareness programme shows a significant change in behaviour of school's teaching staff.

**41:** Prakash Poudyal, Teresa Goncalves and Paulo Quaresma  
 Experiments On Identification of Argumentative Sentences

The main purpose of this study is to evaluate the best set of features that automatically enables the identification of argumentative sentences from unstructured text. As corpus, we use case laws from the European Court of Human Rights (ECHR). Three kinds of experiments are conducted: Basic Experiments, Multi Feature Experiments and Tree Kernel Experiments. These experiments are basically categorized according to the type of features available in the corpus. The features are extracted from the corpus and Support Vector Machine (SVM) and Random Forest are the used as Machine learning algorithms. We achieved F1 score of 0.705 for identifying the argumentative sentences which is quite promising result and can be used as the basis for a general argument-mining framework.

### S-13 Control ana Robotics applications

**23:**Dongyun Wang, Aihui Wang Wang, Yiwen Fu, Junming Xiao and Huiqin Liu  
Robust Nonlinear Perfect Control for Semiconductor Refrigeration Device

In this paper, operator-based robust perfect control for nonlinear semiconductor refrigeration device with uncertainties is considered. For the research about the properties of the semiconductor refrigeration, an aluminum plate with Peltier device is very representative. So, the perfect tracking control performance is studied by using this device. The robust right coprime factorization approach is convenient in analysis and design for the nonlinear system with uncertainties, based on this reason, operator-based robust right coprime factorization approach and operator-based observer approach are used. First, something about semiconductor refrigeration devices and operator-based robust right coprime factorization approach has been introduced. Second, basic conceptions and methods about operator method and robust right coprime factorization approach are described in rough. Third, a perfect tracking control design is given, the robust stability of the system is guaranteed and the perfect tracking performance can be achieved. Finally, the effectiveness of the design scheme is demonstrated by an experiment for the aluminum plate with Peltier device.

**102:**Xi Chen and Tao Wu  
Simulation as a Service through Controller Northbound Interface for SDN

The Software Defined Networking (SDN) is considered as a primary evolutionary direction for the next generation networks. The OpenFlow protocol enabling SDN decouples the control plane from the data plane, thus complex controlling and management functions are able to be eliminated from switches, resulting in dumb switches with fewer layers and higher forwarding efficiency. Sophisticated controlling and management functions seen in traditional switches are moved to dedicated controllers in an SDN environment. Controlling and management functions are primarily provided through the controller northbound interface. But mainstream controllers do not dedicatedly offer sophisticated simulation capabilities. Simulation plays an important role in both traditional network and the emerging SDN which paves the foundation for network prototyping. This paper proposes the Simulation as a Service (SimaaS) though northbound interface based on Floodlight controller and Mininet simulator to assist network administrators and researchers to efficiently prototype and test an SDN network with visual support and simulation utilities. SimaaS is a visual-aided Floodlight extension based on Floodlight's REST APIs, which offers visual support for QoS-aware topology viewing, topology making and flow table manipulation not seen in the original Floodlight controller. The experiments on the SimaaS show that it offers desirable features and feasible performances.

**10:**Dongyun Wang, Chenglong Jiang, Yongping Dan and Shengjun Wen  
Design of air quality monitoring system base on Internet of things

A kind of ethernet remote monitoring and control system based on LM3S8962 is presented in this paper. By transplanting LwIP protocol on the LM3S8962, to achieve a homemade weather station Internet connection and automatically obtain an IP address, the user through the mobile phone or a PC web browser to access the system WEB server through the web page display the temperature, humidity, voltage , PM2.5 and other sensor data, and network gateway can control sub-node peripherals use the control instruction which be uploaded to be sent to the sub-node, achieving wireless LAN to the Internet for remote monitoring and control system by ZigBee, the local LCD would display the parameters and IP addresses. Meanwhile, the system can also be used as a client, the collected data is uploaded to a common data center networking platform-yeelink websit.



**52:**Zhengxiang Ma, Tiejun Chen and Aihui Wang  
Robust Nonlinear Control Design of A Robot Arm with Micro-hand Using Operator Approach

This work focuses on a robust nonlinear control design of a robot arm with micro-hand by using operator approach. In proposed control system, we can control the endpoint position of robot arm and obtain the desired force of micro-hand to perform a task, and a miniature pneumatic curling soft actuator which can generate bidirectional curling motions in different positive and negative pressures is used to develop the fingers of micro-hand. In detail, to control successively the precise position of robot arm and the desired force of three fingers according to the external environment or task involved, this paper proposes a double-loop feedback control architecture using operator-based robust right coprime factorization approach. First, the inner-loop feedback control scheme is designed to control the angular position of the robot arm, the operator controllers and the tracking controller are designed, and the robust stability and tracking conditions are derived. Second, the complex stable inner-loop and micro-hand with three fingers are viewed as two right factorizations separately, a robust control scheme using operator-based robust right coprime factorization approach is presented to control the fingers forces, and the robust tracking conditions are also discussed. Finally, the effectiveness of the proposed control system is verified by experimental and simulation results.

**21:** Siyuan Ma, Yong Zhang, Yuan Xu, Bin Wang, Jin Cheng and Qinjun Zhao  
An Indoor robot navigation by coupling IMU, UWB

Accurate position information of the robot is required in many applications. In this work, a novel INS/range-only based UWB/Encode integrated navigation model is proposed. In this model, the positions of range-only based UWB and INS are used for the position estimation of integrated model; the velocities of encode and INS are used for the velocity estimation of integrated model. Then, a filter with a 4-element vector is used to fuse the measurements of INS, UWB, and encode. Meanwhile, the position of RN is also able to be estimated by the range-only based UWB model. The simulation shows that the performance of the proposed model is better than the traditional model in position accuracy.

## S-14 Information system

**62:** Jinghua Hou  
Prospective Memory Aid Reminder System Design for Group Tasks

Prospective memory (PM) is a form of memory involving remembering to perform delayed intentions or planned actions. PM failures may lead to serious consequences. Although many PM aid systems have been developed, existing works on reminder systems only focus on individual tasks. However, people with PM difficulties (e.g., elderly) are often involved in many group tasks and it is important to take into account the interaction between group members while designing an efficient reminding system for group tasks. Based on the theoretical background of PM, this paper thoroughly analyzes the factors that will affect the PM task performance and proposes a computational approach for determining the appropriate number of reminders and reminding method. To evaluate the proposed reminding model, we conducted a preliminary user study and the participants felt that the reminders are appropriate and our approach provides a better overall experience and reminds more effectively than its control version.

**80:** Bassant Mohamed Elbagoury and Luige

A Hybrid Real-Time EMG Intelligent Rehabilitation Robot Motions Control based on Kalman Filter

Intelligent Control of agent autonomous rehabilitation robot is a very complex problem, especially for stroke patients' treatments and dealing with real-time EMG sensors readings of muscles activity states and transfer between real-time Human motions to interface with rehabilitation robot agent or assisted device. The field of Artificial Intelligence and neural networks plays a critical role in modern intelligent control interfaces for robot devices. This paper presents a novel hybrid intelligent robot control that acts as human-robot interaction, where it depends on real-time EMG sensor patients data and extracted features along with estimated knee joint angles from Extended Kalman Filter method are used for training the intelligent controller using support vector machines trained with Adatron Learning algorithm for handling huge data values of sensors readings. Moreover, the proposed platform for rehabilitation robot agent is tested in the framework of the NAO Humanoid Robot agent along with Neurosolutions Toolkit and matlab code. The average overall accuracy of the proposed intelligent motion SVM-EKF controller shows average high performance that approaches average 96% of knee motions classifications and also good performance for comparing Extended Kalman filter knee joint angles estimations and real EMG human knee joint angles in the framework of Human Walk Gait cycle. Also, the basic enhancement of proposing PSO optimization technique for robot knee motion is discussed for future improvements. The overall algorithm, methodology and experiments are presented in this paper along with future work.

**78:** Tao Yan, Jin Wang, Qing Hu and Xiaodan Du

TBDT: A New Trust-Based DDoS-Tolerant Model

DDoS attack is fatal to the survivability of internet service. Some DDoS attackers with spoofed source IP send a large number of packets to congest the victim's bandwidth. We were motivated this problem. This paper proposed a new method for defending against DDoS. This DDoS-Tolerant method can not only defend against spoofing IP attacks, but also tolerant the bandwidth flood attacks. At last, this paper provided the simulation. The simulation's results showed that the victim could survive the DDoS attacks.

**45:** Muhammad Hasnain Abbas Naqvi, Jiang Yushi, Mishal Hasnain Naqvi and Muneeb Abid Malik  
Attitudes Of Audience Towards Repeat Advertisements A Case Of Pepsi Ads

The main focus on the company's marketing is advertising nowadays, which has so much influence that nothing can be marketed without advertising. Just to inform your customers of what your company is offering media is the only option now to let people know. Media is so influential these days they repeat advertisements of companies just to get into the customers mind. Repeating advertisements has surely been a tool to grab customers for a company's offerings. This research focuses on the effects of repeat advertisements on the purchase decisions of customers. In this research we will be focusing just on the PEPSI ads which are aired on TV during the cricket matches on different sports channels. This will also show attitudes of people towards the ads, are they motivated by those ads to use the product of the company or not. The analysis and finding section shows that the television ads which are repeated several times during a cricket match do not get much of attention. Repeating advertisements show little effect on the customers purchase decisions. Consumers find that the theme of the ads plays an important role in grabbing the customer's interest. Advertisement is the most important source to promote the brand

**40:** Libo Zhang, Yihan Sun and Tiejian Luo.

A framework for evaluating customer satisfaction

In this paper, we study the performance of six American Airline for providing recommendations for potential passengers through analyzing their comments reported on Twitter by flyers of Twitter users. All the source data is collected from open source on Twitter APIs. First of all, evaluation on

each company will be generalized in terms of three sentiments including negative, neutral and positive ones. Furthermore, to demonstrate each specific performance of each company, the performance of each company consisting of ten different aspects will be evaluated in terms of these ten indexes and comparison among all the companies will be made. Additionally, future research directions are finally made in the conclusion to reach a recommendation system.

### **S-15 Interactive session**

76: Go Sang, Lai Xu and Paul De Vrieze  
A Reference Architecture for Big Data Systems

Over dozens of years, applying new IT technologies into organizations has always been a big concern for business. Big data certainly is a new concept exciting business. To be able to access more data and empower to analysis big data requires new big data platforms. However, there still remains limited reference architecture for big data systems. In this paper, based on existing reference architecture of big data systems, we propose new high level abstract reference architecture and related reference architecture notations, that better express the overall architecture. The new reference architecture is verified using four existing cases and an additional new use case.

77: Olaolu Sofela, Paul De Vrieze and Lai Xu  
Service Identification Requirements for Enterprise Information Systems

Identifying services is one of the most important step in developing service-oriented business systems. Existing service identification methods still have some shortcomings, e.g. unrepeatable approach, inapplicable to all enterprise information systems and unadaptable to business factor change. Some approaches focus on fixed cases or certain types of organizations neglecting the change of involvement and operation of the enterprise systems, which have limited value to apply to a broad range of real-life business cases In this paper, we investigate requirements of service identification from different types of information systems, from single systems to collaborative systems, from closed systems to open systems. The research is important for providing a solid foundation for further identifying services for developing different service-oriented systems.

93:Li Jie, Wang Tian-Zheng and Hu Fan  
ADAPTIVE NOISE REDUCTION ALGORITHM BASED ON GRADIENT IN WAVELET FEATURE DOMAIN

Conventional linear system adaptive filtering techniques have been widely used in adaptive noise reduction problems. However, because of the linearity of the operation, it is difficult to suppress the noise and keep the speech signal using linear filters when the spectrum of a signal is somewhat wideband and nonstationary. In order to slove the problem, gradient-based adaptive learning algorithms with the characteristics of infinitely differentiable are presented to seek the optimal solution for noise reduction. Test on several different speech databases, the experimental results also prove the effectiveness of the proposed method.

6: Li Qiaoliang, Chen Zhewei and Qi Suwen  
Multi-view face detector using a single cascade classifier

In this paper, a cascade classifier is trained to detect multi-view face samples. Compare with most of face detection system which use different classifier to classify frontal face and profile face, our

system has advantage in detection speed. We extract the Haar-like feature from the training samples and train a cascade classifier by using Adaboost learning algorithm. Different from the existing algorithms, our detection system only contains a cascade classifier model. Our primary experiment demonstrates that our cascade classifier can achieve high accuracy and high speed detection of multi-view face in real-time.

33:Maha Talaat

Design and Implementation of a new hybrid defense mechanism against DoS attacks

Nowadays, many people uses internet for personal uses, work purposes or even entertainment. This made the internet a fertile place for criminals to steal their information's such as e-mail accounts, passwords, bank account balances, and credit card information. According to Cyber Attacks Statistics Timelines of January 2016, Cyber Crime ranks on top of the Motivations Behind Attacks chart with 60.6%, January reported that DDoS leads the chart of the known techniques with 22.3%. It's the most difficult type of attacks as attackers use fake identities and deceive target servers by masquerading legitimate identity. This paper proposed a new hybrid defense mechanism that filter traffic packets at early step before reaching target server and block malicious packets using OPNET Modeler network simulation software. Group of experiments carried out to evaluate the proposed mechanism.

66:Jiang Ge and Tang Xinhuai

Q-Mon: An Adaptive SOA System with Data Mining

Traditional SOA system frequently fails to execute services after the service composition. We address these shortcomings with Q-Mon, and efficient, reliable SOA system to find the rules between the environment and the executed service. Q-Mon provides real time replacement by choosing another service to execute, which is predicted to have a good performance in the current context. Q-Mon monitors the behavior of the executing service and the environment, and the collected data is used for relationship mining. Our experimental results show that Q-MON reduces the response time drastically and also predicts suitable service to replace the failed one for executing.

37:Li Zhang, Chang Liu and Xiujun Zhang

Classification of Parkinson's disease and Essential Tremor Based on Structural MRI

Parkinson's disease (PD) and essential tremor (ET) are two kinds of tremor disorders which always confusing doctors in clinical diagnosis. Early experiments have already shown that Parkinson's disease can cause pathological changes in the brain region named Caudate\_R (a part of Basal ganglia) while essential tremor cannot. Although there are many research work on the classification of PD and ET, they didn't achieve the automatic classification of the two diseases. In order to achieve this, we proposed a machine learning framework based on principal components analysis (PCA) and Support Vector Machine (SVM) to the classification of Parkinson's disease and Essential Tremor. This machine learning framework has two-stage method. At first, we used principal component analysis (PCA) to extract discriminative features from structural MRI data. Then SVM classifier is employed to classify PD and ET. We used statistical analysis and machine learning method to test the differences between PD and ET in specific brain regions. As a result, the machine learning method has a better performance in extracting the differential brain regions. The highest classification accuracy is up to 93.75% in the differential brain regions

98:Jinyun Liu, Dayou Li and Zuobin Wang

A Developed Magnetic Force Microscope

In the paper, a magnetic force microscope (MFM) was developed for applications in liquid environment. The 3D structure of the developed MFM system was designed first and then the

components of every part were machined and assembled. The structure for fixing the probe holder can be used for balancing and adjusting the probe. The laser holder can be adjusted not only in the X and Y directions but also the incidence angle. This research focuses on the design of a specific MFM system to obtain the magnetic force images in liquids.

50:Chunyan Hou, Jinsong Wang and Kai Shi  
Reliability Analysis of Web Server Cluster Systems based on Proportional Hazards Model

With the universal application of web server clusters (WSCs), their reliability is drawing more and more attention from academia to industry. Many accelerated life testing (ALT) models have been proposed for hardware load-sharing systems (LSSs), which are not suitable for WSCs whose reliability is significantly dependent on system software. In contrast to hardware which runs all the time after a system launches, software performs only when it is called. This paper presents an approach for WSC reliability and degradation process analysis, which is modeled as a non-homogeneous Markov process (NHMH) composed of several non-homogeneous Poisson processes (NHPPs). The arrival rate of each NHPP corresponds to system software failure rate which is expressed using Cox's proportional hazards model (PHM) in terms of the cumulative and instantaneous load of software. The first refers to software cumulative execution time, and the latter denotes the rate at which user requests arrive. The result solved from NHMH is a time-varying reliability and degradation process over WSC lifetime. Finally, the evaluation experiment shows the potential of the approach.

### S-16 Interactive session

3:Kehe Wu, Jianyong Xue and Yan Zhou  
A Risk Analysis and Prediction Model of Electric Power GIS Based on Deep Learning

In the power distribution and supplying system, grid power supply and power users are complex and diverse, operation and management in the power system are closely associated with the geographic information. With the help of Geographic Information Systems (GIS) equipment for dynamic analysis and the study of nonlinear network structure for efficient learning. Complex function models are able to simulate the real operational situation of power grid equipment more efficiently. In the end, we can predict the risk of entire power grid and provide decision support for risk management. At the meantime, our work based on multiple sets of historical data that collected by the provincial power grid systems. After training and validation the model, we predicted real-time risk based on the trained model and compared the result with the analysis and forecasting results of posterior data, the experimental result shows that the model is fully capable of achieving better results.

5:Wei Li, Hongyu Liu and Xiaoliang Zhang  
A Network Data Security Analysis Method Based On DPI Technology

In view of the high demand for the security of visiting data in power system, a network data security analysis method based on DPI technology was put forward in this paper, to solve the problem of security gateway judge the legality of the network data. Considering the legitimacy of the data involves data protocol and data contents, this article will filters the data from protocol matching and content detection. Using deep packet inspection (DPI) technology to screen the protocol. Using protocol analysis to detect the contents of data. This paper implements the function that allowing secure data through the gateway and blocking threat data. The example proves that the method is

more effective guarantee the safety of visiting data.

14: Jiali Dong, Xiaoyong Li and Binxing Fang  
A Recommendation System Based on Multi-attribute

In recent years, more and more internet companies trend to fuse their products with personal recommendation functions. Although the idea of this business model satisfies characteristic of Internet industry felicitously, scientists and engineers gradually find out that the effect is worse than they expected. The quality of recommendation is limited by cold start, data sparse, lack of learning contextual aware, and so on. One of the most important drawbacks of existing recommendation systems is that they usually use only rating matrix as useful information and not fully consider item attributes. In this paper, we proposed an optimized recommendation system, which based on modeling of items in a multidimensional space of item's attribute. The presented approach takes item attributes, user preferences and user context into consideration, and is mainly composed of two modules: (1) attribute-latent factor model, which is used to show user latent preference for each attribute; (2) multi-attribute model, which is used to show user preference between all attributes. The research is conducted in a practical application environment, and the preliminary experimental results show the validity of the recommendation.

19: Yi-Tao Liang, Kui-Bin Zhao, Meng Zhang  
Haze Image Moving Window Threshold Segmentation Algorithm Based on Contrast Enhancement

Under the bad weather, scattering of atmospheric particles lead to the degradation of image quality. And then the later image threshold segmentation is affected. We propose a moving-window threshold segmentation algorithm based on contrast enhancement. According to the characteristics of gray levels and by way of different histogram enhancement, the image contrast can be effectively improved. Moving-window threshold segmentation can reconstruct image gray space. In accordance with the certain rules and artificial selection of a small piece of  $\Delta m \times \Delta n$ , threshold segmentation of sub-block can be done. Then the threshold segmentation of the whole image can be obtained through progressive scan from top to bottom. Then, by combining the split result together and smoothing the image block adjacent joint, the final image segmentation is obtained. The experimental results show that image gray histogram completely enhances the haze image and efficiently restrains the noise.

20: Yi-Tao Liang, Kui-Bin Zhao, Lan Li and Jiang-Hui Hu  
Defogging Algorithm of Color Images Based on Gaussian Function Weighted Histogram Specification

Under the condition of hazy weather, although there are many existing defogging algorithms of images, those which really realize real time and high efficiency are few. The defogging in aspects of road traffic, video supervision and target tracking is unsatisfactory. Therefore, we propose a kind of color image defogging algorithm based on histogram specification of Gaussian function weighting. This algorithm firstly adopts the HSI space luminance conversion model based on the scattering property, and extracts the intensity image  $I$ . Then, it adopts histogram specification algorithm based on Gaussian function weighting for processing, further converting to RGB color space to obtain the intensified image. The processing effect is obviously superior to the histogram specification algorithm, moreover, the calculated amount is small and the processing speed is fast without manual intervention.

22: Xiangyang Lu, Qiang Guo, Fengge Wang.  
Control Information Flow with Transformation in Complex Networks

It is a typical inverse problem to design the global states by controlling or adjusting the local

dynamic characteristics. This paper introduces an information flow mechanism, and analyses the distribution characteristics of the information flow in global networks. The space transformation method, which is originally used to control the physical field by designing material parameters, is proposed to obtain necessary local dynamic parameters when the global state of a network is prescribed in a space. With this method, the area of key and essential nodes in the network is cloaked by adjusting the route of information flow spread. Finally, the simulations show that the method is a intuitive and direct way for network control.

30: Baudouin Dafflon and Madeleine El-Zaher  
An Agile development for platoon system based on Verification and Validation

This paper introduces a verification and validation (V&V) process in a product life-cycle, where we consider a V&V process as the composition of the three tasks: formal verification, simulation and experimentation. The considered application is a platoon system, a set of autonomous vehicles that move together without any material connection. The platoon system development considers the specification of the SafePlatoon project. Main goal of the V&V process is to put to the proof the platoon controller (Decision making unit). V&V is then a corner stone for critical functions that require zero default. Algorithm and hardware must respect some security concerns such as collision free between platoon vehicles, platoon integrity, obstacles avoidance, and etc. After a specification phase, where safety properties are defined, a classical or agile V&V cycle can be applied. In the case of SafePlatoon project, where different partners are evolving simultaneously on the models, an agile development method is used; where formal verification and benchmark simulation works together in order to improve model's safety. Formal verification is made using The SAL model checker. Validation by simulation is made using an internal tool called Vivus.

48: Li Jie, Wang Tian-Zheng and Zhao Ya-Ning  
LOCATION MECHANISM FOR WIRELESS SENSOR NETWORKS IN MINE

For complex environment in the mine, a wireless sensor node location mechanism based on a combination of RSSI ranging and genetic simulated annealing algorithm is proposed. Wireless signal transmission loss model in the mine was researched and used for RSSI ranging. Location problem is as an optimization problem to locate by improved genetic simulated annealing algorithm. Simulation results show that the location mechanism in the mine reduce the location error compared to the classic weighted centroid location algorithm and the DV-HOP algorithm.

61: Su Yan  
A TDMA MAC Scheduling Protocol Algorithm for Wireless Mobile Ad Hoc Network and Its Performance Analyses

Mobile Ad Hoc Network has been widely used in disaster areas, war zones, deep sea and other areas where the network infrastructures are difficult to be established. However, when the mobile terminals increase heavily in Ad Hoc Network, it will cause signal conflicts. In this paper, based on TDMA time-division multiple access allocation scheme, a MAC scheduling protocol algorithm is designed for multiple wireless channels Ad Hoc Networks, which contain varieties of network services. According to the MAC scheduling protocol, wireless channel resource can be assigned to each mobile terminal reasonably, in order to eliminate the network conflicts, guarantee the network performance and improve the utilization rate of the wireless channels. The performances of the MAC protocol algorithm are also be analysed.