Advanced Program

IFIP IIP2012

7th IFIP International Conference

On

Intelligent Information Processing

12-15, October, 2012

Guilin, China



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7th IFIP International Conference on

Intelligent Information Processing

IIP 2012

12-15 October, 2012

Guilin, China

Sponsored by

International Federation for Information Processing, IFIP TC12

Co-Sponsored by

Chinese Association for Artificial Intelligence Guilin University of Electronic Technology Institute of Computing Technology, Chinese Academy of Sciences

Welcome Address

Dear Colleagues,

Welcome to the 7th IFIP International Conference on Intelligent Information Processing. We would like to extend to you our warmest welcome and sincere greetings. As the world proceeds quickly into the Information Age, it encounters both successes and challenges, and it is well recognized nowadays that Intelligent Information Processing provides the key to the Information Age and to mastering many of these challenges. Intelligent Information Processing supports the most advanced productive tools that are said to be able to change human life and the world itself. However, the path is never a straight one and every new technology brings with it a spate of new research problems to be tackled by researchers; as a result we are not running out of topics; rather the demand is ever increasing. This conference provides a forum for engineers and scientists in academia, university and industry to present their latest research findings in all aspects of Intelligent Information Processing.

This is the 7th IFIP International Conference on Intelligent Information Processing. We received more than 70 papers, of which 39 papers are included in this program as regular papers and 5 as short papers. We are grateful for the dedicated work of both the authors and the referees, and we hope these proceedings will continue to bear fruit over the years to come. All the submitted papers were reviewed by two referees.

A conference such as this cannot succeed without the help of many individuals who contributed their valuable time and expertise. We want to express our sincere gratitude to the program committee members and referees, who invested many hours for reviews and deliberations. They have provided detailed and constructive review reports that will significantly improve the papers included in the program.

We are very grateful to have the sponsorship of the following organizations: IFIP TC12, the Guilin University of Electronic Technology and the Institute of Computing Technology, Chinese Academy of Sciences.

Finally, we wish you will find IFIP IIP2000 an inspiring and informative experience. This interesting volume will be shared updated progresses of intelligent information processing. Enjoy your leisure stay in Guilin, China.

Zhongzhi Shi, China David Leake, USA Sunil Vadera, UK IIP2012 General Chair and Program Committee Chairs

Conference Organization

General Chairs

T. Dillon (Australia)	T. Gu (China)	A. Aamodt (Norway)		
	Program Chairs			
Z. Shi (China)	D. Leake (USA)	S. Vadera (UK)		

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Keynotes Speakers

The AI Journey: the Road Traveled and the (Long) Road Ahead

Ramon Lopez de Mantaras Artificial Intelligence Research Institute, Spanish National Research Council (CSIC), Spain

Abstract: In this talk I will first briefly summarize the many impressive results we have achieved along the road so far traveled in the field of AI including some concrete results obtained at the IIIA-CSIC. Next I will describe some of the future challenges to be faced along the (long) road we still have ahead of us with an emphasis on integrated systems, a necessary step towards human-level AI. Finally I will comment on the importance of interdisciplinary research to build such integrated systems (for instance, sophisticated robots having artificial cartilages, artificial muscles, artificial skin, etc) using some examples related to materials science.

Bio-Sketch: Master of Sciences in Computer Science from the University of California Berkeley, PhD in Physics (Automatic Control) from the University of Toulouse, and PhD in Computer Science from the Technical University of Barcelona. A pioneer of Artificial Intelligence in Spain, with contributions, since 1976, in Pattern Classification, Approximate Reasoning, Expert Systems, Machine Learning, Case-Based Reasoning, Autonomous Robots, and AI & Music. Author of around 250 papers. Invited plenary speaker at numerous international conferences. Former Editor-in-Chief of Artificial Intelligence Communications, current editorial board member of several international journals, including AI Magazine and Associate Editor of the Artificial Intelligence Journal. Conference Chair of UAI-94, ECML'00, ECAI-04, ECML-07, PKDD-07, and IJCAI-07. ECCAI Fellow. Co-recipient of four best paper awards at international conferences. Recipient of the "City of Barcelona" Research Prize, and the "2011 Association for the Advancement of Artificial Intelligence (AAAI) Robert S. Engelmore Memorial Award". President of the Board of Trustees of IJCAI from 2007 to 2009. Presently working on case-based reasoning, machine learning for autonomous robots and AI applications to music. For additional information please visit: http://www.iiia.csic.es/~mantaras.

Transfer learning and Applications

Qiang Yang

Department of Computer Science and Engineering, Hong Kong University of Science and Technology, Hong Kong

Abstract: In machine learning and data mining, we often encounter situations where we have an insufficient amount of high-quality data in a target domain, but we may have plenty of auxiliary data in related domains. Transfer learning aims to exploit these additional data to improve the learning performance in the target domain. In this talk, I will give an overview on some recent advances in transfer learning for challenging data mining problems. I will present some theoretical challenges to transfer learning, survey the solutions to them, and discuss several innovative applications of transfer learning, including learning in heterogeneous cross-media domains and in online recommendation, social media and social network mining.

Bio-Sketch: Qiang Yang is a professor in the Department of Computer Science and Engineering, Hong Kong University of Science and Technology and a director of the new Huawei Noah's Ark Research Lab in Hong Kong, which specializes in Big Data Mining and Artificial Intelligence. Qiang Yang is an IEEE Fellow and ACM Distinguished Scientist. His research interests include machine learning, data mining and artificial intelligence. Qiang received his PhD from the University of Maryland, College Park in 1989. His research teams won the 2004 and 2005 ACM KDDCUP competitions on data mining. He is a vice chair of ACM SIGART, a founding Editor in Chief of the ACM Transactions on Intelligent Systems and Technology (ACM TIST), a PC Co-chair for ACM KDD 2010 and the General Chair for ACM KDD 2012 in Beijing.

Semantics of Cyber-Physical Systems

Tharam Dillon¹, Elizabeth Chang², Jaipal Singh³, Omar Hussain² ¹ La Trobe University, Australlia ² Department of Information Systems, Curtin University, Australia ³ Dept. of Electrical and Computer Engineering, Curtin University, Australia

Abstract: The very recent development of Cyber-Physical Systems (CPS) provides a smart infrastructure connecting abstract computational artifacts with the physical world. The solution to

CPS must transcend the boundary between the cyber world and the physical world by providing integrated models addressing issues from both worlds simultaneously. This needs new theories, conceptual frameworks and engineering practice. In this paper, we set out the key requirements that must be met by CPS systems, and review and evaluate the progress that has been made in the development of theory, conceptual frameworks and practical applications. We then discuss the need for semantics and a proposed approach for addressing this. Grand challenges to informatics posed by CPS are raised in the paper.

Bio-Sketch: Professor Tharam Dillon is Professor of Computer Science and Head of Research and Development at the Digital Ecosystems and Business Intelligence Institute, Curtin University of Technology, Perth, Western Australia. He was the Dean of the Faculty of Information Technology at the University of Technology, Sydney till 2006, a position he held since 2003. Professor Tharam was the Chair Professor of Computer Science and Computer Engineering at La Trobe University, a position he assumed at the beginning of 1986. In December 1998 he took up the position of Professor of Computing at Hong Kong Polytechnic University and Acting Head of Department of Computing until July 2001, at which time he resumed his role as Chair Professor and Head of the School of Engineering at La Trobe University. He is a Fellow of the Institution of Electrical and Electronic Engineers (USA), Fellow of the Institution of Engineers (Australia), Fellow of the Safety and Reliability Society (UK), and Fellow of the Australian Computer Society.

Big Data Mining in the Cloud

Zhongzhi Shi

Key Laboratory of Intelligent Information Processing Institute of Computing Technology, Chinese Academy of Sciences, Beijing, China

Abstract: Big Data is the growing challenge that organizations face as they deal with large and fast-growing sources of data or information that also present a complex range of analysis and use problems. Digital data production in many fields of human activity from science to enterprise is characterized by an exponential growth. Big data technologies will become a new generation of technologies and architectures which is beyond the ability of commonly used software tools to capture, manage, and process the data within a tolerable elapsed time.

Massive data sets are hard to understand, and models and patterns hidden within them cannot be identified by humans directly, but must be analyzed by computers using data mining techniques. The world of big data present rich cross-media contents, such as text, image, video, audio, graphics and so on. For cross-media applications and services over the Internet and mobile wireless networks, there are strong demands for cross-media mining because of the significant amount of computation required for serving millions of Internet or mobile users at the same time. On the other hand, with cloud computing booming, new cloud-based cross-media computing paradigm emerged, in which users store and process their cross-media application data in the cloud in a distributed manner. Cross-media is the outstanding characteristics of the age of big data with large scale and complicated processing task. Cloud-based Big Data platforms will make it practical to access massive compute resources for short time periods without having to build their own big data farms. We propose a framework for cross-media semantic understanding which contains discriminative modeling, generative modeling and cognitive modeling. In cognitive modeling, a new model entitled CAM is proposed which is suitable for cross-media semantic understanding. A Cross-Media Intelligent Retrieval System (CMIRS), which is managed by ontology-based knowledge system KMSphere, will be illustrated.

This talk also concerns Cloud systems which can be effectively employed to handle parallel mining since they provide scalable storage and processing services, as well as software platforms for developing and running data analysis environments. We exploit Cloud computing platforms for running big data mining processes designed as a combination of several data analysis steps to be run in parallel on Cloud computing elements. Finally, the directions for further researches on big data mining technology will be pointed out and discussed.

Bio-Sketch: Zhongzhi Shi is a professor at the Institute of Computing Technology, Chinese Academy of Sciences, leading the Intelligence Science Laboratory. His research interests include intelligence science, machine learning, data mining, image processing, cognitive computing and etc. Professor Shi has published 14 monographs, 15 books and more than 450 research papers in journals and conferences. He has won a 2nd-Grade National Award at Science and Technology Progress of China in 2002, two 2nd-Grade Awards at Science and Technology Progress of the Chinese Academy of Sciences in 1998 and 2001, respectively. He is a fellow of CCF and CAAI, senior member of IEEE, member of AAAI and ACM, Chair for the WG 12.2 of IFIP. He serves as Editor-in-Chief of Series on Intelligence Science, Editor-in-Chief of International Journal of Intelligence Science.

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Research on Semantic Programming Language

Shi Ying

State Key Laboratory of Software Engineering, Wuhan University, Wuhan, China

Abstract: As technologies of Semantic Web Service are gradually matured, developing intelligent web applications with Semantic Web Services becomes an important research topic in Software Engineering. This speech introduces our efforts on Semantic Web Service oriented programming. Employing the concept of semantic computing into service-oriented programming, we proposed a programming language SPL, Semantic Programming Language, which supports the expression and process of semantic information. Based on collaboration of semantic space and information space, the running mechanism of SPL program is presented, which provides SPL program with higher flexibility and stronger adaptability to changes. Furthermore, with the introduction of semantic operators, a kind of searching conditional expression is offered to facilitate the search of Semantic Web Services with greater preciseness and higher flexibility. Besides, semantic based policy and exception mechanism are also brought in to improve the intelligence of policy inference and exception handing in SPL program. At the same time, a platform that supports design and running of SPL program is developed.

Bio-Sketch: Dr. Shi Ying is the Deputy Director of the State Key Laboratory of Software Engineering (SKLSE), Wuhan University and also serves as the Vice Dean of the School of Computer Science in Wuhan University. He is a member of the CCF TCSE (China Computer Federation – Technical Council on Software Engineering), a member of CIE CCEA (Chinese Institute of Electronics – Cloud Computing Experts Association) and the secretary of Wuhan Software Engineering Society.

Dr. Shi Ying devotes his major efforts in teaching and research on Software Engineering as well as development of application software. His primary research is conducted in several research areas, which includes web service oriented, aspect oriented, and semantic software development, the development approaches in the Era of cloud computing, software development methodology based on intelligent technologies, and software reusability and high trustworthiness.

As the project leader, Dr. Shi Ying has engaged in a number of research projects supported byKey (Key grant) Project of Chinese Ministry of Education, Youth Science & Technology Chen'guang Plan Project of Wuhan City, Youth Outstanding Talent Foundation Project of Hubei Province, National High-tech R&D Program of China (863 Program), National Natural Science Foundation of China, Ph.D. Programs Foundation of Chinese Ministry of Education, etc. He has published more than 100 academic papers in the domestic core journals, among which many are indexed by SCIE, EI and ISTP.

Besides, Dr. Shi Ying has supervised more than 30 PhD students and more than 70 master students, andhas rich experience in teaching courses for undergraduate and graduate students over multiple years, especially software engineering, UML modeling, and formal methods for software development.

Overview of Technical Program

	October 12 Friday	October 13 Saturday		October 14 Sunday		October 15 Monday
8:00-8:30		Registration		Registration		
9:00-10:30		IIP2012 Opening Ceremony And Plenary Session 1		Plenary Session 2		
10:30-11:00		Coffee Break				
11:00-12:30		Session A1 Machine Learning	Session B1 Semantic Web	Session A4 Social Networks	Session B4 Internet of Things	Social Activity
12:30-14:00						
14:00-15:30	Registration	Session A2 Data Mining	Session B2 Information Retrieval	Session A5 Trust Software	Session B5 Pattern Recognition	
15:30-16:00	Registration					
16:00-17:30	Registration	Session A3 Automatic Reasoning	Session B3 Knowledge Representation		Session B6 Image Processing	
18:00-20:00	Reception	Banquet				

Technical Program

Friday October 12, 2012

2:00pm – 5:00pm: Registration **Place:** Guilin Park Hotel, Guilin, China

Saturday October 13, 2012

8:00am - 5:00pm: Registration

9:00am-9:30am: IIP2012 Opening Ceremony Place: Xianghe Hall Chair: Sunil Vadera, PC Co-Chair

Tharam Dillon: Greetings from General Chairs and IFIP TC12 Tianlong Gu: Welcome address Zhongzhi Shi: Introduction to IIP2012 Program

9:30-10:30 Plenary Session 1 Room: Xianghe Hall Chair: Tharam Dillon

Ramon Lopez de Mantaras: The AI Journey: the Road Traveled and the (Long) Road Ahead Qiang Yang: Transfer learning and Applications

10:30am-11:00am Coffee Break

11:00am-12:30pm: Parallel Sessions

Session A1: Machine Learning

Room: Xianghe Hall Chair: Tatpong Katanyukul

- 1. Effectively Constructing Reliable Data for Cross-domain Text Classification *Fuzhen Zhuang, Qing He and Zhongzhi Shi*
- 2. Improving Transfer Learning by Introspective Reasoner *Zhongzhi Shi, Bo Zhang and Fuzhen Zhuang*
- 3. PPLSA: Parallel Probabilistic Latent Semantic Analysis Based on MapReduce Ning Li, Fuzhen Zhuang, Qing He and Zhongzhi Shi
- 4. Analysis on Limitation Origins of Information Theory Yong Wang, Huadeng Wang and Qiong Cao

Session B1: Semantic Web

Room: Mingzhi Hall Chair: Khaled Shaalan

1. Dynamic Logic for the Semantic Web Liang Chang, Qicheng Zhang, Tianlong Gu and Zhongzhi Shi

- 2. On the Support of Ad-Hoc Semantic Web Data Sharing *Jing Zhou, Kun Yang, Lei Shi and Zhongzhi Shi*
- 3. An Architecture Description Language Based on Dynamic Description Logics Zhuxiao Wang, Hui Peng, Jing Guo, Ying Zhang, Kehe Wu, Huan Xu and Xiaofeng Wang
- 4. Application of artificial intelligence in new materials design *Ping WU and Yingzhi ZENG*

12:30pm-2:00pm: Lunch Break

2:00pm-3:30pm: Parallel Sessions

Session A2: Data Mining Room: Xianghe Hall Chair: Fuzhen Zhuang

- 1. Intelligent Inventory Control: Is Bootstrapping Worth Implementing? *Tatpong Katanyukul, Edwin K. P. Chong and William S. Duff*
- 2. Support Vector Machine with Mixture of Kernels for Image Classification Dongping Tian, Xiaofei Zhao and Zhongzhi Shi
- 3. The BDIP Software Architecture and Running Mechanism for Self-Organizing MAS Yi Guo, Xinjun Mao, Fu Hou, Cuiyun Hu and Jianming Zhao
- 4. Optimization of Initial Centroids for K-means Algorithm Based on Small World Network *Shimo Shen and Zuqiang Meng*
- 5. ECCO: A New Evolutionary Classifier with Cost Optimisation Adam Omielan and Sunil Vadera

Session B2: Information Retrieval Room: Mingzhi Hall Chair: Xiaoyang Tan

- 1. Query Expansion based-on Similarity of Terms for Improving Arabic Information Retrieval *Khaled Shaalan, Sinan Al-Sheikh and Farhad Oroumchian*
- 2. Towards an Author Intention Based Computational Model of Story Generation *Feng Zhu and Cungen Cao*
- 3. Adaptive Algorithm for Interactive Question-based Search Jacek Rzeniewicz, Julian Szyma ński and Wlodzis law Duch
- 4. Research of Media Material Retrieval Scheme Based on XPath *Shuang Feng and Weina Zhang*
- 5. Construction of SCI publications information system for statistic *Xie Wu, Huimin Zhang and Jingbo Jiang*

3:30pm-4:00pm: Coffee Break

4:00pm-5:30pm: Parallel Sessions

Session A3: Automatic Reasoning Room: Xianghe Hall Chair: Wenjia Niu

- 1. Reasoning Theory for D3L with Compositional Bridge Rules Xiaofei Zhao, Dongping Tian, Limin Chen and Zhongzhi Shi
- 2. Semantic Keyword Expansion: A Logical Approach *Limin Chen*
- 3. An ABox abduction algorithm for the description logic ALCI

Yanwei Ma, Tianlong Gu, Binbin Xu and Liang Chang
4. Reasoning about Assembly Sequences Based on Description Logic and Rule Yu Meng, Tianlong Gu and Liang Chang

Session B3: Knowledge Representation Room: Mingzhi Hall Chair: Shi Ying

- 1. Symbolic ZBDD Representations for Mechanical Assembly Sequences *Fengying Li, Tianlong Gu, Guoyong Cai and Liang Chang*
- 2. The Representation of Indiscernibility Relation Using ZBDDs
- Qianjin Wei, Tianlong Gu, Fengying Li and Guoyong Cai
- 3. Symbolic OBDD Assembly Sequence Planning Algorithm Based on Unordered Partition with 2 Parts of a Positive Integer
 - Zhoubo Xu, Tianlong Gu and Rongsheng Dong
- 4. A Representation Model of Geometrical Tolerances Based on First Order Logic *Yuchu Qin, Yanru Zhong, Liang Chang and Meifa Huang*

Sunday October 14

9:00am-10:30am Plenary Session 2 Room: Xianghe Hall Chair: Sunil Vadera

Tharam Dillon: Semantics of Cyber-Physical Systems Zhongzhi Shi: Big Data Mining in the Cloud Shi Ying: Research on Semantic Programming Language

10:30am-11:00am: Coffee Break

11:00am-12:30am Parallel Sessions

Session A4: Social Networks Room: Xianghe Hall Chair: Yang GAO

- 1. Modeling Group Emotion Based on Emotional Contagion Yanjun Yin, Weiqing Tang and Weiqing Li
- 2. Hierarchical Overlapping Community Discovery Algorithm Based on Node purity *Guoyong Cai, Ruili Wang and Guobin Liu*
- 3. Finding Topic-related Tweets Using Conversational Thread Peng Cao, Shenghua Liu, Jinhua Gao, Huawei Shen, Jingyuan Li, Yue Liu and Xueqi Cheng
- 4. Messages Ranking in Social Network Bo Li, Fengxian Shi and Enhong Chen

Session B4: Internet of Things Room: Mingzhi Hall Chair: Jing Zhou

- 1. Frequency-Adaptive Cluster Head Election in Wireless Senor Network *Tianlong Yun, Wenjia Niu, Xinghua Yang, Hui Tang and Song Ci*
- 2. A Cluster-based Multilevel Security Model for Wireless Sensor Networks *Chao Lee, Lihua Yin and Yunchuan Guo*
- 3. A New Security Routing Algorithm based on MST for Wireless Sensor Network

Meimei Zeng and Hua Jiang

12:30pm-2:00pm: Lunch

2:00pm-3:30pm Parallel Sessions

Session A5: Trust Software Room: Xianghe Hall Chair: Liang Chang

- 1. Diagnosis of Internetware Systems Using Dynamic Description Logic Kun Yang, Weiqun Cui, Junheng Teng and Chenzhe Hang
- 2. Reasoning about Semantic Web Services with an Approach Based on Temporal Description Logic *Juan Wang, Liang Chang, Chuangying Zhu and Rongsheng Dong*
- 3. Constraint Programming-Based Virtual Machines Placement Algorithm in Datacenter Yonghong YU and Yang GAO
- 4. Recommendation-based trust model in P2P network environment *Yueju Lei and Guangxi Chen*

Session B5: Pattern Recognition Room: Mingzhi Hall Chair: Jacek Rzeniewicz

- 1. Robust Palmprint Recognition based on Directional Representations Hengjian Li, LianHai Wang and Zutao Zhang
- 2. FPGA-based Image Acquisition System Designed for Wireless Haohao Yuan, Jianhe Zhou and Sugiao Li
- 3. A Context-aware Multi-agent Systems Architecture for Adaptation of Autonomic Systems *Kaiyu Wan and Vasu Alagar*
- 4. Eyes Closeness Detection Using Appearance Based Methods *Xue Liu*, *Xiaoyang Tan and Songcan Chen*

4:00pm-5:30pm Session B6: Image Processing Room: Mingzhi Hall Chair: Xiaofei Zhao

- 1. A Novel Model for Semantic Learning and Retrieval of Images *Zhixin Li, ZhiPing Shi, ZhengJun Tang and Weizhong Zhao*
- 2. Automatic Image Annotation and Retrieval Using Hybrid Approach *Zhixin Li, Weizhong Zhao, Zhiqing Li and Zhiping Shi*
- 3. Double Least Squares Pursuit for Sparse decomposition Wanyi Li, Peng Wang and Hong Qiao
- 4. Ensemble of k-labelset classifiers for multi-label image classification Dapeng Zhang and Xi Liu

6:00pm-8:00pm: Banquet Room: Xianghe Hall

Conference Venue

Location: how do I get to the Guilin Park Hotel



(1) Arriving by Plane

For guests arrived at the **Guilin Liangjiang International Airport**. Please take the bus in the airport and get off at **Civil Aviation Building Station**(\Im 20). walk to the **Anxin Community Station**(about 300 m). Then, take the No. 2 bus and get off at the **Fengbei Crossroad Station** (\Im 1). Walk to the **Guilin Park Hotel** (about 400 m).

You can also take a taxi. (It is 20km from Guilin Liangjiang International Airport to Guilin Park Hotel, takes about 35 minutes by taxi; and it is 4km from the Civil Aviation Building Station to Guilin Park Hotel, takes about 10 minutes by taxi.)

(2) Arriving by Train

For guests arrived at **Guilin Railway Station** (**Guilin South Station**). Go across the street to take the No. 99 bus and get off at the **Fengbei Crossroad Station** (¥2). Then, walk to the Guilin Park Hotel (about 500 m). You can also take a taxi. (It is 4km **from Guilin Railway Station** to Guilin Park Hotel, and takes about 10 minutes by taxi.) For guests arrived at **Guilin North Station**. Please take the No. 1 bus and get off at **Fengbei Crossroad Station** (**¥1**). Then, walk to the Guilin Park Hotel (about 500 m). You can also take a taxi. (It is about 6km **from Guilin North Station** to Guilin Park Hotel, and takes about 18 minutes by taxi.)

(3) Arriving by Bus

For guests arrived at **Guilin Bus Station**. Please go across the street to take the No. 99 bus and get off at the **Fengbei Crossroad Station** (Υ 2). Then, walk to the Guilin Park Hotel (about 500 m).

You can also take a taxi. (It is about 4km **from Guilin Bus Station** to Guilin Park Hotel, and takes about 10 minutes by taxi.)

Social Activities

Here list possible social activities for your reference. You can make your own arrangements and all payments by yourselves.

- Lijiang River Cruise
- Two Rivers and Four Lakes
- Seven-Star Park
- Elephant Trunk Hill
- Reed Flute Cave
- Dragon's Backbone Rice Terrace

More information on Tourist Attractions in Guilin can be found on the Guilin Official Tourism Website: http://www.guilintourist.com/