

FOURTH INTERNATIONAL CONFERENCE ON THE FOUNDATIONS OF INFORMATION SCIENCE (FIS 2010)

Beijing, China

21-24 August 2010



- Technical Committee on Artificial Intelligence Theory (TCAIT), Chinese Association for Artificial Intelligence (CAAI), Beijing, China
- Social Information Science Institute (SISI), Huazhong University of Science and Technology (HUST), Wuhan, China

CONTENTS

A Welcome Speech from Professor Kang Ouyang

1. About FIS 2010
2. Sponsors of FIS 2010
3. Co-sponsors of FIS 2010
4. Venue and Date of FIS 2010
5. Organization of FIS 2010
 - (1) General Co-Chairs
 - (2) Honorary Chairs
 - (3) Program Co-Chairs
 - (4) Organization Co-Chairs
 - (5) International Advisory Board
 - (6) General Secretary
 - (7) Secretary
6. Concise Program of FIS 2010
7. Full Program of FIS 2010
8. Abstracts of Papers of FIS 2010

A Welcome Speech from Prof. Kang Ouyang

General Chair from China of the Fourth International Conference on the Foundations of Information Science (FIS2010)



The Fourth International Conference on the Foundations of Information Science (FIS2010) is being held in Beijing, the Capital of China, after one year's preparation. On behalf of all members of the Advisory Committee, the Program Committee, the Organization Committee and the Secretariat who are involving in preparing for this conference, I am privileged to have the opportunity to warmly welcome all of you to Beijing and join in this conference.

Modern information science and technology, which was rising in the second half of 20th century, promoted global development of human civilization, led the development direction of contemporary science and technology and made a new era of informational and intellectual society. In the process of interacting continually and benignly with progress of human civilization, modern information science itself obtains sufficient development and gets extremely great achievement, and at the same time, it has become a complex of theoretical problem cluster, academic subject cluster and application technology cluster implying many fundamental, pre-conditional and methodological problems which need to be answered from the perspectives and dimensions of philosophy, scientific theory and application technology and to be discussed deeply by integrating theory and practice. Since the First International Conference on the Foundations of Information Science was held in Madrid, Spain in 1994, scholars and experts from the international theoretical circle of foundations of information science have made great efforts and progress and acquired great accomplishments. Nowadays, the Fourth International Conference on the Foundations of Information Science is opening in China, and so many information scientists from different countries gather in Beijing, exchange and examine the recent new achievement in information science, discuss the complicated and difficult problems facing currently and design future development, which will possibly become another important milestone in the process of research and development of modern information science.

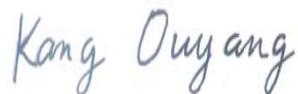
Generally speaking, the theoretical study of information science and the application of information technology in China are relatively late at the beginning stage comparing with western developed countries. However, with the rapid development of China's modernization and comprehensive application of information science and technology, theoretical study on foundations of information science in China is constantly extending and deepening. Scholars from universities and research institutes in Beijing, Wuhan, Xi'an and other places across China actively hold various seminars and workshops and compile research journals to research, discuss and communicate basic theories of information science, on the basis of which a lot of works including books and treatises about study on foundations of information science are published, which lays a necessary academic foundation for the holding of this conference (FIS2010) in China. Moreover, Chinese Association for Artificial Intelligence (CAAI) has played very active and indispensable important role in launching, organizing and promoting the theoretical study and practical application of information science, which also contributes to the holding of this conference in China.

Social Information Science Institute at Huazhong University of Science and Technology (SISI at HUST), established in December 12, 2006, is a trans-district, trans-affiliation and trans-discipline organization of theoretical study on information science. In recent years, it held some symposiums and workshops, accepted and granted twenty research projects about social information science proposed by dozens of domestic scholars under the support of National Philosophy and Social Science Innovation Base named “Scientific Progress and Humanistic Spirit” at Huazhong University of Science and Technology. Furthermore, it is also actively concerned with theoretical study and practical exploring of theoretical informatics and social information problems and obtains lots of accomplishments, and fortunately can hold this international academic conference.

The holding of this conference benefits from strong supports of some important domestic and oversea research institutes of this subject field and active participation of some international famous scholars, and we would like to show our sincere gratitude to them. We are especially happy to see that some world-famous experts and scholars such as Prof. P. Marijuan, chair of European Board of Foundations of Information Science, Prof. Wolfgang Hofkirchner, chair of Science Advisory Board of Science of Information Institute, Washington, USA, and Prof. Konstantin Kolin, the Institute of Informatics Problems, Russian Academy of Sciences, Moscow, Russia etc not only make great contribution to organizing this conference, but also gather with us in Beijing to introduce their research achievements and consult the future development blueprint of information science. This conference will discuss the possibility of preparing for launching a new international academic organization, namely, the International Society of Information Science (ISIS), which aims to promote the international information science movement to a bran-new stage.

Finally, I am particularly grateful to Prof. Yi-Xin Zhong, chair of Academic Committee of Chinese Association for Artificial Intelligence (CAAI), and Prof. Hua-Can He, vice president of Chinese Association for Artificial Intelligence and director of Technical Committee on Artificial Intelligence Theory for their organization, supports and directions which are general guarantee of victory holding of this conference. At the same time, my thanks also go to all paper authors who benevolently submit their precious manuscripts to this conference. I would like to thank all of the participants for their interest and efforts in helping us making this conference possible and all fellows for their hard working and altruistic sacrifice for preparing this conference!

The study of modern information science needs not only passion and wisdom, but also friendship and cooperation. I sincerely wish this conference will be successful. I wish every guest healthy and happy during the conference. And I wish the friendship of all information scientists all over the world everlasting!



Prof. Kang Ouyang

Vice President of Huazhong University of Science and Technology, China

Director of Social Information Science Institute at HUST

Chief Editor of Social Sciences Edition of Journal of Huazhong University of Science and Technology

General Chair (China) of the Fourth International Conference on the Foundations of Information Science (FIS2010)

Fourth International Conference on the Foundations of Information Science (FIS 2010)

1. About FIS 2010

The Fourth International Conference on the Foundations of Information Science (FIS 2010) takes place as part of the 2010 Multi-Conference on Advanced Intelligence (MCAI 2010), together with two other conferences which are the Second International Conference on Advanced Intelligence (ICAI 2010) and the IEEE Natural Language Processing and Knowledge Engineering (NLP-KE'10).

Continuing the series of FIS Conferences (Madrid 1994, Vienna 1996, Paris 2005) a new venue will be held in Beijing 2010. In our times, an increasing number of disciplines are dealing with information in very different ways: from information society and information technology to communication studies (and related subjects like codes, meaning, knowledge, intelligence, and theory of social information), as well as quantum information, bioinformation, knowledge economy, network science, computer science and Internet, to name but a few. At the same time, an increasing number of scientists in the East and the West have been engaged with the foundational problems underlying this development, to such an extent that the integration of disciplines revolving around information seems an idea whose time has come. A new science of information can be envisaged that explores the possibilities of establishing a common ground around the concept, of constructing a new scientific perspective that connects the different information-related disciplines and provides a new framework for transdisciplinary research.

(1) The purpose of this conference is thus:

- to enable the discussion of different concepts, theories and approaches to the information field,
- to facilitate the exchange between informational disciplines concerning different but complementary tasks, objects of study, and methodologies,
- to network researchers and research institutions as well as knowledge transfer institutions in the promotion of the new science of information,
- to create a new community of scholars and to promote a new style of scholarship,
- to advance a new point of view on global problems.

(2) The language of this conference:

- The language for working, exchange, presentation, and publication in Beijing conference is English,
- without any language translation services in the meeting.

(3) Topics may comprise:

1. The Impact of a New Science of Information on Society

2. The Position of Intelligence Science in Information Science
 - a. Information and Intelligence
 - b. Intelligence Science as a tool Informatics in Information Science
3. The Role of Other Applied Information Science Disciplines (Computer Science, Human Computer Interaction, Computer Mediated Communication, Computer Supported Cooperative Work, Information and Communication Technologies and Society, Library and Documentation Science, ...)
4. The Basis of a New Science of Information
 - a. Feasibility of a single generic concept of information
 - b. Concepts, Principles, and Methodology of a “General Informatics” or “Theoretical Informatics”
 - c. Knowledge Structure of a Unified Theory of Information
5. Philosophy of Information
 - a. Information Ethics
 - b. Epistemology, Social Epistemology, Theory of Social Information (Information and the Scientific Method, ...)
 - c. Ontology of Information
 - d. Information and Philosophy of Science (Information and the System of Sciences – Transdisciplinarity – Consilience, ...)
6. Science of Information in Real-World Systems
 - a. Science of Information in Physical and Chemical Systems (Quantum Information, Molecular Recognition, ...)
 - b. Science of Information in Living Systems (Biosemiotics, Systems Biology, Bioinformation, ...)
 - c. Science of Information in Human / Social Systems
 - i. Science of Information in Human Cognition (Mind-Brain Theory, Consciousness, ...)
 - ii. Science of Information in Human Communication (Linguistics, Social Networking, Communication Studies, ...)
 - iii. Science of Information in Human Cooperation (Collective Intelligence, Knowledge Management, Advanced Intelligence, ...)
7. Science of the Information Society / Age (Information Society Theory, Internet Research, Social Informatics, New Media Studies, ...)
8. Other related topics

(4) Instructions for Authors

Papers should be no longer than 10 pages including all tables, figures, and references. Use the [word template downloadable here](#) to prepare your paper for FIS 2010.

All papers for FIS 2010 should be uploaded to <http://www.sciforum.net/> (see below for a detailed submission procedure).

All paper submissions will be peer reviewed. All accepted papers will be published in the online journal *tripleC* (www.triple-c.at) and available at the conference. Selected papers will be published in the online journal Entropy after the conference. At least one author of an accepted paper must register at the conference and present

the paper at the conference. FIS 2010 Best Paper Awards will be conferred at the conference on the authors of (1) the best research paper and (2) the best application paper.

2. Sponsors:

- Technical Committee on Artificial Intelligence Theory (TCAIT), Chinese Association for Artificial Intelligence (CAAI), Beijing, China
- Social Information Science Institute (SISI), Huazhong University of Science and Technology (HUST), Wuhan, China

3. Co-sponsors:

- Center for Information Policy Research, University of Wisconsin, Milwaukee, USA
- Institute for Science, Technology and Society, Tsinghua University, Beijing, China
- Department of Information Management, Peking University, Beijing, China
- Science of Information Institute, Washington, USA

4. Venue and Date

- Venue: Capital Normal University, Beijing, China
- Date: 21-24 August 2010

5. Organization

(1) General Co-Chairs

- **Kang Ouyang** (Professor, Director, Social Information Science Institute; Chief Editor, Social Sciences Edition, Journal of Huazhong University of Science and Technology (HUST); Vice President, HUST; China)
- **Pedro C. Marijuan** (Professor, Director, Bioinformation Group, Health Science Institute of Aragon, Zaragoza, Spain; Chair, Board, Foundations of Information Science)
- **Wolfgang Hofkirchner** (Professor, Internet and Society, University of Salzburg, Austria; Chief Editor, Triple-C; Chair, Science Advisory Board, Science of Information Institute, Washington, USA)

(2) Honorary Chairs:

- **Yi-Xin Zhong** (Professor; Chair, Academic Committee, Beijing University of Posts and Telecommunications; President, Chinese Association for Artificial Intelligence (CAAI), Beijing, China)
- **Zhong-Zhi Shi** (Professor; Director, Institute of Computing Technology, Chinese Academy of Sciences; Vice President, Chinese Association for Artificial

Intelligence (CAAI), Beijing, China)

- **Hua-Can He** (Professor, Northwestern Polytechnical University; Vice President, Chinese Association for Artificial Intelligence (CAAI), Director, Technical Committee on Artificial Intelligence Theory; Beijing, China)

(3) Programme Co-Chairs:

- **Hua-Can He** (Professor, Northwestern Polytechnical University; Vice President, Chinese Association for Artificial Intelligence (CAAI), Director, Technical Committee on Artificial Intelligence Theory; Beijing, China)
- **Zong-Rong Li** (Professor, Technical Committee on Artificial Intelligence Theory; Vice Director, Social Information Science Institute, Huazhong University of Science and Technology, Wuhan; China)
- **Xue-Shan Yan** (Professor, Department of Information Management, Peking University, China)

(4) Organization Co-Chairs:

- **Wei-Ning Wang** (Senior Engineer, Beijing University of Posts and Telecommunications; Director, Office of Chinese Association for Artificial Intelligence (CAAI), Beijing, China)
- **Wei Wang** (Professor, Institute for Science, Technology and Society, Tsinghua University, China)
- **Wen-Guang Chen** (Professor, Department of Information Management, Peking University, China)
- **Jing-Shan Wang** (Professor, School of Communication Studies, Beijing Institute of Graphical Communication, Beijing, China)
- **Lin Zhang** (Associate Professor, School of Mathematics and Computer Science, Hubei University, China)

(5) International Advisory Board:

- Joseph Brenner (International Center for Transdisciplinary Research, Paris, France)
- Søren Brier (Professor in the Semiotics of Information, Cognitive and Communication Science, Department of International Culture and Communication Studies, Centre for Language, Cognition, and Mentality, Copenhagen Business School, Denmark; Executive Committee, ISBS)
- Luis Emilio Bruni (Associate Professor, Department of Architecture, Design and Media Technology, Aalborg University, Denmark; Executive Committee, ISBS)
- Elizabeth A. Buchanan (Director, Center for Information Policy Research, University of Wisconsin, Milwaukee, USA)
- Mark Burgin (Visiting Scholar, Department of Mathematics, University of California, Los Angeles, USA)
- Rafael Capurro (Director, Steinbeis-Transfer-Institute Information Ethics (STI-IE), Germany; Founder, ICIE)
- Jerry Chandler (Research Professor, Krasnow Institute for Advanced Studies, George Mason University, USA; President, WESS)
- John Collier (Professor, Philosophy and Ethics, University of Kwazulu-Natal, Durban, South Africa)
- György Darvas (Senior Research Fellow, Institute for Research Organization, Hungarian Academy of Sciences, Hungary; Director, Symmetrion)

- José María Díaz Nafría (Visiting Professor, University of León, Spain; Coordinator, BITrum Research Group)
- Dail Doucette (Director, Science of Information Institute, Washington, USA)
- Charbel Niño El-Hani (Professor of History, Philosophy, and Biology, Institute of Biology, Federal University of Bahía, Salvador, Brazil; Executive Committee, ISBS)
- Charles Ess (Visiting Professor, Department of Information and Media Studies, University of Aarhus, Denmark)
- Peter Fleissner (retired University Professor, Institute of Design and Assessment of Technology, Vienna University of Technology, Austria; UTI Research Group)
- Luciano Floridi (Research Chair in Philosophy of Information, Department of Philosophy, University of Hertfordshire, UK; President, IACAP)
- Ted Goranson (Sirius Beta, USA)
- Ji-Fa Gu (Professor, Academy of Mathematics and Systems Science, Chinese Academy of Sciences)
- Qi-Quan Gui (Professor, Department of Philosophy, Wuhan University, China)
- Yukio-Pegio Gunji (Professor, Department of Earth and Planetary Science, Graduate School of Science, Japan)
- Soraj Hongladarom (Director, Center for Ethics of Science and Technology, Chulalongkorn University, Thailand)
- Xin-Zheng Jin (Professor, Center for Health Information Resources Research, Huazhong University of Science and Technology, China)
- Alicia Juarrero (Professor, Prince George's Community College, USA)
- Allenna Leonard (President, International Society for the Systems Sciences, Canada)
- Konstantin Kolin (Professor, Principal Researcher of the Institute of Informatics Problems of the Russian Academy of Sciences; Doctor of Technical Sciences; Honored Worker of Science of the Russian Federation; Mosco, Russia)
- Michael Leyton (Professor, DIMACS Center for Discrete Mathematics and Theoretical Computer Science, Rutgers University, USA)
- Shu-Kun Lin (Molecular Diversity Preservation International, Basel, Switzerland)
- Robert K. Logan (Professor Emeritus, Department of Physics, University of Toronto, Canada)
- Ai-Nai Ma (Professor, Peking University, Department of Geography Science, China)
- Shi-Long Ma (Professor, Beijing University of Aeronautics and Astronautics, National Laboratory of Software Development Environment, China)
- Dong-Sheng Miao (Professor, Renmin University of China, Department of Philosophy, China)
- Matjaz Mulej (former President, International Federation for Systems Research, Institute for Development of Social Responsibility, Maribor, Slovenia)
- Basarab Nicolescu (Professor, Babeş-Bolyai University, Cluj-Napoca, Romania; President, CIRET)
- Toru Nishigaki (Professor, Graduate School of Interdisciplinary Information Studies, University of Tokyo, Japan)
- Michel Petitjean (MTi, INSERM, Université Paris Diderot, France)
- Stuart A. Umpleby (Professor, Department of Management, George Washington University, Washington D.C., USA)
- Günther Witzany (telos, Philosophische Praxis, Bürmoos, Austria)

- Kun Wu (Professor, Xian Jiaotong University, School of Humanities, China)
- Tom Ziemke (Professor of Cognitive Science and Cognitive Robotics, Cognition and Interaction Lab, University of Skövde, Sweden)
- Rainer E. Zimmermann (Professor of Philosophy, University of Applied Sciences Munich; President, Institut für Design Science, Munich, Germany)

(6) General Secretary:

- **Prof. Zong-Rong Li;** Tel: (86)27-63962956, (86)13554242936; Email: zrli@hubu.edu.cn
- **Prof. Jian-Wei Zhang;** Tel: (86)13971245691; Email: weisschatten@sina.com
- **Prof. Gen-Hui Liu;** Tel: (86)27-62137608; Email: genhuiliu@163.com

(7) Secretary:

- **Dr. Yang Wang;** Tel: (86)27-63685081; Fax: 027-87559143; Email: camphorec@yahoo.com.cn
- **Dr. Ming-Yi Chen;** Tel: (86)15927349270; Fax: 027-87559143; Email: mingyide86@yahoo.com.cn
- **Dr. Dong-Jian Sun;** Tel: (86)18910980801; Email: goldsunroad@163.com

Full Program of FIS 2010

Date	Time	Proceedings	Location/Place	Chair/Principal
Aug. 21	8:00 –18:00	Registration	North Hall , International Culture Building (ICB), Capital Normal University	Zong-Rong Li, Jing-Shan Wang
	18:00-19:30	Welcome Banquet	Meeting Room 6 International Culture Building	Yi-Xin Zhong, Hua-Can HE, Kang Ouyang
	20:00-21:30	Preparatory Meeting of FIS 2010	Meeting Room 4 International Culture Building	Kang Ouyang, Pedro Marijuan, Wolfgang Hofkirchner

MCAI – Plenary sessions – August 22

Aug. 22	8:00 –8:30	Registration		North Hall , International Culture Building	
	8:30-9:00	MCAI Opening Ceremony		Reporting Hall , International Culture Building	Yi-xin Zhong
	9:00-10:00	MCAI Plenary Session 1		Reporting Hall , International Culture Building	Fuji Ren
		<i>Sub Time</i>	<i>Key speaker</i>	<i>Title</i>	
		9:00-9:30	Yi-xin Zhong	On Advanced Intelligence	
		9:30-10:00	Ben Goertzel	Artificial General Intelligence: Past, Present and Future	
	10:00-10:30	Coffee Break			

	10:30-12:00	MCAI Plenary Session 2		Reporting Hall, International Culture Building	Chair: Ben Goertzel
		<i>Sub Time</i>	<i>Key speaker</i>	<i>Title</i>	
		10:30-11:00	Paul S. Rosenbloom	Towards a New Generation of Cognitive Architectures	
		11:00-11:30	Gerhard Brewka	Multi-Context Systems: From Knowledge Integration Towards Knowledge Mediation	
		11:30-12:00	Yue-jia Luo, Ru-lei Gu, Run-guo Wu	Anxiety and Decision-Making: Evidence from Neuroimaging studies	
	12:00-13:30	Lunch Break			

FIS 2010 – Plenary sessions – August 22

	13:30-13:50	FIS 2010 Opening Ceremony		Jieti Hall, International Culture Building	Co-chairs: P. Marijuan, Wolfgang Hofkirchner, Kang Ouyang,
	13:50-15:30	FIS 2010 Plenary Session 1		Jieti Hall, International Culture Building	Co-chairs: Konstantin Kolin and Hua-Can He
		<i>Sub Time</i>	<i>Key speaker</i>	<i>Title</i>	
		13:50-14:15	Kang Ouyang	On the Research Focus and a Framework of the Social Information Sciences	
		14:15-14:40	Pedro Marijuan	How a Bacillus “Sees” the World Information Needs and Signaling Resources of Mycobacterium tuberculosis	
		14:40-15:05	Yi-Xing Zhong	On Information Science-- An Introduction to “Principles of Information Science”	
		15:05-15:30	Wolfgang Hofkirchner	Four ways of thinking in information	

	15:30-16:00	Photographs and Coffee Break		
	16:00-17:40	FIS 2010 Plenary Session 2	Jieti Hall, International Culture Building	Co-chairs: Kang Ouyang and Pedro Marijuan
		<i>Sub Time</i>	<i>Key speaker</i>	<i>Title</i>
		16:00-16:20	Konstantin Kolin	Social Informatics today and tomorrow: status, problems and prospects of development of complex lines in the field of science and education
		16:20-16:40	Hua-Can He	On the building of theoretic system of information science
		16:40-17:00	Kun Wu	Identification to rely on difference; construct to depend on an intermediary; Virtual to through construction
		17:00-17:20	Dail Doucette	Challenges for Those Constructing a Science of Information as an Evolving Unique Discipline
		17:20-17:40	Zong-Rong Li	“1+4+3”: A Framework of New Science of Information
	18:00-19:30	Diner Break		
	19:30-21:00	FIS 2010 International Advisory Board Meeting	Meeting Room 4, International Culture Building	Co-chairs: Pedro Marijuan, Wolfgang Hofkirchner, and Konstantin Kolin

FIS2010 – Plenary sessions – August 23

Aug. 23	8:20-10:00	FIS 2010 Plenary Session 3	Jieti Hall, International Culture Building	Co-chairs: Wolfgang Hofkirchner and Yi-Xing Zhong
		<i>Sub time</i>	<i>Key speaker</i>	<i>Title</i>
		8:20-8:40	Ai-Nai Ma	“Tian, Di, Ren, Ji” Information Integrative Network System
		8:40-9:00	Luis Bruni	Cognitive Sustainability in the Age of Digital Culture
		9:00-9:20	Lu Jiang	Research of Information Science as Viewed from System Science

	9:20-9:40	J.M. Díaz Nafria	Towards a transdisciplinary frame: Bridging domains, a multidimensional approach to information
	9:40-10:00	Igor Gurevich	Physical Informatics – Information Methods of Natural Systems Research
	10:00-10:20	Dong-Sheng Miao	Exploring the Information Carrier
10:00-10:20	Coffee Break		
10:20-12:00	FIS 2010 Plenary Session 4		Jieti Hall, International Culture Building Co-chairs: Kang Ouyang and Yukio-Pegio Gunji
	<i>Sub Time</i>	<i>Key Speaker</i>	<i>Title</i>
	10:20-10:40	Kevin Kirby	The Great Chain of Computing – Informatics at Multiple Scales
	10:40-11:00	Xue-Shan Yan	It has been prepared
	11:00-11:20	Joseph Brenner	Information in Reality – Logic and Metaphysics
	11:20-11:40	Xin-Zheng Jin	Methodology of Information Science
	11:40-12:00	John Collier	Kinds of Information in Science Use
12:00-13:30	Lunch Break		

FIS2010 – Concurrent sessions (August 23)

Aug. 23	13:30-15:30	FIS 2010 Concurrent Sessions		
	Session 1	Topic: Information, Intelligence, and Logic		Meeting Room 3, International Culture Building
<i>Sub Time</i>		<i>Key Speaker</i>	<i>Title</i>	
13:40-13:50		Miranda Kajtazi & Darek Haftor	Exploring the Notion of Information: a Proposal for a Multifaced Understanding	
13:50-14:00		Gerhard Luhn	Towards an Ontology of Information and succeeding Fundamentals in Computing Science	
14:00-14:10		Konstantin Kolin	Philosophy of information and fundamental problems of modern Informatics	
14:10-14:20		Qiao Tian-Qing	Definition and Essence of Information	
14:20-14:30		Liu Gen-Hui	The Decoding and Feedback of the Linguistic Message under the Information Asymmetry	
14:30-14:40		Gao Hong	Reexamine the Evolution from a perspective of Life Informatics	
14:40-14:50		Xiao-Hui Zou	The Meaning of the Information Model on KM in University	
14:50-15:00		Xiao-Han Huang	It has been prepared	
15:00-15:10		Li Dong-Dong	Exploration of the nature of virtual practice	
15:10-15:20		Yu Bin	Computer-mediated Communication System	
Session 2	Topic: Unified Theory of information and Theoretical Informatics		Meeting Room 6, International Culture Building	Co-chairs: Igor Gurevich and Jing-Shan Wang
	<i>Sub Time</i>	<i>Key Speaker</i>	<i>Title</i>	
	13:30-13:40	Xian-Han Luo	Matter Information Theory: Matter Information System of Various	

				Layers and Their Philosophical Explorations		
		13:40-13:50	Xiao-HanHuang	It has been prepared		
		13:50-14:00	Xu Ming	Further Reflections on Faithfulness Criterion of Translation Criticism from the Perspective of Information Science		
		14:00-14:10	Tang Jian-Wang	Dissipative Structure Characteristics of Virtual Community and Its Orderly Method		
		14:10-14:20	Li Xiao-Gang	The Public Opinion Evolution dynamics on Scale Free Network in the External Field		
		14:20-14:30	Zhou Xun-Wei	Introduction to mutually-inversistic discrete mathematics		
		14:30-14:40	Duan Zhan-Qi	The Emergence and Development of Theoretical Informatics		
		14:40-14:50	Peter Fleissner	Reconstructing the Economy: A Methodological Journey from the Surface to the Essence and back		
		14:50-15:00	Natalia Gendina	Russian view on information literacy and information culture		
		15:00-15:10	Jason Hewitt	The Identity of Objects: Form and Nature in the Digital Museum		
	Session 3	Topic: Social Informatics and Information Philosophy		Meeting Room 9, International Culture Building	Co-chairs: J.M. Díaz Nafría and Kun Wu	
		<i>Sub Time</i>	<i>Key Speaker</i>	<i>Title</i>		
		13:30-13:40	Takayuki Niizato and Yukio Gunji		Are the Flocks Critical Phenomena?	
		13:40-13:50	Wataru Hashimoto		Autopoiesis, Observation and Informatics: Lessons from the Development of Autopoietic Systems Theory in Japan	
		13:50-14:00	Yohei Nishida		The Relationship between Autopoiesis Theory and Biosemiotics: On Philosophical Suppositions as Bases for a New Information Theory	
		14:00-14:10	Koji Sawa and Yukio-Pegio Gunji		An emergence of formal logic induced by an internal agent	

		14:10-14:20	Kang Lan-Bo	Thinking on the thought-premise about information ethnics
		14:20-14:30	Gang Liu	Information philosophy and trans-disciplinary study
		14:30-14:40	Jin Hui	The rise of philosophy of information in China
		14:40-14:50	Li Chuan-Yin	An Outline of Humanistic Information Science
		14:50-15:00	Jiang Xiao-Hui	A Philosophical Thinking about the Complexity of Social Information System
		15:00-15:10	Xia Yun-Feng	Study on the Self-growth of Internet Communication System
		15:10-15:20	Ji-Fa Gu	Hierarchy of D-I-K-W
	15:30-15:50	Coffee Break		
	15:50-17:10	FIS 2010 Concurrent Sessions		
Session 4	Topic: The Conceptualization of Information		Meeting Room 3, International Culture Building	Co-chairs:Luis Bruni and Ai-Nai Ma
	<i>Sub Time</i>	<i>Key Speaker</i>	<i>Title</i>	
	15:50-16:00	Wei Wang	A Defense of Ceteris Paribus Laws	
	16:00-16:10	Cai Dong-Wei	Discussion on the Six problems about Information in the Philosophical Viewpoint	
	16:10-16:20	Wang Chao	Self-replication of Internet Communication	
	16:20-16:30	Zhao Chuan	The Formal Semantic Analysis on Two Types of Chinese Sentences and Programming Realization	
	16:30-16:40	Mario Pérez-Montoro & J.M. Díaz Nafría	Is information a sufficient basis for cognition? (Part 1)	

		16:40-16:50	J.M. Díaz Nafria & M. Pérez-Montoro	Is information a sufficient basis for cognition? (Part 2)	
		16:50-17:00	Carlos Aguilar, Lydia Sánchez and Manuel Campos	Information Extraction from Audiovisual Data	
		17:00-17:10			
	Session 5	Topic: Information Society and Information Technology		Meeting Room 6, International Culture Building	Co-chairs: Kevin Kirby and Gang Liu
		<i>Sub Time</i>	<i>Key Speaker</i>	<i>Title</i>	
		15:50-16:00	Mary Joe Deering	Harnessing Informatics to Improve Health and Health Care in the United States: a Policy Perspective	
		16:00-16:10	Vladimir Kinelev	The Use of ICT in Education and Science	
		16:10-16:20	Victor Shreiber and Georgy Ishmaev	The place of information and knowledge in the structure of labor	
		16:20-16:30	Liu Jing	On the Goal and Methods of Researches on Theoretical Informatics	
		16:30-16:40	Sun Dong-Jian	Digital Publishing Age: Mosaicking your fragment Information	
		16:40-16:50	Wang Jing-Shan	Analysis on Characteristics of the Self-organization of Internet	
		Session 6	Topic: Science of Complexity as Basis for a New Science of Information		Meeting Room 9, International Culture Building
	<i>Sub Time</i>		<i>Key Speaker</i>	<i>Title</i>	
	15:50-16:00		Li Zhi-Tang	The measurements and comparisons of media networks	
	16:00-16:10		Dai Jin-Ping	Study on the Intension and Extension of Information Culture	
	16:10-16:20		Li Wu-Zhuang	How Is it Possible that Information Philosophy Is Regarded as Meta-Philosophy?	

		16:20-16:30	Li Guo-Wu	Information Philosophy in China——Professor Wu Kun 30 years of academic thinking in information philosophy	
		16:30-16:40	Kohei Sonoda	Analyzing Double Image Illusion through Double Indiscernibility and Lattice Theory	
		16:40-16:50	Shimpei Tatsumi	A model of "musicking" driven by mediation local-global concept lattices	
		16:50-17:00	Eugene Kitamura	Evolving Lattices for Analyzing Behavioral Dynamics of Characters in Literary Text	
		17:00-17:10			
	18:00-19:30	Closing Ceremony and Banquet		3rd Floor, Dinning Hall, Main Campus, Capital Normal University	Co-chairs: Yi-Xin Zhong, Hua-Can He, and Kang Ouyang
	20:00-21:30	Preparatory Meeting of China-FIS 2011		Meeting Room 4, International Culture Building	Co-chairs: Yi-Xin Zhong , Hua-Can He and Kang Ouyang
Aug. 24	8:00-9:30	Leaving/Sightseeing in Beijing			

Abstracts of Papers of FIS 2010

On “Society Thinks, Therefore Society Is” —Also on logically starting point of social epistemology and social information Science

Ai-Jin Tian, Xin-Ming Zhang, Zong-Rong Li

Abstract: In this paper, we advance and explain a proposition, "society thinks, therefore society is", and believe that the proposition is the logically starting point of the social epistemology and social information science. There is a Hierarchical structure in the world of life. Observing at human individual level: individual thinks with his brain but each of his cells can not think, even a nerve cell; though society consists of individuals, but it can not think because it has not a brain like individual's one. However, from the viewpoint of theoretical informatics, society, person, cell, DNA, and bio-molecule have a common feature, i.e., "input - processing - output" (IPO) of information, then they are all able to think though among them there some difference, i.e., the distinction of the structure and content of their thought. If the Descartes "I think, therefore I am" is the first assumption of individual epistemology in the industrial era, then in the information age, the first assumption of social epistemology and social information science should be "society thinks, therefore society is".

“Tian, Di, Ren, Ji” Information Integrative Network System

Ai-Nai Ma

Abstract: “Space, earth, man, and computer” in Chinese words that is “Tian, Di, Ren, Ji”. This paper discusses how has integrated remote sensing system

(RSS), global positioning system (GPS), data collected system (DCS), geographical information system (GIS), expert information system (EIS), management information system (MIS), decision-making information system (DIS), and virtual reality system (VRS) into one network system for information society. It is an open, complex, and great system.

Computer-mediated Communication System

Bin Yu

Abstract: The essence of communication is to exchange and share information. Computers provide a new medium to human communication. The CMC system composed of human and computers absorbs and extends the advantages of all former formats of communication, embracing the instant interaction of oral communication, the abstract logics of printing dissemination, and the vivid images of movie and television. It establishes a series of new communication formats, such as Hyper Text, Multimedia etc. which are the information organizing methods, and cross-space message delivering patterns. Benefiting from the continuous development of technique and mechanism, the computer-mediated communication makes the dream of transmitting information cross space and time come true, which will definitely have a great impact on our social lives.

Extraction of information of audio-visual contents

Carlos Aguilar, Lydia Sánchez and Manuel Campos

Abstract: In this article we show how it is possible to use Channel Theory [Barwise and Seligman, 1997] for modeling the process of information

extraction realized by audiences of audio-visual contents. To do this, we rely on the concepts proposed by Channel Theory and, especially, its treatment of representational systems. We then show how the information an agent is capable of extracting from a content depends on the number of channels he is able to establish between the content and the set of classifications he is able to discriminate. The agent can endeavor the extraction of information through these channels from the totality of content; however, we discuss the advantages of extracting from its constituents in order to obtain a greater number of informational items that represent it. After showing how the extraction process is endeavored for each channel, we propose a method of representation of all the informative values an agent can obtain from a content using a matrix constituted by the channels the agent is able to establish on the content (source classifications), and the ones he can understand as individual (destination classifications). We finally show how this representation allows reflecting the evolution of the informative items through the evolution of audio-visual content.

Self-replication of Internet Communication

Chao Wang

Abstract: In systems science, self-replication refers to the system or subsystem in the absence of a specific external system produces offspring related to its own structural system, such as the propagation of organisms is a self-replication, self-replication, therefore also called self-reproduction. Self-replication system is an important form of system self-organization. There is chose relationship between self-replication and self-growth、self-adaption, slightly more complex self-growth or self-adaption should contain some kind self-replication. Phenomena of self-replication exist in the

internet communication system widely. Both self-growing and self-adaption in the internet communication system contain self-replication of internet communication elements. In this sense, self-replication of internet communication is the basic style of self-organization of internet communication.

The Formal Semantic Analysis on Two Types of Chinese Sentences and Programming Realization

Chuan Zhao, Yuan-Yuan Wang, Yao Lu, Yu Liu, De-Zhi Tu

Abstract: The Verb-driven Chinese natural language understanding system realizes logic-driven semantic analysis. There are two types of Chinese sentences –把(ba)- sentence and 被(bei)- sentence. In this paper we use λ -transformation to analyze them. Yan Jiang and Haihua Pan put out formal semantics theory based on the concepts of type and category [3]. We program to realize semantic level analysis and expression, try to realize the idea to algorithm, and formalize natural language to logical expressions. According category theory to analyze semantics and transform the concept of category to the “field” in corpus. Finally we program to control the flow of analysis process and realize the logic-driven semantic analysis system.

Challenges for Those Constructing a Science of Information as an Evolving Unique Discipline

Dail Doucette

Abstract: This paper suggests those interested in a Science of Information establish an entirely new academic and scientific discipline to be titled "Science of Information". This new discipline should be established as a meta-discipline because the new discipline will include the theoretical work of

and complement the other disciplines. It should exist equally with traditional disciplines such as physical, social science, arts, and humanities. It should not compete with or replace other disciplines. It should stand alongside them and assist them, as well as conduct comparisons and consolidations amongst the disciplines regarding information theories, methodologies, practices, by adding new perspectives, resources and developments.

Exploration of the nature of virtual practice

Dong-Dong Li

Abstract: Modern revolution of information technology gave birth to a new kind of practical form - virtual practice. It has gradually penetrated into every corner of society, and profoundly changing the way of human existence. In this paper, the comparison between generation of virtual practice and traditional practice reveals the nature of virtual practice to improve human existence.

Digital Publishing Age: Mosaicking your fragment Information

Dong-Jian SUN

Abstract: Mosaic is originally used in architecture. As the digital publishing age comes, a number of specialists emphasize that knowledge should be broken into fragments for convenient usage. However, to break up knowledge is mere a process, not a purpose. Some measure must be taken to piece all of the fragments up for individualized construction of one's own knowledge system. This paper introduces the concept of mosaic into communication study and brings forward some principles of mosaicking one's fragment information into a whole knowledge system

Exploring the Information Carrier

Dong-Sheng Miao

Abstract: This article discusses three issues related to information carrier. (1) "Bare information" does not exist, which has nothing to do with the carriers; the evolution of information is inseparable from the evolution of information carrier. The evolution of this symbol code developed from non-coded information to coded information and from the material code to the natural language is the result of natural self-organization. (2) The emergence of words means starting other-organization evolution of information carrier, and the new information carrier can only be a human conscious creation. The main direction throughout the evolutionary history of information carrier is: the more the operation of information depends on material energy reduce, the more the efficiency of information operation improves. (3) The information carrier has different levels, caused by different strength of material carriers. The division of carrier level also means the division of information level, that is, the difference of information levels can be attributed to differences between the carrier levels. The carrier with strong materiality can load the carrier with weak materiality, not vice versa.

Discussion on the Six problems about Information in the Philosophical Viewpoint

Dong-Wei Cai

Abstract: From the philosophical angle, discussed the six problems about information: first, discussion on the concept of social information based on the theory of ontology, Second, the creation of information and the social information communication, Third, the practice and the reality of the social

information, Fourth, on the truth information, Fifth, virtualization and the truth information, Sixth, on the “social information” consumption, etc.

Evolving Lattices for Analyzing Behavioral Dynamics of Characters in Literary Text

Eugene Kitamura

Abstract: This paper is about an application of rough set derived lattices onto analyzing the dynamics of literary text. Due to the double approximation nature of rough set theory, a pseudo-closure obtained from two different equivalence relations allows us to form arbitrary lattices. Moreover, such double approximations with different equivalence relations permit us to obtain lattice fixed points based on two interpretations. The two interpretations used for literary text analysis are subjects and their attributes. The attributes chosen for this application are verbs. The progression of a story is defined by the sequence of verbs (or event occurrences). By fixing a window size and sliding the window down the story steps, we obtain a lattice representing the relationship between subjects and their attributes. The resulting lattice provides information such as complementarity (lattice complement existence rate) and distributivity (lattice complement possession rate). These measurements depend on the overlap and the lack of overlap among the attributes of characters. As the story develops and new character and attributes are provided as the source of lattices, one can observe its evolution. In fact, a dramatic change in the behavior of characters in a scene is reflected in the particular shifts in the character-attribute relationship. This method lets us quantify the developments of character behavioral dynamics in a story.

The Decoding and Feedback of the Linguistic Message under the Information Asymmetry

Gen-Hui LIU, Zheng-Rong Wang

Abstract: The transmission of the linguistic message in the communication is composed of six steps, including coding, sending, transmitting, receiving, decoding and giving feedback of the message. In this procedure, the information asymmetry is permanent while symmetry is relative. The symmetry both in the quantity and quality is the perfect state in intercommunication. There are three events which could affect the information symmetry: transmission, integration and feedback. There might be some noises exist in the linguistic message which the speaker has sent. From the attribute of the noise, it can be divided into two types: the primary noise and the secondary noise. The noise might but not certain to debase the efficiency of the transmission. It is absolutely necessary for the listener to reduce the inconveniences that the noises would cause.

Towards an Ontology of Information and succeeding Fundamentals in Computing Science

Gerhard Lubn

Abstract: A common usage of the concept of information requires a unique definition of it. The text expands on a proposal for an ontology of information, which will be grounded in physics. Shannon’s communication theory does not conceptualize any physical variable. It will be shown that by doing so the gap between syntax and semantics can be closed by introducing the universal category of triadic information. Any informational scenario is given by the trias of a) a sender, and of b) the transformation which happens to c) the receiver. The concept of information is taken in a broader sense, and

is based on physical fundamentals. The gravitational force which is exploited to a physical body holds in the same sense well defined information as a spontaneous appearance of a new, algorithmically underivable structure or event: the world gets 'completed' within a continuous informational process. Any spontaneous process will always happen in order to increase the entropy of the world. That is, such fundamental information which causes this completion process is given within our universe. For those reasons we have to state, that information causes any causal process, rather than 'is' a causal process. All living species are grounded on an information-receiving, heteronomous deep structure, which includes as well the message which corresponds to further autonomy and freedom (the completion theorem). To summarize, we are enabled to create and to enter into the so called information society by ontological evidence. Based on such foundations, an adequate concept for computer science will be shortly introduced.

Information Philosophy in China—Professor Wu Kun 30 years of academic thinking in information philosophy

Guo-Wu Li

Abstract: Professor Wu Kun, from Xi'an Jiaotong University of China, has been studied in philosophy of information for 30 years. He thinks information conception is one of the most fundamental areas in philosophy, and founded the information philosophy. He has done a lot of pioneering and original research in information ontology, epistemology, social information theory, information production theory, information evolution theory, the value of information and information thinking directions. And therefore he is the first person to set up a complete view of theories, systems and methods about information philosophy.

On the language of information

György Darvas

Abstract: Many writings on information mix information on a given system (I_S), measurable information content of a given system (I_M), and the (measurable) information content that we communicate among us on a given system (I_C). They belong to different levels and different aspects of information. The first (I_S) involves all what one possibly can, at least potentially, know about a system, but never will learn completely. The second (I_M) contains quantitative data that one really learns about a system. The third (I_C) relates rather to the language (including mathematical) by which we transmit information on the system to each other, than to the system itself. The information content of a system (I_M - this is what we generally mean on information) may include all (relevant) data on each element of the system. However, we can reduce the quantity of information we need to mediate to each other (I_C), if we refer to certain symmetry principles or natural laws which the elements of the given system correspond to. Instead of listing the data for all elements separately, even in a not very extreme case, we can give a short mathematical formula that informs on the data of the individual elements of the system. This abbreviated form of information delivery includes several conventions. These conventions are protocols that we have learnt before, and do not need to repeat each time in the given community. These conventions include the knowledge that the scientific community accumulated earlier when discovered and formulated the symmetry principle or the law of nature, the language in which those regularities were formulated and then accepted by the community, and the mathematical marks and abbreviations that are known only for the members of the given scientific community. We do not need to repeat the rules of the

convention each time, but the conveyed information includes them, and it is there in our minds behind our communicated data on the information content. For example, if I say that the elements of a system are placed mirror-symmetrically, I do not need to give the position of all elements individually. It will be enough to give the positions of the half of the elements and add that the rest is placed mirror-symmetrically. Of course, this statement includes all preliminary information on what we mean on “mirror-symmetry”. Tycho Brache left a large amount of observation data on the celestial orbit positions of planets to Johannes Kepler. Based on these data, Kepler discovered the laws of motion of planets, formulated them in three short mathematical equations, by the help of which one can determine the position of any planet at any moment in the sky. These quantitative laws make us possible to use much less information (I_c) to obtain and mediate the information (I_M) on the position of the planets. However, over the few mathematical variables applied in the Kepler formulas, this abbreviated information includes all the intellectual work invested by Kepler to discover the laws, all experimental data (as input information) observed and collected by Brache and his predecessors, and all mathematical knowledge by which we understand what do those formulas mean and how to use them. Another example is the information content of a DNA. We can give it as a sequence of the four nucleotide bases. Their sequence determines, e.g., the proteins of the individual organisms. If we know the law that any triplet of the nucleobases (codon) determines one of the twenty essential amino acids used by living cells to encode proteins, we can reduce the data (to one third) to give the information for the proteins to describe the sequence of the triplets encoding one of the twenty amino acids. However, in this case too, there is in the background our knowledge about the law of correspondence between the

codons’ triplet structure and the individual amino acids which they encode, and all our knowledge about how proteins are built of amino acids. In short, the information content of the language by which we communicate the obtained information, cannot be identified with the information content of the system that we want to characterize, and moreover, it does not include all the possible information what we could potentially learn on the system. Symmetry principles and natural laws may reduce the information we need to communicate on a system, but we must keep in mind the conventions that we have learnt about the abbreviating mechanism of those principles, laws, and mathematical descriptions.

Reexamine the Evolution from a perspective of Life Informatics

Hong Gao, Xin-Zheng Jin

Abstract: The life information evolution is a theory which runs parallel with the Darwin’s theory of biological material evolution, including chemical evolution, biological evolution, and information evolution in the human evolution. The Darwinism is the theory basically about the living matter evolution. We believe that the life essence is not only the material, but also the information. The theory of life information evolution is a promoted version of the theory of biology evolution in the information age. The goal of this paper is to suggest that the theory of biological evolution should be related to the entire universal life information evolution mechanism, which is helpful for us to reveal the rule of life information evolution.

On the building of theoretic system of information science

Hua-Can HE and Ying-Cang MA

Abstract: The objective world consists of material world and information world, each world has two proorties -- existence and activity, then the objective world has four inherences -- material, energy; information, and intelligence. The material science is the study of material world, which is a great disciplines and now is very considerably rich and complete. Information science is the study of information world, which is also a major disciplines, but the development of its theoretical system just started, in which there are many rules needed to be explored. In this paper, the process of building material scientific system will be reviewed carefully, from which we are able to get some important enlightenments for the development of theoretical system of information science.

Physical informatics – information methods of natural systems research

Igor Gurevich

Abstract: The work is confirming priority of informational laws, which are the basis of physical informatics: the informational laws (informatics laws) are define and restrict the physical laws; the informatics laws have general, universal character, operate in all possible universes with different physical laws. Physical Informatics is Science of modern Information in Physical and Chemical Systems, including Quantum Informatics, and is the basis of Informatics of the Living Systems.

The Identity of Objects: Form and Nature in the Digital Museum

Jason Hewitt

Abstract: Reconciling Justus Buchler's theory of natural complexes with the Peircean triadic categorial schema, a theory of semiotic radiance is articulated that elaborates the nature of identity with regard to informatic control over objects in a museum collection. The model is deployed in the context of Edwina Taborsky's description of the historical transformation of the cultural syntax of museums. It is argued that the pattern of transformation is not random, but rather follows a specific and recognizable pattern. This pattern is consistent with a general trend in culture, identified by Heidegger, that becomes particularly problematic in its later stages. A theory of the commons derived from Hardt and Negri is articulated that looks to regenerate the space of the museum with regard to its informatic structures in order to renegotiate humanism in terms of a liberation ethic. The rubric of fundamental informatics is borrowed from Toru Nishigaki to describe the inquiry that pursues that end.

A Brief Analysis on Dissipative Structure Characteristics of Virtual Community and Its Orderly Method

Jian-Wang Tang

Abstract: This paper analyzes the concept of virtual community, a brief analysis of the dissipative structure theory and its four characteristics, the analysis of virtual community shows that it has the characteristics of the dissipative structure: virtual community is a dynamic and open network social system, is a non- balanced system, the nonlinear mechanism of virtual communities and the effect of the fluctuations in the nonlinear effect. Finally,

the author proposes to use the endogeneity and external stipulation to achieve orderliness of the virtual community.

On the Goal and Methods of Researches on Theoretical Informatics

Jing Liu, Xin-Zheng Jin

Abstract: In order to establish and improve theoretical informatics, this paper discusses the goal and special methods of the researches on theoretical informatics. These methods include driving intellectual innovation with method innovation; unifying tool informatics and field informatics; combining multi subjects in realism breadth wise and history lengthways; combining multi levels in application, theory and philosophy; and listing some programs that are pending further discussion.

Study on the Intension and Extension of Information Culture

Jin-Ping Dai

Abstract: Information culture can be defined as a kind of cultural morphology in the information era which is formed through the entire revolution of human living style that is caused by social informationization process. It's based on the application of modern information technology, uses information industry and knowledge industry as its backbone, and takes the production, distribution, transmission, communication and using of information and knowledge as the contents of human activities. The definition of information culture in its broad sense is the culture in information society and information era; while in a narrow sense, it refers to the general name of new type of cultural morphology which is formed around

these new technologies as modern computer technology, telecommunication technology and network technology. Though there are differences between broad-sense information culture and narrow-sense information culture, they still contain internal relation.

Analysis on Characteristics of the Self-organization of Internet

Jing-Shan Wang, Li-Fang Wang

Abstract: Compared to newspapers, periodicals, radio and television and other media, Internet is a new media. Internet communication has self-organizing and heter-organizing mechanism. Although the self-organization of network communication occurs and develops in different levels of network communication system, it has similar performance and operating rules. On the basic level, elements of Internet system have their own spontaneous movement mechanism. however, the whole Internet can form a number of ordered structure and function. Therefore, like the self-organization of other systems, self-organizing network communication mechanism has the characteristics of their own as a result of dynamic behaviors.

Kinds of Information in Science Use

John Collier

Abstract: There are many different mathematical definitions of information that have their various uses, but I will be concerned with notions of information used in applications in various branches of science that are

distinguished by their topic, i.e., what they apply to. I describe the major uses of information, and show their relations to each other. I will argue that the various uses form a nested hierarchy, in which each is a restriction on the previous, inheriting the properties of its predecessor, but adding in new features that make it a special case. The lowest level is physical information determined by distinctions and the highest is explicit representation in linguistic social communication. Is there anything common to information at all these levels? I will argue that there is, and that information in each case is what Donald MacKay (1969) called a distinction that makes a difference. What distinguishes the use of information at each level is what distinctions make a causal difference at that level. At each successive level distinctions that make a difference at a previous level make no difference at that level. In order to create this sort of filter new levels have to be formed by cohesion peculiar to the identifying characteristics at that level. A consequence of this view is that information must have causal powers, and that there is a tight connection between information and causation.

How a Bacillus “Sees” the World Information Needs and Signaling Resources of Mycobacterium tuberculosis

Jorge Navarro and Pedro Marijuan

Abstract: Any living cell parasitizing a host organism is immersed into a molecular environment of unfathomable complexity. For the advancement of its life cycle in such “hostile” a territory, the cell has to carefully sense its environment, “see” the ongoing physiological processes taking place, and guide subsequently its own network of self-construction processes, pathological responses included. We will discuss how this informational matching occurs in the bacillus Mycobacterium tuberculosis, and how

transcriptional programs within the global transcriptional regulatory network are deployed in response to specific signals from the environment and from within the cell itself. In the era of the bioinformatic revolution and of systems biology, it is perhaps surprising that the functional interconnection between the transcription network and the signaling system is far from clarified yet. In the extent to which the living cell can be considered as one of the central paradigms of the nascent information science, this discussion becomes one about the essential cluster of concepts which should potentially apply to the analysis of other information-based entities.

Towards a transdisciplinary frame: Bridging domains, a multidimensional approach to information

José María Díaz Nafria and Francisco Salto Alemany

Abstract: A trans-disciplinary frame is proposed, aimed at addressing the very understanding of information in all its variety. It aims at unifying perspectives and integrating techniques from different fields of knowledge and practice, searching for the most overarching account of information phenomena, a better formalization of real processes and a global stance towards problems concerning information. Such research frame might try to answer: Which are the basic distinct accounts of information to be applied in fields from telecommunication to philosophy, from biology to documentation, from logic to quantum physics? Which are the minimum primitive concepts that may cover all of them? Is a unified theory feasible? Could a better information measure be found? Could the societal and practical interest be better preserved in an integrated perspective of information? The methodological proposal aims at opening a space for the interweaving of different scientific frameworks (characterized by specific paradigms and

methodologies) to delve into the very landscape of information, searching for a transdisciplinary treatment of theoretical, technical and practical problems concerning information. It is based on an already active interdisciplinary International community and a critical mass of research groups at the global level. By means of bridging these communities, a new transdisciplinary science of information might emerge as an integrated framework in which information will be considered in all its formal, natural, cognitive, social, technical, ethical and philosophical aspects.

Is information a sufficient basis for cognition? (Part 1: Critic to Dreske's Vision)

José María Díaz Nafría and Mario Pérez-Montoro Gutiérrez

Abstract: Based upon the natural limits of observation, we tackle a critical review of Dretske's approach to information, knowledge and perception. The physics of the manifestation of an arbitrary object –tackled in Part 2 as a separate article– sets forth an informational boundary stating that information cannot be enough to support our cognitive processes. The problems do not rely –as Dretske supposes– on the lacks of the channel, but on the very nature of observation. Furthermore, Dretske's approach –handcuffed to his maximalist support on information– presents some lacks concerning processual character of information, fuzziness of perception and knowledge, contents de dicto and conventional regularities. The posed limits and problems intend to settle new foundations for a more refined conjunction of information and knowledge.

Is information a sufficient basis for cognition? (Part 2: Physical foundations)

José María Díaz Nafría and Mario Pérez-Montoro Gutiérrez

Abstract: In this second part of our inquiry into the relation between information and cognition, we delve into the physical limits of the manifestation of an arbitrary object first with independence of any observer, then considering the nature of perception. The analysis of the manifestations of an object in a homogeneous environment by means of wave phenomena shows that the information carried by such manifestations offers a constitutive fuzziness and ambiguity of the observed object. On the one hand, the details that can be specified concerning the object are strictly limited by the wave length; on the other hand, the volumetric details of the object (i.e. its bowls) are outlawed to the observer, not in virtue of the object opacity, but to the very dimension or complexity of the wave phenomenon in the space surrounding the object. The analysis of perception, considering this physical boundary and the specificity of the animal sensitivity, shows the combined role of other concurrent or previous percept and some a priori knowledge in the perception and awareness of reality.

Researches on Three Laws of Theoretical Informatics

Jun-Feng Liu, Hong Gao, Xin-Zheng Jin

Abstract: This paper conducts the researches on the three laws of informatics proposed by Zong-Rong LI using the method of analogy with thermodynamics. The three laws of theoretical informatics are: the information being nonconservation; information energy increasing with time; information increasing with no upper limit. These three laws are keys of the

information ontology research. They show up the character and relationship of information, entropy, negentropy, and information energy.

New Science Building and Research: From Systems Biology to Theoretical Informatics

Jun You and Zong-Rong Li

Abstract: Briefly introduced the status and related theories foundation of Theoretical Informatics (TI) and Systems Biology(SB). These two disciplines were compared and analyzed, mainly from the background, epistemological approach, informational energy of open systems, which these three aspects can demonstrate the two disciplines be of connected or similar attributes or characteristics, to indirectly discourse the necessity, the rationality, the feasibility and the vital significance of the establishment and researches for TI. Explore how to draw, reference SB model of development to promote the prosperity and great development of TI.

On the Research Focus and a Framework of the Social Information Sciences

Kang Ouyang

Abstract: In this paper, the author discusses the proposal of the social information science, the issues of social information, the theoretical orientation of the social information science, the research focus of the social information science, and the the operating mechanism of the Social Information Science Institute (SISI) at Huazhong University of Science and Technology (HUST). A system and framework of social information science was advanced in the paper. Generally speaking, if the social information science is to be viewed as a relatively independent subject, there should be

four levels of researches. They are the philosophical level, the scientific theoretical level, the level of concrete subjects, and the level of social information technology

Accounting in Genetics

Karl Javorszky

Abstract: We present a logical tool that can well be used to contribute to a rational understanding of the functioning of theoretical genetics. The tool itself is a numerical Table, comparable to some tables of Triangulation or of other function values. It has been produced based on natural numbers in the range of 1 to 136. It can be easily constructed on the Reader's own PC.

An approach to the newly developed informatics: exceeding the traditional information theories

Ke Li, Jing-Ping Ouyang

Abstract: The author considered that "To the newly developed informatics" prompted by Wolfgang Hofkirchner include three tasks: developing the theoretical informatics, perfecting the framework of informatics, and implement the worldview and the methodology of informatics. And the exceeding of the traditional information theories is the priority. So, in this paper, we discussed how to exceed the traditional information theories from six aspects: improving Shannon's communication theory, perfecting Wiener's Concept of "Information", supplementing Turing's "Computing Model", generalizing human "intelligence", analyzing the theory of triple factors (substance, energy and information) of the cosmic constitution, and decoding the Mind-body problem of Descartes.

The Great Chains of Computing: Informatics at Multiple Scales

Kevin Kirby, James Walden, Rudy Garns and Maureen Doyle

Abstract: The perspective from which information processing is pervasive in the universe has proven to be an increasingly productive one. Phenomena from the quantum level to social networks have commonalities that can be usefully explicated using principles of informatics. We argue that the notion of scale is particularly salient here. An appreciation of what is invariant and what is emergent across scales, and of the variety of different types of scales, establishes a useful foundation for the trans-discipline of informatics. We survey the notion of scale and use it to sort out characteristic features of information statics (data), kinematics (communication), and dynamics (processing). We then explore the analogy to the principles of plenitude and continuity that feature in Western thought, under the name of the "great chain of being", from Plato through Leibniz and beyond, and show that the pancomputational turn is a modern counterpart of this ruling idea. We conclude by arguing that this broader perspective can enhance informatics pedagogy.

Analyzing Double Image Illusion through Double Indiscernibility and Lattice Theory

Kobei Sonoda

Abstract: The figure-ground division plays a fundamental role in all image perceptions. Although there are a lot of studies about extraction of a figure such as detection of edges or grouping of texture, a few discussions about a relationship between obtained figure and ground. We focused on double image illusions having two complementary relationships between figure and

ground and analyzed them. We divided the double image illusions according to two different interpretations and using these divisions we extracted and analyzed its logical structures by lattices derived from rough sets that we had developed. As a result we discovered unusual logical structures in double image illusions.

An emergence of formal logic induced by an internal agent

Koji Sawa and Yukio-Pegio Gunji

Abstract: In this paper, we mainly address three issues: externality of an agent, purpose of an agent, and a kind of "softness" of components in a system. Agents are independent of a system in an ordinary multi-agent model, hence the behavior of a system is not autonomous but influenced by the agents. If a multi-agent model is considered as a completely autonomous one, agents in the model are inevitably deprived of their externality and independence from the model. In order to treat of the completely autonomous transition of a system, we introduce an agent which is a part of a system, and has a purpose which is independent from a system. The interaction between a system and an agent transforms a random graph corresponding to the system into the graph which represents formal logic adequately. In the emergent graph, there are many complete subgraphs, which can be regarded as conceptualized things. We modify the definition of a conceptualized thing into a subgraph which is a cycle of arrows, and regard the density of arrows of each conceptualized thing as validness. We define this object with the density as a soft object. A complete graph has maximum number of arrows, hence is the most reliable soft object. In a similar way, we call an arrow with the validness a soft arrow, and treat of the relation between soft objects and soft arrows. The argument of this paper is relevant to

dynamical formal logic, and at the same time, is intended to serve as a basis for an agent model.

Philosophy of information and fundamental problems of modern Informatics

Konstantin Kolin

Abstract: Actual philosophical and scientifically-methodological problems of modern Informatics as fundamental science and a complex scientific direction are considered. Communication of these problems with prospects of development of Informatics and fundamental science as a whole is shown.

Social Informatics today and tomorrow: status, problems and prospects of development of complex lines in the field of science and education

Konstantin Kolin

Abstract: We consider the current state and current problems of development of Social Informatics in Russia as an important direction in science and education, studying information processes and systems in a modern society in terms of globalization and informatization of the complex. Russian scientists set out the approach to the study of Social Informatics in the education system at the time of his substantial upgradin in terms of becoming an information society.

Scientific information scienceize

Kun Wu

Abstract: Development to today's information science is no longer just a single subject or just a kind of cross nature, cross-sectional nature of subject,

but one has many levels and involves subject system of multidisciplinary fields. Levels of this subject system can be broadly divided into: the philosophy of information, general information theory, the field of information science, category of information science, a branch of information science and engineering informatics. Information science in essence is a transformation of scientific normal form; this transformation has led to a new modern sense, take information theory as modern scientific system of dominant knowledge mode.

Identification to rely on difference; construct to depend on an intermediary; Virtual to through construction — The general process and mechanism of people's information cognition activities

Kun Wu

Abstract: Form a relationship to due to differences between things, information obtained present in the different relationships, it is only through the different relationship to identify the information; in understanding the process of arising, there is no direct touch between the subject and object, interaction between subject and object is be multi-level intermediaries, such as the information field, the subject physiological structure, the subject cognitive structure, the materialized tools of subject cognitive are the form of an intermediary of interaction between subject and object; knowledge of by multi-level intermediaries is knowledge of constructed and virtual in intermediary, each intermediary link of cognitive occurred is a relatively that the nature of intermediary link to occur of information selection, transformation and construction of the device, structure through the intermediary link, the object information is bound to happen some dogleg or

rebuild of distortion, also in the information processing activities in people's thinking can also create a new information of subjective design, which inevitably presents the subject to object cognitive form and content, etc to some extent has been the scene of virtualized; The essence of virtual reality through direct simulation information environment, feel the experience, direct manipulation conversion of feel the experience, so as to realize to human cognitive the virtual; virtual reality is not only for man's cognitive possible ways to open up a very broad prospects, but also helps from fundamental to clarify as a general processes and mechanisms of human cognitive activities of information activity.

The informational essence, classification and nature of different grade

Kun Wu

Abstract: information is a marks indirect existential philosophical category, which is self-display of the material (direct existence) existence way and status. Information including in-itself, for-itself, regenerated three basic forms, each of the basic form also consists of two basic forms. Information of these three basic forms has reached unity of the essence of itself completion in the social information. Information with nature of three different grade, informational nature of primary grade is a directly existential level objective shows, that is a level objective indirect existence; informational nature of secondary grade is directly existential multi-levels objective shows, that is a multi-level objective indirect existence; informational nature of third grade is a nature of subjective relationship of human understanding give to information.

Thinking on the thought-premise about information ethnics

Lan-Bo Kang

Abstract: the thought-premise of traditional ethnics is that “human is ... animal”. This kind of concept could demonstrate the human’s moral behavior, however, it would be faced with two difficulties in the end. The first is that it negates the need that human should “pursue to become real human”, because it understand human as something “established being”. The second is that it can’t exceed the animal’s layer to think on the standard of “real human”, even though it is admitted by some people that human should “pursue to become real human”. In the era of information, having great changes take place in the being manner of human, these two difficulties are more and more obviously, and even restrict the research and use to the technology of information exactly. Under these circumstances, how human should understand himself all rounds? Which standard should be set up for human “pursue to become real human”? Like these kinds of problems are becoming so important in the era of information that ethnics would have to search for seriously. Being searching after these kinds of problems, information ethnics would exceed the layer of traditional ethnics, and become a kind of philosophy that of in the era of information.

Human Intelligence: Fundamental Driving Force of Social Progress

Ling Zhang, Zong-Rong Li

Abstract: This article is devoted to the study on the development of tools and machines, the important part of productivity. The author introduces the characteristics of the development process and analyzes the radical reason and the driving force for the development. Based on the effect of tools and

machines on human social development, the author tries to illustrate it is the intelligence that drives the social progress and human society have entered the intelligence age and become intelligence society.

Using non-recursive biological information sources as oracles?

Lothar Michael Putzmann

Abstract: Computability is a relative notion depending on the intertwining of one's logic and resources that are made available. Additional resources such as oracles or new primitive functions can expand the set of 'computable' functions. Practical implementation raises the question how to locate harnessable real processes, i.e. gateways to non-recursive information sources. — Here we're resuming some issues (in the first half) and trying to make (in the second half) a contribution by discussing the paradigm of the shift function - a function intimately related to the Radó-function - with the feature that no function which is an upper bound for it is recursive. We're asking about any possible naturally occurring function that is an upper bound to the shift function, which seems to be plausible in the biological evolution and information growth. — Perhaps the best introduction to the talk will be a listing of the section headings: 1. What kind of 'thing' is information? 2. Quantitative measurements: Shannon's entropy: The problem of biological information as statistical problem. 3. The need for 4. Advantages of Rényi entropy: 5. Qualitative measurements: Kolmogorov's entropy: The problem of biological information as semantical problem. 6. or ? Facing the revenant of the perpetuum mobile of the third kind? There are no meaning generating algorithms but there are oracles! 7. Oracle machines are no spectres: basics about the 4-tuple 8. What about an

unfixed oracle, i.e. non-recursive ones? The paradigm of the shift function. 9. Biological functions as an upper bound for the shift function? 10. How could we sure about the results of such hidden functions? 11. Turing-oracles revisited

Research of Information Science as Viewed from System Science

Lu Tan, Ya Zhou, Lu Jiang

Abstract: Making researches on information which is regarded as a state variable of system from the perspective of system science can promote the development of information science. In the framework of system science model, the analysis of relations among three system attributes which are information, matter (mass) and energy is to the benefit of understanding the connotation of information better. Furthermore, for the different range of researches of theoretical informatics and subject informatics, we hold that the priority should be given to the development of subject informatics to strengthen the research of information science at this stage. And based on the difference between natural information and language and word information, a trend of the research of theoretical informatics is proposed.

Cognitive Sustainability in the Age of Digital Culture

Luis Bruni

Abstract: The objective of the present paper is to contextualize the impact of the expansion of digital culture in the on-going discussions about the relations between sustainability and information technology. In order to relate the development of a global digital communication web, its effects on cultural processes and the issues of ecosystem and human sustainability that humanity

is facing, I will relate and elaborate on three aspects: 1) A Batesonian perspective on sustainability 2) The recent evolution of the technosphere, and 3) Yuri Lotman's notion of Semiosphere and his semiotic theory of culture. This path will lead me to delineate some of the eco-ethical dimensions implied in the development of pervasive digital-interactive-immersive-representational technologies.

Matter Information Theory: Matter Information System of Various Layers and Their Philosophical Explorations

Luo Xianhan

Abstract: According to the development of modern natural science, the relation exists between matter and information. In the early part of universe, the information carried by the elementary particles is the basic matter information, by which the solar system is formed. The biological molecules are the matter information systems with more layers through interaction of many factors between heavens and earth. The information of persons is closely related to the stability and development of society. The author tries to establish a philosophical system of matter information theory, including the interpretation in ontology, the development outlook and theory of knowledge.

Foundations for Science of Information: Reflection on the Method of Inquiry

Marcin Schroeder

Abstract: The paper considers necessary conditions for establishing information science as a scientific autonomous discipline. The lack of commonly accepted definition of information is not as threatening as it may

seem, as each study within the discipline may choose own definition, as well as own philosophical framework, when there are some alternatives to choose between. More important is development of common methodology of inquiry and some range of standard questions regarding the concept of information. Also, it is important to develop some standards of inquiry which would make information scientific studies accessible to philosophical analysis and reflection. In turn, contributions of information science to resolution of problems identified within philosophy will give a best measure of the maturity of information science as a discipline.

Information: Concept Clarification

Mark Burgin

Abstract: On the one hand, information is the basic phenomenon of our world. We live in the world where information is everywhere. All knowledge is possible only because we receive, collect and produce information. People discovered existence of information and now talk of information is everywhere in our society. As Barwise and Seligman write (1997), in recent years, information became all the rage. The reason is that people are immersed in information, they cannot live without information and they are information systems themselves. The whole life is based on information processes as Loewenstein convincingly demonstrates in his book (1999). Information has become a key concept in sociology, political science, and the economics of the so-called information society. Thus, to better understand life, society, technology and many other things, we need to know what information is and how it behaves. Debons and Horne write (1997), if information science is to be a science of information, then some clear understanding of the object in question requires definition. On the other

hand, the actual nature of the information and knowledge produced and distributed by information technology remains abstract and actually undefined. Even more, Many researchers assume that this diversity of information uses forms an insurmountable obstacle to creation of a unified comprehensible information theory. For instance, Shannon (1993) wrote: “It is hardly to be expected that a single concept of information would satisfactorily account for the numerous possible applications of this general field.” Other researchers, such as Goffman (1970) and Gilligan (1994), argued that the term *information* has been used in so many different and sometimes incommensurable ways, forms and contexts that it is not even worthwhile to elaborate a single conceptualization achieving general agreement. Capuro, Fleissner, and Hofkirchner (1999) even give an informal proof of the, so-called, Capuro trilemma that implies impossibility of a comprising concept of information. According to his understanding, information may mean the same at all levels (*univocity*), or something similar (*analogy*), or something different (*equivocity*). In the first case, we lose all qualitative differences, as for instance, when we say that e-mail and cell reproduction are the same kind of information process. Not only the ”stuff” and the structure but also the processes in cells and computer devices are rather different from each other. If we say the concept of information is being used analogically, then we have to state what the “original” meaning is. If it is the concept of information at the human level, then we are confronted with anthropomorphisms if we use it at a non-human level. We would say that “in some way” atoms “talk” to each other, etc. Finally, there is equivocity, which means that information cannot be a unifying concept any more, i.e., it cannot be the basis for the new paradigm... The Capuro trilemma is a valid scientific result if it is assumed that researchers tried to elaborate a definition of information in the traditional

form. Indeed, in this case, the trilemma clearly explains and grounds why it is impossible to achieve a comprising definition of information. At the same time, utilization of a new type of definition, which is called a parametric definition, made it possible to adequately and comprehensively define information (Burgin, 2010). Parametric systems (parametric curves, parametric equations, parametric functions, etc.) have been frequently used in mathematics and its applications for a long time. For instance, a parametric curve in a plane is defined by two functions $f(t)$ and $g(t)$, while a parametric curve in space has the following form: $(f(t), g(t), b(t))$ where parameter t takes values in some interval of real numbers. Parameters used in mathematics and science are, as a rule, only numerical and are considered as quantities that define certain characteristics of systems. For instance, in probability theory, the normal distribution has the mean m and the standard deviation s as parameters. A more general parameter, functional, is utilized for constructing families of non-Diophantine arithmetics (Burgin, 1997c; 2001b). In the case of the general theory of information, the parameter is even more general. The parametric definition of information utilizes a system parameter. Namely, an infological system plays the role of a parameter that discerns different kinds of information, e.g., social, personal, chemical, biological, genetic, or cognitive, and combines all existing kinds and types of information in one general concept “information”. This parametric approach provides tool for building the general theory of information as a synthetic approach, which organizes and encompasses all main directions in information theory (Burgin, 2010). On the meta-axiomatic level, it is formulated as system of principles, explaining what information is and how to measure information. On the level of science, mathematical model of information are constructed. One type of these models bases the mathematical stratum of the general theory of information

on category theory. Abstract categories allow us to develop flexible models for information and its flow, as well as for computers, networks and computation. Another type of models establishes functional representation of infological systems representing information as an operator in functional spaces. In the first part of the paper, we explicate meta-axiomatic foundations of the general theory of information. In the second part of the paper, we present mathematical models of information in the context of the general theory of information. In the third part of the paper, we discuss relations between the general theory of information and physics.

Harnessing Informatics to Improve Health and Health Care in the United States: a Policy Perspective

Mary Jo Deering

Abstract: Health information technology has the potential to improve health care quality, prevent medical errors, and improve the health of individuals and populations. The United States is investing over \$20 billion to promote the implementation of health IT through diverse financial incentives, support programs, and R&D initiatives. These efforts reflect strategic priorities for transforming the U.S. health care system.

Further Reflections on Faithfulness Criterion of Translation Criticism from the Perspective of Information Science

Min Xu, Xue-Fang Feng

Abstract: The article attempts to elaborate the principles of translation criticism by exploiting the definitions, characteristics and rules in Information Science. It is shown that in translation criticism, the influence of the intentionality, consciousness and the non-neutrality of value of the target text

as information on translation strategies should be taken into full considerations which bring the traditional faithfulness criterion into a more tolerant and more multiple dimensions.

Abduction as Incomplete Parameter Estimation

Moto Kamiura

Abstract: Abduction, which is a kind of inference, is clearly articulated by C.S. Peirce (Peirce 1868; 1955). Although abduction is considered as reasoning with uncertainty (Finlay and Dix, 1996), it has been studied in artificial intelligence and computer science (Bylander et al 1991; Abe 2003). Recently, constructing a dynamical model which represents logical inferences, Sawa and Gunji use an arrow diagram which represents three types of inference articulated by Peirce (i.e. deduction, induction and abduction). This formalization for abduction is not only consistent with the preceding studies (Peirce 1868; Finlay and Dix 1996), but also opens up the way by which abduction can be applied to numerical function systems (Kamiura 2010). In this paper, based on the Sawa-Gunji's inference diagram, a numerical aspect of abduction is formalized as incomplete parameter estimation

Russian view on information literacy and information culture

Natalia Gendina

Abstract: Information culture and information literacy are differentiated in the given paper. The paper presents Russian approach to education in information culture and information literacy.

Reconstructing the Economy: A Methodological Journey from the Surface to the Essence and back

Peter Fleissner

Abstract: The essential methodology in social science to “understand” phenomena is informed abstraction. But the way - how and what for - the abstraction process is shaped divides the economists into various schools. While mainstream economists abstract from any links of the economy to human beings - replacing them by selfish machines maximizing their profits or individual utilities, and neglecting any deeper analysis of the basic constructions they use (like prices or money), heterodox economists try to look behind the surface, link them to certain periods of history and to the source of all value: humans are social beings and cannot exist without mutuality. The paper presents a heterodox way to reconstruct contemporary capitalist economies by applying the new science of information with its evolutionary concepts. It starts the description on a very abstract level: useful things and services produced by specialized labor. Step by step new layers of information are added. At the same time economic indicators of the lower levels are modified (labor values, competition leading to prices of production, money and banks, state activities, monopoly), ending at the surface of the economy with the introduction of commodification and commercialization processes of information in the so called information society. The result of the reconstruction is used in a mathematical simulation model based on stylized facts.

The Central Idea of the Philosophy of Computer Science—— the Instruction of Research on Philosophy of Computer Science

Qi-Quan Gui, Xiao-Ming Ren

Abstract: The basic spirit of Pythagoreanism is the pursuit of the mathematical harmoniousness of the universe, and it can guide scientists to characterize the internal mystery of the physical world in terms of mathematical language and mathematical formula successfully and it fit to the current computationalism. On the other hand, re-understanding natural views of teleology by means of the modes of system science can interpret the biological universe, the artificial life and the universe of self organization reasonably. We insist that the integration of the pythagoreanism and the natural views of teleology will constitute the central idea of the philosophy of computer science.

An Outline of Humanistic Information Science

Rui DENG and Chuan-Yin LI

Abstract: The authors of this paper put forward an idea that humanistic informatics is a new science besides natural informatics and social informatics. Then an outline of humanistic informatics is explained.

A Study on the Basic Problems of Information Ethics

Shan Gao

Abstract: This passage has recalled the formation of information ethics, the author studied analytically the current status of information ethics, general essence and special essence of information ethics, and predicted the future trends of information ethic.

A model of "musicking" driven by mediation local-global concept lattices

Shimpei Tatsumi

Abstract: Musical performances are supposed to be body-experiences. That is to say, musicking is a contact-mediated action. In this work a unique approach is proposed, a system motivated to move on two-dimensional space by itself making a sense of body and environment, which are formalized to "concept lattice" on the Lattice theory. This Musicking Self-Motivated System (MSMS) creates senses of touch and auditory as sense of body and sense of external world, then fabricates a sense of body agency motivated by variance of those senses to determine the next movement. Trajectories of MSMS were spatially biased on environments of which partial properties are given randomly. It is suggested that MSMS has robust intentionality onto perpetually open environment. Here debates MSMS comparing try-and-error processing of handling an unknown, i.e. potentially-instrument.

Are the Flocks Critical Phenomena?

Takayuki Niizato and Yukio Gunji

Abstract: Almost all flock models are constructed using a self-propelled particle system (SPPs). In an SPP method, each individual will interact with neighbors found within a certain radius. Recent investigations are forcing us to reconsider the notion of the neighborhood in flocks. Cavagna et al. found a scale-free correlation in which the sub-flocks use the same information and where their size is proportional to the flock size. This finding indicates that the flock neighborhood dynamically changes the shape and formation of the flock. They defined this state of the flock as the "noise critical phenomenon". However, is it a sufficient interpretation of the scale-free correlation? The

agent of the type-token model, which we proposed, changes its neighborhood by adjusting between the type and token cognitions. These differences in the neighborhood of each agent enables their flock to rapidly change direction without external noise and shows a scale-free correlation that is supported with empirical research. The type-token model suggests that the flock emerges as a scale-free correlation without considering noise critical phenomena.

The rise of philosophy of information in China

Tian-Qi Wu, Hui Jin

Abstract: 80 years of the 20th century, a wave to problems of information go on philosophy discuss surged on the Chinese academics circles, emerged a large number of discuss, papers and several monographs of the issue associated with the philosophy of Information. The text "Outline of philosophy Information Theory "(1985) by Mr. Wu Kun published and publication of the book "Introduction of Philosophy Information Theory "(1987) has become a symbol that the philosophy of information formal established in China. Mr. Wu Kun stress in particular that as the philosophy of information set out of a whole new existence area split mode, that from fundamentally changed the specific way of expression of philosophical problems of basic, so, philosophy of Information is a kind of metaphilosophy Or a maximum of philosophy. Philosophy of Information achieved the first fundamental turn of human philosophy, and thus leads to omnibearing fundamental changes of human philosophy.

Definition and Essence of Information

Tian-Qing Qiao

Abstract: It is 60 years since essential attributes of information were explored in the field of philosophy, resulting in contention of a hundred schools of thought and wide division of opinions so far. Some scholars at home and abroad have been trying to build a new system of information philosophy from the angle of ontology so as to explain the world. This paper, however, puts forward a definition of information and its mathematical expressions, and points out that information is the collection of three kinds of attributes of things, which is proved perfect after testing. It is found on analysis that the essence of information people refer to nowadays is just the interaction of matters, and the representation of the law of causality in philosophy. The paper also suggests that information is only a noun that people have customarily used and confused. Eventually, the induction, differentiation and utilization of conventionally-stated information should be applied into studying matters themselves.

The place of information and knowledge in the structure of labor

Victor Shreiber and Georgy Ishmaev

Abstract: Many social researchers and economists observe changes in the structure of labor in contemporary society, pointing out information and knowledge as key elements of labor. Still analysis of that content is often hampered by the confusion of terms, and objectionable simplification. This article suggests some approaches to introduce clarity in the role of information and knowledge in the structure of labor.

The Use of ICT in Education and Science

Vladimir Kinelev

Abstract: Philosophical and methodological issues of the use of information and communication technologies in science and education as one of the prime strategic challenges for the Information society are considered

Autopoiesis, Observation and Informatics: Lessons from the Development of Autopoietic Systems Theory in Japan

Wataru Hashimoto

Abstract: This article is concerned with redefining the notion of information from a perspective of systems theory. In recent years, the notion of information, which was closely related to the framework of old cybernetics, has been refined in parallel with the emergence of new cybernetics, especially second-order cybernetics and autopoiesis. The systemic view of new cybernetics provides us with the notion of “informationally closed system.” This notion is congruent with the epistemological implications of radical constructivism. In order to help understand this argument, we aim at highlighting the development of autopoietic systems theory in Japan. Autopoiesis has often been considered as a thoroughly closed system in Japan, where the relationships between autopoiesis and radical constructivism have frequently been overlooked. This is mainly because the importance which autopoietic systems theory originally attaches to the notion of observer and observation has been inadequately discussed, and autopoietic systems theory is regarded as distinct from second-order cybernetics and radical constructivism. However, they must be dealt with together, and Humberto Maturana should be given credit for his ontology of observing. Since the publication of his paper “Biology of Cognition,” Maturana has been

attempting to explain the notion of observation as a biological phenomenon in his own way. Likewise, by taking into consideration the notion of observation, we can build a unified theory of information. Fundamental Informatics, which is being developed by Toru Nishigaki, outlines a unified approach to information by putting human observers at the center of his theory. Social and mechanical information is generated only when human observers conduct observations on the basis of biological information, and this mechanism of generation of information is discussed through the notion of “hierarchical autonomous system.” For an autopoietic organization to be realized, of course, no hierarchy of systems is required, but observers are likely to construct some hierarchy between two systems. The construction of certain hierarchies of systems by observers is of great use for the explanation of fictitious phenomena of information transmission.

A Defense of Ceteris Paribus Laws

Wei Wang

Abstract: Earman et al raise several objections to the Ceteris Paribus laws. In this paper, I argued that CP clauses could be ineliminable even with scientific terminology, and that it is also possible to test the contraposition of a CP law, therefore the law itself. Earman’s account of differential equations may violate his MRL view of laws of nature. Again, Earman’s view of laws of nature may be inconsistent with his supervenience thesis.

Four ways of thinking in information

Wolfgang Hofkirchner

Abstract: There are four ways of thinking: reductionism, projectivism, disjunctivism, integrativism. The gap between the “hard” science perspective

and the “soft” science perspective on information reflect these ways of thinking. The paper discusses how this gap might be bridged by applying the fourth way of thinking.

How Is it Possible that Information Philosophy Is Regarded as Meta-Philosophy?

Wu-Zhuang Li

Abstract: In modern society, “meta-philosophy” should be faced with contemporary reality of "modern revolution of science and technology," "overall community transformation", "global thinking" and reconstruct philosophy owning newly critical logic, new way of thinking, fresh mode of transcendence to the degree of three dimensions of "theory, system, method". Information philosophy is regarded as "meta-philosophy” because great changes have occurred in the following aspects: "basic Problems of Philosophy," "epistemology" and "axiology", which brought us a fresh horizon of philosophy. Practice conditions and dependence outlets of information philosophy as meta- philosophy are that a series of attentions and methodologies will be paid at least.

The Public Opinion Evolution dynamics on Scale Free Network in the External Field

Xiao-Gang Li, Duan-Ming Zhang, Zhi-Cong Li and Min-Hua HE

Abstract: In the paper considering the influence of node’s inertia and a constant external field, we establish an public opinion evolution model in which public opinion evolution and network topological structure interact with each other. It is found that degree distribution gradually gets away from typical power law distribution to Poisson distribution with time evolution

under the influence of node's inertia and a constant external field. With the time evolution in system, there is obvious convergence effect of the public opinions distribution, which not only relates with node's inertia but also depends on the constant external field. It can be obtained that adjusting the value of node's inertia factor and constant external field can control the opinion value's number, which even controls the rate of change.

A Philosophical Thinking about the Complexity of Social Information System

Xiao-Hui Jiang, Ming-Yi Chen

Abstract: Social information science is a kind of rising and high-crossing discipline, the characteristic of which is complexity. The complexity of social information science accords with the features of the complexity of system science and can be studied with analytical methods of system science and system dialectics. Social information systems have their own laws and could be understood and grasped gradually. And the philosophy of information will shed some light on the study of social information science.

Methodology of Information Science

Xin-Zheng Jin, Jing Liu

Abstract: In this paper, the authors introduce separately the "Reduction" methodology, which is mainly applied in the traditional Material Science, and the "Emergence" methodology, which is mainly applied in the Information Science. With analyzing the application scope of "Reductionism" and its restriction, we discuss how "Emergencism" is apt to improving the development of information science, and suggest a conversion from

reductionism based on paradigm of material science into emergencism based on paradigm of information science.

Introduction to mutually-inversistic discrete mathematics

Xun-Wei Zhou

Abstract: Mutually-inversistic discrete mathematics is constructed by the author, including mutually-inversistic logic, set theory, analytic geometry, calculus, abstract algebra, universal matrix, covering all branches of mathematics, including foundations of mathematics, geometry, analysis, algebra. Unlike conventional discrete mathematics, which put together the branches of mathematics needed by computer science, not interrelated to one another, the branches of mutually-inversistic discrete mathematics are interrelated to one another, and they have many applications in information sciences.

On Information Science -- An Introduction to "Principles of Information Science"

Y.X. Zhong

Abstract: As the characteristic feature and mark in science in information age, information science plays a crucial role. However, what is information and what is information science? What are the principles governing the processes of information flow? Is there any new, and meaningful methodologies supporting the study? What is the significance of the study to human society? How to promote the study of information science in the world academic community? Some of my understandings to these questions will be presented in the paper.

Progress in the Researches on Domain Informatics

Yin Zhan, Jing Liu and Xin-Zheng Jin

Abstract: With the application of computer technology and network technology, domain informatics have generated. Almost every combination of a basic subject and informatics can generate a new field of domain informatics by cross-study. However, the development of each discipline is in a different situation and a special degree. In this paper, the authors introduce chemical informatics, bioinformatics, medical informatics, and linguistics: their definitions, researches, and development trends.

Typ-Ken as informational reality: From collective intelligence to collective mind

Yukio Gunji, Hisashi Murakami, Takayuki Niizato, Toru Moriyama, Masashi Toda, Koichiro Enomoto³ and Kojiro Iizuka

Abstract: Infosphere consisting of informational reality is estimated and delineated by introducing the new notion of Typ-Ken, an undifferentiated amalgam of type and token that can be expressed as either type or token dependent on contingent ontological commitment. Infosphere is here illustrated by flocking. Bird flocks, swarms of insects and/or fish schools are typical forms of biological collective behavior. Each agent manages to adjust its local directive motion with global mass behavior. This kind of pair reveals <token, type>, so the agent seems to negotiate the difference in <local, global>. The classical model, called BOID, is based on the one-to-one relationship between local and global properties (we call it the flattening of <local, global>). A local rule, which the agent follows, is defined to reconcile local interactions and global behavior, maintaining a flock. Although previous models for flocks and schools are equipped with the invariant local rule,

constant radii of neighborhoods and invariant strengths of interactions, real birds seem to adjust the local rule dependent on their situation in keeping a flock. Recent progress of image analysis techniques reveals the dynamic structure of flocks. A much more important phenomenon is the scale-free proportion in a flock. The bird flock forms a large sub-domain that scales with the linear size of the flock. Given a distribution of bird velocities, the fluctuation vector for each bird is defined by the difference between its own velocity and the mean velocity of the flock. If the fluctuation originated externally, it is expected that fluctuations are homogeneously and randomly distributed. However, one can see some sub-domains in which fluctuation vectors show the same direction in a real flock. Such sub-domains are synchronously updated as if agents were directly connected with each other. Additionally, the relative size of the sub-domain is constant, independent of the flock size. In other word, starlings form a crowd starling dependent on the size of the population. If a crowd-starling moves as if one individual, starlings involved in the head of the crowd-starling move synchronously. How can we explain the scale-free proportion found in a flock? A flock is a population of agents, a huge computing space and Infosphere. The agents of BOIDS equipped with flattening of <local interaction, global flock> cannot explain this phenomenon. Recently, we applied the concept of Typ-Ken to the neighborhoods of individual animals. The neighborhood of an individual in a flock, school or herd is also regarded as a type and a token. The neighborhood is sometimes a kind of extended body of the individual. On the other hand, even if a school or flock is maintained and the density of the neighborhood is low, each individual manages to follow the flockmate in the neighborhood. In this case, the neighborhood is used as a local space in which the individual and its flockmate (other individuals) are located. The

case reveals that the neighborhood is used as a token. The ambiguity of type and token neighborhoods is implemented by the switches between metric and topological distances in the previous model. Here, we implement the ambiguity by using Typ-Ken as either type or token. This model mimics the behavior of flocks and schools very well. Once some individuals are gathered at some places, the Typ-Ken is employed to the type-neighborhood, and the extended body can be interacted with itself. As a result, some agents are matched with respect to the velocity and move in similar directions. If flockmate in the neighborhood suddenly move or disappear in the token-neighborhood, the agent follows them, creating a moving flock. When a flock encounters another flock, it sometimes has a repulsive reaction and sometimes is fused. Thus, finally, the flock is united as one moving flock. While a flock always consists of agents in both type neighborhoods and token neighborhoods, internal structure in a flock occurs and dynamically changes. Mean size of the sub-domain is statistically estimated by the correlated length, which can be defined as the zero of the correlation function. Depending on the number of agents in a flock (population size), one can obtain various pairs of flock size and correlated length. Our Typ-Ken model shows the relationship between flock size and correlated length over various population sizes. It shows a linear relation, and the sub-domain occurs in a constant proportion independent of the population size. This is nothing but scale-free proportion in a flock. The generation of scale-free proportion results from ambiguity of type and token in Typ-Ken. In other words, Typ-Ken is an expression for informational reality (type and token with ontological commitment) that can reveal seamless local and global interactions in the functioning of a flock or Infosphere.

Study on the Self-growth of Internet Communication System

Yun-Feng Xia

Abstract: As an important part of human information communication system, internet communication has become progressively a system with large scale, complex constructions and perfect functions through the complicated interactions among many sub-systems and their elements. In this process, which is mainly promoted by internet users, the self-growth of internet communication system not only increases the amount of its sub-systems and their elements, it also strengthens its constructions and functions. At the same time, the self-growth of internet communication system indicates that the system is an evolving system with self-organizing property.

The Emergence and Development of Theoretical Informatics

Zhan-Qi Duan, Hong Gao and Xin-Zheng Jin

Abstract: At present, information technology is developing very rapidly. Numerous traditional disciplines have to be informationized and domain informatics derived from it. It calls for the emergence of theoretical informatics because of the need of domain informatics, National Informatization and the transformation of industrial society to an information society. However, present information theory has limitation, for example, the Shannon communication theory only applies to communications. In this paper, we use the system engineering theory. Firstly we study the background of the theoretical informatics. Secondly we analyze the status of it and the limitation of present information theory. And then we discuss the hotspots of the theoretical informatics both at home and abroad. At last, we point out

that the development of it should break out the shackles of theoretical paradigms.

The measurements and comparisons of media networks

Zhi-Tang Li, Xiao-Jing Ma and Dong Li

Abstract: The quantitative measurements of the essential properties and information communication abilities of physical media and media networks are proposed in this paper. Such as the number of sub-networks, the number of lecturing sessions, the number of accepted copies, information power factor and interaction ability et al. The measurement results for media networks of broadcasting, Client/Server, phone-like, single-producer peer-to-peer and multi-producer peer-to-peer types are derived respectively. They are the scientific foundation for understanding, analysis, comparison, monitoring, management, evaluation and utilization of media networks.

“1+4+3”: A Framework of New Science of Information

Zong-Rong Li, Jun You and Ai-Jing Tian

Abstract: “Towards a new science of information”, put forward by Wolfgang Hofkirchner, is the theme of Fourth International Conference on the Foundations of Information Science in Beijing (FIS 2010), which is a new aim for global information scientists. This paper describes main features of traditional information science and advances a framework of new information science: “1+4+3”, in which “1” means theoretical informatics, “4” stands for communication theory, cybernetics, computer science, and robotics, and “3” indicates natural informatics, social informatics, and humanities informatics.

The “1”, “4”, and “3” locate at three levels respectively: theoretical informatics, tool informatics, and domain informatics.

Contents arranged by first author name

On “Society Thinks, Therefore Society Is” —Also on logically starting point of social epistemology and social information Science

Ai-Jin Tian, Xin-Ming Zhang, Zong-Rong Li

“Tian, Di, Ren, Ji” Information Integrative Network System

Ai-Nai Ma

Computer-mediated Communication System

Bin Yu

Extraction of information of audio-visual contents

Carlos Aguilar, Lydia Sánchez and Manuel Campos

Self-replication of Internet Communication

Chao Wang

The Formal Semantic Analysis on Two Types of Chinese Sentences and Programming Realization

Chuan Zhao, Yuan-Yuan Wang, Yao Lu, Yu Liu, De-Zhi Tu

Challenges for Those Constructing a Science of Information as an Evolving Unique Discipline

Dail Doucette

Exploration of the nature of virtual practice

Dong-Dong Li

Digital Publishing Age: Mosaicking your fragment Information

Dong-Jian SUN

Exploring the Information Carrier

Dong-Sheng Miao

Discussion on the Six problems about Information in the Philosophical Viewpoint

Dong-Wei Cai

Evolving Lattices for Analyzing Behavioral Dynamics of Characters in Literary Text

Eugene Kitamura

The Decoding and Feedback of the Linguistic Message under the Information Asymmetry

Gen-Hui LIU, Zheng-Rong Wang

Towards an Ontology of Information and succeeding Fundamentals in Computing Science

Gerhard Luhn

Information Philosophy in China——Professor Wu Kun 30 years of academic thinking in information philosophy

Guo-Wu Li

On the language of information

György Darvas

Reexamine the Evolution from a perspective of Life Informatics

Hong Gao, Xin-Zheng Jin

On the building of theoretic system of information science

Hua-Can HE and Ying-Cang MA

Physical informatics – information methods of natural systems research

Igor Gurevich

The Identity of Objects: Form and Nature in the Digital Museum

Jason Hewitt

A Brief Analysis on Dissipative Structure Characteristics of Virtual Community and Its Orderly Method

Jian-Wang Tang

On the Goal and Methods of Researches on Theoretical Informatics

Jing Liu, Xin-Zheng Jin

Study on the Intension and Extension of Information Culture

Jin-Ping Dai

Analysis on Characteristics of the Self-organization of Internet

Jing-Shan Wang, Li-Fang Wang

Kinds of Information in Science Use

John Collier

How a Bacillus “Sees” the World Information Needs and Signaling Resources of Mycobacterium tuberculosis

Jorge Navarro and Pedro Marijuan

Towards a transdisciplinary frame: Bridging domains, a multidimensional approach to information

José María Díaz Nafria and Francisco Salto Alemany

Is information a sufficient basis for cognition? (Part 1: Critic to Dreske’s Vision)

José María Díaz Nafria and Mario Pérez-Montoro Gutiérrez

Is information a sufficient basis for cognition? (Part 2: Physical foundations)

José María Díaz Nafria and Mario Pérez-Montoro Gutiérrez

Researches on Three Laws of Theoretical Informatics

Jun-Feng Liu, Hong Gao, Xin-Zheng Jin

New Science Building and Research: From Systems Biology to Theoretical Informatics

Jun You and Zong-Rong Li

On the Research Focus and a Framework of the Social Information Sciences

Kang Ouyang

Accounting in Genetics

Karl Javorszky

An approach to the newly developed informatics: exceeding the traditional

information theories

Ke Li, Jing-Ping Ouyang

The Great Chains of Computing: Informatics at Multiple Scales

Kevin Kirby, James Walden, Rudy Garns and Maureen Doyle

Analyzing Double Image Illusion through Double Indiscernibility and Lattice Theory

Kohei Sonoda

An emergence of formal logic induced by an internal agent

Koji Sawa and Yukio-Pegio Gunji

Philosophy of information and fundamental problems of modern Informatics

Konstantin Kolin

Social Informatics today and tomorrow: status, problems and prospects of development of complex lines in the field of science and education

Konstantin Kolin

Scientific information scienceize

Kun Wu

Identification to rely on difference; construct to depend on an intermediary; Virtual to through construction — The general process and mechanism of people's information cognition activities

Kun Wu

The informational essence, classification and nature of different grade

Kun Wu

Thinking on the thought-premise about information ethnics

Lan-Bo Kang

Human Intelligence: Fundamental Driving Force of Social Progress

Ling Zhang, Zong-Rong Li

Using non-recursive biological information sources as oracles?

Lothar Michael Putzmann

Research of Information Science as Viewed from System Science

Lu Tan, Ya Zhou, Lu Jiang

Cognitive Sustainability in the Age of Digital Culture

Luis Bruni

Matter Information Theory: Matter Information System of Various Layers and Their Philosophical Explorations

Luo Xianhan

Foundations for Science of Information: Reflection on the Method of Inquiry

Marcin Schroeder

Information: Concept Clarification

Mark Burgin

Harnessing Informatics to Improve Health and Health Care in the United States: a Policy Perspective

Mary Jo Deering

Further Reflections on Faithfulness Criterion of Translation Criticism from the Perspective of Information Science

Min Xu, Xue-Fang Feng

Abduction as Incomplete Parameter Estimation

Moto Kamiura

Russian view on information literacy and information culture

Natalia Gendina

Reconstructing the Economy: A Methodological Journey from the Surface to the Essence and back

Peter Fleissner

The Central Idea of the Philosophy of Computer Science—— the Instruction of Research on Philosophy of Computer Science

Qi-Quan Gui, Xiao-Ming Ren

An Outline of Humanistic Information Science

Rui DENG and Chuan-Yin LI

A Study on the Basic Problems of Information Ethics

Shan Gao

A model of "musicking" driven by mediation local-global concept lattices

Shimpei Tatsumi

Are the Flocks Critical Phenomena?

Takayuki Niizato and Yukio Gunji

The rise of philosophy of information in China

Tian-Qi Wu, Hui Jin

Definition and Essence of Information

Tian-Qing Qiao

The place of information and knowledge in the structure of labor

Victor Shreiber and Georgy Ishmaev

The Use of ICT in Education and Science

Vladimir Kinelev

Autopoiesis, Observation and Informatics: Lessons from the Development of Autopoietic Systems Theory in Japan

Wataru Hashimoto

A Defense of Ceteris Paribus Laws

Wei Wang

Four ways of thinking in information

Wolfgang Hofkirchner

How Is it Possible that Information Philosophy Is Regarded as Meta-Philosophy?

Wu-Zhuang Li

The Public Opinion Evolution dynamics on Scale Free Network in the External Field

Xiao-Gang Li, Duan-Ming Zhang, Zhi-Cong Li and Min-Hua HE

A Philosophical Thinking about the Complexity of Social Information System

Xiao-Hui Jiang, Ming-Yi Chen

Methodology of Information Science

Xin-Zheng Jin, Jing Liu

Introduction to mutually-inversistic discrete mathematics

Xun-Wei Zhou

On Information Science -- An Introduction to "Principles of Information Science"

Y.X. Zhong

Progress in the Researches on Domain Informatics

Yin Zhan, Jing Liu and Xin-Zheng Jin

Typ-Ken as informational reality: From collective intelligence to collective mind

Yukio Gunji , Hisashi Murakami , Takayuki Niizato , Toru Moriyama , Masashi Toda , koichiro Enomoto ³and Kojiro Iizuka

Study on the Self-growth of Internet Communication System

Yun-Feng Xia

The Emergence and Development of Theoretical Informatics

Zhan-Qi Duan, Hong Gao and Xin-Zheng Jin

The measurements and comparisons of media networks

Zhi-Tang Li, Xiao-Jing Ma and Dong Li

“1+4+3”: A Framework of New Science of Information

Zong-Rong Li, Jun You and Ai-Jing Tian