INTELLIGENT INFORMATION PROCESSING II
IFIP – The International Federation for Information Processing

IFIP was founded in 1960 under the auspices of UNESCO, following the First World Computer Congress held in Paris the previous year. An umbrella organization for societies working in information processing, IFIP's aim is two-fold: to support information processing within its member countries and to encourage technology transfer to developing nations. As its mission statement clearly states,

*IFIP's mission is to be the leading, truly international, apolitical organization which encourages and assists in the development, exploitation and application of information technology for the benefit of all people.*

IFIP is a non-profitmaking organization, run almost solely by 2500 volunteers. It operates through a number of technical committees, which organize events and publications. IFIP's events range from an international congress to local seminars, but the most important are:

- The IFIP World Computer Congress, held every second year;
- Open conferences;
- Working conferences.

The flagship event is the IFIP World Computer Congress, at which both invited and contributed papers are presented. Contributed papers are rigorously refereed and the rejection rate is high.

As with the Congress, participation in the open conferences is open to all and papers may be invited or submitted. Again, submitted papers are stringently refereed.

The working conferences are structured differently. They are usually run by a working group and attendance is small and by invitation only. Their purpose is to create an atmosphere conducive to innovation and development. Refereeing is less rigorous and papers are subjected to extensive group discussion.

Publications arising from IFIP events vary. The papers presented at the IFIP World Computer Congress and at open conferences are published as conference proceedings, while the results of the working conferences are often published as collections of selected and edited papers.

Any national society whose primary activity is in information may apply to become a full member of IFIP, although full membership is restricted to one society per country. Full members are entitled to vote at the annual General Assembly, National societies preferring a less committed involvement may apply for associate or corresponding membership. Associate members enjoy the same benefits as full members, but without voting rights. Corresponding members are not represented in IFIP bodies. Affiliated membership is open to non-national societies, and individual and honorary membership schemes are also offered.
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Dear Colleagues,

The International Conference on Intelligent Information Processing is opening. On behalf of the organizers, we welcome all scientists and practitioners who are interested in Intelligent Information Processing around the world participate in this event. The world is quickly stepping into the Information Age successfully on one hand, as well as problematically on the other hand. It is well recognized nowadays that Intelligent Information Processing provides the key to the Information Age. Intelligent Information Processing supports the most advanced productive tools that are said to be able to change human life and the world itself. However, experiences of recent years also clearly show that there is no way a lead straight into the Information Age. Rather, people become aware of more and more questions about Intelligent Information Processing. The conference provides a forum for engineers and scientists in academia, university and industry to present their latest research findings in all aspects of Intelligent Information Processing.

As scientists, professors, engineers, entrepreneurs, or government officials all over the world, we have the responsibility to understand the truth and explore an effective way to a better life in the Information Age. This is the motivation of IIP2004.

B. Neuman
J. Kephart
S. Doshita
Conference Chairmen of the IIP2004
Greetings from Chairs’ of Program Committee

Dear colleagues and friends:

First of all, we would like to extend to you our warmest welcome and sincere greetings on behalf of the Technical Program Committee of the International Conference on Intelligent Information Processing, ICIIP04-Beijing.

This is the second International Conference on Intelligent Information Processing. We received over 270 papers, of which 66 papers are included in this program. We are grateful for the dedicated work of both the authors and the referees, and we hope these proceedings will continue to bear fruit over the years to come. Papers were submitted and reviewed by several referees.

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

We are very grateful to have the sponsorship of the following organizations: IFIP TC12/WG12.3, The China Computer Federation and Chinese Association of Artificial Intelligence

We hope all of you enjoy this diverse and interesting program.

Zhongzhi Shi
Institute of Computing Technology,
Chinese Academy of Sciences
The Organizations of the Conference

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Keynote Speech

Keynote Speaker: Ian Horrocks

Title: Reasoning with Expressive Description Logics: Logical Foundations for the Semantic Web

Abstract: Description Logics (DLs) are a family of logic based Knowledge Representation formalisms descended from semantic networks and KL-ONE. They are distinguished by having formal (model theoretic) semantics, and by the provision of (sound and complete) inference services, with several highly optimised implementations now being available. DLs have a wide range of applications, but are perhaps best known as ontology languages (they provide the basis for recent "Semantic Web" ontology languages such as OIL, DAML+OIL and OWL). In this talk I will give a brief history of DLs and of DL applications, in particular their application in the context of the Semantic Web. If time permits, I will then give an overview of the reasoning techniques that are employed by state of the art DL implementations, and which enable them to be effective in realistic applications, in spite of the high worst case complexity of their basic inference problems. Finally, I will point out some interesting areas for future research, in particular those related to the Semantic Web application area.

Biography: Ian Horrocks is a Professor of Computer Science at the University of Manchester. His FaCT system revolutionised the design of Description Logic systems, redefining the notion of tractability for DLs and establishing a new standard for DL implementations. He is a member of both the Joint EU/US Committee on Agent Markup Languages and the W3C
Web Ontology Language working group, and was heavily involved in the development of the OIL, DAML+OIL and OWL ontology languages. He has published widely in leading journals and conferences, winning the best paper prize at KR'98. He is/was a member of the programme/editorial committees of numerous international conferences, workshops and journals, was the program chair of the 2002 International Semantic Web Conference and the Semantic Web track chair for the 2003 World Wide Web Conference.
Invited Speech

Invited Speaker: Toru Ishida
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Title: Mega-Navigation: Multi-Agent Navigation for Millions

Abstract: In this talk, I will propose a new digital city application, called mega navigation, that covers millions of people or vehicles with GPS. We apply multiagent technology to realize mega navigation such as wide-area traffic control, crisis management in metropolitan areas, and large-scale event navigation. We implement the mega navigation platform by combining Q and Caribbean: Q is a scenario description language for socially situated agents, and Caribbean is a mega-scale agent server. We use a new system design method called society-centered design to develop complex applications that are to be embedded into human society. In this method, we first conduct participatory simulations consisting of a million software agents. We then perform participatory simulations, where some of the agents are replaced by real humans. We then move to the real city, and conduct augmented experiments, where real-world participants are augmented by socially situated agents.
Biography: Toru Ishida is a full professor of Kyoto University, from 1993, a research professor of NTT Communication Science Laboratories from 1998, a visiting professor of Shanghai Jiao Tong University from 2002, and IEEE fellow from 2002. I was a guest professor at Institut fuer Informatik, Technische Universitaet Muenchen in 1996, an invited professor at Le Laboratoire d'Informatique de Paris 6, Pierre et Marie Curie in 2000 and 2003, and a visiting professor at Institute for Advanced Computer Studies, University of Maryland in 2002. I have been working on autonomous agents and multiagent systems for more than twenty years. My research contribution can be classified into the three categories: production systems, multiagent search, and community computing. In production systems, I first proposed parallel rule firing, distributed rule firing and introduced organizational self-design for adapting to environmental changes. In multiagent search, I worked on realtime path finding problems and distributed constraint satisfaction problems, the two major search problems in AI. For path finding problems, I extended realtime search to be capable to utilize and improve previous experiments, and to adapt to the dynamically changing goals. In community computing, I proposed a concept of communityware to support the process of organizing diverse and amorphous groups of people, while groupware mainly addressed the collaborative work of already-organized people. My team developed mobile assistants and tried out them at international conference ICMAS96 with 100 PDAs with wireless phones. We also worked on a 3D interaction space called FreeWalk/Q, and applied it to Digital City Kyoto. I published three LNCS proceedings and created a network among digital cities. I have been working for conferences on autonomous agents and multiagent systems including MACC/JAWS (Japanese Workshop), PRIMA (Asia/Pacific Workshop), ICMAS / AAMAS (International Conference). I was a program co-chair of the second ICMAS and a general co-chair of the first AAMAS. I am an associate editor of Journal on Autonomous Agents and Multi-Agent Systems (Kluwer) and a co-editor-in-chief of Journal on Web Semantics (Elsevier).

Invited Speaker: Jung-Jin Yang
Professor Dr. Jung-Jin Yang
School of Computer Science and Information Engineering
The Catholic University of Korea
43-1 YeockGok-dong WonMi-gu
Bucheon-si Kyunggi-do, Seoul Korea
Email: jungjin@catholic.ac.kr
Title: Semantic Search Agent System Applying Semantic Web Techniques

Abstract: Semantic analysis occurs both during the collection and classification phases and at the final stage of users search. When users submit a query, the Semantic Search Agent understands the meaning of the request according to their work context, finds relevant documents, and searches on a pre-qualified corpus. In order to infer and extract relevant information by weaving through heterogeneous databases with different schema and terminologies, the standardized way of integrating heterogeneous data is necessary. The obtained results also need be of the highest relevance for the information obtained is in effect right away. The talk describes OnSSA (Ontology-based Semantic Search Agent). It aims to develop a distributed agent-based architecture of semantic search and communication using community-specific ontologies and to equip ontologies with an inference layer grounded in W3C standards. The community-specific ontologies of OnSSA in this talk are in medicine.

Biography: Dr. Jung-Jin Yang is an assistant professor in the School of Computer Science and Information Engineering at the Catholic University of Korea. Currently, she is a head of the Division of Information System Engineering, and its research group is for Intelligent Distributed Information System – IDIS Lab. Her research group cooperates on regular basis with the company of 4HumanTech in Seoul Korea, that is a bio-informatics company. Her main research interests are in Intelligent Autonomous Agents and Multi-Agent System, Information Retrieval, Machine Learning, Ontological Engineering and User Modeling. In particular, her research is more focused in both learning and building user models to understand users better and modeling and building autonomous interface agents to provide continuous and unobstructive assists to users. As relevant research, her dissertation is directly related to the automated induction of user models bridging theory and practice. The knowledge acquisition about users is achieved through individual human-computer interactions gathered from real data in order to predict and assess user behaviors. She's been involved in a research project developing a case-based planning and execution system that is designed to work under conditions of limited computational resources and an incomplete domain theory. Later, She's participated in a project with a research team working on large scale, multi-agent, and distributed mission planning and execution employing intelligent user interfaces, hybrid reasoning and mobile agent technology with Prof. Eugene Santos Jr. at the University of
Connecticut supported by AFIT (Air Force Office for Scientific Research) 2000-2001. As recent research of hers, the study of Semantic Web applicability in bio-informatics systems and the development of the agent system within the Semantic Web was directed in order to produce and exchange useful bio-medical information by dealing with heterogeneous representations and storing schema of bio-related data. The work, which she worked as PI, was supported by Korean Science and Engineering Foundation, KISTEP 2002-2004.

**Invited Speaker:** Honghua Dai  
Daekin University, Australia

**Title:** Software Warehouse and Software Mining: The Impact of Data Mining to Software Engineering

Abstract: Automating Software Engineering is the dream of software Engineers for decades. To make this dream to come to true, data mining can play an important role. Our recent research has shown that to increase the productivity and to reduce the cost of software development, it is essential to have an effective and efficient mechanism to store, manage and utilize existing software resources, and thus to automate software analysis, testing, evaluation and to make use of existing software for new problems. This paper firstly provides a brief overview of traditional data mining followed by a presentation on data mining in broader sense. Secondly, it presents the idea and the technology of software warehouse as an innovative approach in managing software resources using the idea of data warehouse where software assets are systematically accumulated, deposited, retrieved, packaged, managed and utilized driven by data mining and OLAP technologies. Thirdly, we presented the concepts and technology and their applications of data mining and data matrix including software warehouse to software engineering. The perspectives of the role of software warehouse and software mining in modern software development are addressed. We expect that the results will lead to a streamlined high efficient software development process and enhance the productivity in response to modern challenges of the design and development of software applications.

**Biography:** Dr Honghua Dai joined the School of Information Technology at Deakin University in Australia at the start of 1999. Prior to that Honghua was on the faculty of the University of New England. Before that, he was a