

Seventh International Workshop CIA 2003

COOPERATIVE INFORMATION AGENTS

August 27 - 29, 2003, Helsinki, Finland
Sonera Conference Center

Location: Auditorium N151, Sonera Conference Center, Teollisuuskatu 11, 00051 Sonera, Helsinki

Program & Social Events

Invited Talks & Speakers

Awards

Organisers & Sponsors



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SOCIAL EVENTS OVERVIEW

Wednesday, August 27, 18:00 – 19:30

WELCOME RECEPTION



Sonera Cafeteria "Mobilante"

- ❖ **Welcome** by Veikko Hara, CTO of TeliaSonera AB, Sweden/Finland
- ❖ **Snacks and beverages**

Thursday, August 28, 17:30 - 23:00

SOCIAL PROGRAM

- ❖ **Guided boat trip through the Helsinki archipelago**
- ❖ **Social dinner in Villa Karhusaari**



This year's social program of the workshop includes a guided **boat trip** from the Helsinki harbor Kauppatori **through the Helsinki archipelago to Karhusaari** near Espoo city.

The CIA 2003 social dinner takes place in the **Villa Karhusaari** on the island Karhusaari in the Helsinki archipelago.



PROGRAM

Wednesday, August 27



8:30 – 9:00 Registration & Welcome

Session 1

Pervasive Information Service Provision

Chair: Andrea Omicini

- 9:00 – 9:30 **ACCESS: An Agent Architecture for Ubiquitous Service Delivery**
Conor Muldoon, Gregory O'Hare, Donnacha Phelan, Robin Strahan, Rem Collier (Ireland)
- 9:30 – 10:00 **Adaptive Agent-based Service Composition for Wireless Terminals**
Sasu Tarkoma, Mikko Laukkanen (Finland)
- 10:00 – 10:30 **Information Notification Model with VPC on KODAMA in an Ubiquitous Computing Environment, and its Experiment**
Tadashige Iwao, Satoshi Amamiya, Kenechi Takahshi, Guoqiang Zhong, Tatsuya Kainuma, Lusheng Ji, Makoto Amamiya (Japan)

Coffee Break

Session 2

Information Agents and Peer-to-Peer Computing

Chair: Matthias Klusch

- 11:00 – 12:00 **Invited Talk**
- Multi-Agent Systems and Peer-to-Peer Computing: Methods, Systems, and Challenges**
Manolis Koubarakis (TU Crete, Greece)

Lunch

- 13:00 - 13:30 **A Peer-to-Peer Approach to Resource Discovery in Multi-Agent Systems**
Vassilios V. Dimakopoulos, Evaggelia Pitoura (Greece)
- 13:30 - 14:00 **Ostensive Automatic Schema Mapping for Taxonomy-based Peer-to-Peer Systems**
Yannis Tzitzikas, Carlo Meghini (Italy)

Coffee Break

Session 3

Issues of Trading and Negotiation

Chair: Sascha Ossowski

- 14:30 - 15:00 **Proposal-based Negotiation in Convex Regions**
Marco Cadoli (Italy)
- 15:00 - 15:20 **A Conversational Component-Based Open Multi-agent Architecture for Flexible Information Trading**
Habin Lee, Patrik Mihailescu, John Shepherdson (United Kingdom)
- 15:20 - 15:50 **The Search for Coalition Formation in Costly Environments**
David Sarne, Sarit Kraus (Israel)
- 16:00 - 16:30 **Coffee and Q&A Session**
Open discussion on presentations of the day


18:00 – 19:30 CIA 2003 WELCOME RECEPTION



Location: TeliaSonera's cafeteria called *Mobilante*, which is located next to the Sonera conference center, 5 minutes walk. The address is Elimäenkatu 5.

- ❖ Welcome by Veikko Hara, Chief Technology Officer of TeliaSonera AB
- ❖ Snacks and Beverages

Thursday, August 28



Session 4

Information Gathering and Integration

Chair: Sascha Ossowski

9:00 - 9:30

GraniteNights - A Multi-Agent Visit Scheduler Utilising Semantic Web Technology

Gunnar Aastrand Grimnes, Stuart Chalmers, Pete Edwards,
Alun Preece (United Kingdom)

9:30 - 9:50

Send Fredo off to do this, send Fredo off to do that

Luís Botelho, Hugo Mendes, Pedro Figueiredo, Rui Marinheiro
(Portugal)

9:50 - 10:10

Database Integration Using Mobile Agents

Philip Medcraft, Ulrich Schiel, Cláudio S. Baptista (Brazil)

Coffee Break

Session 5

Collaborative Search and Filtering

Chair: Andrea Omicini

10:30 - 11:00

Adaptive Web Search Based on a Colony of Cooperative Distributed Agents

Fabio Gasparetti, Alessandro Micarelli (Italy)

11:00 - 11:20

Agents for Collaborative Filtering

Fabício Enembreck, Jean-Paul Barthès (France)

Session 6

Collaboration in Open Environments

Chair: Matthias Klusch

11:30 - 12:30

Invited Talk

Emergence and Stability of Collaborations Among Rational Agents

Sandip Sen (University of Tulsa, USA)

Lunch

- | | |
|---------------|--|
| 13:30 - 14:00 | A Framework for the Social Description of Resources in Open Environments
Matthias Nickles, Gerhard Weiss (Germany) |
| 14:00 - 14:30 | A Coordination Framework for a Community of Over-Helping Agents
Franck Gaultier (France) |

Coffee Break & System Set-up/Check (System Award Finalists)

Session 7 **System Demonstrations**

Chairs: Heimo Laamanen and Matthias Klusch

CIA 2003 System Innovation Award Finalists

- | | |
|---------------|---|
| 15:00 - 15:30 | ACCESS (U College Dublin, Ireland) |
| 15:30 - 16:00 | GraniteNights (U Aberdeen, UK) |
| 16:00 - 16:30 | Open Discussion and Public Voting |

This year's award is sponsored by Whitestein Technologies.
The winning prize is 300 Euros. (page 14)

17:30 - 23:00 CIA 2003 Social Program

Friday, August 29



Session 8

Issues of Trust in Agent-Based Information Provision

Chair: Andrea Omicini

CANCELLED

Trust Networks on the Semantic Web

Jennifer Golbeck, Bijan Parsia, James Hendler (USA)

9:30 - 10:00

Exchanging Advice and Learning to Trust

Luis Nunes, Eugénio Oliveira (Portugal)

Coffee Break

Session 9

Information Agent Systems Engineering (1)

Chair: Heimo Laamanen

10:20 - 10:50

A Component-based Approach for Interoperability across FIPA-compliant Platforms

Mercedes Amor, Lidia Fuentes, Jose Maria Troya (Spain)

10:50 - 11:20

Logic Programming for Evolving Agents

Jose Alferes, Antonio Brogi, Joao Leite, Luis M. Pereira (Portugal, Italy)

11:20 - 11:50

Temporal and Spatial Analysis to Personalise an Agent's Dynamic Belief, Desire, and Intention Profiles

Catholijn Jonker, Vagan Terziyan, Jan Treur (The Netherlands, Finland)

Lunch

Session 10

Information Agent Systems Engineering (2)

Chair: Sascha Ossowski

- | | |
|---------------|--|
| 13:00 - 13:20 | Meta-Reasoning for Agents' Private Knowledge Detection
Jan Tozicka, Jaroslav Barta, Michal Pechoucek
(Czech Republic) |
| 13:20 - 13:40 | Formalizing Retrieval Goal Change by Prioritized Circumscription - Preliminary report
Ken Satoh (Japan) |
| 13:40 - 14:00 | Organisational Change: Deliberation and Modification
Catholijn M. Jonker, Martijn C. Schut, Jan Treur
(The Netherlands) |

Coffee and Q&A Session:

Open discussion on presentations of the day

Closing Session of the Workshop

- | | |
|---------------|--|
| 14:30 – 15:00 | Workshop Results, Facts & Acknowledgments

CIA 2003 Best Paper Award

CIA 2003 System Innovation Award

Announcement of CIA 2004 |
|---------------|--|

Invited Talks & Speakers

Wednesday, 27th August, 11:00 - 12:00

Information Agents and Peer-to-Peer Computing: Methods, Implementations, and Challenges

In this talk we comment on the relationship between multi-agent systems and peer-to-peer systems. We point out that work in the frontiers of these two areas can be beneficial to both P2P computing and multi-agent systems, and survey recent research that is already addressing these issues. Then we summarize the work of our group at the Technical University of Crete on the topic of selective information dissemination using P2P networks of middle-agents.



Manolis Koubarakis

Associate Professor
Director of the Intelligent Systems Laboratory
Department of Electronic and Computer Engineering
Technical University of Crete
University Campus - Kounoupidiana
73100 Chania, Crete
Greece
Phone: +30 28210 37222
Fax: +30 28210 37542
E-mail: manolis@intelligence.tuc.gr

Manolis Koubarakis has a degree in Mathematics from the University of Crete, an M.Sc. in Computer Science from the University of Toronto, and a Ph.D. in Computer Science from the National Technical University of Athens. He joined the Dept. of Electronic and Computer Engineering, Technical University of Crete in January 1999. He is currently an Associate Professor and Director of the Intelligent Systems Laboratory (www.intelligence.tuc.gr). Before coming to Crete, he held positions at Imperial College, London (research associate) and UMIST, Manchester (lecturer). Research in the Intelligent Systems Laboratory has recently concentrated on self-organizing information systems (especially multi-agent systems and P2P systems). This work has been funded by project DIET (Decentralised Information Ecosystem Technologies, IST-FET-FP5 of the European Commission, 2000-2003). In DIET Prof. Koubarakis has led the work on P2P systems for selective information dissemination, P2P system architectures and fair resource allocation algorithms for P2P systems.

Prof. Koubarakis has published over 50 papers in the areas of database and knowledge-base systems, constraint programming, intelligent agents and peer-to-peer computing. He has served in program committees for many international conferences and workshops. Recently, Prof. Koubarakis has co-organized the 1st International Workshop on Agents and P2P Computing (Bologna, Italy, July 2002, collocated with AAMAS2002) and currently co-chairs the 1st International Workshop on Databases, Information Systems and P2P Computing (Berlin, September 2003, collocated with VLDB2003). More information is available at www.intelligence.tuc.gr/~manolis.

Thursday, 28th August, 11:00 – 12:00

Evolution and Stability of Collaboration Among Rational Agents

Autonomous agents interacting in an open world can be considered to be primarily driven by self interests. In this talk, we evaluate the hypotheses that self-interested agents with complementary expertise can learn to recognize cooperation possibilities and develop stable, mutually beneficial coalitions that is resistant to exploitation by malevolent agents. Previous work in this area has prescribed a strategy of reciprocal behavior for promoting and sustaining cooperation among self-interested agents. That work have considered only the task completion time as the cost metric.

To represent more realistic domains, we expand the cost metric by using both the time of delivery and quality of work. In contrast to previous work, we use heterogeneous agents with varying expertise for different job types. This necessitates the incorporation of the novel aspect of learning about other's capabilities within the reciprocity framework. We also present a new mechanism where agents base their decisions both on historical data as well as on future interaction expectations. A decision mechanism is presented that compares current helping cost with expected future savings from interaction with the agent requesting help.



Sandip Sen

Associate Professor
Department of Mathematical & Computer Sciences
The University of Tulsa
600 S. College
Tulsa, OK 74104
USA
Phone: (918) 631-2985
Fax: (918) 631-3077
E-mail: sandip@kolkata.mcs.utulsa.edu

Professor Sen earned a Ph.D. in Computer Science and Engineering from the University of Michigan, Ann Arbor, MI, in December, 1993; M.S. in Electrical Engineering, from the University of Alabama, Tuscaloosa, AL, in December 1988; and a B.S. in Electronics & Tele-Communications Engineering, from Jadavpur University, Calcutta, India, in June, 1986. Since 1998 he is associate professor at the University of Tulsa, USA. Among others he has been awarded the Outstanding Researcher Award from the University of Tulsa, 1999; the CAREER Award (1997), and Research Initiation Award (1994), both from the National Science Foundation. He served as programme committee member for numerous international conferences and workshops, and has published widely on topics in the field of agent-based computing, with particular focus on learning agents.

CIA 2003 Social Program

Thursday, August 28, 2003

17:30

Shuttle leaves from the hotel to the harbour

18:00 - 19:00

Guided boat trip through the Helsinki Archipelago to Karhusaari island



The Helsinki Archipelago is particularly known as an excellent place of relaxed residence, fishing, sailing, and bird hunting. Already one thousand years ago there were many routes tracing paths through the archipelago. The eastern route of the Vikings, and later that of the Hanseatic merchants, crossed through the outer archipelago. A Danish navigation description dating back to the near 1300s tells about "King Valdemars" sailing route, which follows the Swedish coastline, through the Åland islands to the Archipelago Sea and on to Tallinn.

The Archipelago Sea and its nature are quite unique. Nearly every island displays bedrock from close to 2000 million years ago. The continental glacier and waves have worn the rocks into smooth glaciated rock. Thousands of years ago, the ice age has formed the Salpausselkä ridge, which crosses the Archipelago Sea. The area around the island is scattered with shipwrecks, which is testimony to the sharp, rocky texture of the archipelago. In the archipelago you will also find traces of sea battles and historical anchorage sites. All of the islands have their own history and many also have their own chapel. In the 1800s, the number of inhabitants in the archipelago was at its highest. The islands in the Archipelago Sea contain 30 old archipelago villages.



Our boat trip through the archipelago reaches its final destination at **Karhusaari island**, the grounds of the Karhusaari villa, and park.



19:00 Social Dinner in the Villa Karhusaari



The **Villa Karhusaari**, a perfect little manor house, was built for the Sinebrychoff family between 1888 and 1892 in the Neo-Renaissance style, and has been restored to the original form.

Part of the villa is the Sinebrychoff art gallery, that contains most of the Finnish National Gallery's old foreign art, Italian, Dutch, Flemish, and French paintings from the 14th to the mid-19th century, Russian icons, selections from its collection of Swedish portraits, and Scandinavia's second largest collection of miniatures.

Nowadays, the villa is open to the public for exclusive parties and private exhibitions. It is owned by Espoo city near by the Lansivayla highway.

We are very cordially inviting you to relax from your hard work of the day at this special place in the heart of the Helsinki archipelago area, and enjoy with us a traditional finnish archipelago buffet dinner in the Karhusaari manor house.

Enjoy, and kipp es!

Matthias, Andrea, Sascha, and Heimo



22:00 - 23:00 Return to Helsinki city centre and hotels.

CIA 2003 Awards

The international workshop series on Cooperative Information Agents issues a best paper award and a system innovation award to acknowledge highly innovative research and development, respectively, in the area of intelligent information agents. Only submissions to the workshop are eligible for nomination and are evaluated by the program committee, sponsors, and co-chairs.

Best Paper Award 2003

This year's award is sponsored by Elsevier Science, The Netherlands. The winning price is 300 Euros.

Six papers have been nominated for the award.

Former winners of the Best Paper Award were as follows.

CIA 2002

Acquiring an Optimal Amount of Information for Choosing from Alternatives,
by Rina Azoulay-Schwartz and Sarit Kraus (Israel, USA), Springer LNAI vol. 2446

CIA 2001

Optimality and Risk in Purchase at Multiple Auctions
by Onn Shehory (IBM Research, Israel), Springer LNAI vol. 2182



System Innovation Award 2003



This year's award is sponsored by Whitestein Technologies, Switzerland. The winning prize is 300 Euros.

Two top-ranked finalists have been selected out of a set of four nominated systems through voting by the program committee, sponsors, and co-chairs.

Each information agent system is evaluated against the following criteria: core functionality, main techniques used, experimental results, innovative features in comparison to other existing systems.

The final decision on the winner of this year's award depends on the result of a public voting by all workshop attendees and the final vote by all workshop co-chairs after the public software demonstration of the finalists' systems to be given in session 7 on August 28, 2003, 14:30.

Former winners of the System Innovation Award were as follows:

CIA 2002

- First prize
 - Virtual Private Community System,
Developed by T. Iwao, M. Okada, K. Kawashima, S. Matsumura, H. Kanda, S. Sakamoto, T. Kainuma, M. Amamiya (Fujitsu, Japan)
 - Competitive Information Recommendation System,
Developed by Y. Kitamura, T. Sakamoto, S. Tatsumi (Osaka U, Japan)
- Third prize
 - Tourists on the Move,
Developed by M. Laukkanen, H. Helin, H. Laamanen (Sonera Corporation, Finland)

CIA 2001

- First prize:
 - LEAP - Enabling FIPA agents on small devices.
Developed by Federico Bergenti et al. (University of Parma, Italy)
- Second prize:
 - Towards efficient and reliable agent communication in wireless environments.
Developed by Heikki Helin et al. (Sonera Corporation, Finland)

The award giving ceremony is scheduled for the closing session of the workshop on August 29, 2003, 14:30.

Organisers of CIA 2003

General Chair of CIA 2003



Matthias Klusch is a senior researcher at the German Research Center for Artificial Intelligence, in the multiagent systems research group. Formerly, he was Assistant Professor at the department for Artificial Intelligence of the Free University of Amsterdam, The Netherlands (2000-2002); Assistant Professor at the department for Data Management of the Technical University Chemnitz, Germany (1997-1999); and visiting researcher at the Robotics Institute of Carnegie Mellon University in Pittsburgh, USA (1998). He obtained his MSc (1992) and PhD (1997) in Computer Science from the Christian-Albrechts University of Kiel, Germany. Matthias is co-coordinator of the AgentLink Special Interest Group on Intelligent Information Agents. Besides, he is associate editor of five international journals, co/editor of twelve books, co/authored numerous papers on intelligent information systems and agents. He is currently program co-chair of the IEEE conference on intelligent agent technology (IAT 2003), and the first German conference on multi-agent system technologies (MATES 2003). He served as program committee member of many major international conferences in the field, and is assigned project reviewer for several science funding institutions in Europe. Contact him at klusch@dfki.de, www.dfki.de/~klusch/

Program Co-Chair of CIA 2003



Andrea Omicini is associate professor at the DEIS, the Department of Computer Science and Engineering of the University of Bologna. He received his Laurea degree in Electronic Engineering in February 1991 and his PhD in Computer Science in November 1995, both from the University of Bologna. He has published over sixty articles on coordination models and languages, Internet technologies, and agent-based models and systems, in international journals, books, conferences and workshops. He edited four international books on agent-related issues, and guest edited three international journal's special issues on coordination models and infrastructures. He has held several tutorials on agent-based systems and coordination models at international conferences. He has organized and chaired several international conferences and workshops. Besides CIA 2003, he is currently the Organizing Chair of the 4th International Workshop "Engineering Societies in the Agents World" (ESAW 2004), and Program Chair of the 19th ACM Symposium on Applied Computing (SAC 2004). He is also a member of the Program Committees of many international conferences and workshops. He is currently the Chair of the SIG on Agents and Multi-Agent Systems of the Italian Association for Artificial Intelligence (AI*IA), and is Member of the Directive Council of the Italian Association for Logic Programming (GULP). Contact him at andrea.omicini@unibo.it, <http://lia.deis.unibo.it/~ao>

Program Co-Chair of CIA 2003



Sascha Ossowski is associate professor of Computer Science at the University Rey Juan Carlos in Madrid where he leads the Artificial Intelligence Research Group. Formerly, he was an HCM/TMR research fellow at the AI Department of Technical University of Madrid. He obtained his MSc degree in Informatics from the University of Oldenburg (Germany) in 1993, and received a PhD in Artificial Intelligence from Technical University of Madrid in 1997. Prof. Ossowski is holding several research projects focussing on the development of advanced software systems based on Artificial Intelligence and Agent Technology. He has published a monograph and more than 40 research papers on agent co-ordination and communication, and their application to real-world problems such as transportation management, e-commerce or network management. He served as programme committee member for numerous international conferences and workshops, and acted as a scientific adviser in various Spanish research programmes. Contact him at: sossowski@escet.urjc.es, www.ia.escet.urjc.es/~sossowski/

Local Organizing Co-Chair of CIA 2003



Heimo Laamanen is a principal researcher in the department of Emerging Technologies and Innovations, TeliaSonera. He leads Knowledge of Intelligent Wireless Internet (KIWI) research group, and is also a lecturer at the University of Helsinki. He received a Bachelor of Science, a Master of Science, and Licentiate of Philosophy in computer science from the University of Helsinki. Heimo has taught several courses in mobile computing and software agent technology. He is an author of several publications on wireless data communications and software agent technology, and is a European patent holder. He is actively involved with standardization work, has worked on TETRA and GPRS standardization at ETSI and software agent technology at FIPA. He was a chairman of Technical Committee E during 1998-1999, and a member of FIPA Board of Directors during 2000-2002. He is a member of ACM and IEEE. His research involves next generation wireless Internet including software agent technology, Semantic Web, GPRS, UMTS, and WLANs. Contact him at Heimo.Laamanen@teliasonera.com

Local organisation team in Helsinki:

Heikki Helin (TeliaSonera, Finland)
Heimo Laamanen (TeliaSonera, Finland)
Mikko Laukkanen (TeliaSonera, Finland)
Martti Mäntylä (Helsinki Institute of Information Technology, Finland)
Kimmo Raatikainen (University of Helsinki, Finland)
Roope Raisamo (University of Tampere, Finland)
Henry Tirri (University of Helsinki, Finland)

Sponsors of CIA 2003

We very gratefully acknowledge the financial support of this workshop by the following co-sponsors.

TeliaSonera

TeliaSonera is the leading telecommunications group in the Nordic and Baltic regions. TeliaSonera's overall focus is on best serving its customers in its core business and creating value for shareholders through stronger profits and cash flows. TeliaSonera is listed on the Stockholm Exchange, the Helsinki Exchange and Nasdaq Stock Market in the USA. Pro forma Net sales 2002 amounted to EUR 8.8 billion. The number of employees is about 28,000. Telia recorded EUR 130 million in research and development expenses in 2001 and Sonera Corporation recorded EUR 82 million for the year 2001. TeliaSonera's research and development is focused for example on the following areas:

- mobile communications, networks and services,
- Internet and electronic business services,
- customer service and billing solutions, and
- wireless Internet applications.

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WHITESTEIN
Technologies

Whitestein Technologies is a young international IT company, specialized in the design and development of advanced agent-based systems, applications, and technologies, combined and well integrated with other advanced information and communication technologies (eg. mobile wireless computing) and current state-of-the-art technologies (eg. Java J2EE). It was founded in January 1999 with the mission to

become a leading provider of advanced software agent technologies, products, solutions, and services for various applications and industries. We strongly believe that agent-based technologies and agent-oriented software engineering methodologies will be among the key concepts of a next generation of distributed information systems and network infrastructures, in particular in combination with other leading-edge technologies such as web services and mobile wireless computing. However, based on our hands-on experience in the real IT-world, we also know that software agent technologies will only thrive in the marketplace if they reach industry-grade quality and applicability, and are well integrated with "traditional" technologies and products. Consequently, Whitestein pursues a well-focused, integrated and balanced approach on parallel paths in order to realize the agents technologies' potential for better solutions and thus additional customer benefits and profits. Technology Research: academic partnerships and international research projects; systematic exploration and analysis of relevant technologies and architectures; prototyping and proof of concepts; publishing; contributions to standardization bodies. Technology Development: industrial partnerships and joint ventures; development of conceptual frameworks; development of mostly industry-agnostic (horizontal) technology products and solutions. Technology Application: development of industry-specific (vertical) products and solutions, including the development and integration of customer-specific applications. Technology Consulting: know-how transfer to customers and partners; management consulting and professional support services; training and education; conferences and events. <http://www.whitestein.com/>



The Spanish Association for Artificial Intelligence (AEPIA) was founded in 1983 aiming to encourage the development of Artificial Intelligence both in Spain and South America. AEPIA is member of the ECCAI (European co-ordinating committee for Artificial Intelligence) and founder member of IBERAMIA, the Iberoamerican Conference on Artificial Intelligence. The association also supports several national and international events with high interest for the members (CAEPIA, TTIA, etc.).

The aims of AEPIA include creating and coordinating working groups; giving support to technology transference and entities (such as universities, R&D centers, enterprises, institutions, etc.) in order to contribute to the application of Artificial Intelligence techniques; and also giving support to students and researchers in technology, development, application and teaching issues. Since 1997, AEPIA activities are managed through the association journal (Artificial Intelligence: Iberoamerican Journal on A.I.), which publishes three or four issues per year, printing 450 numbers of each issue on average. AEPIA also coordinates the Artificial Intelligence distribution list INT-ARTIF (supported by RED-IRIS) and maintains a teaching resources repository about Artificial Intelligence.

The CIA 2003 workshop is organised in co-operation with



NOTES