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BNAIC 2009

The 2009 SKBS-Strukton Prize

Emotions, Robots and Twins

News from the Benelux Association for Artificial Intelligence

Doppelgänger

Editor-in-chief

In many traditions, seeing one's own doppelganger is to be taken as a sign of bad luck, or even as an omen of death. But artificial doppelgänger don't have such negative denotations. They are considered mostly as tokens of amusement or admired for their technical craftsmanship. The first what comes to mind when thinking of doppelgänger probably are wax sculptures as found in several museums worldwide. How good the resemblance might be, superficial inspection easily reveals their nature. Try talking to them, or just touching them (though of course don't do this in museums).

How different it is nowadays with robot doppelgänger, modelled after living persons (robot twins). Most famous are undoubtedly the ones built by Professor Hiroshi Ishiguro, director of the Intelligent Robotics Laboratory of Osaka University. The first such robot created by him in 2004 was called REPLIEE R1, modelled after his own 5-year old daughter. R1's head could move in nine directions and her left arm was fully mobile, allowing her to make gestures. Additionally, four high-sensitive tactile sensors, placed under the skin on that arm, allowed her to react to different pressures – a gentle squeeze or a crushing grip for example.

REPLIEE R1.

REPLIEE Q2 and "original".

A year later Ishiguro revealed REPLIEE Q1. She again was modelled after a real human being, this time an adult woman. REPLIEE Q1's far more advanced movements were made possible by motion-tracking studies of human body movements, which were mapped into a computer, to be used as the basic template for expression. Sadly, REPLIEE Q1 was not fully mobile either. She could only sit down, and interact from that position – standing and walking were beyond her. Her upper body is motivated by thirty-one actuators powered by compressed air, which allow natural, fluid movements from her upper half. REPLIEE Q2 was an "upgraded version" of Q1, with even more degrees of freedom.

Shortly after, Professor Ishiguro finally cloned himself! This android, named GEMINOID HI-1, is again one step further in the development of robots exhibiting human-like behaviour. Look at videos of his appearance and you will be amazed how natural he responds to touching his face, how he moves his lips while talking, how he blinks his eyes, and even seems to breathe. And the development of androids will continue in rapid pace, Professor Ishiguro assures us. He is convinced that one day robots will fool us into believing they are human. He believes that it may prove possible to build an android that could pass for a human, if only for a brief period.

GEMINOID HI-1 and Ishiguro.

Professor Ishiguro was keynote speaker at the 2nd International Conference on Human-Robot Personal Relationships in June this year (see pp. 102-104 for a report). As you can read from the report, this was a successful and very fascinating conference indeed.

Let me conclude briefly with another successful conference: BNAIC 2009. This issue only contains some session reports and a report of the demo award, but the next issue will give you a more extensive coverage of the event, including many more reports and many photographic impressions. Stay tuned!

Ishiguro's robot laboratory: **http://www.is.sys.es.osaka-u.ac.jp/index.en.html**
Videos from Ishiguro's lab: **http://expo21xx.com/automation21xx/17466_st3_university/default.htm**

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Front cover: Cover of the BNAIC 2009 proceedings.

The deadline for the next issue is: **December 1, 2009**.

BNVKI-Board News

Antal van den Bosch

It was extremely nice to see our association together again at BNAIC-2009 in Eindhoven. In the capable hands of Karl Tuyls and Toon Calders and their organizational team, a great programme was compiled that, as usual, offered a cross-section of all things on AI in the Benelux. The two invited talks were impressive and enlightening, perhaps also because of a feature they shared: visualisations. Enough said about the contents of BNAIC – the event is discussed at large in this edition and the next, by way of the session and track reports.

At the BNAIC we held our annual general assembly, of which the notes can be found in this newsletter. Highlights were first that we welcomed two new members to our board: Koen Hindriks (Delft) and Richard Booth (Luxembourg), who will introduce themselves next time in this newsletter. Second, the meeting approved (the University of) Luxembourg as the location of BNAIC-2010, a fitting next step after we welcomed Luxembourg to our association last year. We discussed the association's finances, and gave an overview of the six events we sponsored in the last year as part of our Benelux AI Event series – I repeat my invitation to consider having your AI-related event sponsored by the BNVKI-AIABN!

As always, it was great to receive your input, ideas, and suggestions. You are in many ways the association, which binds together a meaningful set of research areas under the still valid and powerful umbrella of AI.

In sum, we hope to see you at the Benelux AI Events, and of course in Luxembourg for BNAIC-2010!

Minutes of the BNVKI/AIABN General Assembly

Friday October 30, 2009
Eindhoven, the Netherlands

Ann Nowé

Present: Antal van den Bosch (Chair), Virginia Dignum, Sien Moens, Annette ten Teije, Jos Uiterwijk, Ann Nowé, Joke Hellemons and 10 members.

1. Opening
Chair Antal van den Bosch opens the meeting at 13:10.

2. Minutes of the BNVKI General Assembly of October 31, 2009
The minutes are approved.

3. Announcements
The BNAIC'09 is very successful. The organisers received 117 submissions, of which 61 have been accepted for oral presentation, 36 as poster and 6 demos. There are 152 participants, divided as follows over the following countries: 116 NL, 26 BE, 7 LUX and 3 others.

Antal van den Bosch asks whether the opinion about the format of the proceedings has changed or do the participants still prefer to have the proceedings on paper. Toon Calders replies that this seems still to be the case, but confirms that the paper proceedings represent an important part of the budget.

Jaap van den Herik believes that 4 locations for demos, of which one is located outside the conference site, is not attractive because it makes it difficult to visit all demos during the time allocated for the demo sessions. He asks if it would be possible to have the demos running till the closing session. Jos Uiterwijk suggests for the future to have the slot for lunch and demos split up in two parts of 45 minutes each. This should allow the participants to have lunch, and attend and present the demos.

4. Financial report 2008
Virginia Dignum, treasurer, reports on the financial situation of the BNVKI. For the financial year 2008, the profit is higher than expected, viz. 7.259 Euro. This despite of the fact that from 2008 onwards, the BNVKI no longer receives an NWO subsidy. The treasurer also presents the budget for 2009, which is approved by the General Assembly.

5. Auditing committee 2009
The auditing committee, consisting of members Katja Verbeeck (KaHoSt. Lieven Gent) and Martin Caminada (Université du Luxembourg, Luxembourg), checked the financial report and accorded it. The meeting thanks Katja and Martin for their work and discharges them. Treasurer Virginia proposes for a new auditing committee, to check the financial report to be delivered at the next General Assembly, to consist of Menno van Zaanen and Birna van Riemsdijk. This proposal is accepted by the assembly.

6. Progress report 2009 and plans for 2010
Antal van den Bosch reports on the activities of the past year, November 2008 - October 2009, and presents the current board members and the liaisons (ECCAI, NSVKI, and De Connectie). The NVSKI is again active with a new board. In spring 2010 a student event will be organised. Hendrik Blockeel,

treasurer of ECCAI, will step down. Belgian members are welcome to apply for this mandate.

As announced last year, the BNVKI has an increased budget for sponsoring events. In 2009 the following endorsements and sponsorships have been granted:

1. *ESAW 2009*, The 10th Annual International Workshop "Engineering Societies in the Agents' World", November 18-20, 2009, Utrecht University, the Netherlands
2. *SRL-2009* (International Workshop on Statistical Relational Learning), *ILP-2009* (19th International Conference on Inductive Logic Programming), and *MLG-2009* (7th International Workshop on Mining and Learning with Graphs), July 2-4, 2009, Leuven, Belgium
3. *INTETAIN 09*, The 3rd International Conference on Intelligent Technologies for Interactive Entertainment, June 22-24, 2009, Amsterdam, the Netherlands
4. *BENELEARN 09*, The 18th Annual Belgian-Dutch Conference on Machine Learning, May 18-19, 2009, Tilburg University, the Netherlands
5. *GALP*, ICR International Symposium on Games, Argumentation, and Logic Programming, April 23-24, 2009, Luxembourg
6. *Rich Cognitive Models for Policy Design and Simulation*, January 12-16, 2009, Lorentz Centre, Leiden, the Netherlands

In order for the application to be eligible, the following should be taken into account:

- Event taking place in Benelux
- (One of) organizers should be BNVKI member
- Event should acknowledge BNVKI support; after the event, a report should be provided to the BNVKI
- BNVKI advertises the event

The application should be submitted at least 2 months before the event and include a description of the topic, targeted audience and an estimation of the budget.

7. Board members and elections.

There has been a call for new board members; based on the applications received the board proposes: Richard Booth of the University of Luxembourg and Koen Hindriks of the Delft University of Technology as new board members and Jos Uiterwijk, editor in chief of the newsletter, for a second term of 5 years. The new candidate board members present themselves. The board proposal is accorded with applause.

8. BNAIC'10

The board is happy to announce that Richard Booth and Leon van der Torre of the Université de Luxembourg have accepted to organize BNAIC 2010. In the organisation the following teams will be involved: The Interdisciplinary Lab for Intelligent and Adaptive Systems (ILIAS), The Public Research Centre Henri Tudor and The Interdisciplinary Centre for Security, Reliability and Trust. Richard Booth and Leon van der Torre prepared a nice presentation on the prospective venue Kirchberg. The assembly applauds the offer.

Virginia Dignum asks to provide cheap registration rates and accommodation for master students. Jaap van den Herik raises the question of sponsoring. Sponsoring is expected from The National Research Fund Luxembourg, but other potential sponsors will be contacted.

9. End of meeting

There are no more comments or questions. The meeting is closed at 14:15.

BNAIC 2009: Session Reports

Agent-Based Simulation

Frances Brazier
TU Delft

The session on agent-based simulation in different domains on Thursday was quite lively with interesting discussions after each presentation with about 20 participants.

The first paper *Comparison of Agent-Based and Population-Based Simulation of Displacement of Crime* by Tibor Bosse, Charlotte Gerritsen, Mark Hoogendoorn, Syed Waqar Jaffry, and Jan Treur, presented by Charlotte Gerritsen, did justice to its title. The paper compared the results of a population-based system to an agent-based system designed with the same knowledge in a simulation and formally analysed a number of properties of both systems. The results were comparable, the agent-based system slower. A good baseline for future research in which the attractiveness of a location can be modelled using a wider variety of agents.

The second paper *Using Agent-Based Organisational Models for Crisis Management* by Thomas Quillinan, Frances Brazier, Huib Aldewereld, Frank Dignum, Virginia Dignum, Loris Penserini, and Niek Wijngaards presented by Thomas Quillinan, modelled different groups involved in crisis management at different levels in the organisation. In this case GRIP 1 was used to illustrate the implications of strategic choices/plans in the context of flooding in Rotterdam. The

knowledge attained can then be used to modify real-world plans.

The third paper *Modelling Social Learning of Adolescense-Limited Criminal Behaviour* by Tibor Bosse, Charlotte Gerritsen, and Michel Klein, presented by Michel Klein, investigated the benefit of simulation for analysis of emergence of criminal behaviour. The simulations model social learning (based on Sutherland) in different scenarios, the results of which were validated with real-life data. These simulations have been extended in "future work" that analyses data on 1700 students containing information on their behaviour over time and their friendship relationships.

The discussions after each of the papers addressed the purpose and value of simulations in general, but also for each of the papers individually. The conclusion was that simulations are used to identify problems, analyse the potential of specific plans, transitions, analyse possible behaviour: a useful experimental tool.

Data Mining

Hendrik Blockeel
KU Leuven

The session on data mining contained four talks. The first paper presented was *Approximation Bound for K-Means Clustering of Binary Data*, authored by Nikolaj Tatti. Unfortunately the author could not attend the conference; the paper was presented by Boris Cule instead, who did a very good job at presenting this work, in which he had not been involved personally. As the title suggests, a bound was given for the maximal squared error of k-means clustering, for the special case of binary data. A clear explanation was also given why such a bound is possible for binary data, when it is known not to be possible for data in general.

The second talk, given by Tias Guns, was on *Constraint Programming for Correlated Itemset Mining*. In a very visual and intuitive presentation, the author explained how, when one is looking for frequent itemsets that correlate with particular classes (and hence are useful for predicting these classes), earlier derived bounds on when an itemset might still meet a minimum correlation criterion can be improved. To this were added experimental results which showed how the inclusion of these stronger bounds in a constraint-programming-based data-mining algorithm results in a spectacular efficiency gain.

The third speaker was again Boris Cule, who now presented his own work: *A New Constraint for Mining Sets in Sequences*. A problem in sequence mining is that when gaps in the sequence are allowed, it can be difficult to assess how interesting a frequent subsequence is; the sequence "abc" may be interesting if the a, b and c frequently occur close together, and less interesting if they occur equally frequently but with large gaps between them. The authors present a new measure that takes into account both the frequency and the "cohesion" of the subsequence, and an algorithm for efficiently detecting sequences that surpass a given threshold for this measure.

The fourth talk was on *Descriptive Mining of Folk Music: A testcase*. Jonatan Taminau presented this very nice application of subgroup discovery, where folk songs from 6 different countries or regions were analysed using the CN2-SD system. It turns out that very simple and interpretable subgroup descriptions can clearly expose particularities of the folk music from these countries.

As a whole, the data mining session presented a very nice and balanced sample of the high-quality research on data mining that is being conducted in the Benelux, with contributions both on the theoretical and the application-oriented side.

Knowledge Representation and Reasoning

Birna van Riemsdijk
TU Delft

The session on knowledge representation and reasoning featured one A-paper and three B-papers, covering diverse topics in the area. The first speaker was Krystyna Milian (VU), who presented work on the identification of subdomains of medical ontologies, related to particular diseases. Two methods for identification were compared, using a case study of identifying breast cancer concepts in the medical ontology SNOMED. The results show that the two methods yield partially overlapping subdomains, that form a small part of the whole ontology.

The second speaker was Paolo Turrini (UU) who presented a modal logic investigating the interaction between coalitions of agents and their environment. Specifically, the logic allows to reason about situations in which the outcomes of an interaction are determined by the agents, without the environment being able to interfere.

Duco Ferro (TUD) gave the third presentation about monitoring of business processes, with the aim of informing managers about business activities. Properties that the business activities should adhere

to are specified in the Temporal Trace Language (TTL). An organization-specific ontology is used to facilitate expressing properties in TTL.

Finally, Nico Roos (MU) presented work on diagnoses. It was shown that traditional notions of diagnosis are no longer suitable if the available data has different accuracies, and a new notion of diagnosis was presented.

Evolutionary Computation

Ida Sprinkhuizen-Kuyper
Radboud University, Nijmegen

This session contained two presentations. The first presentation was by Peter Bosman. He presented the paper: *On Empirical Memory Design, Faster Selection of Bayesian Factorizations and Parameter-Free Gaussian EDAs*. In an impressive presentation he shortly showed three recent contributions to EDAs. In the award session he received the award for the best B-paper.

The second presentation was by Martijn van Otterloo (paper with coauthor Tim De Vuyst): *Evolving and Transferring Probabilistic Policies for Relational Reinforcement Learning*. This paper focussed on learning relational policies in a probabilistic logical framework. He illustrated his algorithm with examples in the Block World and Goldfinder domains. It was a nice presentation.

Both presentations were followed by animated discussions.

Machine Learning I

Walter Kosters
Universiteit Leiden

In the first presentation Vincent van der Goes discussed *The Effect of Life Expectancy on Risk Aversion* (co-authored by Guszti Eiben; both from the Vrije Universiteit, Amsterdam). He introduced a simple artificial multi-agent world, the so-called sugarscape system. There is only one resource: sugar. In the proposed evolutionary approach, risk attitude is coded as a gene. Simulations show the following: agents that have much to lose (i.e., their eternal life) evolve a more risk-averse life style than those with a limited life span. Interesting applications might include the observed difference in average life expectancy for men and women.

The second talk, entitled *Probabilistic Relational Modelling of Mammographic Images*, was given by Nivea Ferreira (co-author: Peter Lucas; both from the Radboud University at Nijmegen). In mammography, the so-called mediolateral oblique (MLO) and craniocaudal (CC) X-ray projections are the most common ones used for breast imaging. Information from these sources must be combined: a suspicious region in one view might have a corresponding region in the other. Object-oriented database theory is employed as a basis, and relational probabilistic methods (in particular the Relational Probability Tree (RPT)) are shown to improve predictions. The full paper was published in the Proceedings of the 22nd IEEE International Symposium on Computer-Based Medical Systems, 2009.

The third paper was *Improved Mammographic CAD Performance using Multi-View Information: A Bayesian Network Framework*, presented by Marina Velikova (with co-authors Maurice Samulski, Peter Lucas and Nico Karssemeijer; all from the Radboud University at Nijmegen). As in the previous presentation, the issue is the improvement of the analysis of breast images from screening programs, again using MLO and CC projections. A Bayesian network framework is proposed, that exploits multi-view dependencies. Experiments show that the incorporation of expert knowledge in a probabilistic manner provides a significantly higher breast-cancer detection rate compared to the single-view computer-aided detection (CAD) system. Another benefit is the potential for prescreening purposes. The full paper appeared in Physics in Medicine and Biology 54 (2009), 1131-1147.

The fourth and last presentation was by Perry Groot, who talked on *Multi-Task Preference Learning with Gaussian Processes* (co-authored by Adriana Birlutiu and Tom Heskes; all from the Radboud University at Nijmegen). Suppose you want to learn preferences. Data for a single task might be scarce; however, multiple subjects can give preference data for similar tasks. This can be used to regularize individual user models by assuming that model parameters are drawn from a common hyperprior. The usefulness of the approach is demonstrated on an audiological data set, where preference for one of two sounds is measured. A hierarchical non-parametric model based on Gaussian processes improves the process. The full paper was published in the Proceedings of the 17th European Symposium on Artificial Neural Networks (ESANN), pages 123-128, 2009.

Semantic Web

Martin Caminada
Université du Luxembourg

The presentation of Radboud Winkels was titled *Reasoning with Spacial Plans on the Semantic Web*. The topic can be described as normative reasoning based on spacial plans ("ruimtelijke ordening"), that

is, what is and is not allowed in a specific area. For this, Semantic Web techniques have been applied in combination with Geographic Information Systems (GIS). This allows users to see what is and what is not allowed in specific areas on a map.

The presentation of Zhisheng Huang was titled *Using Semantic Distances for Reasoning with Inconsistent Ontologies*. The proposed approach is first to apply a relevance function to select some consistent sub-theory from an inconsistent ontology, then to apply standard reasoning on the selected sub-theory. If this yields no satisfying answer, then the relevance degree of the selection function is made less restrictive, thereby extending the consistent sub-theory for further reasoning. The approach of selecting consistent sub-theories has the advantage that one can use standard reasoners, which would not be possible if one would for instance adopt a paraconsistent approach.

The presentation of Annette ten Teije was titled *Knowledge Engineering Rediscovered: Towards Reasoning Patterns for the Semantic Web*. The idea is to identify a small number of reasoning patterns and components that can then be re-used for various tasks related to the Semantic Web. For this purpose, seven different task types were provided, and it was shown how these tasks can be implemented using a small number of primitive inference steps. The results of the current work can be seen as a first step towards a methodology for building Semantic Web applications out of reusable components.

The presentation of Alexander Hogenboom was titled *Genetic Algorithms for RDF Chain Query Optimization*. This work focusses on RDF chain queries, which are a special class of SPARQL queries. The proposal is to use the newly devised genetic algorithm RCQ-GA to determine the order in which joins need to be performed for an efficient evaluation of RDF chain queries. It was found that RCQ-GA tends to outperform the benchmark solution in the literature (2PO) on solution quality, execution time needed and consistency of solution quality.

The 2009 SKBS-Strukton Prize

Jaap van den Herik
Director of SKBS

The Foundation for Knowledge Based Systems (SKBS) and the Company Strukton continued their policy of awarding the SKBS prize to the best demonstration of the Demo-session of the BNAIC 2009. Unfortunately, the company Strukton was unable to attend this BNAIC by its members Bas Obladen (who is a regular visitor since the mid 1990s) and Carlos F. Bosma MSc. The economic climate required them to *exploit* their ideas in direct contact with the clients instead of *exploring* new ideas at the BNAIC in Eindhoven. Yet, their interest in new ideas is so intensive that they confirmed to support the SKBS prize also in 2009 with an amount of Euro 350, bringing the full prize to Euro 700. We are grateful for this generous gesture and wish the company a better climate for the months to come. We hope to see Obladen and Bosma again in Luxembourg in October 2010 at the 22nd BNAIC.

The 2009 referee committee consisted of Jaap van den Herik (chair), Annette ten Teije (BNVKI board), Hendrik Blockeel (Belgium, Leuven), and Peter van der Putten (Businessman and researcher).

Peter van der Putten was the invited speaker of the Industry Track. His lecture was titled: *AI in the Wild: Decisioning, Predictive Analytics and Simulation for Customer Experience Optimization.* He is also affiliated to LIACS at the Leiden University.

The referee committee had to consider eight submissions which were eligible for the SKBS prize. In Table 1 we list them by topic (in the order of their publication in the Conference Program BNAIC 2009).

1. Developing Novel Extensions to Support Prototyping for Interactive Social Robots *Martijn ten Bhömer, Christoph Bartneck, Jun Hu, Rene Ahn, Karl Tuyls, Frank Delbressine, and Loe Feijs*
2. Cobes: The clean, safe and hospitable metro *Tom van Bergen, Maarten Brugmans, Bart Dohmen, and Niels Molenaar*
3. SmartGoals: a Hybrid Human-Agent Soccer Training System *Mark de Graaf, Harm van Essen, and Pepijn Rijnbout*
4. Tourist Decision Support for Mobile Navigation Systems: a Demonstration *Joris Maervoet, Wouter Souffriau, Pieter Vansteenwegen, Greet Vanden Berghe, and Dirk Van Oudheusden*
5. Finding Malfunctions in HVAC Installations *Siem Opschoor*
6. Simulating Knowledge and Dishonesty in a Client-Consultant Setting *Eugen Staab and Martin Caminada*
7. Multi-agent Train Driver Rescheduling: Simulating Environment Dynamics *Erwin J.W. Abbink, Pieter-Jan Fioole, David Mobach, Leo Kroon, Eddy van der Heijden, and Niek Wijngaards*
8. Large Scale Text Mining with Highly Accurate Detection of Negatives *Jakub Zavrel, Remko Bonnema, Martijn Spitters, Gert Meijerink, and Gerard Mulder*

Table 1: The 2009 candidates of the SKBS-Strukton prize.

Since 1999 we have seen many different appearances of the Demo-session. The common characteristic is the emphasis on being "an industrial exhibition". Up to 2006 the prize money was provided by SKBS only. The Foundation for Knowledge Based Systems originates from the late 1980s as a foundation within SPIN (Stimulerings Projectteam In Nederland). The Foundation SNN (Stichting Neurale Netwerken) is another well-known member of the former SPIN. They supported SKBS financially with augmenting the SKBS prize in 2007. In 2008, the industrial partner Strukton announced its willingness to participate in the prize funding. The extra contribution was gratefully accepted. As stated above they continued this policy in 2009.

Below we repeat some relevant information of last year as an introduction to Bas and Carlos. Bas Obladen is a fervent and enthusiastic visitor of the BNAIC since the mid 1990s. As a participant from industry he has served over the years, many times in our SKBS jury. He acknowledged recently that he had learned substantial things from our conferences as can be assessed from his ideas publicly voiced in press releases in 2008. Bas is the man who launched the idea that all cars arriving at the Ringway of Amsterdam should be given the opportunity to park directly under the ground. Subsequently, the drivers and passengers should be offered the means to continue their way to the centre of Amsterdam by a strongly improved public transport. The plan had two winning ideas for two different reasons: (1) no cars in the city any more and (2) strong improvement of public transport. During the 2008 BNAIC Bas introduced his successor at Strukton, Carlos F. Bosma MSc and agreed to support the SKBS prize.

In 2009, six of the eight submissions were gathered in the demonstration room of the Auditorium Building TU/e where the BNAIC took place. All six were full-fledged demonstrations. It was really a pleasure to walk along the demos and to discuss them with the stand holders. Two demonstrations were located elsewhere. Smart Goals was in the corridor at the other site of the Aula building. The demonstration titled *Cobes: The clean, safe and hospitable metro* was in the neighbouring building where the Industrial Design education is housed. Again, the quality, particularly the quality of ideas, has grown considerably over the last year.

A rough division into four categories of each two contenders was as follows: the *production* category: (5) and (8), the *pilot* category: (3) and (7), the *proof-of-concept* category: (2) and (4), the *research* category: (1) and (6).

Whatever, the division, the referee committee had a difficult task. The procedure went in shifts: from 8 we reduced the number of candidates to six and then to four. The remaining four were (2) Tom van Bergen *et al*., (4) Joris Maervoet *et al*., (7) Erwin J.W. Abbink, and (8) Jakub Zavrel *et al*.. Taking a decision was difficult.

The members of the referee committee were invited to score on (a) the quality of the submission, (b) the originality, (c) the scientific element, (d) the relations within AI, (e) the applicability (in industry or education), (f) the presentation, and (g) the use of AI tools and/or AI methods. The spirit of the SKBS prize is in the criteria (d) and (e). If only criteria (g) had been applied then (7) would have won, even so we agreed that criteria (e) and (g) only would have led to (8) as winner. Moreover, the criteria (a), (e) and (g) lead us to (4). Finally, all these criteria taken into account together with criteria (b), the jury arrived at (2) for the SKBS-Strukton prize in 2009. It was the demo *Cobes: The clean, safe and hospitable metro* by Tom van Bergen, Maarten Brugmans, Bart Dohmen and Niels Molenaar. Our congratulations. The team received a cheque of Euro 700,-.

In Table 2 we provide an overview of the winners of the SKBS-Strukton prize so far.

1999 Maastricht M. van Wezel, J. Sprenger, R. van Stee, and H. La Poutré *Neural Vision 2.0 – Exploratory Data Analysis with Neural Networks*
2000 Kaatsheuvel (shared prize) E. Zopfi *HKT* G. Schram *LubeSelect*
2001 Amsterdam Alexander Ypma, Rob Kleiman, Jan Valk, and Bob Duin *MINISOM – A System for Machine Health Monitoring with Neural Networks*
2002 Leuven F. Brazier, D. Mobach, and B. Overeinder *AgentScape Demonstration*
2003 Nijmegen Bert Kappen, Wim Wiegerinck, Ender Akay, Marcel Nijman, Jan Neijt, and André van Beek *Promedas: A Diagnostic Decision Support System*
2004 Groningen Wouter Teepe *The Secret Prover: Proving Possession of Arbitrary Files While not Giving Them Away*

2005 Brussels Gerald de Jong *Fluidiom: The Evolution of Locomotion*
2006 Namur Marion Verduijn, Niels Peek, Peter Rosseel, Evert de Jonge, and Bas de Mol *Procarsur: A System for Prognostic Reasoning in Cardiac Surgery*
2007 Utrecht Tim Harbers, Rob van der Veen, and Marten den Uyl *Sentient Demonstration BNAIC 07: Vicavision*
2008 Enschede (shared prize) Joris Maervoet, Patrick De Causmaecker, and Greet Vanden Berghe *A Generic Rule Miner for Geographic Data* and Dennis Reidsma and Anton Nijholt *Temporal Interaction between an Artificial Orchestra Conductor and Human Musicians*
2009 Eindhoven Tom van Bergen, Maarten Brugmans, Bart Dohmen, and Niels Molenaar *Cobes: The clean, safe and hospitable metro*

Table 2: Overview of SKBS-Strukton prizes.

Emotions, Robots and Twins

Report of the 2nd International Conference on Human-Robot Personal Relationships June 11-12, 2009 Leiden, the Netherlands

Bas Steunebrink
Universiteit van Utrecht, Intelligent Systems Group
and Jaap van den Herik
TiCC, UvT

On June 11 and 12, the 2nd International Conference on Human-Robot Personal Relationships (HRPR) took place at the Leiden University, Kamerlingh Onnes Building, Steenschuur 25, Leiden. Originally, it was scheduled to take place at TiCC in Tilburg, at the Tilburg University. The shift of venue was due to the unique opportunity to combine the organisational forces of the CHI-NL workshop (to be held at June 11, 2009 in the Kamerlingh Onnes Building) and the HRPR.

CHI stands for Computer Human Interaction, the aim of CHI and HRPR are particially overlapping. So, both programme chairs (Jaap van den Herik, HRPR, and Frans Verbeek, CHI-NL) faced an overlapping group of potential attendees and speakers. Conscientious deliberation led to a merge of the organisation and the key-note speakers. Here, emphasis was on the key-note speech by professor Hiroshi Ishiguro, a senior researcher of the ATR Intelligent Robotics and Communication Laboratories in Japan. Below we start with a blow-by-blow account of the lectures of the HRPR and complete the report by a summary of Ishiguro's ideas.

Title: *Child-robot interaction: Investigating emotional expressions and social interaction of children in a collaborative game*
Presenter: Suleman Shahid
Overview: The outcomes of an experiment were presented in which children of 8 and 12 years old play a simple guessing game either with a friend, a stranger, alone, or with the robot iCat. The main measurement of interest was the level of emotional expression during the game. Although emotional expressions were strongest when playing with a friend, they were also observed when playing with the iCat. Moreover, emotional expressions directed towards the iCat were observed, and children were generally more positive about iCat after the experiment, especially the 8-year-olds.

Title: *Face recognition and user identification*
Presenter: Wilco Moerman
Overview: A method of face detection was presented, which should be able to match photographs of faces in different angles and lighting conditions and identify which pictures are from the same person. This is done by mapping detected facial features on a sparse 3D model of a head, which can then be rotated so that faces pictured in different angles can be easily compared.

Title: *Humans, animals, and robots: A phenomenological approach to human-robot relations*
Presenter: Mark Coeckelbergh
Overview: Coeckelbergh argued that a phenomenological approach and comparisons with human-animal relationships can aid our understanding of human-robot relations. He explored some potential gains of this approach by discussing the concept of alterity, the importance of diversity and appearance, Heidegger's claim that animals are 'poor in world', and the issue of robot-animal relations.

Title: *Humanoid robots and the problem of the social border: Toward a deanthropologized concept of personhood*
Presenter: Hironori Matsuzaki
Overview: In modern democratic societies, the circle of social persons is delimited on the basis of a distinction between living human beings and other entities. But it is highly likely that the current delimitation of the social will be increasingly more questioned when interactive robots with human-like

features are integrated into the life-world on a large scale. Matsuzaki developed a theoretical framework for rational understanding of such border problems posed by the novel kinds of human-machine relationship. Within this approach, the conception of personhood is radically deanthropologized, i.e., it must be considered an open question whether only living humans can be social persons. Thereby a crucial methodological problem occurs because it must first be clarified what constitutes (1) social phenomena and (2) personhoods. He assumed this problem can be overcome by elaborating a formal model of the social. This basic assumption will steer the critical field observation on human-robot interaction. The key idea consists in the focus on the high complexity emerging within the practically conducted interaction between at least the three entities, viz. human beings, interactive robots, and other entities.

Title: *Looking forward to a "robotic society"? – Imaginations of future human-robot relationships*
Presenter: Judith Igelsbroeck
Overview: The outcomes of an experiment were presented in which laymen and experts were asked about their view of future human-robot relations. Although experts appeared to see more potential for robots, their worries were not too dissimilar from those of laymen. The audience thought including, e.g., Japanese in the participants might give different interesting results. Also, the audience wondered whether the results would differ if the participants were also asked to include technological enhancements to humans in their vision of future robotic societies.

Title: *Intimate physical interaction with robots, human - robot Kiss*
Presenter: Hooman Aghaebrahimi Samani
Overview: A prototype robot was presented which would facilitate remote kissing. Egg-shaped and the size of a human head, it has two lips with several sensors in them, which can register a person's kiss. This particular kiss can then be sent to another such robot (possibly by interfacing with a mobile phone), where another person can hold his own robot to his skin and receive the kiss. This way, two persons can share a kiss even when far apart. David Levy argued this was the best project shown at this HRPR conference.

Title: *Do puppeteers design better robot gestures?*
Presenter: Jamy Li
Overview: The outcomes of an experiment were presented in which laymen and professional puppeteers were asked to create emotional gestures on a robot named robotPHONE. This is a teddy bear with 2 DOF in its head and 2 DOF in each arm. The participants were asked to create gestures that would convey the emotions happiness, sadness, anger, fear, surprise, and disgust. It was found that not all gestures designed by the puppeteers were recognized better than those designed by the novice participants. The audience suggested that this may be due to the few DOF of the robot used, putting the puppeteers in a disadvantadge because they are used to handling more expressive puppets. The audience also suggested that the 6 basic emotions used may not have been an optimal choice, because the reason these are considered basic emotions (by Ekman) is the universality of their corresponding facial expressions, while the robot used in the experiment is not capable of making facial expressions.

Title: *Using positive and negative social feedback to promote energy conservation behavior in the home*
Presenter: Jaap Ham
Overview: The outcomes of an experiment were presented in which the iCat robot gave feedback on the energy consumption when selecting a (simulated) washing task. It was found that giving negative feedback was most effective in persuading participants to reduce energy consumption, independent of the source of the feedback (i.e., iCat or any other source).

Title: *Persuasive agents and the occurrence of reactance as a result of restricting communication*
Presenter: Maaike Roubroeks
Overview: The outcomes of an experiment were presented in which participants were persuaded to reduce energy consumption when selecting a (simulated) washing task. Participants were presented with either a non-threatening, low-threatening, or high-threatening message to conserve energy, conveyed by either text, a still robot, or an animated robot (iCat). The main variable measured was the level of intention to restore threatened freedom (i.e., psychological reactance). It was found that reactance was higher with higher threats and with higher social agency of the conveyor, but no support for interaction between the two was reported.

Title: *Robot vacuum cleaner personality and behaviour*
Presenter: Bram Hendriks
Overview: The outcomes of an experiment were presented in which participants were asked to describe the desired personality of a robot vacuum cleaner. The mentioned traits were then mapped to the Big Five model and used to implement the behavior of a prototype robot vacuum cleaner. The participants were then shown a video of a robot vacuum cleaner with the desired behavior, and indeed, the participants recognized the intended behavior.

Hiroshi Ishiguro
Professor Hiroshi Ishiguro had a perfect and very sophisticated lecture. He started from scratch with a simple idea in building robots that could perform easy tasks. The task became more and more difficult and that invited the researchers to develop a methodology for their research. For adequate developing such a methodology it was necessary to formulate goals. Hiroshi did so step by step and was able to grasp the attention of the audience for a full hour. The final goal was to create a robot twin. Two examples were: a twin robot for his daughter and a twin robot for himself (see the picture).

The main problems did not come from technology, but from social sciences: what are the behavioural rules when handling a twin robot? Hiroshi is an excellent representative for the work performed at his laboratory, he knows all the technical details and is able to convince people in this respect.

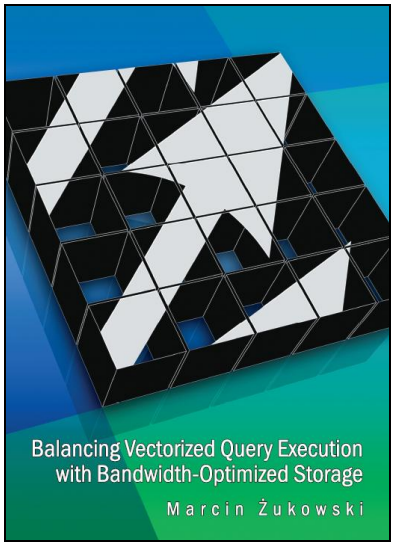
The audience was taken, but not all of them since David Levy was among them. He wrote the book *Intimate relationship between artificial partners*, which was later published in the US under the title *Love and Sex with Computers*. So, one can imagine that there arose a lively discussion between David and Hiroshi.

PH.D. THESIS ABSTRACTS

Balancing Vectorized Query Execution with Bandwidth-Optimized Storage

Ph.D. thesis abstract
Marcin Żukowski

Promotor: Prof.dr. M.L. Kersten
Copromotor: Dr. P.A. Boncz
Date of defense: September 11, 2009



With the performance of modern computers improving at a rapid pace, database technology has problems with fully exploiting the benefits that each new hardware generation brings. This has caused a significant performance gap between general-purpose databases and specialized, application-optimized solutions for large-volume computation-intensive processing problems, as found in areas including information retrieval, scientific data management and decision support.

This thesis attempts to enhance the state-of-the-art in architecture-conscious database research, both in the query execution layer as well as in the data storage layer, and in the way these work together. Thus, rather than focusing on an isolated problem or algorithm, the thesis presents a new database system architecture, realized in the *MonetDB/X100* prototype, that combines a coherent set of new architecture-conscious techniques that are designed to work well together.

The motivation for the new query execution layer comes from the analysis of the problems of two popular approaches to query processing: *tuple-at-a-time* operator pipelining, used in most existing systems, and *column-at-a-time* materializing operators, found in MonetDB. MonetDB/X100 proposes a new *vectorize- in-cache* execution model that exploits ideas from both approaches and combines the scalability of the former with the high-performance *bulk processing* of the latter. This is achieved by modifying the traditional *operator-pipeline* model to operate on cache-resident *vectors* of data using highly optimized *primitive* functions. Additionally, within this architecture, a set of hardware-conscious design and programming techniques is presented, enabling efficient execution of typical data-processing tasks. The resulting query-execution layer efficiently exploits modern

super-scalar CPUs and cache-memory systems and achieves in-memory performance often one or two orders of magnitude higher than the existing approaches.

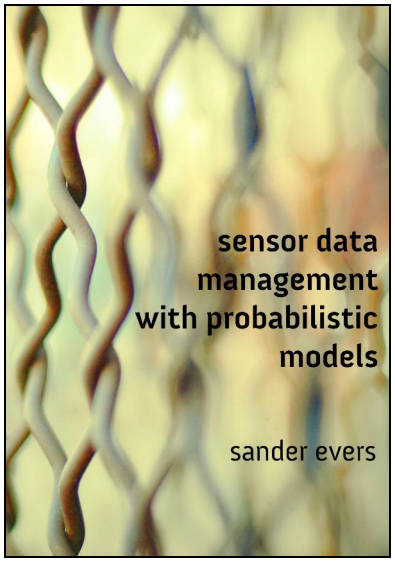
In the storage area there are two hardware trends that significantly influence database performance. First, the imbalance between sequential disk bandwidth and random disk latency continuously increases. As a result, access methods that rely on random I/O become less attractive, making various forms of sequential access the preferred option. MonetDB/X100 follows this idea with *ColumnBM* – a bandwidth-optimized column store. Secondly, both disk bandwidth and latency improve significantly more slowly than the computing power of modern CPUs, especially with the advent of multi-core CPUs. ColumnBM introduces two techniques that address this issue. *Lightweight in-cache compression* allows trading some processor time for an increased perceived disk bandwidth. High decompression performance is achieved by applying the decompression on the RAM-cache boundary, providing cache-resident data directly to the execution layer. Additionally, the introduced family of compression methods provides performance an order of magnitude higher than previous solutions. *Cooperative scans* observe current system activity and dynamically schedule I/O operations to exploit overlapping demands of different queries. This amortizes the cost of disk access among multiple consumers, and also better utilizes the available buffer space, providing much better performance with many concurrently executing queries.

By combining CPU-efficient processing with a bandwidth-optimized storage facility, MonetDB/X100 has been able to achieve its high in-memory raw query-execution power also on huge disk-resident datasets. We evaluated its performance both on TPC-H decision-support data sets as well as in the area of large-volume information retrieval (the Terabyte TREC task), where it successfully competed with the specialized solutions, both for in-memory and disk-based tasks.

Sensor Data Management with Probabilistic Models

Ph.D. thesis abstract
Sander Evers

Promotores: Prof.dr. P.M.G. Apers and Prof.dr. L. Feng
Date of defense: September 25, 2009



The increasing availability of cheap, small, low-power sensor hardware and the ubiquity of wired and wireless networks have led to the prediction that 'sensing environments' will emerge in the near future. The sensors in these environments collect detailed information about the situation people are in, which is used to enhance information-processing applications that are present on their mobile and 'ambient' devices.

Mediating between the sensor-data supply and demand sides poses new requirements to data management. In this thesis, we identify and investigate the challenge of dealing with the uncertainty inherent in sensor-data processing. This uncertainty arises due to many causes: measurement noise, missing data because of sensor or network failure, the inherent 'semantic gap' between the data that is measured and the information one is interested in, and the integration of data from different sensors. Probabilistic models deal with these uncertainties in the well-understood, comprehensive and modular framework of probability theory, and are therefore often used in processing sensor data.

In particular, Bayesian networks form a good candidate for modeling sensor data in a flexible environment, because of their comprehensiveness and modularity. We provide extensive technical argumentation for this claim. As a demonstration case, we define a discrete Bayesian network for location tracking using Bluetooth transceivers.

In order to scale up sensor models, efficient probabilistic inference is crucial. We observe that the conventional inference methods for Bayesian networks, which have mainly been developed in the medical and hardware-diagnosis domain, do not scale well for our demonstration case. We propose

several optimizations, making it possible to jointly scale up the number of locations and sensors in sublinear time, and to scale up the time resolution in linear time.

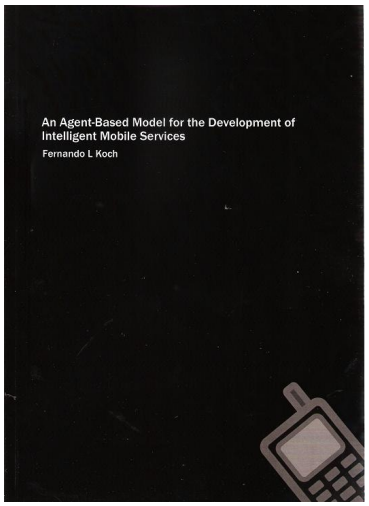
More important than these optimizations themselves is the way by which we arrive at them; we define a straightforward theoretical framework for translating an inference query into relational algebra. This allows the query to be analyzed and optimized using insights and techniques from the database community; for example, using cost metrics based on cardinality rather than dimensionality, which is common in conventional inference algorithms.

A fairly orthogonal research question investigates the possibility of collecting the transition statistics (needed for acquiring the parameters of a probabilistic model) in a local, clustered fashion, in which transitions between states of different clusters cannot be directly observed. We show that this problem can be written as a constrained system of linear equations, for which we describe a specialized solution method.

An Agent-Based Model for the Development of Intelligent Mobile Services

Ph.D. thesis abstract
Fernando Koch

Promotor: Prof.dr. J.-J.Ch. Meyer and Prof.dr. E. Sonenberg
Copromotor: Dr. F. Dignum
Date of defense: October 5, 2009



As the infrastructure to provide a service, mobile applications must be simple, quiet, invisible and unobtrusive. However, examples of applications that do not consider the current situation while delivering information are present everywhere. Out-of-context information is perceived by the user as inappropriate and inconvenient. The objective of this research is to define a computing model that supports the development of better, more intelligent mobile services. The solution must consider environment information, provide a flexible deliberation cycle, and explore the trade-off between quality of information and resource efficiency. With that in mind, this research seeks to answer a key question: what is the architecture of the inference system needed to support the development of intelligent mobile services? Revolving around that question, it investigates: (1) How to balance proactivess and reactiveness in mobile services? (2) How contextual information can be used to support the decision process? That is, how information from the environment can help to decide when stop being proactive and act reactively, and *vice versa*? And (3) How to extend the deliberation model to inherently support these elements?

The work focuses on agent-based software architecture and methods to support the implement-tation of intelligent mobile services. The proposed model is an extension of the BDI-model of software agents equipped to operate in highly dynamic environments. Tests show that applications built upon this model provide similar effectiveness as the purely reactive systems (e.g., cautious agents, which is a configuration used by several agent implementations) with significant gains in computational performance. The improvement is emphasised when the application is running on highly dynamic environments: e.g., one test shows 30% better performance if the environment's degree of dynamism is around 10%, 50% improvement if the degree parameter is around 50%, and up to 65% improvement if the degree parameter is set to 90%. From these results, the research concludes that the proposed model is a better option to implement mobile services than other solutions in the field. The optimisation in deliberation performance means that less CPU-cycles are required to run the application, which reflects in the application's overall performance and reduction of battery utilisation.

The research contributes to the theory and the field in the following ways: (1) it introduces an extended BDI-model of agent computing that provides inherent solutions to operate in highly dynamic environments; (2) it provides a new approach to allow agent-based applications to exploit features of the environment to infer when to revise current processing lines; (3) it proposes that different agent platforms could be adapted to support the proposed design to reduce CPU cycles and increase overall application performance, and (4) it suggests that the

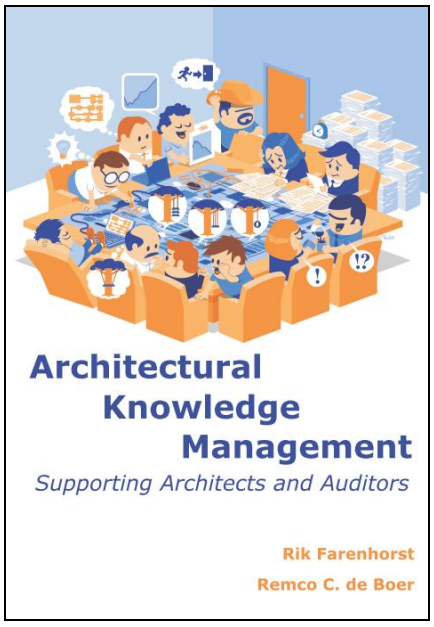
technology can be applied to implement applications in different knowledge domains where software applications must operate in a dynamic environment, use context information for decision making, and implement both reactive and proactive behaviour.

Finally, the solution can be applied to different knowledge domains that involve high-dynamic environments, as for example: *intelligent personal assistant*: solution to support dynamic environment and resource constraints, aiming to deliver quality information for end-user; *robotics*: solution to support dynamic environment and resource constraints, aiming on better autonomous behaviour, and; *ambient intelligence:* solution to support dynamic environment and to deliver quality information to end-user.

Architectural Knowledge Management: Supporting Architects and Auditors

Ph.D. thesis abstract
Rik Farenhorst and Remco de Boer

Promotor: Prof.dr. J.C. van Vliet
Copromotor: Dr. P. Lago
Date of defense: October 5, 2009



Software knowledge unnecessarily lost
All too often the knowledge acquired by software architects is unnecessarily lost. Moreover, it is difficult to simply and quickly assess the quality of software. According to Dutch researchers Remco de Boer and Rik Farenhorst these problems can, however, be easily resolved. They investigated how architectural knowledge can be better disseminated and retrieved.

The design and construction of large software systems demands a lot of creativity and knowledge on the part of software architects. During projects such as the *OV-chipkaart* (digital public transport pass) or digital tax return form, due consideration needs to be given to security requirements, ease of use and performance. The architect incorporates these requirements and the wishes of his clients in the design and must at the same time allow for the technical limitations and possibilities. Architects who do not have or cannot access the right knowledge in time, keep on 'reinventing the wheel'.

Rik Farenhorst investigated how software architects can share their knowledge more easily. He discovered that many architects simply talk too little with each other. They want to receive knowledge, but are less willing to pass it on. He calls for a combination of two forms of knowledge sharing: using fixed templates in which architectural knowledge can be recorded and through open communication. Such open communication could be facilitated by forums or 'yellow pages' that allow the architects to find each other.

Assessing software
Remco de Boer examined the role of auditors. These auditors assess the quality of software systems. This means that they must often wade through piles of paperwork looking for the information they need, for example about the decisions that an architect has made during the design process. De Boer developed a method for guiding auditors through this information to ensure that less time and money is lost in endless searches.

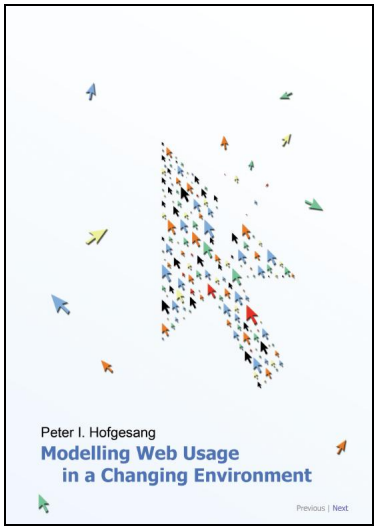
Farenhorst and De Boer carried out their research in collaboration with several IT companies. These organisations indicated that the design and evaluation processes for their software often proceed with difficulty. Farenhorst and De Boer have now demonstrated how these difficulties can largely be resolved.

Farenhorst's and De Boer's research was part of the NWO programme Joint Academic and Commercial Quality Research & Development (JACQUARD). They carried out their work within the GRIFFIN project, which is describing how and why software engineers take decisions about the architecture of their software. GRIFFIN is a consortium of academic and industrial partners.

Modelling Web Usage in a Changing Environment

Ph.D. thesis abstract
Peter Hofgesang

Promotor: Prof.dr. A.E. Eiben
Copromotor: Dr. W. Kowalczyk
Date of defense: October 8, 2009



Web usage mining (WUM) aims to analyse and model the browsing behaviour of Web users to discover relevant patterns and knowledge about Web usage. This knowledge can then be exploited to steer Web marketing strategies, to improve Web site usability and in general to provide better service to online customers.

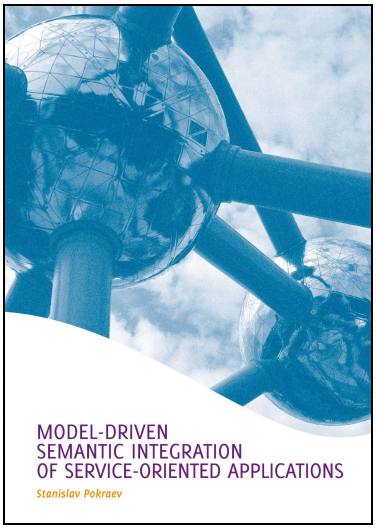
In recent years, with the widespread diffusion of broadband internet and with the vastly growing number of online services, the number of online customers and the amount of browsing (a.k.a. clickstream) data generated by them greatly increased. Processing and modelling huge volume clickstream data in practice poses difficulties for traditional WUM techniques. Efficient online Web usage mining algorithms, that process and model the data stream incrementally, on-the-fly, are needed to take up the challenge.

In this book our main goal is to model the behaviour and changes of the behaviour of Web users over time considering the aforementioned harsh constraints. Both the design and maintenance of compact and efficient individual user profiles and monitoring their changes over time are largely unexplored areas in (online) Web usage mining and this forms the main challenge in our work.

Model-Driven Semantic Integration of Service-Oriented Applications

Ph.D. thesis abstract
Stanislav Pokraev

Promotor: Prof.dr.ir. R.J. Wieringa
Copromotor: Prof.dr. M. Reichert
Date of defense: October 22, 2009



In this thesis, we propose a method for the semantic integration of service-oriented applications. The distinctive feature of the method is that semantically-enriched service models are employed at different levels of abstraction (from business requirements to software implementation) to deliver flexible integration solutions.

In Chapter 2, we start with analyzing the most cited interoperability definitions and derive common characteristics of interoperability. Next, we use these common characteristics to define what interoperability means and identify three different levels of interoperability, namely, syntactic, semantic and pragmatic interoperability. Finally, we study literature from different areas and identify possible interoperability problems at each of the interoperability levels.

In Chapter 3, we present a short history of the enterprise-application-integration (EAI) approaches, discuss their shortcomings and argue what is required to address these shortcomings. We identify three main aspects of the EAI problem. The first aspect concerns the difference in the information models of the systems that have to be integrated. The second aspect concerns the differences in the interaction protocols of the systems. Finally, the third aspect concerns the complexity of building EAI solutions.

Service-Oriented Architecture (SOA), Knowledge Representation (KR) and Model-Driven Architectures (MDA) have been proposed as solutions to each of the indentified problems. In Chapter 3, we argue that, since the problem aspects of current EAI approaches always occur together, SOA, KR and MDA should be combined to deal with the problem as a whole.

In Chapter 4, we define a conceptual framework for service modeling. The purpose of the framework is to serve as a common semantic meta-model that enables the description, integration and reasoning about (integrated) service-oriented applications. Using the framework one can model the domain of a system, the interactions among its components and their relations, and reason whether these components are interoperable. We expect that our framework will have a wide spectrum of application, e.g., can be used to model services at a business, application and component level, thus beyond the usual domain of web services.

In Chapter 5, we present a method for the semantic integration of service-oriented applications. We start by identifying necessary conditions for semantic and pragmatic interoperability of service-oriented applications. Next, we propose an integration method that enables business-domain experts to explicitly specify an integration solution at a higher level of abstraction. The abstract solution is then (semi-)automatically transformed to a software solution by adding technical details by the IT experts. Finally, we present a method to verify formally whether the proposed integration solution meets the identified conditions for interoperability.

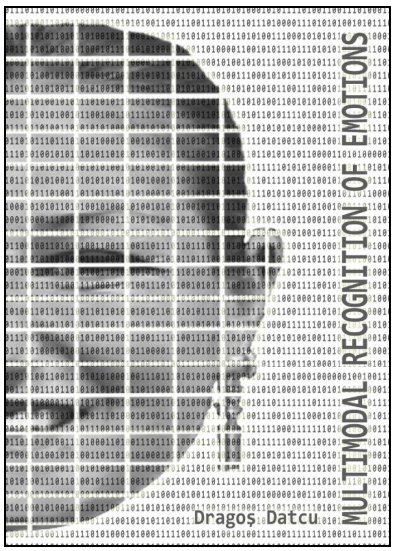
In Chapters 6 to 9, we validate our integration method by applying it in a particular context, using particular technologies. In Chapter 1, we identified a number of requirements for integration methods in general. To verify whether our method meets these requirements we make a number of claims and provide arguments for their validity. We do this by applying our method in a concrete context using concrete technologies. For that purpose, we solve two integration problems from order-management domain and travel domain, respectively. When applying our integration method we observe a number of effects. We analyse our observations and argue to what extent our integration method meets the requirements defined in Chapter 1.

Finally, in Chapter 10, we summarise the conclusions of this thesis and identify some topics for further research.

Multimodal Recognition of Emotions

Ph.D. thesis abstract
Dragoş Datcu

Promotores: Prof.dr. H. Koppelaar and Prof.dr.drs. L.J.M. Rothkrantz
Date of defense: October 27, 2009



Multimodal recognition of emotions has been lately extensively studied by several research groups worldwide. The race for making computer programs to be able to read emotions has been motivated by the potentially wide range of applications which involve human-machine interfaces. The emotion-recognition mechanisms which now represent true engineering milestones for research area, will definitely represent standards to empower useful devices in every-day life of people in the near future. This thesis proposes different approaches for automatic recognition of emotions by considering vision and speech data. The major characteristic of the recognition is the robustness to various working contexts like face orientation, illumination, subject's gender, age and skin colour.

The modalities have been investigated separately and together in order to identify which models lead to better recognition results. The recognition process implies the classification of six categories, according to the prototypic emotions as defined by Ekman.

The facial-expression classification models have been adapted and tested on samples from the unimodal Cohn-Kanade database and on the bimodal Enterface05 database.

By using the action-unit annotations and by studying the data-set outliers, we obtained well-balanced

databases of facial expressions. In addition to building models for facial-expression analysis, we have focused also on the detection of action units. The work is significant because it allows for more flexibility in decoding facial expressions.

Eventually, the facial expressions are identified using static and dynamic models. In contrast to static models which attempt the classification from separate images, dynamic models use extra clues regarding dynamic shape and texture changes from video data. In either case, we have used parameter facial representations from adapted local binary patterns, Viola&Jones features, geometric and optical flow features. For dynamic analysis of data, we separated the influence of speech on the face appearance. In the research, we proposed a version of the Adaboost.M2 multi-class classifier and used this implementation in the context of analysing large sets of visual features for facial expression recognition. The extraction of specific indicators of emotion from speech audio data has been realized using prosodic features and classification models like GentleBoost and hidden Markov models.

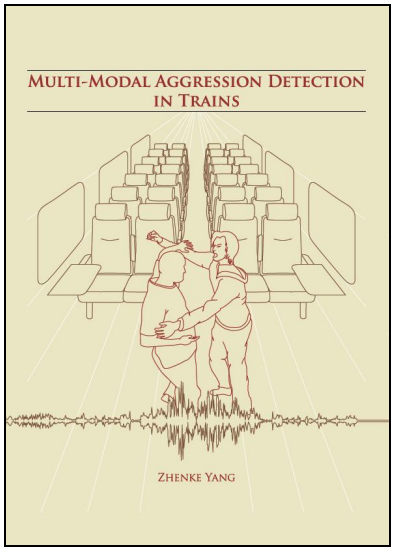
In order to process real-life data, we have done research on various multimodal data-fusion techniques. The fusion is firstly assumed to increase the confidence of the recognition results compared to the results of unimodal processing of emotions. Subsequently, applying fusion on face and voice data aims at decreasing the ambiguity of the classification when there is no emotion consistency among modalities. We used the emotion-recognition models which were presented in this thesis for the implementation of an on-line software prototype. The system has been described and showed in several conference papers and during the demo sessions of international conferences.

The set of audio and video emotion recognizers are eventually integrated using a common multimodal framework. We have developed a working prototype which allows for loosely coupled asynchronous communication between multiple processing components. Based on the multimodal framework, we further developed an application for detecting aggression in train compartments.

Multi-Modal Aggression Detection in Trains

Ph.D. thesis abstract
Zhenke Yang

Promotor: Prof.dr. H. Koppelaar
Copromotor: Prof.dr.drs. L.J.M. Rothkrantz
Date of defense: October 29, 2009



In many public places multiple sensing devices, such as cameras, are installed to help prevent unwanted situations such as aggression and violence. At the moment, the best solution to reach a safe environment requires human operators to monitor the camera images and take appropriate actions when necessary. In the wake of the terrorist attacks of September 11, 2001, there has been a rapid growth in the volume of security cameras and other sensing devices for anti-terrorism and other security purposes. The increased application of these, often multi-modal, sensors has caused a digital data explosion that human operators have difficulty to keep up with. The need for a fully or partially automated system becomes all the more prevailing.

The main aim of this thesis is to report on our work to address the complex challenges that arise within the context of multi-modal automatic surveillance applications. In this thesis work, a multi-modal aggression-detection system was built that fuses audio and video data from sensors located in a train compartment. Compared to previous work, we adopt a more human centered approach to the detection problem by extracting knowledge and rules from security experts. The aggression-detection system is based on many hours of observing and studying professional operators at work as they analyze and respond on surveillance data.

Our aggression-detection approach is essentially divided into two models: (1) the observation model which describes how low-level features from observations are combined into high-level concepts and (2) the reasoning model in which high-level concepts are reasoned with in order to infer the presence of aggression.

In the observation model, feature-extraction algorithms are used to transform audio and video signals into features, which are combined by classification algorithms into high-level concepts. In the thesis, an analysis is made of the train compartment in particular, on the objects and situations that may be encountered in the train compartment. This analysis is formalized in a train-aggression ontology. In addition an overview of relevant audio and video feature-extraction and classification algorithms is given. Also the JDL model is introduced as a way to structure the wide range of available algorithms.

In the reasoning model knowledge of the human expert and high-level reasoning is used to infer the presence of aggression. In essence this boils down to combining the results of the observation model to a description of the current scenario, and comparing this to known scenarios. If the current scenario is similar to a known unwanted scenario or if the current scenario deviates too much from a known normal scenario, an alarm situation may be announced. There are a number of different approaches to accomplish the inference. In this thesis, three different inference methods are explored for their merits in aggression detection: expert-system-based reasoning, Bayesian reasoning and self-organization/emergent reasoning.

To test and verify the results, several experiments were conducted in a real train. During the experiments, actors had to perform scenarios as described in storyboards. The storyboards where previously validated by security experts for their realism. As the actors performed the scenarios data was captured using multiple cameras and microphones. The acquired data was annotated using the vocabulary from the train-aggression ontology and used as ground truths for the evaluation of the aggression-detection system.

Many Lists, Many Announcements

H. Jaap van den Herik
TiCC
Tilburg University

Artificial Intelligence is instrumental in many disciplines. At first, it was related to computer science, later to computing science and logic. Then the applications came in: AI and Medicine, AI and Law, AI and Economics, AI and Language, etc. Nowadays we also collaborate with supercomputers (e.g., the Go program MOGO-TITAN). The diversity of applications also has consequences for the lists of announcements. Moreover the announcements themselves are diversified. We start with the latter.

Below we see the following four items: Ph.D. defence announcements (inclusive a Honoris Causa Award), Inaugural addresses, Dies address, Farewell speech.

Recently, we received the NBIC list. NBIC stands for Netherlands Bioinformatic Centre. Your editor was facing the opportunity of merging this list with our common lists or publishing this list in the original version and then merging the announcement in the December issue. I have chosen for the last opportunity, which implies for this issue that we have many lists and many announcements.

I would like to congratulate all Ph.D. defenders with the milestone reached and to wish them much success in their career. The newborn professors are congratulated with their Inaugural Addresses and Professor Dietz with his valedictory address. He has contributed more than his share to our community. Dear Jan, SIKS is grateful for your contributions and we wish you all the best.

PH.D. ANNOUNCEMENTS

Albrecht Zimmerman (May 29, 2009*). Mining Sets of Patterns,* K.U. Leuven, Promotor: Prof. L. De Raedt (KUL).

Tom Croonenborghs (September 3, 2009) *Model-Assisted Approaches for Relational Reinforcement Learning.* K.U. Leuven. Promotores: Prof.dr. M. Bruynooghe (KUL) and Prof.dr. H. Blockeel (KUL).

Björn Bringmann (September 21, 2009). *Mining Patterns from Structured Data.* K.U. Leuven. Promotor: Prof. L. De Raedt (KUL).

Fabian Güiza (September 23, 2009). *Predictive Data Mining in Intensive Care.* K.U. Leuven. Promotores: Prof.dr. M. Bruynooghe (KUL) and Prof.dr. H. Blockeel (KUL).

Robby Goetschalckx (September 29, 2009). *The Use of Domain Knowledge in Reinforcement Learning.* K.U. Leuven. Promotores: Prof.dr. M. Bruynooghe (KUL) and Prof.dr. H. Blockeel (KUL).

Fernando Koch (October 5, 2009). *An Agent-Based Model for the Development of Intelligent Mobile Services.* Utrecht University. Promotores: Prof.dr. J.-J. Ch. Meyer (UU) and Prof.dr. E. Sonenberg (University of Melbourne). Copromotor: Dr. F. Dignum (UU).

Rik Farenhorst and Remco de Boer (October 5, 2009). *Architectural Knowledge Management: Supporting Architects and Auditors.* VU Amsterdam. Promotor: Prof.dr. J.C. van Vliet (VU). Copromotor: Dr. P. Lago (VU).

Rui Li (October 6, 2009*). Mixed-Integer Evolution Strategies for Parameter Optimization and Their Applications to Medical Image Analysis.* Leiden University. Promotor: Prof.dr. T. Baeck.

Peter Hofgesang (October 8, 2009). *Modelling Web Usage in a Changing Environment.* VU Amsterdam. Promotor: Prof.dr. A.E. Eiben (VU). Copromotor: Dr. W. Kowalczyk (VU).

Professor Tim Berners-Lee (October 20, 2009). *World Wide Web*. Erepromotor: Prof.dr. A.T. Schreiber (VU).

Stanislav Pokraev (October 22, 2009). *Model-Driven Semantic Integration of Service-Oriented Applications*. Twente University. Promotor: Prof.dr.ir. R.J. Wieringa (UT). Copromotor: Prof.dr. M. Reichert (University of Ulm). Assistent promotor: Dr.ir. M.W.A. Steen (Novay).

Datcu Dragos (October 27, 2009). *Multimodal Recognition of Emotions.* Delft University of Technology. Promotores: Prof.dr. H. Koppelaar (DUT) and Prof.dr.drs. L.J.M. Rothkrantz (KMA).

Zhenke Yang (October 29, 2009). *Multi-Modal Aggression Detection in Trains.* Delft University of Technology. Promotor: Prof.dr. H. Koppelaar (DUT). Co-promotor: Prof.dr.drs. L.J.M. Rothkrantz (KMA).

Wouter Koelewijn (November 4, 2009). *Privacy en Politiegegevens.* Leiden University. Promotores: Prof.dr. H.J. van den Herik (UL/UvT) and Prof.dr. A.H.J. Schmidt (UL). Copromotor: Dr. L. Mommers (UL) .

Mounia Belmamoune (November 17, 2009). *Spatio-Temporal Framework for Integrative Analysis of Zebrafish Developmental Studies.* Leiden University. Promotor: Prof.dr. J.N. Kok (UL). Copromotor: Dr. F. Verbeek (UL).

Stephan Raaijmakers (December 1, 2009). *Multinomial Language Learning: Investigations into the Geometry of Language.* Tilburg University. Promotores: Prof.dr. W.M.P. Daelemans (Antwerpen University) and Prof.dr. A.P.J. van den Bosch (UvT).

Tim Cocx (December 2, 2009). *Algorithmic Tools for Data-Oriented Law Enforcement.* Leiden University. Promotor: Prof.dr. J.N. Kok (UL) Copromotor: Dr. W. Kosters (UL).

Igor Berezhnoy (December 7, 2009). *Digital Analysis of Paintings.* Tilburg University. Promotores: Prof.dr. E.O. Postma (UvT) and Prof.dr. H.J. van den Herik (UvT).

Toine Bogers (December 8, 2009). *Recommender Systems for Social Bookmarking.* Tilburg University. Promotor: Prof.dr. A.P.J. van den Bosch (UvT).

Dory Reiling (December 11, 2009). *Technology for Justice, how information technology can support judicial reform.* VU University Amsterdam. Promotores: Prof.mr. A. Oskamp (VU) and Prof.dr. A. Harding (University of Victoria, Canada).

NBIC PH.D. ANNOUNCEMENTS

Fabrice Colas (March 4, 2009). *Data Mining Scenarios for the Discovery of Subtypes and the Comparison of Algorithms.* Leiden University. Promotor: prof. J.N. Kok (KUL).

Richard Notebaart (May 6, 2009). *Integrative Bioinformatics of Metabolic Networks.* CMBI, Radboud University Medical Centre. Promotores: Prof. B. Teusink (VU) and Prof. R. Siezen (RUN).

André de Vries (June 3, 2009). *The Value of Haplotypes.* Rijksuniversiteit Groningen. Promotor: Prof. dr. R.M.W. Hofstra (RUG).

Anand Gavai (June 8, 2009). *Bayesian Networks for Omics Data.* Wageningen University and Research Centre. Promotores: Prof. J.A.M. Leunissen (WUR) and Prof. M. Muller (WUR).

Serge Smeets (June 22, 2009). *Genetic and Functional Analysis of Head and Neck Carcinogenesis.* Vrije Universiteit Amsterdam. Promotores: Prof. C.R. Leemans (VU) and Prof. R.H. Brakenhoff (VU).

Pieter Neerincx (September 14, 2009). *Webservices for Transcriptomics.* Wageningen University. Promotor: Prof.dr. J.A.M. Leunissen (VU).

Yunlei Li (September 20, 2009). *Exploiting Noisy and Incomplete Biological Data for Prediction and Knowledge Discovery.* Delft University of Technology. Promotor: Prof.dr. M.J.T. Reinders (TUD).

Suzanne Smit (September 22, 2009). *Statistical Data Processing in Clinical Proteomics.* Universiteit van Amsterdam. Promotores: Prof.dr. A.K. Smilde (UVA) and Prof.dr. C.G. de Koster

(UVA). Copromotor: Dr.ir. H.C.J. Hoefsloot (UVA).

INAUGURAL ADDRESSES

In the next months the following inaugural addresses will take place.

Dr. T.M. Heskes (October 8, 2009). *Computers met hersenen.* Radboud University Nijmegen.

Dr. R. Verbrugge (May 25, 2010). Title to be announced. Groningen University.

Dr. R. Leenes (June 11, 2010). Title to be announced. Tilburg University.

DIES ADDRESS

Prof.dr. F.A.M. van Harmelen (October 20, 2009). *Web en Wetenschap: op weg naar Science 2.0.* Vrije Universiteit Amsterdam.

FAREWELL ADDRESS

Prof.dr. J. Dietz (October 16 , 2009) *Is it ΦΘΨ or bullshit?* Delft University of Technology.

Section Editor
Richard Starmans

SIKS Day 2009

INTRODUCTION

On November 16, 2009, the School for Information and Knowledge Systems (SIKS) organizes its annual SIKS day. The location will be Grand Hotel Karel V in Utrecht.

The main aim of the event is to give SIKS-members, participating in research groups all over the country, the opportunity to meet each other in an informal setting and to inform them about current developments and some new activities and plans for the coming year. This year we also celebrate the fact that our school has been re-accredited by KNAW this summer for another period of six years. A small scientific symposium will be organized at the SIKS day as well.

PROGRAM

10.00-10.30	Coffee and Tea
10.30-10.45	Welcome by Hans Akkermans (VU), Chair Board of Governors SIKS
10.45-11.30	*Self-Organizing Access and Storage of Correlated Data: Crossing the frontier of structured data management* by Peter Boncz (CWI)
11.30-12.15	*Knowlege Representation on the Web: What to do when success is becoming a problem?* by Frank van Harmelen (VU)
12.15-12.30	*SIKS: Accreditation Outcome and Future Plans* by Roel Wieringa (UT), Scientific Director SIKS
12.30-13.45	Lunch
13.45-14.00	*The SIKS PhD Advisory Board: Going where the wild things are* by Nieske Vergunst (UU), Chair Phd Advisory Board
14.00-14.45	*The Minimum Description Length Principle for Data Mining* by Arno Siebes (UU)
14.45-15.15	Coffee and Tea
15.15-16.00	*On the Usability of Business Process Models: A formal and empirical approach* by Hajo Reijers (TU/e)
16.00-16.45	*Professor Kripke, Let me Introduce Professor Nash: Logic for economic mechanism design* by Michael Wooldridge (Liverpool, UK)
16.45-18.00	Drinks

By inviting these researchers we hope to have selected the right ingredients for a memorable day. All members of our research school (research fellows, associated members and Ph.D.-students) as well as the members of SIKS' Advisory Board and our alumni are invited to participate. Abstracts will be made available soon.

REGISTRATION

For participation, please fill in the registration form at the SIKS-site.

Workshop "Engineering Societies in the Agents' World" for SIKS-Ph.D. Students

The 10th Annual International Workshop "Engineering Societies in the Agents' World" (ESAW 2009) will be held at Utrecht University, The Netherlands on the 18th, 19th, and 20th of November, 2009.

Following successful editions since 2000, the 10th edition of ESAW remains committed to the use of the notion of multi-agent systems as seed for

animated, constructive, and highly inter-disciplinary discussions about technologies, methodologies, and tools for the engineering of complex distributed applications. While the workshop places an emphasis on practical engineering issues and applications, it also welcomes theoretical, philosophical, and empirical contributions, provided that they clearly document their connection to the core applied issues.

As a result of the cooperation between SIKS and the BPM 2009 organisation, SIKS-Ph.D. students can participate for free in the workshops and tutorial program of the conference. There is a fixed number of places available for SIKS. The workshops / tutorials are part of the Advanced Components stage of the school's educational program. Therefore, Ph.D. students working in the field of Enterprise Information Systems and Multi-Agent Systems are strongly encouraged to participate.

More details on registration will be made available on the website in due course.

SIKS Basic Course "Research Methods and Methodology for IKS"

INTRODUCTION

On November 25-27, 2009, the School for Information and Knowledge Systems (SIKS) organizes the annual three-day course "Research Methods and Methodology for IKS". The location will be Conference center Woudschoten in Zeist. The course will be given in English and is part of the educational Program for SIKS-Ph.D. students. Although the course is primarily intended for SIKS-Ph.D. students, other participants are not excluded. However, their number of passes will be restricted and depends on the number of SIKS-Ph.D. students taking the course.

"Research Methods and Methodology for IKS" is relevant for all SIKS-Ph.D. students (whether working in computer science or in information science). The primary goal of this hands-on course is to enable these Ph.D. students to make a good research design for their own research project. To this end, it provides an interactive training in various elements of research design, such as the conceptual design and the research planning. But the course also contains a general introduction to the philosophy of science (and particularly to the philosophy of mathematics, computer science and AI). And, it addresses such divergent topics as "the case-study method", "elementary research methodology for the empirical sciences" and "empirical methods for computer science".

"Research Methods and Methodology for IKS" is an intense and interactive course. First, all students enrolling for this course are asked to **read some pre-course reading material,** comprising some papers that address key problems in IKS-methodology. These papers will be sent to the participants immediately after registration. Secondly, all participants are expected to give a **brief characterization of their own research project/proposal,** by answering a set of questions, formulated by the course directors, and based on the aforementioned literature. We believe that this approach results in a more efficient and effective course; it will help you to prepare yourself for the course and this will increase the value that you will get from it.

COURSE COORDINATORS

Hans Weigand (UvT), Roel Wieringa (UT), John-Jules Meyer (UU), Hans Akkermans (VU) and Richard Starmans (UU).

PROGRAM

The program will be announced in due course.

REGISTRATION

In the conference center there is a limited number of places and there is interest from other groups in the topic as well. Therefore, an early registration is required. For registration you are kindly requested to fill in the registration form.

SIKS Basic Courses "Agent Systems" and "System and Architecture Modelling"

INTRODUCTION

From December 7-10, 2009, the School for Information and Knowledge Systems (SIKS) organizes two basic courses "Agent Systems" and "System and Architecture Modelling". Both courses will be given in English and are part of the obligatory Basic Course Program for SIKS-Ph.D. students. Although these courses are primarily intended for SIKS-Ph.D. students, other participants are not excluded. However, their number of passes will be restricted and depends on the number of SIKS-Ph.D. students taking the course.

Location: Landgoed Huize Bergen, Vught

Date: December 7-10, 2009

SCIENTIFIC DIRECTORS

- Prof. dr. W.-J. Van den Heuvel (UvT), System and Architecture Modelling
- Dr. P. van Eck (UT), System and Architecture Modelling
- Prof.dr. J.-J. Ch. Meyer (UU), Agent Systems
- Prof. dr. C. Witteveen (TUD), Agent Systems
- Prof.dr. C. Jonker (TUD), Agent Systems

PROGRAM

The program is not available yet, but may include the following topics:

Agent Systems

- Introduction multi-agent systems:
- Agent logics, agent theories;
- Agent architectures;
- Agent programming;
- Norms/ institutions/deontic logic,
- Planning, coordination;
- Conflict resolution in MAS;
- Negotiation, mechanism design and auctions.

System and Architecture Modelling

- Information, function, and process modeling;
- Architecture for IKS;
- Intro to business-ICT alignment;
- Enterprise architecture;
- Service-Oriented Computing.

REGISTRATION

In the conference center there is a limited number of places and there is interest from other groups in the topic as well. Therefore, an early registration is required.

Deadline for registration for SIKS-Ph.D. students: November 15, 2009.

After that date, applications to participate will be honoured in a first-come first-serve manner. Of course, applications to participate from other interested groups are welcome already. They will receive a notification whether they can participate as soon as possible.

For registration you are kindly requested to fill in the registration form.

Arrangement 1 includes single room, all meals, and course material. Arrangement 2 includes two lunches, one dinner and course material. So no stay in the hotel and no breakfast.

ANNOUNCEMENTS

Call for Participation

SIKS Workshop HART 2009

November 21, 2009, Utrecht

Human-Agent-Robot Teamwork Workshop http://jeffreymbradshaw.net/HART/

Co-located with the 10th International Workshop on Engineering Societies in the Agents' World (ESAW 2009) in Utrecht, the Netherlands (http://www.cs.uu.nl /esaw2009/) organized in collaboration with SIKS (http://www.siks.nl/).

OVERVIEW

Teamwork has become the most widely accepted metaphor for describing the nature of multi-robot and multi-agent cooperation. The key concept usually involves some notion of communication, shared knowledge, goals, and activities that function as the glue that binds team members together. By virtue of a largely reusable explicit formal model of shared intentions, team members attempt to manage general responsibilities and commitments to each other in a coherent fashion that both enhances performance and facilitates recovery when unanticipated problems arise. For example, a common occurrence in joint action is when one team member fails and can no longer perform in its role. A general teamwork model might entail that each team member be notified under appropriate conditions of the failure, thus reducing the requirement for special-purpose exception-handling mechanisms for each possible failure mode.

Whereas early research on teamwork focused mainly on interaction within groups of autonomous agents or robots, there is a growing interest in better accounting for the human dimension. Unlike autonomous systems designed primarily to take humans out of the loop, the future lies in supporting people, agents, and robots working together in teams in close and continuous human-robot interaction.

What kinds of foundational software systems are needed in support of human-robot teams? The multi-agent-systems community has been focusing on how distributed software agents can jointly perform tasks. For software agents and robots to participate in teamwork alongside people in carrying out

complex real-world tasks, they must have some of the capabilities that enable natural and effective teamwork among groups of people. Just as important, developers of such systems need tools and methodologies to assure that such systems will work together reliably and safely, even when they are designed independently and operated with reduced human oversight.

PROGRAM

Participation in the program is by invitation only. Invitations will be issued to selected participants. Some presentations may be turned into chapters for a published volume.

PARTICIPATION

There is no cost for participation. The workshop is open to all interested parties though, due to limited seating, we may not be able to honour all requests.

SPONSORSHIP

Thanks to the SIKS Research School for helping fund the workshop.

CONTACTS

- Maarten Sierhuis (NASA Ames):
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  http://homepage.mac.com/msierhuis/Menu8.html
- Jeffrey M. Bradshaw (IHMC):
  jbradshaw@ihmc.us
  http://www.ihmc.us/users/user.php?UserID=jbradshaw
- Jurriaan van Diggelen (TNO) (Local organization):
  jurriaan.vandiggelen@tno.nl
  http://cm.tm.tno.nl/index.php/nl/diggelenvan

Call for Communications

Dutch Belgian Database Day 2009 (DBDBD 2009)

November 30, 2009
Delft, the Netherlands

The Dutch Belgian Database Day (DBDBD) is a yearly one-day workshop organized in a Belgian or Dutch university, whose general topic is database research. DBDBD invites submissions (1 page abstract) on a broad range of database and database-related topics, including but not limited to data storage and management, theoretical database issues, database performance, data mining, information retrieval, data semantics, querying, ontologies etc. Based on the submissions, the workshop will be organized in different sessions each covering a particular topic.

Participation is free for all SIKS-members (Ph.D. students, research fellows, senior research fellows and associated members).

At the DBDBD, junior researchers from the Netherlands and Belgium can present their recent results. It is an excellent opportunity to meet up with your Belgian/Dutch colleagues, and to get informed about the (recent) database-related research performed in Belgian/Dutch universities. The workshop is also open to non-Belgian/Dutch participants (presentations are in English).

The DBDBD 2009 is organized under auspices of SIKS, the Dutch research school for information and knowledge systems. This year, DBDBD will be held in the Aula Congrescentre of the TUDelft, located on the university campus, on Monday November 30, 2009.

The workshop consists of a number of oral presentations. There are no printed proceedings. Abstracts of talks will be published on the workshop's website:
http://www.wis.ewi.tudelft.nl/index.php/dbdbd2009

TOPICS OF INTEREST

Any topic related to databases, including but not limited to: data storage and management, theoretical database issues, database performance, data mining, information retrieval, data semantics, querying, ontologies, ...

SUBMISSION

The DBDBD has a tradition of favouring presentations by junior researchers. Proposals for presentations should be made before or on November 1, 2009. The format is a 1-page pdf-document, to be sent to: dbdbd09@gmail.com.

Each submission should contain:

- the title of the talk;
- the name of the prospective speaker;
- his/her affiliation;
- a one-page abstract;
- if applicable: reference(s) to papers covered by the proposed presentation.

REGISTRATION AND WORKSHOP VENUE

See the workshop's website.

IMPORTANT DATES

November 12, 2009: Submission Deadline (1-page abstract):
November 19, 2009: Notification

November 20, 2009: Program online
November 23, 2009: Registration deadline
November 30, 2009: Dutch-Belgian Database Day

LOCAL ORGANIZERS

- Dr.ir. Jan Hidders, TUDelft
- Prof.dr.ir. Geert-Jan Houben, TUDelft

Call for Participation

AI-2009
Cambridge, UK, December 15-17, 2009

http://www.bcs-sgai.org/ai2009/

Organised by BCS SGAI: The British Computer Society Specialist Group on Artificial Intelligence (an ECCAI Member Society).

INVITATION TO REGISTER

AI-2009 offers the perfect opportunity for you to update your knowledge of current AI developments and applications, and to meet with leading AI practitioners in a relaxed social environment. This year's conference brings technical papers on the latest developments in AI, presentations from industry practitioners with practical experience of applying AI in the real world, and a range of workshops – ideal for those seeking to expand and deepen their knowledge of a wide range of AI techniques. All this in the historic surroundings of Peterhouse, Cambridge's oldest college.

The BCS SGAI is pleased to announce that:

- Registration prices are held below AI-2004 levels;
- Workshops are now FREE for those registering at the main conference.

WORKSHOPS (15TH DECEMBER)

There is a preliminary day (Tuesday December 15) devoted to half-day workshops on:

- Artificial Intelligence in Games
- Computational Optimisation
- Artificial Intelligence in Education
- Intelligent Systems in Accounting, Finance and Management

together with the 14th UK CBR Workshop (full day).

This day is included FREE for attendees of the main conference, but can be attended on its own at a special rate.

MAIN CONFERENCE

The main 2-day conference (Wednesday December 16 - Thursday December 17) includes:

- Keynote lectures:
  - Professor Chris Bishop (Microsoft Research) on *Third Generation Machine Intelligence*
  - Colin Cadas and Badr Haque (Rolls-Royce) on *Whatever Happened to Expert Systems?*
- Technical stream papers on Knowledge Discovery and Data Mining, Reasoning, Data Mining and Machine Learning, Optimisation and Planning, and Knowledge Acquisition and Evolutionary Computation.
- Application-stream papers on AI and Design, Commercial Applications of AI and other AI applications.
- Business and Industry Presentations with the theme of 'Real Artificial Intelligence'.
- Poster sessions on emerging research and applications in intelligent systems.
- The eighth annual BCS prize competition for the best live demonstration of Progress Towards Machine Intelligence.

This year's conference will be held at Peterhouse College in Cambridge. In addition to the formal sessions, the conference programme includes a welcome reception and a Gala Dinner. Plenty of time has been inserted into the programme to allow discussions with other delegates and time to make new contacts and renew old acquaintances.

AI-2009 offers a valuable opportunity to keep up to date with developments in AI and to share experiences in the practical issues of developing AI-based systems.

Discounts are available for members of SGAI, AISB and other ECCAI member societies, students and also for members of NCAF.

CONFERENCE COMMITTEE

All correspondence should be sent by email to the conference secretariat: sgai-conference@bcs.org.uk

- Conference Chair: Dr. Miltos Petridis, University of Greenwich
- Local Arrangements Chair: Dr Frans Coenen, University of Liverpool
- Workshop Organiser: Prof. Adrian Hopgood, De Montfort University
- Treasurer: Rosemary Gilligan, University of Hertfordshire
- Poster Session Organiser: Dr Nirmalie Wiratunga, The Robert Gordon University, Aberdeen

- Application Programme Chair: Richard Ellis, Stratum
- Deputy Application Programme Chair: Dr. Tony Allen, The Nottingham Trent University
- Technical Programme Chair: Professor Max Bramer, University of Portsmouth
- Deputy Technical Programme Chair: Dr. Frans Coenen, University of Liverpool
- Research Student Liaison: Dr. Alice Kerly, University of Birmingham and Dr. Kirsty Bradbrook
- UK CBR Organiser: Dr. Miltos Petridis, University of Greenwich
- Paper Administrator: Bryony Bramer
- Conference Administrator: Rachel Browning, BCS

Call for Papers

4th International Workshop on Value Modeling and Business Ontologies

Amsterdam, December 21-22, 2009

Special Theme:
"Ontological Foundations of Service Science"

The importance of modeling the essence of enterprises on a level that abstracts from business process details is increasingly recognized. Two recognized approaches are value modeling and REA. The REA (Resources, Events and Agents) model originating from the accounting domain is maturing to a conceptual framework and ontology for Enterprise Architectures in general. Value modeling is a business-modeling approach that focuses on the value objects exchanged in business networks and that is supported by the e3-value tool set.

The goals of this VMBO workshop are to bring together researchers with an interest in value modeling, REA systems, or related approaches, in order to present and discuss the current state of business modeling and to identify key areas for further research. This year, a major part of the program will be devoted exclusively on discussing the ontological foundations of service science from both a business and a software-engineering perspective.

If you are interested in joining, please submit a short paper (maximum of four pages) describing your main ideas. We encourage you to focus on the ideas in progress for which you would like to get feedback from other workshop participants.

Note that submitted papers will be reviewed only marginally. The program committee will use the papers to put together a final program; the aim is to accommodate all relevant papers. If necessary, a selection will be made in such a way that an overall good balance is achieved. Depending on the contributions, we may organize a special issue in a recognized journal.

PROGRAM COMMITTEE

- Geert Poels (chair)
- Hans Weigand (chair)
- Jaap Gordijn
- Nicola Guarino
- Pavel Hruby
- Paul Johannesson
- Bill McCarthy
- Michael Petit
- Erik Proper
- Yao-Hua Tan

TOPICS OF INTEREST

Topics of interest include

- Ontology-driven enterprise system development
- Ontology-based business modeling
- Conceptual modeling patterns founded on business ontologies
- Reference modeling using business ontologies
- Business ontology and Model-Driven Architecture
- Business rules modeling and policy management using business ontologies
- Business ontology as an internal control framework
- Ontology-based/semantic business process management
- Service-oriented business architectures
- Ontology-aware enterprise systems
- Goal modeling versus business modeling
- Business-ontology-supporting model or system interoperability
- Enterprise modeling for strategy exploration
- Profitability analysis of value constellations
- Value-modeling fundamentals
- Value-modeling applications
- Service-oriented enterprises
- Service ontologies

IMPORTANT DATES

Nov 15, 2009	Paper submission deadline
Nov 30, 2009	Notification of acceptance
Dec 7, 2009	Registration deadline
Dec 21-22, 2009	VMBO Workshop, Amsterdam

HOW TO SUBMIT

Send your short paper preferably in PDF format and following the (Proceedings) style of Springer LNCS

by email to H.Weigand@uvt.nl or Geert.Poels @UGent.be.

LOCAL ORGANIZATION

Jaap Gordijn, Elly Lammers, VU Amsterdam (www.vu.nl).
Sponsoring by research school SIKS (www.siks.nl).

RELEVANT LINKS

E3value: www.e3value.com
REA: https://www.msu.edu/~mccarth4/
http://reatechnology.com/
ISTC-CNR: www.loa-cnr.it
Previous VMBO workshop:
http://vmbo.blogs.dsv.su.se/

Call for Papers

DIR 2010

The primary aim of the Dutch-Belgian Information Retrieval (DIR) workshop is to provide an international meeting place where researchers from the domain of information retrieval and related disciplines can exchange information and present innovative research developments.

DIR 2010 will take place at the Radboud University Nijmegen, the Netherlands, on January 25, 2010 (note that contrary to the earlier announcement, DIR 2010 will be only one day).

DIR 2010 welcomes contributions related to any aspect of IR, including but not limited to:

- Forensic Search
- Privacy aspects of IR
- Retrieval models, language models
- Natural-language processing for IR, text summarization
- Information extraction, question answering
- Machine Learning for IR
- Query processing, thesaurus construction, user models
- Multimedia IR, video retrieval, audio and music retrieval, cross-media retrieval
- Multilingual and cross-lingual retrieval
- Structured document retrieval, XML-IR
- Image processing for IR, audio processing for IR
- Processing and search of e-mail, spam, blogs
- Categorization, topic tracking and event detection
- Web IR, distributed IR, enterprise search, search of digital libraries, intranet search, desktop search
- Collaborative filtering, recommender systems
- Efficiency and performance
- IR evaluation

SUBMISSION DETAILS

Papers may range from theoretical work to system descriptions. We encourage Ph.D. students to submit their research. We also welcome contributions from the industry when they focus on novel research directions. Submissions will be reviewed by at least two domain experts.

The conference language is English. Papers should describe original research. Please submit papers in pdf-format, using the ACM SIG Proceedings style (www.acm.org/sigs/pubs/proceed/template.html), with a maximum length of 8 pages.

DIR2010 uses the Easychair system for submitting, please use the form found at this url: www.easychair.org/conferences/?conf=dir2010.

Up-to-date information can be found at the DIR-website: http://www.ru.nl/ds/ifl/dir_2010/

IMPORTANT DATES

November 13, 2009: Paper submission deadline
December 11, 2009: Notification of acceptance
January 25, 2010: Conference at Radboud University Nijmegen

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