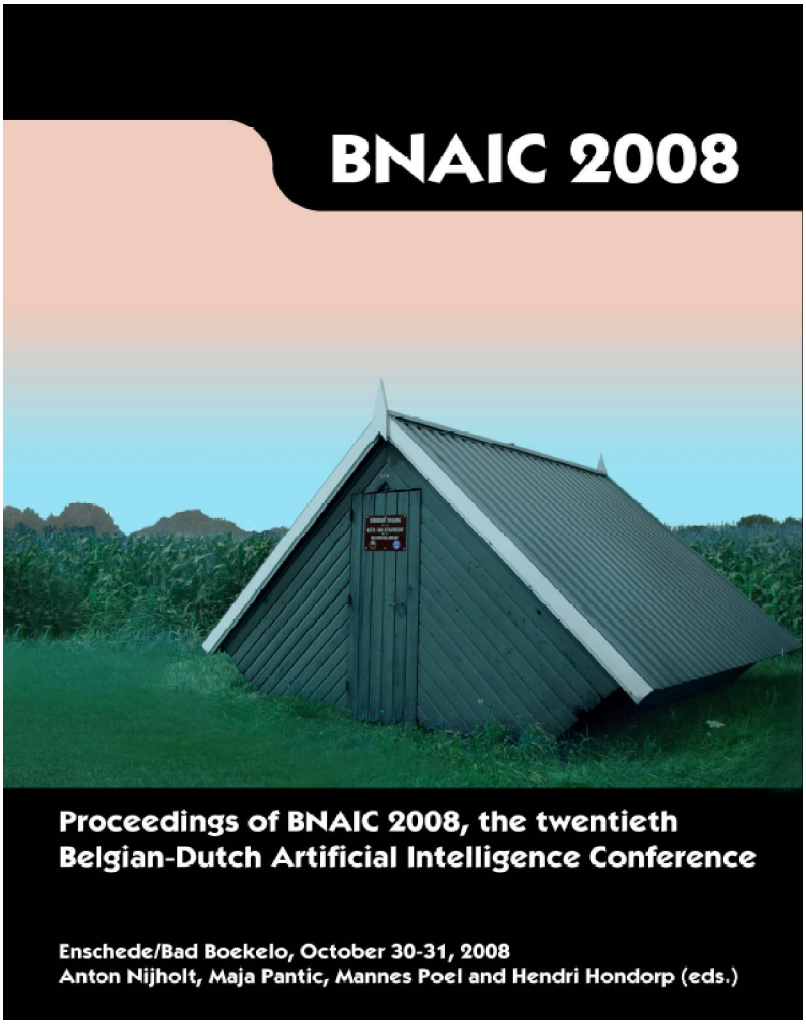
NEWSLETTER

BNVKI
AIABN

December 2008
Vol. 25, No. 6
ISSN 1566-8266



BNAIC 2008

AI in Eldercare

AI@uni.lu

News from the
Benelux Association
for Artificial Intelligence

Enough is Enough!?

Editor-in-chief

In chess notation the postfix '!?' is used for an interesting move that may not be best. With the title of this editorial I also want to express such an ambiguity. Let me explain.

As editor-in-chief you always welcome copy for your journal or newsletter. Mostly this does not come automatically, and you have to approach prospective writers actively. But sometimes enough is indeed enough! With the BNAIC 2008 just finished, this issue offers you an extensive retrospect on this event, with no less than 16 reports. And with 2 additional articles, 4 Ph.D. thesis abstracts and, of course, Jaap van den Herik's traditional end-of-the-year lists, this issue comprises a record of 36 pages. I even had no room left to include more than one photograph of the BNAIC event. So more visual impressions of the BNAIC have to wait for the next issue.

Anton Nijholt, contemplating on a well-done conference.

One of the articles may raise questions. Didn't we see already an article with the name 'AI@uni.lu' in the October 2006 issue? Yes, indeed. However, since our community decided during the last General Assembly Meeting to include Luxembourg in our community, I invited an update of this article. In fact more than an update, since when comparing the two you will see that the Luxembourg AI group is growing and growing, and developing rapidly into a very active and outstanding research group. So no more petty-bourgeois borders within our community, enough is enough! Welcome to Luxembourg. Witnessing their activity I just received a message from Martin Caminada announcing the first Luxembourg happening in the Benelux AI Event Series. Since I really had no space left to include this announcement in the "regular" place, I prominently include it here. So here it is: "On April 23-24, 2009, a symposium at the University of Luxembourg will be organised, entitled *Games, Argumentation and Logic Programming*. So far, already 8 invited speakers have agreed (Marina de Vos, Gerd Brewka, Krzysztof Apt, Henry Prakken, Davide Grossi, Patrizio Barbini, Martin Caminada, and Dov Gabbay). The symposium will be held in the building of the Faculty of Exact Sciences, and admission is free." Of course, in the next issue a more elaborate announcement will be included.

Enough is enough? Well, this growth brings me to the statement that sometimes one should strive for more and more. Only judging the length of the December contributions by Jaap van den Herik, we see a substantial increase over the last years, reflecting the growth in the number of SIKS and AI-related Ph.D. theses per year. Of course, we welcome such a trend very much. It is good for the success of our community that the number of researchers, Ph.D. defences and publications grows. I'll be glad to reserve already an increased number of pages in the December 2009 issue for Jaap's lists.

I hope this first issue of the *BNVKI Newsletter: News from the Benelux Association for Artificial Intelligence* provides you with much pleasant reading, and of course I wish you all a happy and fruitful 2009!

Front cover: The BNAIC 2008 Proceedings, edited by Anton Nijholt, Maja Pantic, Mannes Poel, and Hendri Hondorp.

The photograph on this page is by Alice Vissers.

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

TABLE OF CONTENTS

Enough is Enough!? 126

Table of Contents 127

BNVKI-Board News (Antal van den Bosch) 128

Minutes of the BNVKI/AIABN General Assembly (Ann Nowé) 128

BNAIC 2008 Conference (Bad Boekelo, October 30-31, 2008) 129
- 20th BNAIC in Bad Boekelo, Twente (Anton Nijholt and Maja Pantic) 129
- Session Reports 130
  - Applications (Ann Nowé) 130
  - Games & Entertainment I (Jos Uiterwijk) 131
  - Games & Entertainment II (Jaap van den Herik) 132
  - Intelligent Agents & MAS I (Virginia Dignum) 132
  - Intelligent Agents & MAS II (Niek Wijngaards) 133
  - Intelligent Agents & MAS III (Davide Grossi) 133
  - Intelligent Agents & MAS IV (Janneke Bolt) 134
  - Intelligent Agents & MAS V (Job Zwiers) 134
  - Intelligent Agents & MAS VI (Annette ten Teije) 135
  - Logic & Logic Programming (Cees Witteveen) 135
  - Machine Learning I (Marco Wiering) 136
  - Machine Learning II (Antal van den Bosch) 137
  - Machine Learning III (Peter Bosman) 138
  - Vision (Betsy van Dijk) 138
- The 2008 SKBS-Strukton Prize (Jaap van den Herik) 138

AAAI Fall Symposium: AI in Eldercare (Ben Kröse) 141

AI@uni.lu (Raymond Bisdorff, Pascal Bouvry, Christoph Schommer, Ulrich Sorger, Leon van der Torre, and Emil Weydert) 142

Ph.D. Thesis Abstracts 144
- Design and Implementation Strategies for IMS Learning Design (Hubert Vogten) 144
- Studies in Frequent Tree Mining (Jeroen de Knijf) 148
- Segmentation, Diarization and Speech Transcription: Surprise Data Unraveled (Marijn Huijbregts) 148
- On the Use of Independence Relations in Bayesian Networks (Ildikó Flesch) 149
- Topical Facets: Semantic Patterns between Documents and the Vocabulary (Eric Van Horenbeeck) 151

A Substantial Increase (Jaap van den Herik) 152

The NBIC List (Ruben Kok and Jaap van den Herik) 156

'De Connectie' (Joris de Ruiter) 157

SIKS (Richard Starmans) 157
- 5-Day Course "Human Technology Interaction" for SIKS-Ph.D. Students 157
- Advanced SIKS Course "Organizational Principles for IKS" 158

Conferences, Symposia, Workshops 159

Advertisements in the BNVKI Newsletter 159

Contact Addresses Board Members/ Editors BNVKI Newsletter / How to Subscribe? / Submissions 160

BNVKI-Board News

Antal van den Bosch

The end of 2008 brings good tidings. The board was delighted to learn that NOW's Vici programme has welcomed another laureate in AI. Rineke Verbrugge, working in the AI group of the University of Groningen, and a former member of our association's board, received the prestigious Dutch award for her proposal entitled "Cognitive systems in interaction: Logical and computational models of higher-order social cognition". Rineke's plan beautifully shows how current AI defies the traditional areas of humanities, computer science, and behavioral sciences; our inherent versatility may well work out as an advantage.

The board also looks back to a great twentieth BNAIC at Bad Boekelo, organised by the team of Anton Nijholt of the Human Media Interaction group at Twente University. We thank Anton and his team for a wonderfully prepared conference with a great atmosphere, with good content and enjoyable surroundings. The many session reports in this issue serve to preserve some of the key memories of this conference.

At the general assembly of our association held during BNAIC, we made an explicit point of welcoming aboard Luxembourg (metaphorically speaking; of course we mean AI researchers in Luxembourg), to become "BNVKI-AIABN: Benelux Association for Artificial Intelligence". The meeting did agree on keeping the household abbreviations: the bilingual name BNVKI-AIABN, as well as BNAIC, but to use English subtitles that express our intentions: "BNAIC: Benelux Artificial Intelligence Conference". The board also proposed to assign a common name to the events it endorses and sponsors: "Benelux AI Event Series".

All good intentions, to be realized in 2009. We hope to meet you again in the new year. Have a very good festive season and a happy 2009!

Minutes of the BNVKI/AIABN General Assembly

Friday, October 31, 2008
Bad Boekelo, Netherlands

Ann Nowé

Present: Antal van den Bosch (Chair), Virginia Dignum, Sien Moens, Annette ten Teije, Jos Uiterwijk, Ann Nowé, and 15 members.

1. Opening
Chair Antal van den Bosch opens the meeting at 13:20.

2. Minutes of the BNVKI General Assembly of November 6, 2007
The minutes are approved. C. Witteveen informs about the financial status of BNAIC'06. The board is still waiting to finalize the financial statement on BNAIC-2006, but the finalization will not involve any significant sum. The board has since 2006 adopted a written document with concrete financial agreements, mutually agreed on by BNVKI and BNAIC organizers.

3. BNAIC'08
The board is very pleased with the organisation of the current BNAIC and is happy to see that the number of participants reached 160. However, the board regrets that there are few participants coming from Belgium. J. van den Herik is asking about the hardcopy of the proceedings. Due to a mistake made by the printer, which was beyond the control of the organisers, the proceedings are not ready on time and will be sent to the participants later on.

4. Financial report
Virginia Dignum, treasurer, reports on the financial situation of the BNVKI. The BNVKI made quite some profit, the balance for 2007 is € 5147. This positive result is mainly due to the large profit made by the BNAIC'07. The total number of members is more or less a status quo. This number is however strongly linked to the number of participants at the BNAIC conferences. The treasurer concludes her exposition with a call for requests for sponsoring. The board announces that it has allocated € 2000 for sponsoring events (see also below).

5. Auditing committee
The auditing committee, consisting of members Jan Struyf (KULeuven) and Rui Li (Leiden University), checked the financial report and accorded it. Antal thanks Jan and Rui for their work and discharges them. Treasurer Virginia Dignum proposes a new auditing committee, to check the financial report to be delivered at the next General Assembly, to consist of Martin Caminada (University of Luxemburg) and Katja Verbeeck (Katholieke Hogeschool Sint-Lieven, Gent). This proposal is accepted by the assembly.

6. Progress report and plans for 2009
The chairman explains that the board decided to define 6 portfolios to define more explicitly the tasks of the different board members:

– Chair	Antal van den Bosch
– Secretary	Ann Nowé
– Treasurer (+ vice chair)	Virginia Dignum

– Newsletter editor-in-chief Jos Uiterwijk
– Students Annette ten Teije
– PR and sponsoring Sien Moens

This year the students have organised an NSVKI Student Symposium in Utrecht on June 6, 2008. There was no BNAIS conference this year.

The BNVKI is a member of ECCAI. Our representative is Hendrik Blockeel. BNVKI members have, via ECCAI, online access to *AI Communications*. This year no ECCAI fellows have been proposed from our society, because we reached the 5% limit for the ratio of ECCAI fellows versus BNVKI members. Next year we will again make a proposal; suggestions are welcome.

The board decided to look more actively for sponsoring via advertising in the newsletter. The contact person is Sien Moens, sien.moens @cs.kuleuven.be. Prices are set as follows:

- Whole page: € 400 for 2 months; € 600 for 4 months; € 900 for 1 year.
- Half page: € 300 for 1 month; € 450 for 4 months; € 675 for 1 year.
- Quarter page: € 200 for 1 month; € 300 for 4 months; € 450 for 1 year.

The board allocated a budget of € 2000 to sponsor AI-related events taking place in the Benelux. At least one of the organisers should be a BNVKI member. The request for sponsoring should be submitted at least 2 months before the event takes place and should include: a brief description of the topic, targeted audience and an estimate of the budget. On approval, the organisers should acknowledge the BNVKI support and provide a report to the *BNVKI Newsletter* afterwards. The BNVKI will advertise the event.

7. BNAIC'09

The board is happy to announce that Toon Calders and Karl Tuyls of the University of Eindhoven have offered to organize BNAIC 2009. Toon prepared a nice presentation to introduce the candidate organisers and the prospective venue: TU/e, main auditorium. The assembly applauds the offer.

Important dates:

- Submission time: June 2009
- Notification: Mid – End of August 2009
- Camera ready: Early – Mid September 2009
- Conference dates: 29 – 30 October 2009

8. BENELUX

As already announced at the previous general assembly, there is a mutual proposal to include Luxembourg in the BNVKI society. Luxembourg has a growing AI community and is currently not represented within ECCAI. The chairman explains that the association already uses the bilingual name BNVKI/AIABN since 1999. The board proposes to hold on to the name BNVKI/AIABN, but intends to express the Benelux scope by carrying an English subtitle: BNVKI/AIABN: Benelux Association for Artificial Intelligence. The members of Luxembourg present at the meeting can agree with this proposal, however they express their preference for renaming the association like BENELUX-AI. In the same vein, the board intends to hold on to the conference name "BNAIC", but proposes a subtitle expressing the Benelux scope: BNAIC, Benelux Artificial Intelligence Conference. The assembly decides to support the proposals of the board and the assembly also agrees with the board's proposal to assign a common name to the events it endorses and sponsors: Benelux AI Event Series.

9. Questions and end of meeting.

J. van den Herik expresses the idea of reintroducing an industrial track at the BNAIC conference. Next BNAIC's location seems to be an opportunity. It would also be good to foresee more time for the demo and poster sessions. There are no further remarks and the meeting is closed at 14:00.

BNAIC 2008 Conference

On October 30-31, 2008, the 20th Belgian-Dutch Conference on Artificial Intelligence (BNAIC 2008) was held in Bad Boekelo, the Netherlands. The conference was a great success. Below we present a general report by the organizers, 14 session reports, and a report on the 2008 SKBS-Strukton Prize.

20th BNAIC in Bad Boekelo, Twente

Anton Nijholt and Maja Pantic
HMI, University of Twente

On October 30 and 31, the 20th edition of the Belgian-Netherlands Conference on Artificial Intelligence was held at Bad Boekelo, near Enschede. The conference was organized by the Human Media Interaction group of the University of Twente. As usual, the conference was under the auspices of the Belgian-Dutch Association for Artificial Intelligence (BNVKI) and the Dutch Research School for Information and Knowledge Systems (SIKS). The conference aimed at presenting an overview of state-of-the-art research in artificial intelligence in Belgium, the Netherlands, and Luxembourg. The conference chairs for this

BNAIC edition were Anton Nijholt and Maja Pantic. There was a large team of the Human Media Interaction group involved in the organization. And, of course, a large program committee took care of the reviewing process.

The organizers received 108 submissions consisting of 44 regular full papers, 53 short papers, and 11 system demonstrations. A small committee chaired by the conference chairs made the final decisions. The acceptance rate of the regular papers was 80%. Of the short papers 75% was presented in oral sessions, the others were presented in poster sessions. In addition to the regular speakers and presenters BNAIC 2008 had two invited speakers, Wolfgang Wahlster (DFKI, Saarbrücken, Germany) with a talk on *Anthropomorphic Interfaces for the Internet of Things* and Ruth Aylett (Heriot-Watt University, Edinburgh, UK) with a talk on *Planning Stories – emergent narrative or universal plans?*

Four awards were presented during the conference. The prize for the best paper went to *From Probabilistic Horn Logic to Chain Logic* by N. Ferreira, A. Hommersom, and P. Lucas. The prize for the best application paper went to *Actor-agent Based Approach to Train Driver Rescheduling* by E.J.W. Abbink, D.G.A. Mobach, P.J. Fioole, L.G. Kroon, N.J.E. Wijngaards, and E.H.T. van der Heijden. The best demonstration award, sponsored by SKBS and Strukton, was shared by the demonstrations *Temporal Interaction between an Artificial Orchestra Conductor and Human Musicians* (D. Reidsma and A. Nijholt) and *A Generic Rule Miner for Geographic Data* (Joris Maervoet, Patrick De Causmaecker, and Greet Vanden Berghe). Finally, Jacolien van Rij from the University of Groningen received the KION Thesis Award for the best thesis in the field of artificial intelligence.

Bad Boekelo turned out to be a wonderful place to organize BNAIC. Most of the participants stayed one or two nights at this location and took time to enjoy social interactions during breakfasts, lunches and dinners. Since it was the 20th BNAIC the organizers offered an excellent dinner, preceded by an aperitif offered by the BNVKI, and followed by a performance of the folkgroup Gonnagles. Moreover, participants were made happy with a bag and t-shirt that allows them to prove that they indeed attended the 20th conference. Unfortunately, the hardcopy proceedings were not available during the conference and had to be sent by regular mail to the participants.

The conference was sponsored by Koninklijke Nederlandse Akademie van Wetenschappen (KNAW), Vereniging Werkgemeenschap Informatiewetenschap, Delft Cooperation on Intelligent Systems (D-CIS), Dutch Research School for Information and Knowledge Systems (SIKS), Netherlands Organisation for Scientific Research (NWO), Stichting Knowledge-Based Systems (SKBS), SKF Benelux, Belgium-Netherlands Association for Artificial Intelligence, Centre of Telematics and Information Technology (CTIT), and the Human Media Interaction (HMI) research group of the University of Twente.

Session Reports

Applications

Report by Ann Nowé
Vrije Universiteit Brussel

In the Applications session, four papers were presented. Three papers were related to planning and scheduling, while the fourth one was on information retrieval. Originally, a fifth presentation was planned in the program, but the paper *Distributed Perception Networks for Environmental Monitoring*, by Gregor Pavlin, was not presented.

The first presentation, entitled *Decentralized Online Scheduling of Combination-Appointments in Hospitals* by Ivan Vermeulen, Sander Bohte, Sylvia Elkhuizen, Piet Bakker, and Han La Poutré presented a multiagent approach to the scheduling of combined appointments for outpatients at multiple departments. The department agents rank all available timeslots with respect to schedule efficiency, and each department agent offers a set of the most efficient timeslots to the patient agent. The patient agent then selects and combines timeslots to make combined appointments. Two approaches have been considered, being: the patient agent selects the combination-appointment with the lowest summed cost of individual timeslots, ensuring that the most efficient combination-appointment is selected form the department's point of view; the second approach allows the patient agent to select his preferred combination from all combination-appointments. The multiagent approach also allows a hospital or department to set a desired level of efficiency yet fulfilling the patient preferences as good as possible.

The second paper was on the importance of link evidence in Wikipedia by Jaap Kamps and Marijn Koolen. The main objective of this work was to find out if the typical Wikipedia's link structure can be exploited to improve ad hoc information retrieval. The free encyclopaedia is densely linked and internal links in Wikipedia are typically based on words naturally occurring in a page, and link to

another semantically related entry. The main findings were, firstly: the Wikipedia link structure is a (possibly weak) indicator of relevance. Secondly, experiments on INEX ad hoc retrieval tasks revealed that if the link evidence is made sensitive to the local context then a significant improvement of retrieval effectiveness is observed. Hence, in contrast with earlier TREC experiments using crawled Web data, it has been shown that Wikipedia's link structure can help improve the effectiveness of ad hoc retrieval.

In the third contribution, *Reconfiguration Management of Crisis Management Services* by J.B. van Veelen, S. van Splunter, N.J.E. Wijngaards, and F.M.T. Brazier, a Generic Reflective Autonomous Management (GRAM) architecture to support continuous adaptation of complex systems involving multiple organisations was proposed. The GRAM architecture allows integrating different organisations by supporting the exchange of policies and service-level agreements between the layers of the different organizations. The prototype was illustrated by an appealing demo, which considered a setting of fire-fighters in multiple safety regions. The GRAM prototype will be extended within the FP7 ALIVE project.

The last paper presented in the session was *Determining Resource Needs of Autonomous Agents in Decoupled Plans* by Jasper Oosterman, Remco Ravenhorst, Cees Witteveen, and Pim van Leeuwen. The case that was considered is the turn-around process of planes at airports. During this process, a number of services need to be provided: e.g., de-boarding, cleaning, catering, fuelling, and boarding. Since these services are provided by different service providers, represented by different agents, coordination is an issue. In previous research, the airport activities and their constraints were modelled as a Simple Temporal Network (STN) and the temporal-decoupling algorithm introduced by Hunsberger [5] was applied in order to break it up into several local (i.e., agent-particular) temporal specifications. In the study, two important extensions are developed. First, a new algorithm is introduced to take into account the capacity – in terms of resources – of each ground handling agent for accomplishing its task. Second, before determining the order of tasks and consequently the capacity, the travel time between gates for each agent is taken into account. This makes the application much more realistic, since the actual travel times between gates strongly influence the required capacity. An advantage of the algorithm that has a quite modest time complexity is that it not only gives the amount of resources needed, but also where and when these should operate. This fourth paper concluded an interesting applications session.

Games & Entertainment I

Report by Jos Uiterwijk
MICC, Maastricht University

The first session on Games & Entertainment contained three interesting papers, all three dealing with the notion of 'adaptation' in game AI. This is an increasingly interesting topic, seeing the rapid growing of the market for video games.

The first paper presented was *Adaptive Intelligence for Turn-based Strategy Games*, by Maurice Bergsma and Pieter Spronck (Tilburg University), and presented by the latter. The paper is based on Bergsma's Master thesis at Maastricht University. The authors propose a game AI architecture for Turn-based Strategy (TBS) games, called ADAPTA (Allocation and Decomposition Architecture for Performing Tactical AI). It combines at a high level a task-decomposition scheme and at a lower level the use of machine-learning techniques. The experiments show that game AI developed with ADAPTA outperforms static opponents.

Next, Sander Bakkes presented the paper *Rapidly Adapting Game AI*, co-authored by Pieter Spronck and Jaap van den Herik (all of Tilburg University). The title refers to a novel approach to automatically gather domain knowledge for game AI which can be used immediately (i.e., without the need for a large number of adaptation trials and without resource-intensive learning). Experiments that apply the approach in an actual video game support their conclusion that rapidly adaptive game AI provides a strong basis for effectively adapting game AI in actual video games.

The last speaker was Joost Westra, presenting the paper *Modeling Agent Adaptation in Games*, co-authored by Frank and Virginia Dignum. This paper was presented before at the OAMAS workshop at AAMAS, May 2008, Lisbon. They show the benefits of a system that can generate games that can dynamically adapt themselves to the human users. They use autonomous agents for all the possible adaptable elements of such a game and show how the OperA agent-coordination model can be used to organize and control the autonomous agents. OperA turns out to be suited to define the overall requirements and flow of the games.

All in all a very interesting session, with three different views on how adaptation in games can be effectuated. Time will learn what type of adaptation will prove best.

Games & Entertainment II

Report by Jaap van den Herik
TiCC, Tilburg University

The session Games & Entertainment II contained three lectures on three different games, viz. Same Game, LOA, and Sokoban. Same Game and Sokoban are single-player games. LOA is a two-player game. When reporting on computer chess or computer Go an author is usually not tempted to describe the game and provide details on the strategy to follow. For these three games, such a decision is more difficult, since we may assume that not every reader is familiar with the games. Yet, we focus on the AI techniques, which the lectures highlighted in their presentation. Moreover, the techniques do exploit the domain-specific knowledge of the games to a large extent.

The first lecture given by Maarten Schadd (Maastricht University) was titled *Single-Player Monte Carlo Tree Search*. His co-authors were Mark Winands, Jaap van den Herik, Guillaume Chaslot, and Jos Uiterwijk. The point of departure was the observation that the well-known algorithms A* and IDA* fail without an accurate admissible evaluation function. The paper investigates whether Monte Carlo Tree Search (MCTS) is a viable alternative. MCTS is characterized by four stages: selection, expansion, simulation, and backpropagation. The stages selection and backpropagation are different in Single Player MCTS (SP-MTCS) with respect to the standard techniques as applied in MCTS. Schadd explained that SP-MCTS performed a straightforward Meta-Search extension. This is possible by the virtue of missing an opponent. The results were outstanding. For this moment they are the best of the world. Still, Maarten was able to point to possible improvements with potentially better results. The paper has been published and presented before (at the 6th Computer and Games Conference, Beijing 2008).

The second lecture was from the same stable. It was titled *Monte-Carlo Tree Solver* and presented by Mark Winands (Maastricht University). His co-authors were Yngvi Björnsson and Jahn-Takeshi Saito. The authors investigate the application of MCTS for the game Lines of Action (LOA). The idea was to develop an MCTS-Solver that plays narrow tactical lines better in sudden-death games (LOA is a sudden-death game). Experiments showed very good results (winning 65% of the games). In the discussion after the lecture the question was raised whether the game of LOA can be solved in the future. Mark Winands hesitatedly answered that it may be possible, but that it takes another 20 years. Precisely the double of number of BNAICs up to now. The paper has been published and presented before (at the 6th Computer and Games Conference, Beijing 2008).

The third lecture was by Francois van Lieshout (University of Liege). His lecture was titled *Hierarchical Planning and Learning for Automatic Solving of Sokoban Problems.* The co-authors were: Jean-Noël Demaret and Pascal Gribomont. The authors applied a Hierarchical Planning approach to Sokoban. They started to attempt to solve a Sokoban position by lower-level actions. If the attempt did not succeed they applied a Rearrangement Algorithm and tried again, possibly involving higher-level actions.

The experiments were followed by a comparison of the performances of their program with those of three well-known programs, viz. ROLLING STONE, ABSTRACT SOKOBAN, and AUTOMATIC SOKOBAN. From these three, ROLLING STONE is considered to be the best. A benchmark of 90 positions assessed the order. So, far, ROLLING STONE had solved 61 positions of the set of 90 positions. Van Lieshout *et al.*'s program solved 11 positions that ROLLING STONES could not solve, but failed at 2. The result was 70 out of 90. Quite a performance. The session was lively and attended by many. The results were entertaining as were the speakers.

Intelligent Agents & MAS I

Report by Virginia Dignum
Utrecht University

In the first Intelligent Agents and MAS session, on Thursday morning, two papers were presented, which provided two pretty different approaches on MAS.

The first paper *Individualism and Collectivism in Trade Agents* by Gert Jan Hofstede, Catholijn M. Jonker, and Tim Verwaart is based on the premise that Agent-Based Modeling can contribute to the understanding of international trade processes and posit that for this effect models including culture and cultural differences are required for realistic agent-based simulation of international trade. This paper discussed the implementation of the theory of cultural dimensions theory of Hofstede in a MAS simulation of trade. Based on agents endowed with different cultural values for individualism and collectivism, the simulation demonstrated that different trading decisions are achieved.

The second paper *Of Mechanism Design and Multiagent Planning* by Roman van der Krogt,

Mathijs de Weerdt, and Yingqian Zhang, focused on mechanism design. This paper studies the multi-agent planning problem from a mechanism-design perspective, showing how to incentivise agents to be truthful. They prove that the well-known truthful VCG mechanism is not always truthful in the context of optimal planning, and present some (domain-dependent) poly-time planning algorithms that fix it and maintain truthfulness in spite of their non-optimality.

Intelligent Agents & MAS II

Report by Niek Wijngaards
D-CIS Lab / Thales Research & Technology

The four presentations in the well-attended second session Intelligent Agents & MAS highlighted the importance of both theoretical and application-oriented work. The first lecture titled *Decentralized Learning in Markov Games* (by Peter Vrancx, Katja Verbeeck and Ann Nowé) was presented by Katja Verbeeck. In this more theory-oriented lecture Verbeeck addressed the challenge whether multiple learning automata can learn Markov Games – an extension from learning automata for Markov chains. The results show that a multi-agent approach and a learning-automata approach share the same pure equilibrium points in Markov Games.

The second lecture titled *Actor-Agent based Train Driver Rescheduling* (by Erwin Abbink, David Mobach, Pieter Jan Fioole, Leo Kroon, Niek Wijngaards, and Eddy van der Heijden) was presented by David Mobach. In this lecture, Mobach described the current results of D-CIS Lab and NS-Reizigers to realize an agent-based system for train-driver rescheduling. The crux of the agent-based system is that initially provided train duties are rescheduled via 'task exchange teams' in response to disruptions to the timetables during a day. The demonstration included in the presentation showed both a visualization tool for debugging the multi-agent system and graphical interfaces to insert disruptions and inspect changes to train-driver duties. At the end of the BNAIC 2008, this application paper was awarded the BNAIC 2008 Best Application Award.

The third lecture titled *The Third Agent-based Patient Admission Scheduling in Hospitals* (by Anke Hutzschenreuter, Peter Bosman, Ilona Blonk-Altena, Jan van Aarle, and Han La Poutré) was presented by Anke Hutzschenreuter. In this application-oriented lecture Hutzschenreuter described how the agent-based simulation tool, based on a case study at Catharina Hospital Eindhoven, was effectively used to show the effects of routing of different types of patients over a number of hospital units. The simulation tool was used to calculate the effects of, e.g., removing one hospital unit (a cost-saving intent), in relation to the then additionally required backup units (a much larger cost expense).

The fourth and final lecture titled *Evolutionary Dynamics for Designing Multi-Period Auctions* (by Tomas Klos and Gerrit Jan Van Ahee) was presented by Tomas Klos. In this more theory-oriented lecture, Klos described the challenge of understanding the interplay of seller strategies and buyer strategies, extending the work by Pardoe and Stone. By using many differently 'seeded' multi-period auctions, including an 'evolutionary' based strategy 'inheritance' mechanism, it is possible to study the emerging patterns: often choosing only one or two periods for a multi-period auction is better for the seller while the equilibrium strategy is dominant for the bidder.

Intelligent Agents & MAS III

Report by Davide Grossi
University of Luxembourg

The papers in this session all apply collective-intelligence techniques to tackle the issue of uncertainty, as it arises in different domains.

The first of these domains is automatic multi-issue negotiation. In *Opponent Modelling in Automated Multi-issue Negotiation Using Bayesian Learning*, by K.V. Hindriks and D. Tykhonov, the authors apply Bayesian learning techniques to the so-called negotiation dilemma (how can a negotiator maximize both its own outcome and the chance to reach an agreement?) by enabling the negotiating agents to learn the opponent's preferences. Experiments are run in order to validate the approach.

In *Collective Intelligent Wireless Sensor Networks* (by M. Mihaylov, A. Nowé, and K. Tuyls) learning techniques are deployed within a distributed sensor network, where sensors have to decide whether and when to enter in sleeping mode to maximize their own efficiency. However, in order to increase the lifetime of the network as a whole, the network needs to be able to correctly assess the energy level of each sensor. The paper presents a distributed algorithm to obtain such information, thereby effectively coordinating the sleep mode of the different sensors. The results are validated by simulations.

The problem of job-arrival uncertainty in a logistics context is studied in *Agent Performance in Vehicle Routing when the Only Thing Certain is Uncertainty* (by T. Mahr, J. Srour, M. de Weert, and R. Zuidwijk). In this work the authors compare centralized vs. decentralized (and agent-based) solutions to the vehicle routing problem, where a given number of trucks have to be optimally deployed within a load-pickup-deliver schema.

Finally, the last paper in the session (*Monitoring and Reputation Mechanisms for Service Level Agreement*, by O. Rana, M. Warnier, T.B. Quillinan, and F.M.T. Brazier) discusses the usefulness of the explicit representation of penalty clauses within languages for automatic negotiation and agreement. The incorporation of such clauses, it is argued, can deter non-compliant behaviour under the threat of enforcement, thereby decreasing the uncertainty concerning the future behaviour of the involved parties, and increasing trust.

Intelligent Agents & MAS IV

Report by Janneke Bolt
Utrecht University

About fifty people attended the first session on intelligent agents and multi-agent systems on Friday.

First, Bart-Jan van Putten presented the paper *OperA and Brahms: a Symphony? Integrating Organizational and Emergent Views on Agent-Based Modeling* by Bart-Jan van Putten, Virginia Dignum, Maarten Sierhuis and Shawn Wolfe. In this paper, he and his co-authors describe the Work System Modeling and Simulation framework (WSMS). This framework can be used to evaluate the (simulated) performance of an organisation by comparing what should be done by what actually is done. In this framework, two existing frameworks are combined: OperA, with which the desired performance of the system is described, and Brahms, with which the actual work practice is represented. The WSMS was tested on a simulation of traffic flow management in the US airspace system.

In the second talk, Marc Ponsen presented the paper *The Dynamics of Human Behaviour in Poker* by Marc Ponsen, Karl Tuyls, Steven de Jong, Jan Ramon, Tom Croonenborghs, and Kurt Driessens. This paper investigates the evolutionary dynamics of strategic behaviour in poker. Based on literature, four different meta-strategies (loose-passive, loose-aggressive, tight-passive and tight-aggressive) are defined and data from real-life poker games are used to evaluate these strategies. To compare the strategies, the heuristic payoff table was computed to which then the Replicator Dynamic model was applied. The results confirm the claims by domain experts that aggressive strategies dominate their passive counterparts and that the loose-passive strategy is inferior.

The session was concluded by a talk of Michael Kaisers, who presented the paper *Discovering the Game in Auctions* by Michael Kaisers, Karl Tuyls, Frank Thuijsman, and Simon Parsons. In an auction, traders can deploy different strategies and a question of interest is which strategy yields the highest expected payoff. In previous research, a heuristic payoff table was proposed to capture the average profit of the different strategies. Such a table, however, is unintuitive and lacks information about strategies not yet in use. This paper shows how, using linear programming, a heuristic payoff table can be approximated by a normal-form game. A normal-form game is more intuitive and enables an individual trader to calculate his expected profit for each of his possible choices against any mix of strategies. An evaluation of this conversion with data from a simulated auction showed that the loss of information was reasonably small.

Intelligent Agents & MAS V

Report by Job Zwiers
Universiteit Twente

The second session of the second day in the "Intelligent Agents & MAS" track included three talks, about searching and optimization, about argumentation theories, and about distributed scheduling problems for agents.

Stigmergic Landmarks Lead the Way, by Nyree P.P.M. Lemmens and Karl Tuyls, deals with search and optimization algorithms inspired by the behaviour of ants and bees. Ordinary *bees* act on their own while searching, by performing path integration to keep track of their current location. It was shown, in earlier work, that such behaviour is fine within relatively unobstructed environments. In more constrained or more dynamic environments, *ants* that deposit pheromone trails, will do better than bees. Lemmens and Tuyls introduce *improved bees*, that learnt from the ants: they now use landmarks, that are not unlike pheromones. The resulting search strategy, combining global navigation based upon path integration, combined with local navigation based on dynamic landmark, was tested in three experiments. The major conclusion is that the resulting algorithm is significantly more efficient than the bee-inspired

algorithm, although the cost of a single computational step is significantly higher.

Attack Relations among Dynamic Coalitions, by Guido Boella, Leendert van der Torre and Serena Villata discussed *coalitions of arguments* within the setting of Dung's argumentation theory for nonmonotonic reasoning. Their work defines a formal framework for dealing with such things as arguments *attacking* other arguments, arguments forming *coalitions*, and *preferences* among coalitions. Attacks can even attack other attacks but it is argued that even such second-order attacks can also be seen as instances of Dung's theory. Finally it was discussed how such coalitions can *evolve*, and how this can be related to so-called dynamic dependence networks of interacting agents.

Autonomous Scheduling with Unbounded and Bounded Agents, by Chetan Yadati Narasimha, Cees Witteveen, Yingqian Zhang, Mengxiao Wu, and Han La Poutré, discussed results on distributed task scheduling. Agents are expected to create schedules for a set of tasks allocated to that agent, in such a way that the resulting schedules can be merged into a global schedule, that satisfies all (partial-order-based) constraints. It is assumed that agents can work concurrently on several tasks, and that tasks can be pre-empted. The main challenge is how to create such schedules when agents have only *bounded concurrency*, or when they even have to operate strictly sequentially. It is no surprise that this leads to NP-hard problems, and so, approximation algorithms have to be used. The algorithm proposed here combines a generalized interval-based scheduling, that on its own would suffice for agents with unbounded concurrency, with a maximum-matching algorithm to find sequential schedules.

Intelligent Agents & MAS VI

Report by Annette ten Teije
Vrije Universiteit, Amsterdam

This is the last session of the six "Intelligent Agents & MAS" sessions of the BNAIC 2008.

The first presentation was entitled *A Priced Options Mechanism to Solve the Exposure Problem in Sequential Auctions* by Valentin Robu. In auctions bidding agents may desire bundles of items. This leads to the exposure problem. They propose a method for the exposure problem, which preserves the sequential and decentralized structure of the market. Their method is based on options. It turns out that using options enables to reduce the exposure problem significantly.

The second talk was by Mark Hoogendoorn. He continued with the bidding on bundles of tasks in a decentralized task allocation setting. In the paper *Agents Preferences in Decentralized Task Allocation* the focus is on the preference function for tasks. They propose a function that expresses preferences for three properties of the task: (1) duration, (2) task type and (3) start/end time. They study the impact of their preference function on execution time, both with synthetic scenario and with a real scenario in the domain of logistics.

The last presentation was given by Nicolas Honing about the paper *Beating Cheating: Dealing with Collusion in the Non-Iterated Prisoner's Dilemma*. In this paper they present a strategy for playing multi-agent not-Iterated Prisoner's Dilemma that is based on evolving trust chains between agents. This strategy ("Ask-First strategy") is based on the idea that agents maintain the trust that they have in each other, and communicate this to each other. In the Ask-First strategy the strategy is first to ask other agents for advice whether to cooperate with a particular opponent, which leads to information chains between agents about trust, before acting. Actually there are four steps: select best neighbour, ask for advice, process advice and play. In their experiments they show that the Ask-first strategy is successful against defection, and successful against collusion. The next step is to apply this promising strategy to practical applications.

Logic & Logic Programming

Report by Cees Witteveen
Delft University of Technology

In this session we had the following presentations:

- *Towards an Argument Game for Stable Semantics*, by Yining Wu and Martin Caminada
- *From Probabilistic Horn Logic to Chain Logic*, by Nivea Ferreira, Arjen Hommersom, and Peter Lucas
- *Mental State Abduction of BDI-Based Agents*, by Michal Sindlar, Mehdi Dastani, Frank Dignum, and John-Jules Meyer

Yining Wu started her presentation with a review of the main concepts of argumentation theory, briefly discussing arguments, a defeat relation between them and the discussion of a semantics (the stable semantics) that provides an overall criterion to decide which of the arguments can be considered as justified and which are not. Then she presented a *discussion game* that can be used to determine for an argument whether it occurs in at least one stable extension.

In her presentation, Nivea Ferreira started with the discussion of a probabilistic Horn logic as a merge of Horn logic with probability theory, which allows one to reason with Bayesian networks. While Bayesian logic is similar in expressive power to probabilistic Horn logic, the main difference is that it is primarily meant as a language for generating Bayesian networks. Likewise, Markov logic networks have recently been proposed as a language for generating Markov networks. However, both Bayesian networks and Markov networks have some definite disadvantages w.r.t. independence information. Therefore she proposed Chain logic as a natural probabilistic graphical formalism generalizing both Bayesian networks and Markov networks without preserving their disadvantages.

Finally, Michael Sindlar introduced the problem of providing explanations for the observed behaviour of BDI-based agents in terms of their mental states. For those agents to deliberately cooperate with or obstruct the plans of other agents, it is necessary that they can reason about other agents' mental states, a capacity known as mental-state inference. Because in agents with (declarative) mental states often statements like "if <mental state> then <behaviour>" occur, *logical abduction* seems to be the right way of providing explanations of observed behaviour in terms of mental-state descriptions. Such abductions then can be used to construct agents with *social aware behaviour* that can use these explanations to form expectations about future behaviour of other agents.

Machine Learning I

Report by Marco Wiering
University of Groningen

The first presentation in the Machine Learning session was by Thomas Mensink and Jakob Verbeek and was entitled *Improving People Search using Query Expansion: How Friends Help to Find People*. The problem that was considered in this research project was to find all faces of some person X by using internet search. Only using text does not work since only 40 percent of all returned faces corresponds to the person of interest. On the other hand is manually labelling a training set for many persons much too costly. Furthermore, the problem is made more difficult by appearance variations such as illumination, expressions, pose, scale, occlusion and naming variations. The principle that is used by the algorithm designed by the authors is that the use of text filtering makes the queried person the most frequent and therefore the task is to find the biggest self-contained cluster in the big cluster that is returned by the query. The authors used a couple of steps to filter out false returned faces. First, often co-occurring people are returned, and therefore the authors came up with the idea to query also for images of friends that are in the captions of the person of interest. This returns images of faces of friends that are then filtered out. This improves the queries, but the authors came up with a next step to improve the results even further. The images are described by Sift features around a number of facial features such as the nose. Then a logistic discriminant model is learned where positive images are the ones returned by the query and negative images are random images. This was iteratively done to relabel the noisy positive image data. These steps lead to huge improvements over other state-of-the-art methods.

The second presentation was by Stefan van der Meer, Iris van Rooij, and Ida Sprinkhuizen-Kuyper and was entitled *Evolving Fixed-Parameter Tractable Algorithms*. First Stefan explained that some NP-hard problems are fixed-parameter tractable (FPT) algorithms, where an isolated part of the input is responsible for the intractability. An example is the 2D travelling salesman person (TSP) that is of course NP-hard, but also fixed-parameter tractable if one considers the fixed parameter as the number of inner points in the convex hull. To make an FPT algorithm is not easy, however, and therefore the authors used genetic programming to evolve a FPT program that can solve the 2D TSP. However, it is clear that for this the building blocks should be quite expressive and that the relevant parameter should be used by the algorithm. The only decision that had to be made by the program was to give each next possible city a score. For this it could use functions that return the distance between two cities, mathematical operators, conditional if then else formulations where it could be asked whether a city was on the convex hull or not, and there was a recursive call. The fitness functions combined speed and accuracy of the obtained solution that was tested on 500 TSP instances. The best evolved program questioned whether a city is on the convex hull and in that case the nearest neighbour was returned and otherwise a recursive call was made. Although it was quite fast, it could unfortunately not solve all 2D TSP instances.

The third presentation was by Sicco Verwer, Matthijs de Weerdt, and Cees Witteveen. The presentation was entitled *Polynomial Distinguish-ability of Timed Automata*, and was about deterministic timed automata (DTA) that have multiple clocks that can also be reset, and clock guards that make transition in the automaton possible with statements such as "the time since the last reset should be smaller than 4 time ticks". The goal was to learn the DTA from data, since the

authors want to model and verify reactive systems. An application they were working on is to model the behaviour from truck drivers from sensors that register truck movements. Now the question was whether a DTA can be learned efficiently that means that it needs polynomial time and data to identify the right model. The answer was that in general DTA are not polynomially distinguishable, and a proof was given where an exponential amount of data was necessary to identify the DTA. However, DTA with one clock are polynomially distinguishable, but unfortunately they have a less expressive power than DTA with more clocks.

The last presentation in the Machine Learning I session was given by Eelke Spaak who collaborated with Pim Haselager. The presentation was entitled *Imitation and Mirror Neurons: An Evolutionary Robotics Model*. The research question that the authors want to answer is the following: "Which selective pressure gives rise to the mirror neuron system?" Originally, the mirror neuron system was discovered in Macaque monkeys: if monkeys observe or execute a particular behaviour, then there are neurons that respond in exactly the same way. It turns out that only the action is important, not the visual specifics. The function of the mirror neuron system is to understand the action-selection process and imitation learning. However, what is its evolutionary origin? Rizzolatti thought that first action understanding was evolved and then imitation learning, however small babies also imitate their parents and have no action understanding. Maybe a pressure for imitation is sufficient, and therefore the authors made a simulation using Framsticks with embodied and embedded adaptive agents. They used fully connected recurrent neural networks with adaptive synapses and 4 sensors. The goal was to learn the right state-action mapping from demonstration. It turned out that in the solutions there were particular neurons that seemed to play the role of a mirror neuron, and therefore the evolution of a mirror neuron system may be caused by selective pressure on the helpful ability to imitate others.

Machine Learning II

Report by Antal van den Bosch
TiCC, Tilburg University

This session on machine learning applications was one of the four sessions on machine learning and data mining. This particular session focused on applications in natural-language processing. First, Rieks op den Akker, from the "local" Human Media Interaction group at Twente University, presented *A Neural Network Based Dutch Part of Speech Tagger*, co-authored with Mannes Poel and Egwin Boschman. Op den Akker stressed that actually a larger team of students had been involved in the project, as building a part-of-speech tagger is a yearly student project in Twente, taking the "drosophila" natural-language processing task of part-of-speech tagging as an uncomplicated means to learn about machine learning, particularly applied to sequence processing tasks. The solution in focus was based on multi-layered back-propagation learning. The method did not turn out very competitive against known superior alternatives such as maximum-entropy tagging, but the team did come up with an original way to encode "unknown words", a pervasive phenomenon in natural-language processing, namely as the average encoding of low-frequency words, which are usually nouns, but also a few other fringe categories.

Second, Job Zwiers, from the same Twente HMI group, talked about *A Tractable Hybrid DDN-POMDP Approach to Affective Dialogue Modeling for Probabilistic Frame-based Dialogue Systems*, a topic that has had considerable and succesful attention in the Twente group over the years, recently in first author Trung Bui's Ph.D. thesis. There lies an intriguing chicken-and-egg problem in designing an optimal dialogue managing system when there are users, topics to talk about, goals to achieve, the components of a system, but no recorded dialogues (successful or unsuccessful) yet to allow the system to learn optimal strategies. Also, certain states of the user, such as beliefs and the user's current state of mind (calm, irritated, etc.), are important to allow the system to react naturally and appropriately. POMDPs offer the means to auto-generate data by simulating users and generating many possible dialogues, from which optimal strategies can be deduced. When combined with DDNs (Dynamic Decision Networks), in a modularized architecture where the relatively bad scaling abilities of POMDPs are reduced to only subparts of the dialogue management workload, a system can be trained to cope with many slots to be filled in task-oriented dialogues, as well as affective states of users.

The final talk of the session, by Kim Luycks of the Centre for Dutch Language and Speech (CNTS) of the University of Antwerp, entitled *Authorship Attribution and Verification with Many Authors and Limited Data*, a compressed version of a paper published earlier in the COLING-2008 conference, focused on the challenging topics of classifying an unseen text as being written by one out of a set of authors (attribution), and of verifying whether a text is written by one particular author or not (verification). In a clear presentation, Luyckx acquainted the audience with the challenges of this

task, and with the fact that most current studies in authorship attribution focus on attributing among just a few authors. This bias easily leads to an overestimation of the importance of the features extracted from the training data. Most studies also use dangerously small sizes of training data given the increasing importance that this kind of work is gaining in (mostly U.S.) forensics. Luyckx and Daelemans show, with a self-collected corpus with 145 different authors, that with relatively simple lexical and syntactic features, in almost 50% of the cases a text from one of the 145 authors could be attributed to the correct author by a memory-based classifier.

Machine Learning III

Report by Peter Bosman
CWI

In the first talk, Janneke Bolt discussed the posterior error at convergence nodes when using loopy propagation in Bayesian networks (joint work with Linda van der Gaag). Inference in Bayesian networks can be a hard problem (it is in general NP-hard). One approximate algorithm that can be used instead of exact inference algorithms, is loopy propagation. Janneke showed the impact of observations in the Bayesian network on the approximation error made by the loopy propagation algorithm. The effect on the posterior convergence error may be large.

The second talk was a talk on estimation-of-distribution algorithms (EDAs). EDAs are a specific type of evolutionary algorithm in which machine-learning techniques are used. Michael Emmerich presented joint work with Anyi Zhang, Rui Li, Ildikó Flesch, and Peter Lucas on an EDA for solving mixed-integer optimization problems. One challenge lies in representing multivariate probability distributions of a mixed-variable type (e.g., integers and real values). A first application of the EDA to the theoretically valuable Nk-landscapes was presented as a proof of concept showing that the EDA is able to exploit dependencies between mixed variables.

In the final talk Wouter Koolen presented joint work with Steven de Rooij on defining models for the purpose of prediction with expert advice. A unifying framework was presented that allows the description of many existing prediction strategies with expert advice. This includes Bayesian statistics, source coding and universal prediction. Also, new models for expert tracking were discussed: the switch distribution and a new generalization of the fixed-share algorithm. Wouter illustrated how the unifying approach provides new insights on the relationships between various models for combining expert advice.

Vision

Report by Betsy van Dijk
University of Twente

The vision session only contained two presentations that were quite different in nature, though both mentioned robot navigation as an application that could benefit from their work.

The first presentation by Steven Roebert, Tijn Schmits, and Arnoud Visser from the Intelligent System Laboratory Amsterdam used an omnidirectional camera to create a visual map of the environment from a bird-eye view's perspective. This visual map can be created on-line and allows an operator to navigate a robot through an unknown environment. Though improvement is still needed, the bird-eye view map can be valuable for instance for self-localization and to detect landmarks.

In the second presentation, Gert Kootstra, Arco Nederveen, and Bart de Boer from the Artificial Intelligence group of the University of Groningen propose to pay more attention to symmetry in computational models of saliency. They compared a few symmetry models to an existing contrast salience model and showed that the symmetry models better match human-eye-tracking data. They conclude that robots navigating in environments that contain symmetrical patterns could benefit from symmetry models.

The 2008 SKBS-Strukton Prize

Jaap van den Herik
Director of SKBS

The Foundation for Knowledge Based Systems (SKBS) continued its policy of awarding the SKBS prize to the best demonstration of the Demo-session of the BNAIC 2008. The referee committee consisted of Jaap van den Herik (chair), Bas Obladen (Strukton), Ann Nowé, Catholijn Jonker, and Betsy van Dijk.

The referee committee had to consider twelve submissions which were eligible for the SKBS prize. In Table 1 we list them by author (in the order of their publication in the Conference Program BNAIC 2008).

(1) Roeland Ordelman, Willemijn Heeren, Arjan van Hessen, Djoerd Hiemstra, Hendri Hondorp, Franciska de Jong, Marijn Huijbregts, and Thijs Verschoor
Browsing and Searching the Spoken Words of Buchenwald Survivors

(2) Guillaume Chaslot, Sander Bakkes, Istvan Szita, and Pieter Spronck
Monte-Carlo Tree Search: A New Framework for Game AI

(3) K. Joost Batenburg and Walter A. Kosters
Demonstration of a Multi-agent Simulation of the Impact of Culture on International Trade

(4) Thomas Mensink and Jakob Verbeek
Automatic Generation of Nonograms

(5) Tim Verwaart and John Wolters
Face Finder

(6) François L.A. Knoppel, Almer S. Tigelaar, Danny Oude Bos, and Thijs Alofs
DEIRA: A Dynamic Engaging Intelligent Reporter Agent

(7) Daniel Okouya and Virginia Dignum
OperettA: A prototype tool for the design, analysis and development of multi-agent organizations

(8) Dennis Hofs, Mariët Theune, and Rieks op den Akker
Multimodal Interaction with a Virtual Guide

(9) Michel F. Valstar, Simon Colton, and Maja Pantic
Emotionally Aware Automated Portrait Painting

(10) Joris Maervoet, Patrick De Causmaecker, and Greet Vanden Berghe
A Generic Rule Miner for Geographic Data

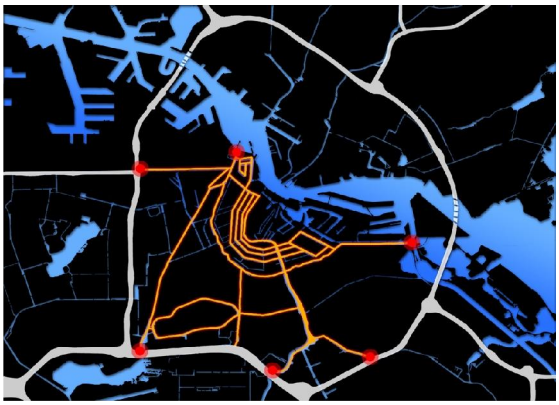
(11) Dirkjan Krijnders and Tjeerd Andringa
Demonstration of Online Auditory Scene Analysis

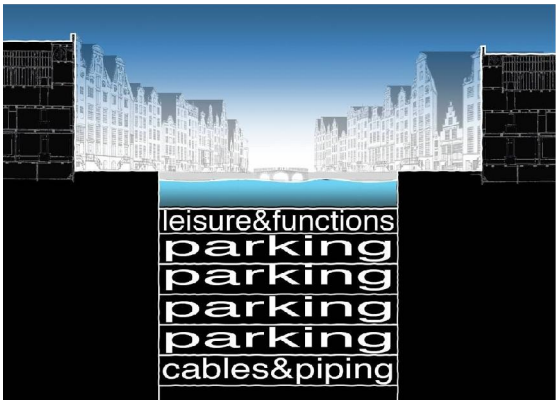
(12) Dennis Reidsma and Anton Nijholt
Temporal Interaction between an Artificial Orchestra Conductor and Human Musicians

Table 1: The 2008 candidates of the SKBS prize.

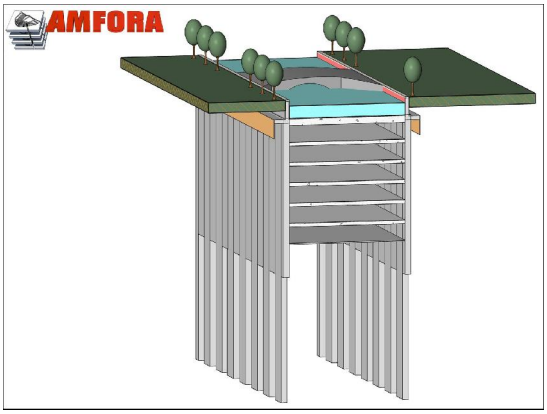
Since 1999 we have seen many different appearances of the Demo-session. The common characteristic is the emphasis in being “an industrial exhibition”. Up to 2006 the prize money was provided by SKBS only. The Foundation for Knowledge Based Systems originates from the late 1980s as a foundation within 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.

Some background may be in order. 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 the spring of this year. Bas is the man who launched the idea that all cars arriving at the Ringway of Amsterdam (see figure with the map of Amsterdam) should be given the opportunity to park directly under the ground (see figure with the parking layers). 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 winners for two reasons: (1) no cars in the city any more and (2) strong improvement of public transport (see figure with layers and trees). The plan was republished in several daily papers abroad and communicated via foreign broadcasting corporations.



During this BNAIC Bas introduced his successor at Strukton, Carlos F. Bosma MSc and agreed to support the SKBS prize with Euro 150 for the years to come. Definitive appointments should be made by SKBS and Strukton. To anticipate the new situation we have changed the name into SKBS-Strukton prize.

In 2008, the twelve submissions were gathered in the demonstration room of the Bad Boekelo resort where the BNAIC took place. All twelve were full-fledged demonstrations. There were moving images, painters and paintings, music, musicians, and electronic conductors, robots, and many handouts. It was really a pleasure to walk along the demos and to discuss with the stand holders. Again, the quality has grown considerably over the last year. 'Seen over the last decade' is a better yardstick, in particular if we divide the observed progress by 10.

So, the referee committee had a difficult task. The procedure went in shifts: from 12 we reduced the number of candidates to six and then to three. The remaining three were (9) Michel F. Valstar *et al.*, (10) Joris Maervoet *et al.*, and (12) Dennis Reidsma and Anton Nijholt. Taking a decision was difficult. At this moment in the decision procedure, we reduced the Jury to three persons only for the final decision (namely Jaap, Bas, and Catholijn) to prevent any influences from members who might have ties with one of the remaining candidate prize-winners.

The first decision taken was that the number of candidates was reduced to two by unanimously agreeing that (10) and (12) were better than (9). Finally, 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, and (e) the applicability (in industry or education). The spirit of the SKBS prize is in criterion (e). If only criterion (b) had been applied then the Artificial Conductor would have won, even so we agreed that criterion (a) only would have led to the Miner for Geographic Data as winner. The promises of both demos for industrial application (the Miner) and educational application (the Conductor) were after a long discussion considered to be equal. Therefore it was decided that the prize should be shared for 2008. Each team received a cheque of € 250,-. It was the second time that an SKBS prize was shared (in 2000 was the first time).

In Table 2 we provide an overview of the winners of the SKBS 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* and 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, 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*

Table 2: Overview of SKBS prizes.

AAAI Fall Symposium: AI in Eldercare, New solutions to old problems

November 7-9, Washington

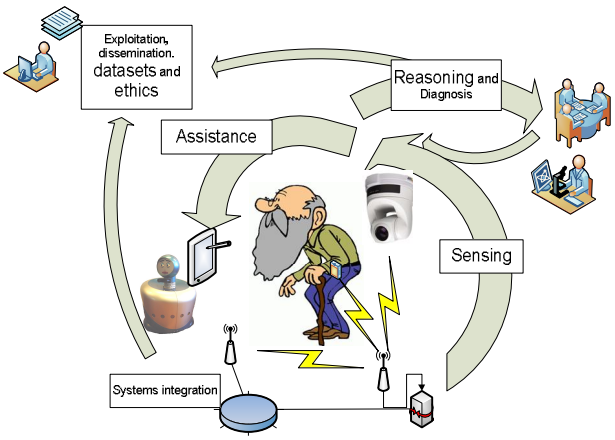
Ben Kröse
Universiteit van Amsterdam and
Hogeschool van Amsterdam

AAAI organizes a Spring and Fall Symposium Series, that affords participants a smaller, more intimate setting where they can share ideas and learn from each other's artificial intelligence (AI) research. This fall I attended the 'AI in eldercare' workshop, organized by Marjorie Skubic from University of Missouri-Columbia.

Because of the increasing age of the population in many parts of the world and the corresponding increase in costs for care, technological solutions are considered to keep these costs limited. ICT plays an important role in these solutions and there is more and more interest for AI techniques in this application domain. In the workshop 16 papers were presented that gave an excellent overview of the developments in the field.

The workshop was built on three themes that correspond with the elementary processes in elderly care:

- Assistance
  - Physical assistance (therapy, service robots),
  - cognitive, social assistance (reminders, communication)
- Diagnosis
  - What is the state of the disease?
  - Are activities carried out normal?
- Sensing
  - How do we measure these activities?



In each of these themes, papers from academic research groups, industry and end users were presented.

In the **sensing** theme new methods for computer vision were presented. Chen *et al*. worked on automatic aggression detection (apparently aggression is an issue in nursing homes), Allin *et al*. presented vision techniques to measure the ability of elderly to go from a sitting position to a standing position (which is indicative for the chance of falling). Since vision is often considered as obtrusive, techniques are developed to preserve privacy with cameras (Park *et al.*). Other sensors were also presented. Popescu presented fall detection from the analysis of sound. However, most papers dealt with simple sensors (switches, touch sensors, infrared proximity sensors, RFID). Here most work is done on machine learning and **reasoning**. Tim van Kasteren, from my own group at the UvA, presented a method for activity recognition from such sensors and how to transfer the learned model such that it can be used in another home. Sledge *et al.* focused on the visualization of such data: how can we visualize long recordings of data and cluster the data? Since these simple sensors do not provide identity, activity recognition is difficult when multiple persons are in a home. Crandall *et al.* addressed this issue.

Two of the **industrial** presentations also focused on these simple sensors. GE has a huge division on healthcare and presented work done in an alliance with 'Quiet care', a company in wireless sensor networks for activity monitoring. Intel is also investing in this area (should we have an Intel in all our e-health devices?), and presented a collaboration project with MIT. From this project Beth Logan presented the impressive dataset that was collected at the MIT Placelab. Data from more than 900 sensors including wired reed switches, current and water flow inputs, object and person motion detectors, and RFID tags was collected during two weeks while a couple was living in the house. Most of the house was monitored by cameras and an independent expert took care of the annotation of the sensor data on the basis of the camera information.

In the field of **assistance** there was work presented by Modayil on giving activity reminders on a PDA on the basis of the output of a sensor network. Other cognive support was presented by Tapus in the form of a robotic system that gave elderly feedback in a game. Physical support was addressed by Cortez *et al.*, who made an intelligent 'rollator' for environments with non-flat streets. Interesting work on (autonomous) wheelchairs was presented by Oishi and Urdinales.

Two other (non-AI specific) plenaries were given. Marylin Rantz, Professor of Nursing at MU presented TigerPlace, a nursing home that is used as

an Innovative Educational and Research Environment. Students from ICT and Nursing are involved in projects in the US 'Living Lab'. The other plenary was given by Michael and Susan Leigh Anderson, and addressed the ethics of ICT in eldercare.

To summarize, the workshop addressed a number of very relevant trends. The field of ICT for healthcare applications is growing rapidly, and definitely AI-related problems have to be solved. Also in the Netherlands and Belgium there is a growing body of research along these lines, and who knows we can see such a workshop in one of the upcoming BNAIC meetings.

AI@uni.lu

Raymond Bisdorff, Pascal Bouvry, Christoph Schommer, Ulrich Sorger, Leon van der Torre, and Emil Weydert
University of Luxembourg

ILIAS

The University of Luxembourg, whose main focus is research, was founded in 2003, and is still growing fast. While it is presently spread over three sites, a new common campus will open its doors in a couple of years in a new City of Sciences in the South.

The Computer Science and Communications research unit is currently located in Luxembourg-city/Kirchberg, close to the European Institutions. It counts 20 professors, around 30 postdocs/senior researchers, and more than 60 Ph.D. students. They are organized in four labs, also reflected in the specializations of the master in computer science. The AI-lab is known as ILIAS – Interdisciplinary Lab for Intelligent and Adaptive Systems.

ILIAS is a cross-disciplinary research group combining expertise from computer science, operational research, information theory, mathematics, and logic. The overarching subject is information processing in complex and dynamic environments given limited resources and incomplete or uncertain knowledge. It investigates the theoretical foundations and the algorithmic realization of systems performing complex problem solving with a high degree of autonomy, i.e., intelligent, and exploiting learning to deal with opaque and dynamic contexts, i.e., adaptive.

There are five individual research teams, typically with a strong involvement in international networks, lead by five professors: Raymond Bisdorff (Decision Aid Systems), Pascal Bouvry (Optimization and Parallel Computing), Christoph Schommer (Adaptive Data Mining and Information Management), Ulrich Sorger (Information Theory and Stochastic Inference), and Leon van der Torre (Knowledge Representation and Multi-agent Systems/Individual and Collective Reasoning).

PARALLEL AND EVOLUTIONARY COMPUTING

The team of Prof. Pascal Bouvry is researching on parallel and nature-inspired computing. The main contributions of the team comprise the development of robust and scalable solutions for parallel computing and the development of new robust evolutionary algorithms (robust, multi-objective) for solving hard problems. Application domains of this research are security, reliability and trust in new generation networks. This includes distributed execution security, intrusion detection, reliable scheduling and routing in grids (the team possesses 2 clusters of 48 and 176 cores part of the Grid5000 project) and reliable scheduling and routing in ad hoc networks (from graph theoretical analysis to realistic simulations and implementations on real devices).

The team is currently composed of four senior researchers (post-docs), seven Ph.D. students, master trainees and one engineer. Cooperation with key academic partners like the Polish Academy of Sciences (Poland), Ecole des Mines de Saint-Etienne, University of Le Havre and University of Metz (France), University of Malaga (Spain), KMUTT (Thailand), Colorado State University and North Dakota University (USA), and University of Sydney (Australia) is achieved through co-supervision of Ph.D. students and/or exchanges of researchers/trainees, lecturing and joint projects. Major projects are undertaken in collaboration with other research units, public research centres, for example the CRP Henri Tudor, and industrial partners, including SUN micro-systems, KBL, CETREL, P\&T, and Telindus.

ADAPTIVE MINING AND INFORMATION MANAGEMENT (MINE)

We concern both with the intelligent processing of data streams and an adaptive management of information that comes out of it. Whereas static data systems refer to data that has been collected in the past, our research interest focuses on the explorative discovery of such streams through adaptive learning algorithms, novel dynamic concepts, and its representation in a fluid management. We work on the generation of associative and adaptive mind-maps, on a novel (bio-inspired) computer protection system, and on concepts for an intellectual web to concern with e-conviviality and e-comfortableness. A current research topic is the finding and

classification of social communities in bibliographic databases and the modelling of trust in natural conversations by using incremental-adaptive mind-maps. Current members of the team are Sascha Kaufmann, Maria Biryukov, and Jayanta Poray (doctoral students). Beside of our academic interest, we foster an industrial contact with IBM University Relations and Accenture Luxembourg. At the undergraduate level (Bachelor), our teaching activities concern with courses on Database Management I-III (Data Modeling, Implementations with Databases, Business Intelligence). At graduate level, we focus on Intelligent Systems, Knowledge Discovery and Data Mining, and Text Mining as well as Applied Mining in Security.

Contact: Prof. Dr. Christoph Schommer, Email: christop.schommer@uni.lu, Web: http://mine.uni.lu

INFORMATION THEORY AND STOCHASTIC INFERENCE

Basic areas of competence of the team of Ulrich Sorger are probability, information, and coding theory. The main directions are decoding of error-control codes and stochastic interference, where the decoding of error-correcting codes can be considered as a stochastic inference problem, respectively the inversion of a stochastic map. Recent results show that encoding / decoding techniques exist that perform well close to theoretical limits. The team investigates these techniques and their applicability to other stochastic inference problems.

Network Traffic Modelling concerns the development of stochastic network traffic models which can help to improve performance of data transfers and network security. The aim is to use these network traffic models to derive useful conclusions from the monitored traffic concerning local congestions, localization of spam sources or denial of service (flood) attacks. Particular attention is focused on elaboration of a new approach to the detection of local network congestions based on spectral analysis of multivariate stationary processes. Current members of the team are Foued Melakessou and Tomasz Ignatz (Ph.D. students) and Zdzislaw Suchanecki (senior researcher).

INDIVIDUAL AND COLLECTIVE REASONING (ICR)

The team of Leon van der Torre studies the use of different kinds of logics for knowledge representation and multi-agent systems. This work is driven by the insight that intelligent systems are characterized as well by their individual reasoning capacity as by their social interaction potential. The goal is to develop and analyze formal and computational models for individual and collective rationality.

Leon van der Torre's work on multi-agent systems is driven by the development of a game-theoretic approach to normative multi-agent systems, based on input/output logics and the BOID architecture, with applications in trust, virtual communities, electronic commerce and security. Emil Weydert investigates formal models of the epistemic activities of cognitive agents (e.g., in science), developing generalized inductive inference and belief-change methods suitable for complex multi-agent contexts. Specific issues are the dynamics of trust (with Mathijs de Boer), and uncertain reasoning about (epistemic) actions (with Guillaum Aucher). Gabriella Pigozzi is working on judgment aggregation (with Marija Slavkovik), combining logic with social choice theory, and norm change (with Leon van der Torre and Davide Grossi). The long-term goal is a logic-based theory of collective reasoning, which is highly relevant for multi-agent systems. Martin Caminada's work (with Yining Wu) is aimed at enhancing argumentation formalisms and their implementations to make them more appropriate for real-world applications (like trust), while insisting on solid formal foundations. All this work receives additional support from prominent visiting researchers like Dov Gabbay, Guido Boella, and many others.

DECISION AID SYSTEMS

Finally, in January 2008, Raymond Bisdorff and his applied mathematics team working in decision mathematics and decision-aid systems joined ILIAS. Their scientific contribution mainly concerns the computational and logical foundations of the multiple-criteria decision-aid (MCDA) methodology, where they promote a non-standard bipolar-valued logical approach in the context of the outranking-based methods. The team has thus been able to extend the application field of the graph-kernel concept (independent and dominating set in a directed graph, Von Neumann 1944) to bipolar-valued outranking digraphs. This allows them to solve all kinds of multiple-criteria selecting, ranking and clustering problems.

The recent acquisition (December 2007) of a high-performance Rich Internet Application server (http://ernst-schroeder.uni.lu) gives them at present interesting perspectives of algorithmic development and new outstanding computing performances are foreseen. Dissemination of the theoretical results via distributed MCDA web services is achieved in the context of the international Decision-Deck project (http://www.decision-deck.org) involving leading European decision-aid laboratories. R. Bisdorff's team is here actively driving the development of the international XMCDA standard for XML-encoding of multiple criteria decision-aid problems and processes.

OUTLOOK

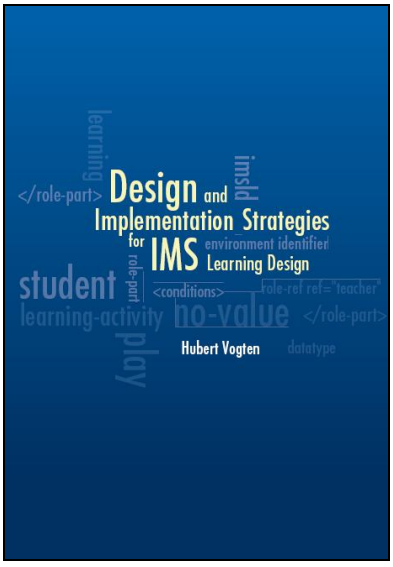
One of the research priorities of the University of Luxembourg continues to be "Security, Trust, and Reliability", as exemplified by the creation of a so-called Interdisplinary Center in this area, focused on cross-disciplinary activities, applications, and cooperation with industry, which will open in 2009. This is a very promising domain for the AI-techniques developed within ILIAS, which will profit from the challenges of this area.

PH.D. THESIS ABSTRACTS

Design and Implementation Strategies for IMS Learning Design

Ph.D. thesis abstract
Hubert Vogten

Promotor: Prof.dr. E.J.R. Koper
Date of defense: November 7, 2008



IMS Learning Design (LD) is a formal language for describing learning designs which uses eXtensible Mark-up Language (XML) as its meta-language. A meta-language is used to make statements about another language: for example, English grammar is a meta-language for English. When the LD specification was officially released, there was a need for an associated reference runtime implementation to help practitioners better understand the specification. System integrators would be able to experiment with the integration of LD in their systems, and system developers could benefit from using it as a reference for their own developments.

However, designing and implementing a reference LD runtime environment is not straightforward. The specification combines characteristics from different languages: for example, it shares some characteristics of an imperative programming language in which statements are given in the order they are to be executed in. But it also has some characteristics of a declarative programming language. LD's conditions require constant evaluation, and resemble production rules in a production system. LD is also declarative in a different sense: it expects much scaffolding from the runtime, as is the case, for example, with services referenced by a mere declaration. In addition, LD is a persistence language, implying that the runtime is expected to automatically take care of persistence. Finally, it resembles a workflow language, orchestrating the learning processes between the different roles of different users. Therefore, implementing a runtime environment requires considerable resources and effort. Any reference implementation, therefore, should be reusable in many different situations to make costly rebuilds less necessary.

The first research question of this thesis is thus formulated as follows:

i) How can a fully compliant reusable reference runtime environment for the IMS Learning Design specification be designed and implemented?

LD also relies on other specifications and learning services. Although it comes with a fairly detailed description on how to incorporate these specifications and services in the learning design at a lexical level, very little is stated about the runtime implications. This situation has led to the second research question:

ii) How, given a reference implementation for the IMS Learning Design specification, can implementations for other e-learning specifications and learning support services be integrated generically at runtime level?

In Chapter 2 we review LD in more detail by discussing its main constructs: we see that it comes in three flavours, each extending the other. LD level A defines the core entities for the specification. It provides constructs for specifying objectives, prerequisites, roles and activities. The method construct combines these roles and activities into role-parts, which can be organized into acts, which

in turn can be sequenced through plays. The method is very much inspired by the theatre. There, a play also has roles and acts and actors who each know the role they are supposed to play. Actors know when to appear on stage, for example, and when to interact with each other. Similarly, the LD play determines which activities have to be performed by what roles, and who will interact with whom at what moment.

Level B offers the means to personalize a learning design by adding properties and conditions to the specification. LD properties are similar to the variables found in most programming languages. They are not identical, however: they also have value constraints and a scope, and automatic persistence properties can be manipulated directly by user input, or alternatively via the consequences of conditions. LD conditions will be familiar for anyone with a programming background. However, these conditions are not imperative, as in most programming languages; the runtime environment must determine when the conditions should be evaluated. Through these conditions many different LD structures can be shown or hidden, which is one of the principles behind personalization in LD.

Finally, Level C contributes only a notification mechanism to the specification. Notifications inform users about events occurring during runtime.

A learning design can be bundled together with its resources to form a unit of learning (UOL). A UOL can be compressed into a single file suitable for further processing. From LD, we derive a set of requirements that any LD runtime must meet in one way or another: validation, publishing, provisioning, population, personalization and integration. We define an LD engine as a software component capable of processing the LD specification. An engine is indifferent to the user interface used to present the engine's results to the user. The software that renders the engine's output is called the LD player; one engine can have many players. An engine is designed as part of an enclosing framework, such as a learning management system.

The aforementioned requirements form the starting point for the design of an LD engine that we discuss in Chapter 3. This design is from the perspective of a finite state machine (FSM). We use LD properties to capture the state of an FSM, and extend these properties by the concept of implicit properties which, unlike their explicit counterparts, are not defined by the UOL authors. Rather, they are generated by the engine when the UOL is published; they typically capture completion and visibility states. We discuss how a UOL can be populated by real users using the concept of a run. Multiple runs can be created for a single UOL, each with their own user population. The users are assigned to one or more of the roles defined in the corresponding UOL. We explain the relationship between runs, roles and the scope of the properties. Each FSM is represented by all implicit and explicit properties belonging to a user performing a role in a UOL run. We argue that there is no single FSM for a UOL, but rather a collection of them. A single FSM is unambiguously addressed by a run, a user and a role.

Having defined how state is represented by the FSM collection, we focus next on state transitions. These are triggered by events which can be generated through direct user intervention or via external incentives such as the passing of time. They can cause state changes, which in turn can trigger conditions defined in the UOL. This way, a single event can cause a ripple effect not constrained to a single FSM, but able to affect many FSMs throughout the engine. We elaborate on the concepts of a dispatcher and event handlers responsible for this event processing. The event handlers act upon the design in the UOL, processing the consequences of conditions defined in the UOL but also dealing with business rules defined by LD such as the completion of roles-parts, acts and plays. During the UOL's publication, all LD business rules are expressed as conditions using an extended version of the LD condition language.

Because properties can be shared between several FSMs, FSMs can simultaneously change state as a result of altering the value of a single property. This automatically deals with any synchronization issues during the learning flow orchestration. Because the event handlers ensure that each FSM is in the correct state at any given moment in time, personalization becomes a 'fill in the blanks' exercise where references to properties in the UOL are simply replaced by their actual values in the appropriate FSM, regardless of whether these properties are explicit or implicit.

Our engine design was put into practice through an implementation called CopperCore, which has been released as open source using the GPL license. The CopperCore engine is intended to be reused as a service via its APIs. In Chapter 4, we take the perspective of a software agent doing just this. We refer to this agent as the client. The CopperCore API is split into a CourseManager API and an LDEngine API. The CourseManager API provides access to the engine's management functionality, including the publication of a UOL, the creation of user accounts, runs, and the assignment of users to roles.

These methods are necessary to prepare a UOL for its execution.

The execution itself is achieved through the LDEngine API, which returns personalized XML snippets resembling parts of the original UOL. We discuss the three main calls of the LDEngine API in more detail, and show how the returned XML snippets are based on the original UOL. We also describe in detail how a client can call the CopperCore engine, and elaborate on the expected output. The relationships between the consecutive API calls are further clarified via a sequence diagram representing a typical client scenario.

Finally, we discuss why we implemented the CopperCore engine as a J2EE application. We review some of the possibilities and issues involved in the different deployment strategies for the client and the engine.

Chapter 5 takes the CopperCore engine as starting point. Given this reference implementation for LD, how can other specifications and learning services be integrated in a generic fashion? We present an architecture wedged between the client and the CopperCore engine which allows new services to be added while requiring minimal code changes in any existing clients that may want to use this new architecture. This is important because the CopperCore engine had been released for some time when work on this service architecture started.

We define service adapters, which position themselves between the original service and a client, and replicate the original API of a service. One adapter informs a dispatcher about calls to the connected service that could be relevant for other services, while other service adapters monitor these events and react to them if necessary. The dispatcher functions as a service bus, relaying events between services. The adapters are defined for various service types such as LD, IMS QTI, forums, search, etc. For each type, multiple adapter implementations may exist, each of which must register with the dispatcher and thereby inform the dispatcher that it should be used for the associated service. This allows the flexible configuration of services. We have implemented this service integration architecture and released it as CopperCore Service Integration (CCSI); just like CopperCore, it can be downloaded from SourceForge and is available as open source under a GPL license. CCSI can be installed as addition to CopperCore by simply being deployed on the same application server.

We elaborate on the CCSI architecture by using the integration of LD and IMS QTI as an example. We achieved this integration by synchronizing IMS QTI outcome variables with LD properties on the basis of lexical similarity, an approach which was also recommended by IMS. Finally, we discuss some alternative approaches and argue why we chose in favour of the CCSI implementation.

Chapter 6 reflects on the impact of CopperCore and CCSI on the LD community by reviewing the use of both products in other research and developments. Both developments of CopperCore and CCSI were iterative processes carried out in the context of several externally funded projects. These projects contributed the necessary resources, but also to the practical validation of the design and implementation of CopperCore and CCSI.

ALFANET was the founding project and resulted in the first release of CopperCore on SourceForge. CopperCore itself was integrated as a separate service in the ALFANET framework. This was followed by a series of SLeD projects carried out with the British Open University which delivered a complete new player, and CopperCore was enhanced to support level C and thereby the full specification. It was also extended with SOAP-compliant APIs, added to open up the engine for non-Java environments. Furthermore, SLeD facilitated the development of CCSI. The SLeD products were installed by Liverpool Hope University to run pilots with its own students as part of a JISC evaluation project. These pilots revealed performance issues with CopperCore which were then successfully addressed in the final SLeD projects.

The UNFOLD project provided a platform for the LD community to meet and exchange ideas and experiences. We briefly describe some of the research and developments presented in the context of the UNFOLD project that reused CopperCore and CCSI. Finally, we take a closer look at the reusing of CopperCore in the TELCERT and ELeGI projects.

Based on the impact of CopperCore and CCSI, we conclude that CopperCore has established itself as the de facto reference runtime environment for LD. We also conclude that many learning design authors have used CopperCore as a reference to help them better understand the specification. At the same time, they also tested the engine in real world practice by deploying and testing designs for all specification levels. The engine has been used many times in various ways, thereby demonstrating its reusability. We also show that a number of new services have been successfully developed for CCSI. We therefore conclude that we have successfully

addressed the two research and development questions of this thesis.

CopperCore and CCSI dealt with the biggest obstacles to the uptake of the LD specification. However, the uptake has still been disappointing. This has been ascribed to the toolset's lack of maturity, felt most significantly in the authoring environments. The current LD authoring tools are inadequate for supporting non-expert users, and enforce the top-down model of authoring which seems so natural to LD. In Chapter 7, we thus propose a complementary authoring approach that closely integrates CopperCore and CCSI in a Personal Competence Manager (PCM). This approach combines both worlds: on the one hand, the informal approach with easy-to-use editing tools favoring bottom-up authoring; and on the other, the more formal, top-down approach currently favored by the LD toolset.

The PCM allows users to develop their personal competences by selecting competence profiles. Each competence may have one or more associated competence developments plans (CDP). These CDPs contain a number of activities that support acquisition of the competence. The PCM provides easy editing of these constructs, which can be considered a form of creating simple units of learning. These simple units of learning, however, are not LD compliant. Although the lower threshold of this kind of editing is beneficial to most authors, we provide several arguments (e.g., accountability, reproducibility, extensibility, quality control) as to why a formal UOL can be beneficial. The concepts of the PCM, such as competences, competence profiles and competence development plans, can be mapped onto LD, making it possible to export any CDP as a UOL. Such exported UOLs may be enhanced by using the regular LD authoring toolset, like Reload. The common LD authoring tools are still required to modify such a UOL; we therefore consider our approach complementary to these tools.

The authoring cycle is completed by feeding the produced UOL back into the PCM as an alternative to the original CDP. This cycle makes it possible to use the most appropriate authoring tools for the situation at hand. Authors can benefit from the ease of use of the PCM's simple authoring environment in situations where having a formal specification is not valuable or sensible. They may also decide to export their learning design to LD when, for example, it has matured into a stable state and requires further refinement not offered by the PCM.

This authoring approach requires close integration of CopperCore and the PCM. This integration must be seamless; to this end, several issues require further research. These include rolling-on and rolling-off users, inclusion or exclusion of services, and role assignments. The latter can be especially complicated because the PCM does not distinguish any formal roles: ad hoc roles may emerge and be formalized in the resulting LD design.

In Chapter 8 we review our results. We reflect on our research and development questions by discussing how we met the set of requirements for an LD engine formulated in Chapter 2. We conclude that we have successfully answered both questions, but also identify several topics that require future research and development. We argue that the XML schema formalism is lacking some expressiveness. Therefore, LD cannot solely be described via an XML schema; additional descriptions in natural language are still necessary. This is not ideal, as it could lead to different interpretations of the specification. We propose to use first-order logic to formalize LD's expected runtime behavior, and to use this formalism to automatically generate the CopperCore engine's implicit conditions.

We also touch upon some criticism of our choice of J2EE. We argue that modern persistence frameworks could help simplify the engine, and elaborate on the reported performance problems: although these were addressed, we identified additional measures needed to make CopperCore suitable for use at an enterprise level. We propose performance improvements by introducing a more efficient approach to property fetching, but also discuss some of the drawbacks.

We then reflect on a more harmonized service architecture based on the CopperCore and CCSI concepts. This integrated approach splits up the current engine into separate services, each with a separate API. This architecture is elegant, extensible and flexible, but we also anticipate performance issues with this approach.

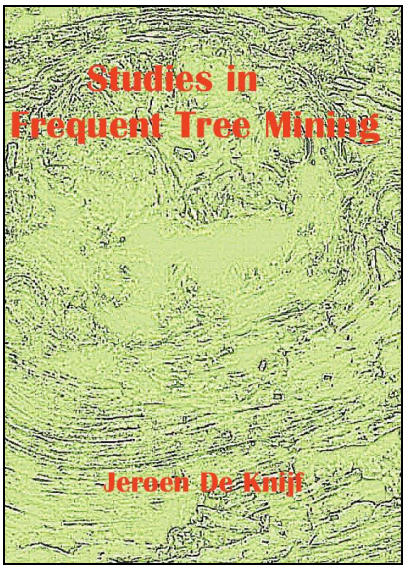
We propose a generic approach (i.e., not only limited to LD and CopperCore) to solving the provisioning issues of Chapter 7. We present an initial architecture that can transform a UOL's abstract handler into a URL pointing to a fully deployed UOL instance.

Finally, we propose to examine more closely the success of Web 2.0. By identifying some of its typical characteristics and comparing them with the designs and implementations presented in this thesis, we identify some areas of potential future research.

Studies in Frequent Tree Mining

Ph.D. thesis abstract
Jeroen de Knijf

Promotor: Prof.dr. A.P.J.M. Siebes
Date of defense: November 19, 2008



Employing data-mining techniques for structured data is particularly challenging, because it is commonly assumed that the structure of the data encodes part of its semantics. As a result classical data-mining techniques are insufficient to analyze and mine these data.

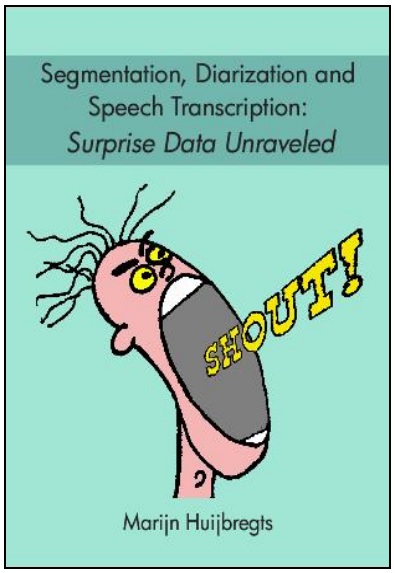
In this thesis we develop several mining algorithms for tree-structured data and discuss some applications. Moreover, we focus on algorithms that only retrieve a small subset of all potentially interesting patterns, while the overall quality of the retrieved subset is as good as the complete set of patterns.

The results show, beside a smaller set of more focused patterns, that the proposed algorithms are far more efficient than existing algorithms.

Segmentation, Diarization and Speech Transcription: Surprise Data Unraveled

Ph.D. thesis abstract
Marijn Huibregts

Promotor: Prof.dr. F.M.G. de Jong
Date of defense: November 21, 2008



In this thesis, research on large-vocabulary continuous-speech recognition for unknown audio conditions is presented. For automatic speech-recognition systems based on statistical methods, it is important that the conditions of the audio used for training the statistical models match the conditions of the audio to be processed. Any mismatch will decrease the accuracy of the recognition. If it is unpredictable what kind of data can be expected, or in other words if the conditions of the audio to be processed are unknown, it is impossible to tune the models. If the material consists of 'surprise data' the output of the system is likely to be poor. In this thesis methods are presented for which no external training data is required for training models. These novel methods have been implemented in a large-vocabulary continuous-speech-recognition system called SHoUT. This system consists of three subsystems: speech/non-speech classification, speaker diarization and automatic speech recognition.

The speech/non-speech classification subsystem separates speech from silence and unknown audible non-speech events. The type of non-speech present in audio recordings can vary from paper shuffling in recordings of meetings to sound effects in television shows. Because it is unknown what type of non-speech needs to be detected, it is not possible to train high-quality statistical models for each type of

non-speech sound. The speech/non-speech classification subsystem, also called the speech-activity-detection subsystem, does not attempt to classify all audible non-speech in a single run. Instead, first a bootstrap speech/silence classification is obtained using a standard speech-activity component. Next, the models for speech, silence and audible non-speech are trained on the target audio using the bootstrap classification. This approach makes it possible to classify speech and non-speech with high accuracy, without the need to know what kinds of sound are present in the audio recording.

Once all non-speech is filtered out of the audio, it is the task of the speaker-diarization subsystem to determine how many speakers occur in the recording and exactly when they are speaking. The speaker-diarization subsystem applies agglomerative clustering to create clusters of speech fragments for each speaker in the recording. First, statistical speaker models are created on random chunks of the recording and by iteratively realigning the data, retraining the models and merging models that represent the same speaker, accurate speaker models are obtained for speaker clustering. This method does not require any statistical models developed on a training set, which makes the diarization subsystem insensitive for variation in audio conditions. Unfortunately, because the algorithm is of complexity $O(n^3)$, this clustering method is slow for long recordings. Two variations of the subsystem are presented that reduce the needed computational effort, so that the subsystem is applicable for long audio recordings as well.

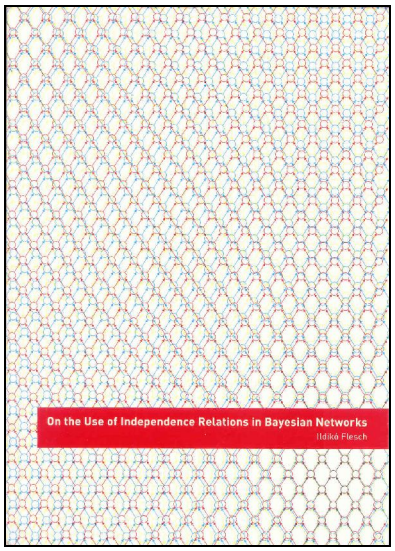
The automatic speech-recognition subsystem developed for this research, is based on Viterbi decoding on a fixed pronunciation prefix tree. Using the fixed tree, a flexible modular decoder could be developed, but it was not straightforward to apply full language-model look-ahead efficiently. In this thesis a novel method is discussed that makes it possible to apply language-model look-ahead effectively on the fixed tree. Also, to obtain higher speech-recognition accuracy on audio with unknown acoustical conditions, a selection from the numerous known methods that exist for robust automatic speech recognition is applied and evaluated in this thesis.

The three individual subsystems as well as the entire system have been successfully evaluated on three international benchmarks. The diarization subsystem has been evaluated at the NIST RT06s benchmark and the speech activity detection subsystem has been tested at RT07s. The entire system was evaluated at N-Best, the first automatic speech recognition benchmark for Dutch.

On the Use of Independence Relations in Bayesian Networks

Ph.D. thesis abstract
Ildikó Flesch

Promotor: Prof.dr.ir. Th.P. van der Weide
Date of defense: November 27, 2008



The central theme of the work described in this thesis is reasoning with uncertainty using Bayesian networks and related probabilistic graphical models. Bayesian networks have opened up a whole new dimension of research in reasoning with uncertainty, where qualitative and quantitative knowledge is given equal status. In this thesis, exploiting these two types of knowledge in the context of various problems is the repeating theme. This choice is an important one, as without the availability of qualitative knowledge, quantitative models are difficult to obtain and to understand. Real AI, therefore, needs both, quantitative as well as qualitative knowledge.

In this thesis, the emphasis is on how particular problem types, such as diagnosis, influence the structure and content of Bayesian networks. Modelling particular problem types has consequences for the independence relations represented by means of Bayesian networks. Independence relations lie at the heart of probabilistic graphical models, and are the main reason for their success. The study of the properties of independence relations yields a deeper understanding of probabilistic relationships, where, from a practical point of view, exploiting the independence relations that hold for a problem

domain gives rise to more compact representations. As independence relations underlying probabilistic graphical models play a major role in all the research described in my thesis, its title, 'On the Use of Independence Relations in Bayesian Networks', has been chosen to reflect this status.

In Chapter 2, the preliminaries of probability and graph theory are summarised, which is followed by a broad overview of important ideas from recent research in probabilistic graphical models, including Bayesian networks, and their equivalence relations.

Bayesian networks can be considered as probabilistic graphical models, representing dependence and independence information. However, normally the emphasis of the visualisation of the reasoning process is on showing changes in the associated marginal probability distributions, due to entering observations, rather than on changes in the associated graph structure. In Chapter 3, it is argued that it is possible and relevant to look at Bayesian-network reasoning as reasoning with a graph structure that may change, and that it is possible to depict those changes in the dependence and independence information. Therefore, a new theory is proposed that is able to modify the graphical part of a Bayesian network to bring it in accordance with the available observations.

Consistency-based diagnosis concerns the use of a model of the structure and behaviour of a system in order to determine whether or not the system is malfunctioning. A well-known limitation of traditional, logic-based consistency-based diagnosis is that it is unable to cope with uncertainty. Proposals made in the field of model-based reasoning to add uncertainty reasoning to model-based diagnosis have many limitations. As uncertainty reasoning is nowadays often done using Bayesian networks, one of the challenges of this research was to find a flexible, probabilistic extension to the logical notions of consistence and inconsistence, that play such an important role in the logical theory of model-based diagnosis. The notion of conflict measure, which was introduced by Bayesian-network researchers to detect discrepancies between data and a given Bayesian network, appeared to be a suitable candidate. In Chapter 4, Bayesian networks are used to represent the structure of logical diagnostic systems and it is shown that it is possible to determine consistent and inconsistent states in the Bayesian-network representation equally well. More importantly, the conflict measure in the probabilistic theory of model-based diagnosis offers a way to favour particular diagnoses above others, resulting into what can be looked upon as a truly probabilistic extension to traditional consistency-based diagnosis. The diagnostic conflict measure is analysed in detail and special computational forms for the measure are derived.

In Chapter 5, dynamic Bayesian networks are defined as a special type of Bayesian networks, which explicitly deal with the dimension of time. In this thesis, it is assumed that dynamic Bayesian networks can have a repetitive and non-repetitive structure. Repetitive networks have the same set of random variables and independence relations at each time step, whereas in non-repetitive networks the set of random variables and the independence relations between these random variables may vary in time. Due to their structural symmetry, repetitive networks are easier to use and are, therefore, often taken as the standard. However, repetitiveness is a very strong assumption, which normally does not hold, since particular dependences and independences may only hold at certain time steps. A new framework for independence modularisation in dynamic Bayesian networks is proposed, based on a theory of separation of temporal and atemporal independence. The resulting theory offers a practical approach to building dynamic Bayesian networks from these separate parts of independence relations taking into account non-repetitiveness. To build dynamic Bayesian networks independence relations are composed by means of a so-called join operator. It is shown that for the correct composition of temporal and atemporal parts of the independence relations, the join operator has to satisfy a number of important properties. Experimental results obtained from learning dynamic Bayesian networks from real medical data show that this framework offers a more accurate way of knowledge representation using dynamic Bayesian networks.

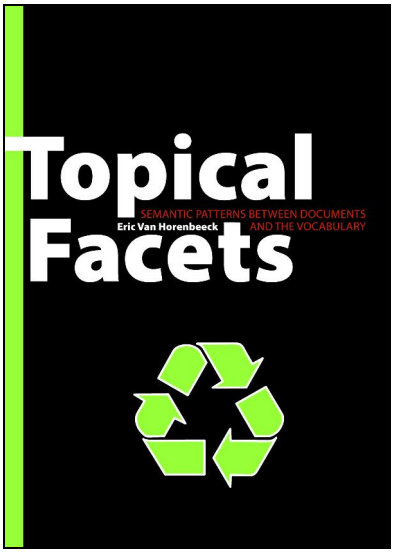
Chapter 6 includes a proposal for an incremental learning method for the construction of Bayesian classifier and regression models from data. The basic idea is that, in contrast to batch learning, the data set from which the Bayesian-network models must be learnt is not available at any time. This happens, for example, in very large data sets or when data are being collected as a stream. The new method uses special Bayesian-network structures; for the Bayesian regression models the theory of mixtures of truncated exponentials is used.

Finally, Chapter 7 gives a summary of what has been achieved in this thesis and some of the limitations of the research that has been done are addressed. In addition, ideas for future research are discussed.

Topical Facets: Semantic Patterns between Documents and the Vocabulary

Ph.D. thesis abstract
Eric Van Horenbeeck

Promotor: Prof.dr. W. Daelemans
Date of defense: December 8, 2008



The Topical Facets thesis is about unsupervised information discovery. An author uses words from the lexicon, organized according to a set of grammatical rules, a process permitting the production of an unlimited stream of texts. Once finished the document petrifies. Changing a word or adding a comma brings forth a new text. There is, however, more structure in language productions than loose words and finished documents. The amount of reused text chunks is striking, chunks that are more complex than words but less so than the text itself or its main components. These chunks make up a third layer between petrified documents and the constituent tokens; a layer with recycled phrases. Texts that share many of these fragments have also a meaning in common, hence, the denomination *topical facets*. The word *topic* relates to the pivotal theme in a language production; it concerns what a text is about. The term *facet* specifies that only a fraction of the whole topic is available. Many topical facets are needed to compose a full topic. When we collect texts based on the topical facets they have in common, we posit at the same time that the documents are gathered on a shared meaning too. A relatively recent theory underpins this conjecture, a theory describing natural language with a special network class: the *small-world* network. A language user follows a path over the network that ultimately results in the text he or she will pronounce or write down. Efficient communication forces the language user to choose words, phrases and rules that are obtainable in the network and that are also used by others when bringing up the same subject.

The Topical Facet dissertation explores a novel way to uncover content from an assembly of documents. We presume a dynamic operating environment where additional material is presented continuously to the system, compelling the object description to adapt to the new facts. A text network is conceptually interesting and provides a computationally efficient setting for tackling this question. Adding data does not force the system to recalculate the entire structure and employing informative phrases makes the application and its functioning intelligible for the user. The solution proposed here applies an intermediate layer between the actual language production and the vocabulary. Topical facets are sets of informative phrases shared by two or more texts. Topical facets endorse access to the documents in different ways. The search for meaningful topics is one of them. A software application engaging the topical facets, demonstrates how a user is assisted to explore and to query a body of possibly unknown data.

Chapters 2 and 3 consider the construction of the topical facet concepts and their evaluation. In chapter 2 topical facets are built with informative phrases found inside a document. To be part of a topical facet these phrases should be shared by at least two different documents. The document description provided by a topical facet is fragmental and is only useful in combination with other facets. The formulation of a query, for instance, is a trigger that brings together several facets and starts the extraction of relevant information in response to the needs of the user. Chapter 3 evaluates how well the application works with an annotated corpus on a topic detection and tracking task (TDT). To check the assumptions, we use a 30,000-document corpus from eight different US news providers. Every article has been manually annotated and assigned, if appropriate, to one of sixty different news topics. In this controlled environment we test the application on its ability to allocate each unseen document to the right topic without external help. Unsupervised information detection or document classification based on certain properties, are possible uses of topical facets. The Topical Facet Application stands the test when judged against other systems; nevertheless, structural improvements are advisable and feasible.

Chapter 4 provides a computational view on the construction of a text network with its key components and relations. The idea of constructing a network representation with linguistic components

is not new. In this case, however, the text network is unrestricted and unsupervised, meaning that it does not contain predetermined constructs. The number and the type of the features are based on actual word usage. They are not anticipated in advance and are not confined to a particular domain. Stop words are not removed and no correction of typographical errors is applied. The network has the property of growing incrementally, remembering time, and source of the added data. Topical awareness with graph labeling is a necessary feature to keep track of the constituting elements. All necessary information is derived from relations between the text components and from the frequency of the links. A network as data structure proves to be computationally advantageous.

The research in this work happens against the background of a relatively recent advancement in language theory. The small-world model is the central concept guiding the development of an instrument to describe (digital) documents. Chapter 5 presents a synopsis of the evolution into a language-description model from a general purpose pattern initially developed for studying hybrid networks such as the World Wide Web. The theory acknowledges that words show different frequencies of use, but argues that words maintain in particular more or less intense relations with other words. The network captures these relations as word types with their combination rules. The original small-world network is supplemented with two functions to make it appropriate as a language description: the possibility of removing or decaying vertices and of rewiring (adding and removing) links. The small-world model situates the Zipf conjecture at the edge of an indexical communication phase, where the number of objects to describe can grow, while keeping the size of the lexicon relatively small and centered on a stable kernel. Language is seen as a special class of social network with word clusters having short distances inside and linked with long distance links (hubs) to other clusters. Available words are bonded to each other via function words acting as a roundabout, redirecting incoming links to other content words. The language network is dynamic: it grows by preferential linking, and decays when words become obsolete or change meaning. Preference linking manifests itself in the community-collection dimension of a document and in the link frequency of a term.

A Substantial Increase

Jaap van den Herik
TiCC, Tilburg

More professors and more Ph.D. students automatically lead to more Ph.D. defences. The world of science is complex, but counting the results is easy. In Table 1 we clearly see a substantial increase of the number of theses. Still, the question whether the first statement is true deserves a closer investigation. Your editor must admit that this statement is based on three separate observations and that the merging of the observation (1) and (2) was a first step to the conclusion (3) which may sound as music in the ears of our community members. First, the number of announcements of inaugural addresses in our Newsletter (of course, corrected for established professors who change Universities) is growing and this implies an increase of professorial activities in the Departments of the Universities. Second, since the prime professional activity is guiding Ph.D. students, I conjecture that the number of Ph.D. students has been increased. This conjecture was confirmed by the SIKS numbers. They indicate an increase of students over the last five years (please note, that we here have the difficulty that more university groups joined the research school) and so the figures may be blurred. Whatever the case, the increase is definitive and substantial. Third, it is therefore no wonder that the number of SIKS theses increased by ten (from 25 to 35). This is a compliment in itself.

Year	# of Theses	# of SIKS Theses
1994	22	-
1995	23	-
1996	21	-
1997	30	-
1998	21	5
1999	28	8
2000	19	11
2001	25	11
2002	33	17
2003	37	18
2004	45	20
2005	45	21
2006	54	28
2007	46	25
2008	**55**	**35**
Grand Total	**504**	**199**

Table 1: Scores and grand total.

Last year I had to resort to an explanation containing notions as “global increases” and “local increases” for a proper interpretation of the results. This year, my task of analysing the results is easier. We may conclude that the scientific education and guidance

of Ph.D. researchers in the field of AI (or related fields) has been successful in their outcomes. Congratulations to all who contributed to these results.

A General View

The 55 Ph.D. thesis announcements are related to the following domains: (1) Artificial Intelligence, (2) AI and Law, (3) AI and Medicine, (4) AI and Economy, (5) AI and Civil Engineering, (6) AI and Computer Science, (7) AI and Information Sciences, (8) AI and Logic, and (9) AI and NBIC (see below).

From this enumeration the reader can see that AI is nowadays an intrinsic part of many other disciplines. So far, the end of the list is not foreseeable. Let me repeat the example of last year. The Netherlands Bioinformatics Centre (NBIC) has bundled its research activities in a research body called NBIC. Obviously, Bio Informatic researchers use all kinds of AI techniques.

Our cooperation with the NBIC Director Ruben Kok resulted again in providing us with a list of 11 Ph.D. theses, published in 2008. In 2007, NBIC had 8 Ph.D. thesis defences. In combination with our 46 announcements (so, in total, we had 54 announcements in 2007), I predicted for the year 2008 an increase up to 60 Ph.D. theses. Now we see that the proper number reads 55+11=66. Hence, the result is better than predicted and we may conclude that the statement at the beginning has some truth.

Predictions

Next to the NBIC-related prediction I have two straightforward predictions in my 2007 overview article on the Ph.D. theses called *Activity and Stabilisation*: "For 2008 I expect 60 Ph.D. announcements in general (see above) and 30 SIKS Ph.D. theses." The "(see above)" remark concerned the NBIC involvement. My conclusion is that both predictions were wrong. The toal number of announcements (including NBIC) is 66 (in stead of 60) and the total number of SIKS Ph.D. theses reads 35 (in stead of the predicted 30). With respect to Table 1, I would like to remark that the NBIC-theses are *not* included in the number of announcements.

In 2007, I stated to expect 80 announcements (including CATCH, MultimediaN, NBIC, Vl/e, and Big Grid related research) for 2009. For SIKS, I then stated for 2009: "I would optimistically like to go to 40 Ph.D. students, since SIKS is growing and the number of Ph.D. students per chair is growing." I do not see any reason to correct these predictions for 2009.

In 2006, I predicted for 2012 the numbers 100 (general announcements) and 50 (SIKS Ph.D. theses). Having seen the current trend and having seen the current activities I keep that prediction for this overview.

Below we honour our 55 successful Ph.D. defenders who completed their theses in 2008. We list them together with the date of promotion. Thereafter we reproduce the SIKS promovendi 2008 list, followed by a list of new announcements. Finally, we provide you with the dates and titles of five inaugural addresses.

Yan Wang (January 9, 2008), Alexei Sharpanskykh (January 10, 2008), Bela Mutschler (January 17, 2008), Anneleen Van Assche (January 22, 2008), Katalin Boer-Sorbán (January 25, 2008), Stefan Raeymaekers (January 30, 2008), Vera Hollink (January 31, 2008), Ander de Keijzer (February 1, 2008), Fenrong Liu (February 26, 2008), Mohammad Torabi Dashti (February 27, 2008), Henk Herman Nap (March 18, 2008), Wauter Bosma (March 27, 2008), Christof van Nimwegen (March 31, 2008), Jun Wang (April 7, 2008), Guénola Ricard (April 14, 2008), Arjen Hommersom (April 18, 2008), Peter van Rosmalen (April 18, 2008), Janneke Bolt (April 21, 2008), Jozsef Farkas (April 23, 2008), Vincent Nollet (April 23, 2008), Caterina Carraciolo (April 25, 2008), Aleksander Beric (May 8, 2008), Michael Capalbo (May 9, 2008), Maarten Peeters (May 19, 2008), Vera Kartseva (May 28, 2008), Martijn van Otterlo (May, 30 2008), Arthur van Bunningen (June 13, 2008), Martin Op 't Land (June 13, 2008), Henriette van Vugt (June 25, 2008), Guido de Croon (June 26, 2008), Henning Rode (June 27, 2008), Zharko Aleksovski (September 5, 2008), Georgi I. Nalbaltov (September 11, 2008), Henk Koning (September 24, 2008), Krisztian Balog (September 30, 2008), Stefan Visscher (September 30, 2008), Pashiera Barkhuysen (October 3, 2008), Geert Jonker (October 6, 2008), Rex Arendsen (October 7, 2008), Ayman Khedr (October 8, 2008), Dennis Reidsma (October 9, 2008), Trung H. Bui (October 9, 2008), Loes Braun (October 29, 2008), Edgar H. de Graaf (October 29, 2008), Frank Terpstra (November 6, 2008), Hubert Vogten (November 7, 2008), Anne Helsdingen (November 7, 2008), Wouter van Attevelt (November 11, 2008), Jeroen de Knijf (November 19, 2008), Marijn Huijbregts (November 21, 2008), Ildikó Flesch (November 27, 2008), Ben Torben-Nielsen (December 3, 2008), Huub de Waard (December 5, 2008), Gijs Geleijnse (December 8, 2008), Nong Chen (December 22, 2008).

SIKS PROMOVENDI 2008

2008-01
Katalin Boer-Sorbán (January 25, 2008). *Agent-Based Simulation of Financial Markets: A Modular, Continuous-Time Approach.* Erasmus Universiteit Rotterdam. Promotor: Prof.dr. A. de Bruin (EUR). Co-promotor: Dr.ir. U. Kaymak (EUR).

2008-02
Alexei Sharpanskykh (January 10, 2008). *On Computer-Aided Methods for Modeling and Analysis of Organizations*. Vrije Universiteit Amsterdam. Promotor: Prof.dr. J. Treur (VU).

2008-03
Vera Hollink (January 31, 2008). *Optimizing Hierarchical Menus: A Usage-Based Approach*. University of Amsterdam. Promotor: Prof.dr. B.J. Wielinga (UvA). Co-promotor: Dr. M.W. van Someren (UvA).

2008-04
Ander de Keijzer (February 1, 2008). *Management of Uncertain Data: Towards Unattended Integration*. University of Twente. Promotor: Prof.dr. P.M.G. Apers (UT). Co-promotor: Dr.ir. M. van Keulen (UT).

2008-05
Bela Mutschler (January 17, 2008). *Modeling and Simulating Causal Dependencies on Process-aware Information Systems from a Cost Perspective*. University of Twente. Promotor: Prof.dr. R.J. Wieringa (UT). Co-promotor: Dr. M.U. Reichert (UT).

2008-06
Arjen Hommersom (April 18, 2008). *On the Application of Formal Methods to Clinical Guidelines, an Artificial Intelligence Perspective*. Radboud University Nijmegen. Promotor: Prof.dr.ir. Th.P. van der Weide (RUN). Co-promotor: Dr. P.J.F. Lucas (RUN).

2008-07
Peter van Rosmalen (April 18, 2008). *Supporting the Tutor in the Design and Support of Adaptive E-Learning.* Open Universiteit Nederland. Promotor: Prof.dr. E.J.R. Koper (OU). Co-promotor: Prof.dr. P.B. Sloep (OU).

2008-08
Janneke Bolt (April 21, 2008). *Bayesian Networks: Aspects of Approximate Inference*. Utrecht University. Promotor: Prof.dr.ir. L.C. van der Gaag (UU).

2008-09
Christof van Nimwegen (March 31, 2008). *The Paradox of the Guided User: Assistance can be Counter-Effective*. Utrecht University. Promotor: Prof.dr. L. van den Berg (UU). Co-promotor: Dr. H. van Oostendorp (UU).

2008-10
Wauter Bosma (March 27, 2008). *Discourse Oriented Summarization*. University of Twente. Promotor: Prof.dr.ir. A. Nijholt (UT). Co-promotor: Dr. M. Theune (UT).

2008-11
Vera Kartseva (May 28, 2008). *Designing Controls for Network Organizations: A Value-Based Approach*. Vrije Universiteit. Promotores: Prof.dr. Y.-H. Tan (VU), Prof.dr.ir R. Paans (VU). Co-promotor: Dr. J. Gordijn (VU).

2008-12
Jozsef Farkas (April 23, 2008). *A Semiotically Oriented Cognitive Model of Knowledge Representation*. Radboud University Nijmegen. Promotores: Prof.dr.ir. T.P. van der Weide (RUN). Co-promotor: Dr. J.J. Sarbo (RUN).

2008-13
Caterina Carraciolo (April 25, 2008). *Topic Driven Access to Scientific Handbooks.* Universiteit van Amsterdam. Promotor: Prof.dr. M. de Rijke (UvA). Co-promotor: Dr. J. Kircz (HvA).

2008-14
Arthur van Bunningen (June 13, 2008). *Context-Aware Querying; Better Answers with Less Effort*. Twente University. Promotores: Prof.dr. P.M.G. Apers (UT), Prof.dr. L. Feng (Tsinghua University, China). Co-promotor: Dr. M. Fokkinga (UT).

2008-15
Martijn van Otterlo (May, 30 2008). *The Logic of Adaptive Behavior: Knowledge Representation and Algorithms for the Markov Decision Process Framework in First-Order Domains*. Twente University. Promotores: Prof. dr.ir A. Nijholt (UT), Prof.dr. J.-J.Ch. Meyer (UU). Co-promotor: Dr. M. Poel (UT). Referent: Dr. M. Wiering (RUG).

2008-16
Henriette van Vugt (June 25, 2008). *Embodied Agents from a User's Perspective.* Vrije Universiteit Amsterdam. Promotores: Prof.dr. J. Kleinnijenhuis (VU), Prof.dr. G.C. van der Veer (VU). Co-promotores: Dr. J. Hoorn (VU), Dr. E.A. Konijn (VU).

2008-17
Martin Op 't Land (June 13, 2008). *Applying Architecture and Ontology to the Splitting and Allying of Enterprises.* Delft University of

Technology. Promotor: Prof.dr.ir. J.L.G. Dietz (DUT).

2008-18
Guido de Croon (June 26, 2008). *Adaptive Active Vision*. Maastricht University. Promotores: Prof.dr. E.O. Postma (UM), Prof.dr. H.J. van den Herik (UM).

2008-19
Henning Rode (June 27, 2008). *From Document to Entity Retrieval: Improving Precision and Performance of Focused Text Search*. Twente University. Promotor: Prof.dr. P.M.G. Apers (UT). Co-promotor: Dr. D. Hiemstra (UT).

2008-20
Rex Arendsen (October 7, 2008). *Geen Bericht, Goed Bericht. Een onderzoek naar de effecten van de introductie van elektronisch berichtenverkeer met de overheid op de administratieve lasten van bedrijven*. Universiteit van Amsterdam. Promotor: Prof.dr. T.M. van Engers (UvA).

2008-21
Krisztian Balog (September 30, 2008). *People Search in the Enterprise*. Universiteit van Amsterdam. Promotor: Prof.dr. M. de Rijke (UvA).

2008-22
Henk Koning (September 24, 2008). *Communication of IT-Architecture.* Universiteit Utrecht. Promotores: Prof. dr. S. Brinkkemper (UU), Prof. dr. J.C. van Vliet (VU). Co-promotor: Dr. R. Bos (UU)

2008-23
Stefan Visscher (September 30, 2008). *Bayesian Network Models for the Management of Ventilator-associated Pneumonia***.** Universiteit Utrecht. Promotor: Prof.dr. M.J.M Bonten (UU/UMCU). Co-promotores: Dr. P. Lucas (RUN), Dr. C.A.M. Schurink (EUR).

2008-24
Zharko Aleksovski (September 5, 2008). *Using Background Knowledge in Ontology Matching***.** Vrije Universiteit. Promotor: Prof. dr. F. van Harmelen (VU). Co-promotor: Dr. W. ten Kate (VU).

2008-25
Geert Jonker (October 6, 2008). *Efficient and Equitable Exchange in Air Traffic Management Plan Repair using Spender-signed Currency*. Universiteit Utrecht. Promotor: Prof.dr. J-J. Ch. Meyer (UU). Co-promotor: Dr. F. Dignum (UU).

2008-26
Marijn Huijbregts (November 21, 2008). *Segmentation, Diarization and Speech Transcription: Surprise Data Unraveled.* University of Twente. Promotor: Prof.dr. F.M.G. de Jong (UT). Co-promotor: dr. R.J.F. Ordelman (UT).

2008-27
Hubert Vogten (November 7, 2008). *Design and Implementation Strategies for IMS Learning Design*. Open Universiteit Nederland. Promotor: Prof.dr. E.J.R. Koper (OU). Co-promotor: Dr. J.M. van Bruggen (OU).

2008-28
Ildikó Flesch (November 27, 2008). *On the Use of Independence Relations in Bayesian Networks*. Radboud Universiteit Nijmegen. Promotor: Prof.dr. Th. van der Weide (RUN). Co-promotor: Dr. P. Lucas (RUN).

2008-29
Dennis Reidsma (October 9, 2008). *Annotations and Subjective Machines – Of Annotators, Embodied Agents, Users, and Other Humans.* Universiteit van Twente. Promotor: Prof.dr.ir. A. Nijholt (UT). Co-promotor: Dr.ir. H.J.A. op den Akker (UT).

2008-30
Wouter van Attevelt (November 11, 2008). *Semantic Network Analysis: Techniques for Extracting, Representing and Querying Media Content.* Vrije Universiteit. Promotores: Prof.dr. F. van Harmelen (VU), Prof.dr. J. Kleinnijenhuis (VU). Co-promotor: Dr. S. Schlobach (VU).

2008-31
Loes Braun (October 29, 2008). *Pro-Active Medical Information Retrieval.* Maastricht University. Promotores: Prof.dr. H.J. van den Herik (UvT), Prof.dr. A. Hasman (UvA). Co-promotor: Dr. F. Wiesman (UvA).

2008-32
Trung H. Bui (October 9, 2008). *Toward Affective Dialogue Management using Partially Observable Markov Decision Processes.* Universiteit van Twente. Promotor: Prof.dr.ir. A. Nijholt (UT). Co-promotor: Dr. J. Zwiers (UT).

2008-33
Frank Terpstra (November 6, 2008). *Scientific Workflow Design; theoretical and practical issues.* Universiteit van Amsterdam. Promotor: Prof.dr. P.W. Adriaans (UVA). Co-promotor: Dr. G.R. Meijer (UVA).

2008-34
Jeroen de Knijf (November 19, 2008). *Studies in Frequent Tree Mining*. Universiteit Utrecht. Promotor: Prof.dr. A.P.J.M. Siebes (UU). Co-promotor: Dr. A.J. Feelders (UU).

2008-35
Ben Torben-Nielsen (December 3, 2008). *Dendritic Morphology: Function Shapes Morphology*. Tilburg University. Promotores: Prof.dr. H.J. van den Herik (UvT), Prof.dr. E.O. Postma (UvT). Co-promotor: Dr. K. Tuyls (TU/e).

NEW ANNOUNCEMENTS

Ben Torben-Nielsen (December 3, 2008). *Dendritic Morphology: Function Shapes Morphology*. Tilburg University. Promotores: Prof.dr. H.J. van den Herik (UvT), Prof.dr. E.O. Postma (UvT). Co-promotor: Dr. K. Tuyls (TU/e).

Huub de Waard (December 5, 2008). *A New Approach to Distributed Data Fusion.* Promotores: Prof.drs. M. Boasson (UvA), Prof.dr.ir. F.C.A. Groen (UvA).

Nong Chen (December 22, 2008). *Discovery Services in Information Rich Environments.* Delft University of Technology. Promotores: Prof.dr. H.G. Sol (TUD), Prof.dr. A.N.W. Dahanayaka (TUD).

Lucian Buşoniu (January 13, 2009). *Reinforcement Learning in Continuous State Action Spaces*. Delft Technical University. Promotores: Prof. dr. R. Babuška, M.Sc. (TUD), Prof.dr.ir. B. De Schutter (TUD).

Hans Stol (January 21, 2009). *A Framework for Evidence-based Policy Making Using IT*. Tilburg University. Promotor: Prof.dr. H.J. van den Herik (UvT).

Jeroen Geertzen (February 11, 2009). *Dialogue Act, Recognition and Prediction: Explorations in computational dialogue modelling.* Tilburg University. Promotor: Prof.dr. H. Bunt (UvT).

Sander Canisius (February 13, 2009). *Structural Prediction for Natural Language Processing: A constraint satisfaction approach*. Tilburg University. Promotor: Prof.dr. A. van den Bosch (UvT).

INAUGURAL ADDRESSES

With much pleasure we announce the following five inaugural addresses.

Prof.dr. J. Scholtes (January 23, 2009). *Text Mining: de volgende stap in zoektechnologie; Vinden, zonder precies te weten wat je zoekt of wat er niet lijkt te zijn.* Maastricht University, Aula, Maastricht, 17.00 hours.

Prof.dr. H.J. van den Herik and Prof.dr. E.O. Postma (March 27, 2009). *Geesteswetenschappen in de 21ste Eeuw.* Tilburg University.

Prof.dr. A.F. Harmsen (April 17, 2009). *Knowledge Management of Global Work*. Maastricht University, Aula, Maastricht, 16.30 hours.

Prof.dr.ir. W. Kraaij (June 25, 2009). *Information Filtering and Aggregation*. Radboud University Nijmegen.

The NBIC List

Ruben Kok and Jaap van den Herik

As a sequel to last year's contribution "*Stop Press for the NBIC List*" we again have the pleasure to offer you the NBIC Ph.D. thesis list. As you may have read in the article *A Substantial Increase* the integration of the NBIC theses has not been fully completed. Merging and counting have their challenges. Meanwhile we congratulate NBIC with their own increase.

Michiel Wels (January 7, 2008). *Unraveling the Regulatory Network of Lactobacillus Plantarum WCFS1*. Wageningen UR. Promotor: Prof.dr. Willem M. de Vos. Co-promotor: Prof.dr. Roland J. Siezen.

Jifeng Tang (January 8, 2008). *A Bioinformatics Approach to Marker Development*. Wageningen UR. Promotor: Prof.dr. J.A.M. Leunissen. Co-promotor: dr. B. Vosman.

Rob Jelier (January 10, 2008). *Text Mining Applied to Molecular Biology*. Erasmus MC Rotterdam. Promotor: Prof.dr. J. van der Lei (EUR). Co-promotores: dr.ir. J.A. Kors, dr.ir. G.W. Jenster.

André Boorsma (January 18, 2008). *Dissection of Transcriptional Regulation Networks and Prediction of Gene Functions in Saccharomyces Cerevisiae*. University of Amsterdam. Promotor: Prof.dr. K.J. Hellingwerf (UvA).

Blaise Alako (February 1, 2008). *An Integrative Algorithmic Approach towards Knowledge Discovery in Bioinformatics.* Wageningen UR. Promotor: Prof.dr. J.A.M. Leunissen.

Martijn Dijkstra (February 15, 2008). *Bioinformatics for Mass Spectrometry*. University of Groningen. Promotor: Prof.dr. Ritsert C. Jansen (UG).

Morris Swertz (February 15, 2008). *Dynamic Software Infrastructures for the Life Sciences.* University of Groningen. Promotor: Prof.dr. Ritsert C. Jansen (UG), Prof.dr. E.O. de Brock (UG).

Guénola Ricard (April 14, 2008). *Evolution and Genome Structure of Anaerobic Ciliates.* CMBI, Radboud University Nijmegen (FNWI). Promotor: Prof.dr. M.A. Huynen (RUN).

Lude Franke (May 27, 2008). *Genome-wide Approaches towards Identification of Susceptibility Genes in Complex Diseases.* University Medical Centre Utrecht. Promotor: Prof.dr. T.N. Wijmenga (UU).

Jeroen Kazius (September 4, 2008). *Computers and Drug Discovery: Construction and data mining of chemical and biological databases.* Leiden University, LACDR. Promotores: Prof.dr. A.P. IJzerman (LU), Prof.dr. J.N. Kok .

Sandra Smit (September 29, 2008). *RNA in Formation: Computational studies on RNA structure and evolution.* Vrije Universiteit Amsterdam. Promotor: Prof.dr. J. Heringa (VU).

'De Connectie'

Joris de Ruiter
Editor-in-chief of 'De Connectie'
Vrije Universiteit, Amsterdam

De Connectie is a Dutch magazine for students Artificial Intelligence and other people interested in the field of AI. Published 4 times a year, it provides background articles, interviews and current developments in the field of AI. All related fields are covered: informatics, psychology, philosophy, logic and language. Compared to the *BNVKI Newsletter* it focuses more on background articles than on new scientific achievements. Thereby, it is more of a magazine than a newsletter. Its articles are published in Dutch and are readable by bachelor-level students and upwards.

De Connectie is available for students at RUG (Groningen), UU (Utrecht), UvA (Amsterdam), VU (Amsterdam), RU (Nijmegen), UM (Maastricht) and TUD (Delft). Private subscriptions cost € 10 for 4 issues, which are delivered at your doorstep.

Previous editions and articles are available at our website: http://www.deconnectie.com/. New content is always welcome! Any kind of article will do, as long as it is related to AI and readable by bachelor AI students. Articles can be sent to hoofdredactie@deconnectie.com.

Section Editor
Richard Starmans

5-Day Course "Human Technology Interaction" for SIKS-Ph.D. Students

From January 26-30, 2009, the First International School on Human Technology Interaction will be organized at Best Western Hotel Landgoed Ehzerworld, Almen (near Zutphen). Details on program and location can be found at http://www.mmi.tudelft.nl/HTIcourses/. As a result of the cooperation between SIKS and the local organisation, there is a fixed number of free places available for fully registered SIKS-Ph.D. students.

The summerschool is part of the Advanced Components stage of the school's educational program and therefore especially Ph.D. students working on the SIKS-focus Human Computer Interaction are strongly encouraged to participate.

A free participation as a SIKS-Ph.D. student is only possible by sending an e-mail to office@siks.nl and inform Mrs. Corine Jolles that you want to participate. Ph.D. students will receive a notification whether they can participate as soon as possible.

Deadline: December 18, 2008.

Our environments and the products inhabiting these spaces become increasingly dynamic and interactive. A growing variety of consumer and professional products is being equipped with sensors, data storage capacity, information-processing technology, actuators and new display technologies. Advancements in network and wireless-communication technology begin to make it feasible to connect such products into smart environments that can sense and reason about user

intentions, experiences and emotions in a natural setting and react and anticipate accordingly. In these smart environments humans will be continuously connected to each other and information will be available anytime everywhere. In order to investigate how these new technologies can be geared to the needs and wishes of humans, one should focus on the technological development, the human-product interaction and the changing role of humans as individuals and as community members.

This will be the first school in a row in which we will explore these issues. This first school will present a broad multidisciplinary view of how fundamental insights into human physical and cognitive capabilities can be used to design human-centered technologies that can collaborate symbiotically with humans to enhance human capabilities well outside the range of normal biological variation.

KEYNOTE SPEAKERS

- Dr. Bernice Rogowitz (IBM) – *Interfaces and Human Perception*
- Prof.dr. John Flach (Wright State Univ.) – *User Modelling*
- Prof.dr. Gilbert Cockton (Univ. of Sunderland) – *User Experience Sampling*

TARGET AUDIENCE

Master/graduate students, (postdoctoral) researchers in human-computer interaction, artificial intelligence, computer science, and related fields.

SETUP

The format of the school is as follows. Participants of the school will be in-house for a week. During 5 days, there will be lectures and some practical sessions, where the participants will work in groups. Each day (except Friday) will be concluded by some drinks and a dinner.

PARTICIPATION

Note that participation is limited. When you are interested in attending the school, you have to register (see below). After the registration deadline, we notify you within a week about your participation. We aim for as many participants as possible to attend for whom the school is directly relevant to their area of research and/or practice.

IMPORTANT DATES

- December 19, 2008: Early registration deadline
- January 26-30, 2009: HTI2009 school

REGISTRATION FEES

Early registration fee:

- 3TU-student or employee € 600,
- member of SIKS € 600,
- others € 700.

Late registration:

- early fee + € 150.

VENUE AND ACCOMMODATION

HTI2009 will take place at Best Western Hotel Landgoed Ehzerworld in Almen near Zutphen). Website http://www.ehzerwold.nl/ontspanning-en-omgeving.html. A number of rooms have been reserved at the Best Western Hotel. Please, indicate if you don't need a room.

ORGANISING COMMITTEE

Coordinators:

- Anton Nijholt (UT)
- Catholijn Jonker (TUD)
- Huib de Ridder (TUD)
- Armin Kohlrausch (TU/e)

Organisation support:

- Matthijs Noordzij (UT)
- Raymond Cuijpers, Wijnand IJsselsteijn (TU/e)
- Sylvia Pont, Ted Barendse (TUD)

For more information on organisational matters please contact Ted Barendse (t.j.m.barendse @tudelft.nl). For more information on content matters please contact Catholijn Jonker (c.m.jonker@tudelft.nl). For all questions regarding SIKS and its educational program, please contact office@siks.nl.

Advanced SIKS Course "Organizational Principles for IKS"

INTRODUCTION

On February 16 and 17, 2009, the School for Information and Knowledge Systems (SIKS) will organize an advanced course on "Organizational Principles for Information and Knowledge Systems". The course takes two days, will be given in English and is part of the Advanced Components Stage of the Educational 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 students taking the course. The course is given by experienced lecturers actively involved in the research areas related to the topics of the course. Especially Ph.D. students working on the SIKS-focus "Agent Systems" and "Enterprise Information Systems" are strongly encouraged to participate.

Organization concepts and models are increasingly being adopted for the design and specification of complex computational systems. As systems grow to include hundreds or thousands of components, it is necessary to move from an agent-centric view of coordination and control to an organization-centric one. Furthermore, open environments pose new demands on traditional architectures. These demands include the integration of organizational and individual perspectives and the dynamic adaptation of models to organizational and environmental changes. Organizational design plays a critical role in the development of larger and more complex (information) systems.

On the other hand, human organizations can be seen as a set of entities regulated by mechanisms of social order and created by more or less autonomous actors to achieve common goals. Organization supports an individual (be it a person, a computer system, or an institution) to recognize its role, and the roles of others, in accomplishing those collective goals. Organizational Theory sees organizations as instruments of purpose, as they are seen as coordinated by intentions and goals. Agent models are therefore increasingly used to model, simulate and support human organizations.

In this advanced SIKS course, we will discuss these two perspectives and present different approaches to the study of organizations both from the perspective of social science and management sciences, as from the perspective of information science and artificial intelligence. Speakers will cover a wide range of topics, and we will have a hands-on session on the design of organization models.

Location: Conference Center Woudschoten, Zeist

Date: February 16-17, 2009

Scientific Director: Dr. Virginia Dignum (UU)

PROGRAM

The program is not available yet, but the course will cover the following subjects:

- Fundamentals of Organization Theory
- Structural and normative dimensions of organization
- Modelling actors in the organization
- Work practice vs. work process
- Organizational dynamics
- Organizational learning
- Social simulation
- Social networks
- Design and analysis of organizational models using OperettA (hands-on tutorial)

REGISTRATION

Details on registration will be made available later this year.

CONFERENCES, SYMPOSIA, WORKSHOPS

FEBRUARY 2-3, 2009
The 9th Dutch-Belgian Information Retrieval Workshop (DIR). Enschede, the Netherlands.
http://dir2009.cs.utwente.nl

MARCH 30-31, 2009
ENLG2009: 12th European Workshop on Natural Language Generation. Athens, Greece.
http://enlg2009.uvt.nl/

MARCH 31-APRIL 1, 2009
Second International Workshop on Social Computing, Behavior Modeling, and Prediction. Phoenix, AZ, USA.
http://www.public.asu.edu/~huanliu/sbp09/

MAY 10-13, 2009
ACS/IEEE AICCSA'09: the 7th ACS/IEEE International Conference on Computer Systems and Applications. Rabat, Morocco.
http://www.congreso.us.es/aiccsa2009

MAY 29-30, 2009
3IA'2009: The Twelfth International Conference on Computer Graphics and Artificial Intelligence. Athens, Greece.
http://3ia.teiath.gr/main_page.php

ADDRESSES
BOARD MEMBERS BNVKI

Prof.dr. A. van den Bosch (chair)
Universiteit van Tilburg, Faculteit der Letteren
Taal en Informatica
P.O. Box 90153, 5000 LE Tilburg
Tel.: + 31 13 4663117. E-mail: Antal.vdnBosch@uvt.nl

Prof.dr. A. Nowé (secretary)
Vrije Universiteit Brussel, Computational Modeling Lab
Department of Computer Science
Pleinlaan 2, B-1050 Brussels, Belgium
Tel.: + 32 2 6293861
E-mail: asnowe@info.vub.ac.be

Dr. M.V. Dignum (treasurer and vice-chair)
Universiteit Utrecht, Inst. for Information & Computing Science
Cognition and Communication Group
P.O. Box 80089, 3508 TB Utrecht
Tel.: + 31 30 2539429. E-mail: virginia@cs.uu.nl

Dr. J.W.H.M. Uiterwijk (BNVKI Newsletter)
Universiteit Maastricht
Maastricht ICT Competence Centre (MICC)
P.O. Box 616, 6200 MD Maastricht
Tel: + 31 43 3883490. E-mail: uiterwijk@micc.unimaas.nl

Dr. M.F. Moens (PR and sponsoring)
KU Leuven, Departement Computerwetenschappen
Celestijnenlaan 200A, 3001 Heverlee, Belgium
Tel.: + 32 16 325383.
E-mail: sien.moens@cs.kuleuven.be

Dr. A. ten Teije (students)
Vrije Universiteit Amsterdam
Dept. of AI, Knowledge Representation and Reasoning Group
Room T343, De Boelelaan 1081A, 1081 HV Amsterdam
Tel.: + 31 20 5987721. E-mail: annette@cs.vu.nl

EDITORS BNVKI NEWSLETTER

Dr. J.W.H.M. Uiterwijk (editor-in-chief)
Maastricht University
Maastricht ICT Competence Centre (MICC)
P.O. Box 616, 6200 MD Maastricht
Tel: + 31 43 3883490. E-mail: uiterwijk@micc.unimaas.nl

Prof.dr. E.O. Postma
Tilburg University
Faculty of Humanities, TiCC
P.O. Box 90153, 5000 LE Tilburg
Tel: + 31 13 4662433. E-mail: E.O.Postma@uvt.nl

Prof.dr. H.J. van den Herik
Tilburg University
Faculty of Humanities, TiCC
P.O. Box 90153, 5000 LE Tilburg
Tel.: + 31 13 4668118. E-mail: H.J.vdnHerik@uvt.nl

M. van Otterlo, M.Sc.
University of Twente, Dept. of Computer Science
P.O. Box 217, 7500 AE Enschede
Tel.: + 31 53 4894111. E-mail: otterlo@cs.utwente.nl

Dr. L. Mommers (section editor)
Universiteit Leiden, Dept. of Meta-Juridica
P.O. Box 9520, 2300 RA Leiden
Tel.: +31 71 5277849. E-mail: l.mommers@law.leidenuniv.nl

J. De Beule, M.Sc. (editor Belgium)
Vrije Universiteit Brussel, Artificial Intelligence Laboratory
Pleinlaan 2, B-1050 Brussels, Belgium
Tel.: +32 2 6293703
E-mail: joachim@arti.vub.ac.be

Dr. R.J.C.M. Starmans (section editor)
Manager Research school SIKS,
P.O. Box 80089. 3508 TB Utrecht
Tel.: + 31 30 2534083/1454. E-mail: office@siks.nl

Ir. E.M. van de Vrie (section editor)
Open Universiteit Nederland, Opleiding Informatica
P.O. Box 2960, 6401 DL Heerlen
Tel: + 31 45 5762366. Email: Evert.vandeVrie@ou.nl

HOW TO SUBSCRIBE

The BNVKI-AIABN Newsletter is a direct benefit of membership of the BNVKI-AIABN: Benelux Association for Artificial Intelligence. Membership dues are € 40 for regular members; € 25 for doctoral students (AIO's); and € 20 for students. In addition, members will receive access to the electronic version of the European journal *AI Communications*. The Newsletter appears bimonthly and contains information about conferences, research projects, job opportunities, funding opportunities, etc., provided enough information is supplied. Therefore, all members are encouraged to send news and items they consider worthwhile to the editorial office of the BNVKI/AIABN Newsletter. Subscription is done by payment of the membership due to Postbank no. 3102697 in The Netherlands (IBAN: NL 74 PSTB 0003 1026 97; BIC: PSTBNL21). Specify *BNVKI/AIABN* as the recipient, and please do not forget to mention your name and address. Sending of the BNVKI/AIABN Newsletter will only commence after your payment has been received. If you wish to conclude your membership, please send a written notification to the editorial office before December 1, 2009.

COPY

The editorial board welcomes product announcements, book reviews, product reviews, overviews of AI education, AI research in business, and interviews. Contributions stating controversial opinions or otherwise stimulating discussions are highly encouraged. Please send your submission by E-mail (MS Word or text) to newsletter@micc.unimaas.nl.

ADVERTISING

It is possible to have your advertisement included in the BNVKI/AIABN Newsletter. For further information about pricing etc., see elsewhere in the Newsletter or contact the editorial office.

CHANGE OF ADDRESS

The BNVKI/AIABN Newsletter is sent from Maastricht. The BNVKI/AIABN board has decided that the BNVKI/AIABN membership administration takes place at the editorial office of the Newsletter. Therefore, please send address changes to:

Editorial Office BNVKI/AIABN Newsletter
Marijke Verheij
MICC, Maastricht University
P.O. Box 616, 6200 MD Maastricht, the Netherlands
E-mail: newsletter@micc.unimaas.nl
http://www.unimaas.nl/bnvki