NEWSLETTER

BNVKI
AIABN

August 2004
Vol. 21, No. 4
ISSN 1566-8266

Relational Reinforcement Learning

Agent Support for Online Learning

The Level Theory of Coherence

News from the Belgium-Netherlands Association for Artificial Intelligence

Olympic Games

Editor-in-chief

While writing this editorial the Olympics in Athens are in full swing. It is broadly acknowledged that the event is very well organised. Obviously, such a big event requires an attractive website. Also in this respect the job is done very well. The Olympic website provides general information on the games, the participants, and the results. In addition, it features a large volume of more detailed information such as extensive biographies of all participants, the rules of the games, historical notes, and even animations of all sports. The website is very stable and exhibits minimal delays. Undoubtedly, this is due to the quality of the underlying software and hardware.

There was even a greater role for software and hardware in a second Olympic Games event: the 9th Computer Olympiad and the accompanying 12th World Computer Chess Championship. Both were held during the first weeks of July 2004 in Ramat-Gan, Israel. As reported by Omid David Tabibi (see pp. 84-85 of this issue), the level of the play in computer chess increases steadily. This is clearly a result of both progress in software (algorithmic enhancements) and hardware (speed and especially the use of multi-processors). In the Computer Olympiad contests, computers played the following seven games: Amazons, Chinese Chess, Go 19 × 19, Go 9 × 9, Lines of Action, Hex, and Octi 6 × 7. For all games (except for the newcomer Octi) the level of play has improved significantly as compared to previous Olympic encounters. Naturally, most programmers do not give away too many of their secrets, but from what is revealed it is clear that the progress likewise is not only due to the hardware speed-up, but that the use of AI techniques plays an increasing role.

Although, not yet an Olympic game, robot soccer is where Artificial Intelligence and robotics meet. The robot-soccer playing strength is determined every year during the RoboCup event, where robot teams in various soccer leagues meet. This year several Dutch institutes joined forces to prepare a team to participate in the 4-legged robot league. Stefan Leijnen reports on the results of the Dutch AIBO team in RoboCup 2004 (see pp. 83-84 of this issue). The development of robots that outperform human players has probably a long way to go, but one day it will be realised. The RoboCup Federation states its ultimate aim as follows: "By 2050, a team of fully autonomous humanoid robot soccer players shall win a soccer game, complying with the official FIFA rules, against the winner of the most recent World Cup of Human Soccer." If the Federation achieves its aim, we may welcome robots playing soccer and other games at the Olympic Games of 2050!

Athens 2004 Olympic Games: http://www.athens2004.com/
9th Computer Olympiad: http://www.cs.unimaas.nl/olympiad2004/
12th World Computer Chess Championship: http://www.cs.biu.ac.il/games/
RoboCup 2004: http://www.robocup2004.pt/

Rectification
The previous issue of this *Newsletter* contained a report on the 2nd EUNITE Workshop "Smart Adaptive Systems in Finance". I was later informed by Dr. Uzay Kaymak of the organising Erasmus University that on the front cover this was unintentionally changed into "Small Adaptive Systems in Finance". Since 'smart' in no way logically implies 'small', it is obvious that this is not a small mistake and surely neither a smart one. I therefore sincerely apologise.

The photo on the frontcover is by Stefan Leijnen.

TABLE OF CONTENTS

BNVKI-Board News

Han La Poutré

When I'm writing this, it's the end of the summer time: the first few weeks of August have been very hot (as often happens in Holland), and now, while the temperature is more "workable", many people are still on holiday, which can be seen from the number of emails in my email box.

Recently, Bas Zinsmeister stepped down from the Board due to a new choice for his career. He has been a very valuable member of the BNVKI for many years, during which he worked for Bolesian, which was later taken over by CGEY. The Board likes to thank him for his many contributions to the BNVKI and his activities towards companies, and wishes him all the best for the future.

In the past months, we have been seeking for candidates for the BNVKI Board. At the moment, we have three candidates: Jos Uiterwijk (the new Editor-in-Chief of the BNVKI Newsletter), Edwin de Jong, and Marie-Francine Moens. The candidates will present themselves during the BNVKI General Assembly (during the BNAIC in Groningen) and elsewhere in this Newsletter.

Also, we have revised the by-laws ("huishoudelijk reglement") of the BNVKI and propose this new version for approval in the next BNVKI General Assembly. You can find the agenda of the next General Assembly as well as the proposed revision of the by-laws elsewhere in this Newsletter.

Finally, the new BNAIC in Groningen is approaching. We expect a high attendance of this BNAIC, also because of the large number of good papers and the interesting location. As it has been established during the last decade, the BNAIC will be again a major meeting spot for AI in the Netherlands and Belgium. We look forward to meeting all of you there again, while we all learn about the latest results of our colleagues or enjoy a nice glass of wine (or so). See you there on 21 and 22 October.

INTRODUCTION EDWIN DE JONG

Edwin de Jong did his Ph.D. research with Prof. Luc Steels in Brussels, were he investigated the development of concepts and communication in multi-agent systems. In his subsequent postdoc with Prof. Jordan Pollack at Brandeis University, he specialized in Pareto-coevolution and in the development of modular and hierarchical representations.

Currently, Edwin is a researcher in the DSS group of Prof. Linda van der Gaag and Dr. Dirk Thierens at Utrecht University. The questions of AI can not only shed light on human intelligence, but also contribute to the welfare and wellbeing of society. Starting from 1998, Edwin has written a series of articles for the BNVKI Newsletter that promote recent developments in AI. Edwin believes the BNVKI has an important role in promoting and facilitating AI research, to which he would like to further contribute. His focus topics would include attracting new students to the field, enabling the transfer of results from research to industry, and combining this with research into fundamental questions whose solution can extend the scope of AI.

INTRODUCTION MARIE-FRANCINE MOENS

Within the BNVKI, I would like to promote education and research in two AI disciplines that are part of my daily work. As a part-time associate professor and research project leader at the Interdisciplinary Centre for Law and Information Technology at the K.U. Leuven, AI and Law is a well-known domain. Moreover, I obtained a Ph.D. at the same university on the topic of information retrieval and teach a course on text retrieval in its Master in AI program. Other engagements in these two disciplines that are relevant to mention are: 1) Scientific coordinator of the Dutch-Belgian JURIX Foundation for Legal Knowledge Based Systems; 2) Involvement in the Dutch-Belgian Information Retrieval Workshop initiatives; 3) Member of the steering committee of the Document Understanding Conferences organized by the NIST (USA). Within the BNVKI, I would also consider it as a task to encourage companies to develop AI and Law and information retrieval applications. Additionally, women's representation in the field of AI (as in any other field of computing) has always been a challenge. If I would become a board member of the BNVKI, I would like to give an increased visibility to the contributions of women in AI as a stimulus for girls to obtain an education and career in this field.

INTRODUCTION JOS UITERWIJK

I started my career in the field of Chemistry at Nijmegen University and obtained in 1985 my Ph.D. at Twente University on the topic of applying theoretical computations on cyclic structures known as "crown ethers". Thereafter I changed my field completely to computer science, at Twente University again, and graduated in 1988 on a

subject of the Conversion between Analytic and Non-Analytic Proofs in Artificial Intelligence.

In 1988 I accepted a job as assistant professor at the Universiteit Maastricht. I soon became involved in the field of developing and applying intelligent search techniques to games. From 2001 onwards I am an associate professor and coordinator of the Search and Games Group of IKAT.

I see the BNVKI as *the* organisation for promoting and strengthening the research on AI in Belgium and The Netherlands, and even worldwide. I currently act as Editor-in-Chief of the *BNVKI Newsletter* and intend as such to enhance knowledge distribution among all "players" in the field.

Huishoudelijk Reglement

BNVKI Board

At the General Assembly meeting of the BNVKI, to be held on October 22 during the BNAIC'04, the by-laws ("huishoudelijk reglement") will be put on the agenda. Below follows the revised version (in Dutch) for comparison. The old version is available on http://www.cs.unimaas.nl/~bnvki/statuten/.

ARTIKEL 1

1. Het bestuur vergadert tenminste zes maal per jaar en voorts wanneer de voorzitter of twee leden van het bestuur zulks wenselijk achten.
2. Het bestuur kan indien noodzakelijk besluiten nemen die de vereniging binden. De leden worden hiervan minstens twee weken van te voren op de hoogte gesteld.
3. Correspondentie namens het bestuur wordt gevoerd en ondertekend namens voorzitter en/of secretaris.
4. Voor de vergaderingen van het bestuur worden de leden zo mogelijk tenminste veertien dagen van te voren door of vanwege de voorzitter opgeroepen, onder vermelding van de agendapunten.
5. Zijn alle leden van het bestuur aanwezig dan kan met algemene stemmen ook beslist worden over zaken die niet op de agenda vermeld zijn; in spoedeisende gevallen kan over zodanige zaken ook beslissing genomen worden wanneer twee/derde van de leden aanwezig is en wel met tenminste drie/vierde der geldig uitgebrachte stemmen. Over de vraag of een zaak die niet op de agenda vermeld staat spoedeisend is, beslist de voorzitter van de vergadering.
6. Het bestuur bestaat uit zeven leden. Hiervan kan bij uitzondering afgeweken worden maar niet minder dan zes en niet meer dan acht. Een termijn in het bestuur duurt 5 jaar. Een lid kan bij uitzondering één keer herkozen worden.
7. Het bestuur wijst uit haar midden een vice-voorzitter aan.
8. Het bestuur wijst (zo mogelijk uit haar midden) de Hoofdredacteur aan van de *BNVKI Newsletter*. Indien deze geen lid is van het bestuur wordt een lid van het bestuur afgevaardigd naar de redactie.

VOORZITTER
ARTIKEL 2

1. De voorzitter van de vereniging leidt de vergaderingen van het bestuur alsmede de algemene vergaderingen. Hij ziet toe op de handhaving van de statuten en het huishoudelijk reglement.
2. Namens de ledenvergadering en het bestuur ziet de voorzitter toe op de uitvoering van de besluiten genomen door de ledenvergadering en het bestuur.
3. De voorzitter draagt voorts zorg voor de contacten met zustervereniging. Hij is afgevaardigd namens de vereniging naar de ECCAI.

VICE-VOORZITTER
ARTIKEL 3

1. De vice-voorzitter vervangt de voorzitter bij ontstentenis dezer tijdens bestuurs- en ledenvergadering.

SECRETARIS
ARTIKEL 4

1. De secretaris is belast met het secretariaat van de vereniging. Hij draagt er onder meer zorg voor dat
   a. aantekening wordt gehouden van het verhandelde in het bestuur en in de algemene vergaderingen;
   b. de correspondentie der vereniging wordt gevoerd;
   c. in de *BNVKI Newsletter* die mededelingen betreffende de vereniging opgenomen worden waarvan publicatie in de *BNVKI Newsletter* door statuten of huishoudelijk reglement voorgeschreven wordt of door het bestuur van belang geacht wordt;
   d. het archief der vereniging en het ledenbestand op een deugdelijke wijze beheerd wordt.
2. Hij is afgevaardigd namens de vereniging naar de ECCAI.

PENNINGMEESTER EN FINANCIËN
ARTIKEL 5

1. De penningmeester is belast met het beheer van de financiën van de vereniging en draagt zorg voor de financiële kontakten met andere instituten en

met het bedrijfsleven. Van zijn werkzaamheden brengt hij periodiek verslag uit aan het bestuur.
2. Voor financiële transacties die niet vallen onder de door de ledenvergadering goedgekeurde begroting is de penningmeester, of in geval van afwezigheid, een ander bestuurslid, bevoegd om, mits gevolmachtigd door de voorzitter en de secretaris, te beschikken over de bank- en girosaldi voor een bedrag van ten hoogste vijf procent van de begroting. Voor bedragen daarboven is de toestemming van de ledenvergadering vereist.
3. Het bestuur is bevoegd om financiële verplichtingen, waaronder leningen, buiten om de goedgekeurde begroting aan te gaan, indien het totale bedrag de vijftien procent van de begroting niet overstijgt. Voor bedragen daarboven is de toestemming van de ledenvergadering vereist.
4. Om als donateur van de vereniging in aanmerking te komen dient een bedrijf een schenking van minimaal 500 Euro en een persoon een schenking van minimaal 100 Euro aan de vereniging te doen.

ALGEMENE VERGADERING
ARTIKEL 6

1. De leden zijn bevoegd schriftelijk vragen te stellen aan de voorzitter en voorstellen te doen ter behandeling op de algemene vergadering; deze vragen en voorstellen dienen op een zodanig tijdstip te worden verzonden dat zij door de voorzitter tenminste tien dagen voor datum van de vergadering worden ontvangen.
2. Met inachtneming van het bepaalde in het vorige lid en artikel 14 van de statuten stelt het bestuur de agenda van de algemene vergaderingen vast.
3. Zijn blijkens de getekende presentielijst alle leden casu quo hun gemachtigden aanwezig, dan kan met algemene stemmen ook beslist worden over zaken die niet op de agenda vermeld zijn; in spoedeisende gevallen kan over zodanige zaken een beslissing genomen worden wanneer twee/derde van de leden casu quo hun gemachtigden aanwezig is en wel met drie/vierde der geldig uitgebrachte stemmen. Over de vraag of een zaak die niet op de agenda vermeld staat spoedeisend is, beslist de voorzitter van de vergadering.
4. Slechts met inachtneming van artikel 6, lid 3 kunnen zaken die op de agenda staan als zodanig ter vergadering worden gewijzigd.

ORDE DER VERGADERINGEN
ARTIKEL 7

1. Met inachtneming van de statuten en in dit reglement neergelegde bepalingen handhaaft de voorzitter van een vergadering de orde in die vergadering.
2. Voor iedere vergadering wordt een presentielijst van stemgerechtigden bijgehouden.
3. Niemand behalve de voorzitter mag in de algemene ledenvergadering meer dan twee maal het woord voeren over hetzelfde onderwerp, tenzij de voorzitter met machtiging van de vergadering hem daartoe verlof verleent.
4. Bij schriftelijke stemming ontvangen alle aanwezige stemgerechtigden vanwege de secretaris een blanco stembiljet.
5. De voorzitter van de vergadering stelt het resultaat van de stemming vast. Hij kan zich daartoe door een of meer leden laten bijstaan.

COMMISSIES AD HOC
ARTIKEL 8

1. Met inachtneming van hetgeen in de statuten en het huishoudelijk reglement is bepaald ten aanzien van de aldaar genoemde commissies, is het bestuur bevoegd commissies in te stellen ter nadere bestudering van zaken de vereniging betreffende. De leden van deze commissies worden door het bestuur benoemd.
2. De leden van deze commissies ontvangen instructies van het bestuur.
3. Tenzij het bestuur anders beslist brengen de commissies aan het bestuur verslag uit.

KANDIDAATSTELLING BESTUURSLEDEN
ARTIKEL 9

1. Kandidaatstelling voor een vacature in het bestuur gebeurt ofwel op voordracht door het bestuur ofwel door tenminste tien leden van de vereniging. Hiertoe dient het bestuur via de *BNVKI Newsletter* de leden op te roepen om kandidaten voor te dragen. Men kan een kandidatuur voorstellen aan het bestuur, dat in dit geval zelf kan beslissen of het de kandidatuur al dan niet weerhoudt, ofwel door ten laatste drie weken na het verschijnen van de aankondiging een brief te schrijven aan de secretaris van de vereniging. Deze brief moet ondertekend zijn door tenminste tien leden van de vereniging.
2. Kandidaat bestuursleden moeten schriftelijk hun kandidatuur bevestigen.

VERKIEZINGEN BESTUURSLEDEN
ARTIKEL 10

1. Na de periode van de kandidaatstelling worden alle kandidaten bekendgemaakt aan de leden ofwel via de *BNVKI Newsletter*, ofwel via een schriftelijke mededeling aan alle leden.
2. In de eerste algemene vergadering volgend op de bekendmaking van de kandidaten zal, indien er meer kandidaten dan vacatures zijn, de vergadering een keuze maken onder de kandidaten. Dit kan

gebeuren door acclamatie van de voorzitter of door een schriftelijke stemming volgens de procedure van artikel 15.4 van de statuten.
3. Indien het door onverwachte omstandigheden tussentijds noodzakelijk is een of meer bestuursleden te kiezen zal een procedure gevolgd worden waarbij de leden schriftelijk hun stem kunnen uitbrengen.

Agenda BNVKI General Assembly

BNVKI Board

1. Opening
2. Minutes of Previous General Assembly (see *BNVKI Newsletter* 20.6, December 2003)
3. Annual Report and Announcements
4. Financial Report and Establishment of Accounts Committee
5. Changes By-Laws (Huishoudelijk Reglement)
6. Future Plans
7. Election New Board Members
8. Location BNAIC 2005
9. Any Other Business
10. Closure

The Dutch Aibo Team 2004

Stefan Leijnen
Universiteit Utrecht

FORMATION OF THE TEAM

The Dutch Aibo Team was formed during a barbecue in Padova, when Robocup 2003 was held there. Several Dutch teams from different institutes had been competing, and now the matches were over we were enjoying our stay. All year, we had been working on soccer-playing robots, disaster-managing software agents, or terrain-observing zeppelins. Actually, the Dutch teams were competing every league except the 4-legged league, where dog-like robots called "AIBO's" struggle to score goals on a small soccer field. We were discussing our plans for the upcoming year, and there seemed to be a common interest to work with these AIBO robots. We decided to join forces and start competing as 'the Dutch Aibo Team'. Being a cooperation of so many institutes – there are representatives of the Universities of Utrecht, Delft, Amsterdam and Twente, the DECIS lab, Hogeschool Rotterdam and Hogeschool Enschede – managing the team is one of the hardest problems to solve. Since this project will span over a number of years, it is important to keep an eye on the progress and to make sure that every effort made is a step forward. We chose to let the professional researchers in our team determine the research strategy and take care of management tasks, such as organizing media events and arranging sponsorship, and let the students focus on research, usually in the form of a course or thesis.

DEVELOPMENT

Building software architecture for the AIBO from scratch is a difficult, time-consuming task that can hardly be done by students. We therefore decided to use the source code from one of last year's teams and make our own modifications to it, which as we later learned is what most teams did. Since all competing robots are similar, the 4-legged league is well suited for open-source development, which is also encouraged by the league committee to increase competition and give newcomers a fair chance. All teams that participated at Robocup 2003 share their code on the Internet, so we could choose from a wide variety of architectures. We found the one developed by the German team to be the most appropriate for us: they take a modular approach, so teams of programmers on different locations can work simultaneously on different parts of the software. Not by coincidence, the German team also consists of more than one institute so they had to come up with an architecture which allowed them to easily coope-rate.

Although using the German software saved us a great deal of work, it was not as straightforward as it might seem: the AIBO's used in last year's games were different from those used in 2004, the ones we had bought. The robot dog still had four legs, but the camera on the new model was improved and the head joints had changed. This required porting the German software to the new model, a task we finished near the end of March. That was just days before the start of the German Open so, unfortunately, we could not implement any of our own ideas before the start of this tournament. We ended up winning one match and losing four, but it proved to be a valuable experience watching other teams play.

Various improvements were made during the three months leading up to the World Cup. New ways of kicking the ball were invented and we used a genetic algorithm to make it walk faster. The vision module was improved by adding edge detection to identify objects, where before we had only used color detection. The behaviours were made dynamical, so the robots would adapt their play to the current score; now, the team could switch to a defensive strategy to maintain a lead, or the goalie could try to make a rush forward when other players fail to score. Also, we organized practice matches,

that not only allowed us to analyze which aspects needed improvement, but also allowed public and media to have a look at a robot soccer match. We were regularly interviewed by the media – which ranged from local newspapers to radio 1 and international television – to explain our motives and achievements.

ROBOCUP 2004

On June 26, we left for Lisbon to participate in the World Championship Robocup, 4-legged league. Apart from the soccer tournament, which was the most important event in our league, there was a scientific challenges competition. For example, we had built a sound localizer, and did a demonstration with one AIBO walking around, making a sound and another – with a blindfold in front of its camera – following it. While we were in Lisbon, we focussed our attention mainly on these challenges, knowing that a good ranking would pre qualify us for next year which was an important goal. We did not make it into the quarterfinals of the soccer competition, although we did manage to win two out of five matches and we had a positive goal balance. Our choice for the German architecture turned out to be a promising one, when we saw the Germans win the tournament by beating the Australian team in the final with 5-3. Our robots did well in the challenges competition, were we finished 6th out of 23 contestants; a ranking high enough to get pre qualified for Robocup 2005. Next year we will compete for the World Cup in Japan, and hopefully bring it home.

More information: http://aibo.cs.uu.nl

The 12th World Computer Chess Championship

Omid David Tabibi
Department of Computer Science
Bar-Ilan University, Ramat-Gan, Israel

The 12th World Computer Chess Championship (http://www.cs.biu.ac.il/games) took place from July 4 to 12 in Bar-Ilan University, Ramat-Gan, Israel. The event was organized by Bar-Ilan University and the International Computer Games Association (ICGA), and sponsored by the City of Ramat-Gan, Intel Israel, Israel Ministry of Tourism, Aladdin, Mercury, IBM Israel, Pitango, PowerDSine, and Golan Heights Winery.

The strongest chess programs took part in the championship. Amongst them Shredder, the 2003 World Computer Chess Champion, Junior, and Fritz. Unlike last year's championship in Graz, the top programs had a tough time against the amateurs. While in Graz the top four programs won almost every game against amateurs with rather ease, this time they lost many half points and even a number of full points against the amateurs, which resulted in a very interesting tournament. This clearly shows that the amateur programs have improved considerably since last year.

After 11 rounds, it was the Israeli program Junior that topped the list, leading half a point ahead of the German program Shredder, becoming the 12th World Computer Chess Champion. The Dutch program Diep finished in the third place, after a spectacular win against the other favorite, Fritz, in the 10th round. The speed-chess tournament was won by Shredder, followed by Crafty (from the US) in the second place, and two Israeli programs Falcon and Junior sharing the third place.

Even though computer-chess is the most researched field in artificial intelligence, these WCCC events each year demonstrate that improvements are always made, and there is still much room for progress. Many programs made tangible improvements since last year, searching more efficiently, and applying more refined evaluation. The opening book preparations were also of utmost importance. Many games were already decided in the opening phase, with preparations extending well into the middlegame.

In addition to the algorithmic improvements and the incorporated chess knowledge, this tournament also proved the importance of hardware speed. The five programs that ran on four processor machines, ended up in top five places, frequently outsearching their opponents running on inferior machines. With multi-core processors emerging soon (IBM already released a multi-core processor, and Intel, AMD, and Sun have announced plans for release of multi-core processors in 2005), more programs are expected to run on parallel hardware in the near future. Thus, efficient parallelization of search algorithms would be of even greater importance.

While currently the strongest human chess players and the strongest chess programs are about equal in their strength (the last three man vs. machine matches of Kramnik vs. Fritz, Kasparov vs. Deep Junior, Kasparov vs. X3D Fritz ended in draws), this tournament illustrated yet again that it will become harder for humans to match up against machines in the near future. In many games the programs searched very deeply, and played brilliant tactical moves that are very hard for humans to find. While in long-term positional understanding humans are still superior to machines, the deeper

the machines search, the more strategic patterns emerge in their moves. With the hardware improvements also on their side, it seems to be only a matter of time until chess programs completely dominate over even the strongest human chess players.

Relational Reinforcement Learning

PhD Thesis by Kurt Driessens
Katholieke Universiteit Leuven

Report by Martijn van Otterlo
Universiteit Twente

The field of relational reinforcement learning – and obviously a thesis having the same name – is concerned with upgrading the representational aspects of reinforcement learning and dynamic programming. Traditionally, propositional and attribute-value representations are used for states and actions, but many large, challenging problems require more powerful formalisms to represent the learning problem. The birth of this exciting – and rapidly growing – subfield of reinforcement learning took place in 1998 when Sašo Džeroski, Luc De Raedt and Hendrik Blockeel applied the relational tree learner TILDE to the problem of Q-function approximation (ICML'98). It was shown that compact policies for simple blocks world tasks can be learned using the basic framework of reinforcement learning augmented with techniques to deal with the relational representation. This pioneering paper also formed the starting point for the thesis in this review.

This thesis is the first full PhD thesis in the field and on the 27th May 2004 Kurt Driessens successfully defended it. Preceding the defense, a small symposium was organized in which the two foreign members of the jury, Sašo Džeroski and Prasad Tadepalli, gave invited talks on "Modelling soil radon concentration for earthquake prediction" and "Average Reward Reinforcement Learning". The subtitle for the symposium was "Different Uses for Regression" and this subtitle is also applicable to this thesis. The main portion of the text deals with extending the method and its applicability as was introduced in the 1998 paper. That is, a number of different relational regression algorithms are developed in the context of Q-function approximation for reinforcement learning. If states and actions are represented by logical atoms, the function approximator should be capable of building a logical description of the Q-function and additionally, in reinforcement learning contexts, it should be capable of online learning and handling unstable datasets. Also described are two computer-game applications and some tech-niques to improve exploration.

The thesis consists of four parts. The first part contains a general-to-specific path from "intelligent computer programs" via "machine learning" all the way down to the field of relational reinforcement learning. Furthermore, it contains a conceptual introduction to reinforcement learning, different representation formalisms and a discussion on Q-learning with relational function approximators. This part is less well-written than the rest of the thesis. Although the thesis takes a practical approach, the connection with well-established theory on Markov decision process – in particular reinforcement learning with function approximation – as well as connections with other work in the literature could have been described in a more rigorous way. This would have made the extension towards relational representation more clear from the viewpoint of traditional reinforcement learning. Also, the related work is discussed briefly in the beginning of the thesis, before the main contributions of the thesis. It is not discussed how other approaches working on the same problem of relational representations for Markov decision processes relate to these contributions on the formal or the application level. I think an opportunity is missed here to embed the research into a broader context.

The second part of the thesis forms the core part of this work. This part is nicely written and gives exact descriptions of the various methods. Three online function approximators are introduced for Q-learning in relational domains.
The first one, TG, is an incremental, online version of the original tree learner TILDE and essentially upgrades the existing G-tree algorithm introduced in 1991 by Chapman and Kaelbling to the relational case. Online splitting of a relational tree is much more difficult than in the propositional case and some special techniques are used to make this feasible.

The second method, RIB, is an instance-based approach using domain-specific distance measures and was developed together with Jan Ramon based on his recent PhD thesis on clustering and distance measures in first-order domains. Some special criteria are described for selecting which learning examples to keep and which to discard in the reinforcement learning setting.

The third approach, KBR, is based on graph kernels and Gaussian processes and was developed with Thomas Gärtner who is finishing his forthcoming

PhD thesis on kernels for structured data. States and actions are described by graph structures and a special kernel is used in the product graph space.

All three methods adhere to the original structure of the RRL-system, but replace batch learning by online learning. Many experiments in various size blocks worlds using simple planning goals are described. The methods in this part fit in the "Leuven Methodology" which is concerned with upgrading propositional machine learning algorithms to the relational case.

One half of the third part of the thesis deals with the problem of sparse rewards. Using plain Q-learning in large state spaces – which naturally occur in relational domains – can often result in a needle-in-a-haystack problem: the probability of entering a goal state (and thus getting a reward necessary for learning) is very low when using random exploration. Because of the relational representation used, hand-coded policies are easy to obtain and they can be used to generate biased learning samples. It is shown that this "guided exploration" helps in speeding up learning.

The other half of this part of the thesis considers the computer games Digger and Tetris in addition to the blocks world tasks in the previous part of the thesis. In Digger, elegant use of the relational representation is made to structure the learning task. Dealing with monsters (avoiding them and shooting them) and collecting emeralds (possibly by digging new tunnels) are treated as separate tasks and Q-functions learned for both tasks are used as logical background knowledge when learning the complete task. Results for the Tetris game are – in the author's own words – a bit disappointing. Existing aproaches in the literature not using relational representations perform much better. Experimental validation alone leaves the question open why this is the case.

The final part of the thesis concludes and points out directions for further research. At the very end of this part one can find a nice feature that is present in all of the Leuven PhD theses, which is – in addition to one page abstracts in Dutch and English – a long (in this case 26 pages) abstract in Dutch, with the same structure as the thesis itself. This enables a good and quick overview of the material. Also interesting is that the author has tried to translate as much as possible and this results in interesting artefacts such as "afbreek-taak" (unstack task) and "begeleide verkenning" (guided exploration).
In summary, this thesis is obligatory reading material for anyone interested in the exciting field of relational reinforcement learning. It contains many practical algorithms that can be applied for Q-learning in relational domains. A downside is a lack of theory and – because of that – an unclear embedding of this work into the surrounding context. The practical nature of the research is also the reason why no satisfactory answers are given why the approaches work, why they do not work in some cases (e.g. Tetris) and what is needed in general to apply the regression techniques in other relational reinforcement systems and applications. In defense one can note that this thesis contains some of the first approaches to relational reinforcement learning, which naturally implies that there are many more research problems to tackle. Altogether I consider this a valuable contribution, providing creative solutions for difficult problems. This work clearly shows the potential of relational representations in reinforcement learning. And although this thesis still leaves the reader with a couple of difficult open questions, it also provides him with a richly filled toolbox containing valuable algorithms and creative ideas to continue exploring them.

Workshop Games and Knowledge Liverpool, July 10-11, 2004

Jeroen Donkers
IKAT, Universiteit Maastricht

Directly after the 6th European Agent Systems Summer School that took place from July, 5 to 9, a workshop on Knowledge and Games was held at the same location: the lush green setting of the Liverpool University. The workshop was organized (and edited) by Sieuwert van Otterloo, Peter McBurney, Wiebe van der Hoek and Michael Woolridge of the university's department of computer science and was co-sponsored by Agentlink. Using the two words "games" and "knowledge" together in one title gives rise to a range of possible topics. However, the connection to the summer school in both space and time is a clear indication of the main interest of the workshop participants. Fortunately, the organizers succeeded to extend the scope of the workshop further than the traditional intersection of logic and games: almost a quarter of the presentations were not on logic. I was a little surprised to find out that Dutch (and Flemmish) was almost the main language in the corridors.

A number of presentations were given on the application of game theory in logic. In game theory it often occurs that some aspects of a game are hidden to at least one of the players. The so-called independence friendly logic (IF logic) is intended to

cover this imperfect information. On top of the game-theoretical semantics, it introduces an operator that indicates that one player makes a choice without knowing the value of some given variables. Francien Dechense from Tilburg presented a paper in which she investigated whether the Thompson transformations on games of imperfect information can be translated in equivalent transformations in IF logic. Merlijn Sevenster from Amsterdam investigated if and when adding imperfect information to a propositional logic leads to a complexity blow-up. It appears that this is not always the case and he suggests that it is wise to take imperfect information as the standard case and perfect information as a special case. Another track of applying game theory to logic was presented in an invited talk by Paul Harrenstein from Utrecht. He considered whether it is possible to use the notion of a game-theoretical optimality (e.g., Nash equilibrium) in propositional logic.

Some other presentations were given on the usage of logic to formalize certain aspects of game theory in order to be able to reason about games and the ever-changing knowledge of players during a game. The invited talk of Hans van Dittmarsch, who presently lives in New Zealand, is a clear example. He presented his research on a trading and bidding game called Pit and showed how logic can be used to reason about the state of knowledge of the players involved and how this influences the bidding and trading strategies. Thomas Agotnes from Bergen discussed the characterization of incomplete (or rather imperfect?) information in alternating Epistemic Transition Systems. The application of formalizations of games in multi-agent systems is apparent. Sieuwert van Otterloo (Liverpool) presented the concept of knowledge condition games in which the goal of the game is to reach a predefined epistemic state. Alexandru Baltag from Oxford very vividly presented his proposal on how to learn that you are being deceived. His proposal is based on epistemic state models, epistemic updates and epistemic programs. He discussed the advantage of his approach over, for example, the approach proposed by Hans van Ditmarsch. In short, Alexandru claims that the learning that you are deceived overrides or cancels the deceiving action: you are not deceived anymore. Eric Pacuit from New York presented a survey of papers that aim at formal tools for reasoning about social software. He discussed both deontic aspects (what should an agent do if he has a certain state of knowledge? If I know that I can help, I should help) as dynamic epistemic aspects (how does the knowledge of agents change as a result of communication?). The whole is placed in a strategic setting in which agents try to maximize their payoffs, expressed in the value of histories. The invited talk by Marc Pauly from Toulouse was closely connected to this issue, but the emphasis of his talk was on the role of common knowledge in the domain of marketing.

The three remaining presentations were quite different from the others since logic did not play a major role. Jeroen Donkers from Maastricht presented his ideas on how to use nonzero-sum games in heuristic game-tree search in order to model situations in which both players have opponent models of each other. Thomas Foster from Cambridge proposed a method to model a class of infinite, continuous games called differential games as discrete combinatorial games. An example of a differential game is the homicidal chauffeur in which an imaginative chauffeur has to override a pedestrian on a parking lot (…) The idea of Thomas Foster is to discretize time and to allow each player in turn to develop a plan, based on observations of the opponent. Wouter Teepe from Groningen tried to prevent players from obtaining too much knowledge and presented a protocol in which one player tries to prove his knowledge of a secret, without giving away the secret itself. In the present political situation, his approach offers a possible way in which countries can exchange crucial information on serious threats without breaching the privacy and human rights of their citizens. Together with the application of opponent models and Baltag's approach to learn when you are deceived, this workshop hopefully contributed to a safer future. To stay down-to-earth, I would like to thank the organizers for an interesting and truly interdisciplinary workshop.

Three Theses and One Lady

Jaap van den Herik
IKAT, Universiteit Maastricht

At the Vrije Universiteit I was taught that students always had to be welcomed with the phrase: "Ladies and Gentlemen", even if only one lady was present. The reason was that if there is only one lady, all the male students will have their eyes in half a jiffy directed towards that lady. Of course, that would be impolite, but it then was caused by the professor. Only when zero ladies were present, the professor would be allowed to start with "Gentlemen".

To emphasize the performance of Catholijn M. Jonker, I decided to have 'one lady' in the title of this section of announcements.

THREE THESES

Of course, our regular scientific output has preference. Thus the announcement is titled "Three Theses and One Lady". Two of the three theses have been listed in the previous issue. The third one is new. All three theses belong to the Research School SIKS. The BNVKI Editorial Board congratulates the three promovendi with their success and wishes them a fruitful career with the newly awarded Doctor's title as stepping stone.

B.P. Harrenstein (September 6, 2004). *Logic in Conflict. Logical Explorations in Strategic Equilibrium*. Universiteit Utrecht. Promotores: Prof.dr. J.-J.Ch. Meyer and Prof.dr. W. van der Hoek. Co-promotor: Dr. C. Witteveen.

M. Klein (September 14, 2004). *Change Management for Distributed Ontologies*. VU Amsterdam. Promotores: Prof.dr. A.Th. Schreiber and Prof.dr. J.M. Akkermans.

S. Kabel (October 20, 2004). *Knowledge-rich Indexing of Learning-objects*. Universiteit van Amsterdam. Promotores: Prof.dr. R. de Hoog and Prof.dr. B.J. Wielinga.

FROM ONE LADY TO FIFTY

Ten years ago Dr. Jonker defended her Ph.D. thesis *Constraints and Negations in Logic Programming* at the Universiteit Utrecht. Since 1995 she worked as Assistant Professor (Associate Professor since 2003) at the Vrije Universiteit.

At the start of the new academic year, 1 September 2004, Catholijn Jonker is appointed as full professor of Artificial Intelligence / Cognitive Science at the KU Nijmegen. Our congratulations. At the same time this University will change its name into Radboud University. Professor Jonker will work at the research institute NICI. She will continue her work on modeling, learning, and man-machine interaction. The BNVKI wishes her much success and looks forward to her inaugural address. We are convinced that our members concur with the congratulations.

The KU Nijmegen is proud to have her appointed, per September 1, 2004 since they then have 50 lady professors of a total of 452 professors. The official announcement reads that the percentage has been raised from 6% in 1999 to 11% in 2004. The first lady professor was dr. Christine A.E.M. Mohrman in 1952 (special chair; 1960 ordinary chair). In Computer Science and related disciplines I am aware now of the following professors: Prof. Linda van der Gaag (AI, Utrecht), Prof. Waltraud Gerhardt (databases, Delft), Prof. Linda Hardman (Multimedia, TU/e), Prof. Anja Oskamp (Law and Computer Science, VU), Prof. Corien Prins (Law and Information Technology, Tilburg), and Prof. Cilia Witteman (medical computer science, Nijmegen).

So, Professor Jonker can be regarded at the seventh lady professor in our circles. The last statement is open to improvement. I invite readers to correct me by providing me with additional information.

I look forward to learning from you and wish NICI all the best with the widening of their research scope in the direction of applied artificial intelligence and cognitive science.

Section Editor
Richard Starmans

SIKS-BNVKI Workshop AI in the Wild: Cognition in Dynamic Environments

As earlier announced in this newsletter BNAIC'04 will be held on Thursday October 21 and Friday October 22, 2004 in conference center "Meerwold" in Groningen. This year, it will be collocated with the workshop "AI in the wild: Cognition in dynamic environments" to be held on Wednesday October 20 at Groningen University. When this edition of the BNVKI-newsletter was published, the final program of the workshop was not available yet. For more details, please visit our agenda at www.siks.nl

Advanced Course The Semantic Web

On November 22 and 23 2004 the School for Information and Knowledge Systems (SIKS) will organize an Advanced Course on The semantic Web in Zeist. The course takes two days, will be given in English and is part of the so-called 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.

LOCATION

Conference center Woudschoten in Zeist.

SCIENTIFIC DIRECTORS

prof.dr. F van Harmelen (VU)
prof.dr. A. Schreiber (VU))

PROGRAM

The program is not known yet, but the following list of topics gives a general impression of the course content:

- Introduction to the semantic web
- Metadata and Ontologies Languages for the Semantic Web (XML, RDF, OWL)
- Description Logics
- Semantic Web enabling Tools
- Semantic Web Applications
- Semantic Web enabled Web Services
- Semantic Web related research initiatives
- Semantic Web future developments

REGISTRATION

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

Deadline for registration for SIKS-Ph.D. students: November 1 2004

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

INFORMATION FOR NON-SIKS-PH.D. STUDENTS

SIKS needs a confirmation from your supervisor/office that they agree with the arrangement and paying conditions. For registration you are kindly requested to fill in the registration form at www.siks.nl

Over the last couple of years the Semantic Web has received much publicity, both inside and outside the scientific community. There is no doubt that the visionary plans of Tim Berner's Lee and his W3C invoked all kinds of new initiatives in the field of Knowledge Representation and Web-based Information systems (which happen to be two of SIKS' most important research foci). An extensive electronic survey research, that was conducted recently among over 125 SIKS-Ph.D. students made this apparent for the Netherlands as well.

For example:

- 24 % of all SIKS-Ph.D. students indicated that their project fits into/can be related to the Semantic Web much/very much
- 43% of all SIKS-Ph.D. students working in the field of Knowledge Representation indicated that their project fits into/can be related to the Semantic Web much/very much
- 46% of all SIKS-Ph.D. students working in the field of Web-based Information systems indicated that their project fits into/can be related to the Semantic Web much/very much

In the next edition of this newsletter we will present the results of the survey.

Basic courses Information and Organisation and Information Retrieval

From December 6 till December 10, 2004, the School for Information and Knowledge Systems (SIKS) organizes two basic courses: Information and Organisation and Information Retrieval. The location will be Landgoed Huize Bergen in Vught. Both courses will be given in English and are part of the obligatory Basic Course Program for SIKS-Ph.D. students. Although these courses are primarily intended for SIKS-Ph.D. students, other participants are not excluded. However, their number of passes will be restricted and depends on the number of SIKS-Ph.D. students taking the course.

SCIENTIFIC DIRECTORS

dr. H. Weigand (UvT) Information and Organisation
prof. dr. ir. Th. van der Weide (KUN) Information Retrieval

PROGRAM

The program is not known yet.

REGISTRATION

For registration you are kindly requested to fill in the registration form at www.siks.nl

AI EDUCATION

Section Editor
Evert van de Vrie

M.Sc. Theses in Section AI Education

Supervisors of remarkable M.Sc. work are invited to ask their student for a short article, to be submitted to the editor of the Section AI Education.

Agent Support for Online Learning

Peter Sloep, Peter van Rosmalen, Francis Brouns, Jan van Bruggen, Marcel de Croock, Liesbeth Kester, Fred de Vries, Onderwijstechnologisch Expertisecentrum, Open Universiteit Nederland

Imagine a haphazard group of people with an interest in educating themselves about a particular subject, say, global warming. They do not know each other, are not university students, nor organised as a group in any other way. They merely share the same desire to become more knowledgeable about global warming. Let's also assume that, within bounds, they are also prepared to share what knowledge they have with others who have the same desire. This characterisation is typical for life-long learners.

Imagine furthermore some educational institution that wants to cater for the needs of life-long learners. The institute has staff experts on global warming, who have created a collection of modules that collectively cover the subject. The modules are relatively small and independent of each other so that they support the browsing-like study habits that are so typical of life-long learners. (Life-long learners are interested in subjects that, at that exact moment of time, they feel the urge to study, rather than in following a set curriculum from beginning to end.) Although the staff people are experts, they are open for the possibility to learn something as well. Often, life-long learners possess particular expertises acquired in their highly specialised line of work that staff simply are not conversant with. Finally, the institution has erected some sort of technological infrastructure that facilitates the online, life-long learner. Let's call this entire ensemble a Learning Network (LN). A LN thus consists of users (people with the intent to learn something and the willingness to share their knowledge), educational materials in the form of small, independent modules, and a technological infrastructure (Koper and Sloep, 2003; Rusman et al., submitted).

Much can be said about the concept of a LN, from a variety of perspectives. Here we focus on three problems that arise from the question of how users of a LN (learners and staff) may best be supported to achieve their goals. Suppose user Matthew has some educational need, say, know more about the effects of sea currents on global warming. Where should he start, given what he already knows? Perhaps he lacks the requisite oceanographic knowledge to straight-away study the module on sea currents; perhaps he knows enough already to skip the introductory module on sea currents and move on right away to the module on mathematical modelling of sea currents. The LN should support Matthew in making an intelligent choice. This is the positioning problem. Once Matthew has started, how does he move from module to module? This depends on his learning goals, but also on how successful he has been in completing modules so far. Matthew might need modules that offer a shallow learning curve, or rather modules that offer a steep one. Or he might want to collaborate with others rather than study individually. Etc. This is the navigation problem, and the LN should also support learners in solving it intelligently. Finally, when studying some module, Matthew might have questions that he cannot answer on the basis of the module alone. He needs help, from the staff or from his peers. This is the support problem.

Any one of these problems may be solved by de-ploying massive numbers of staff. The economics of life-long learning make this impossible but for exceptional cases. The LN should somehow self-organise to solve these problems with as little runtime staff involvement as possible. It is our claim that well-chosen software technologies, involving agents, can raise the self-organising powers of the network sufficiently to make a LN a viable option. Finding support for this claim has become a major R&D focus of the Open Universiteit Nederland Educational Technology Expertise Centre. The R&D programme looks into technologies that are neither proven, for these do not belong in an R&D programme, nor very immature, for these would still require fundamental

research for their application. We hope to draw insights from implementation projects in other fields, for instance e-business. To illustrate how agents could be used, we'll briefly elaborate the support problem somewhat further.

Suppose some network user, call her Ann, during her studies stumbles upon a problem she can't solve on her own. Help is needed and the LN should provide it. There are two broad ways to approach this issue. She may be steered to some other module in the LN or to a FAQ that has been compiled; alternatively, some of her peer LN users are able to help out. The first approach is the most straightforward one. Ann formulates a question to describe her problem and submits it to her personal agent. Ann's agent needs a means to find out what document (module, FAQ entry) best suits her question. Any technique that computes in real-time the semantic similarity between her question and the texts available in the LN can be used for this. Using such a technique yields a series of rank-ordered similarity indices that Ann's agent can feed back to Ann. It is then up to her to decide what document further to study in the hope of finding an answer. In this case, Ann's agent may hardly be called an agent. It really only is a relatively simple piece of software that mediates between Ann and the software that computes semantic similarity indices.

More able agents may however be deployed. Consider the second option, in which Ann looks for a fellow user to help her. Ann will formulate the same question. And the question will be submitted to the same software. This time, however, her question will not be compared to modules and FAQs, but to documents that other LN users have submitted as descriptions of their own capabilities. Such documents are similar to CVs and in the context of learning are often called portfolios. Again a ranking results, this time of fellow users in the order of their suitability to answer Ann's question. Ann now can choose a person from the list with whom to get in touch. This person could be a fellow student, it could also be a staff member. So far, there are no differences.

But note that the suitability measure is based upon semantic similarity only. Obviously, there are all sorts of other considerations that could (and should, we argue) be taken into account before arriving at a list of persons recommended to Ann. Probably, the fellow user that is an expert in the matter will receive the highest rank. Usually, this wil be a paid staff person, say Tricia. This person will likely also rank highest for many other questions. From an organisational point of view it is undesirable that Tricia receives the highest rank in the recommendation: she would rapidly be swamped with questions, also the quite simple ones. Now assume the person with the highest rank would not belong to the staff, but be a fellow learner, say Simon. Having Simon answer these questions would save considerable staff time. But the solution of letting Simon rank highest has serious drawbacks. Now Simon would be swamped with questions and, as a consequence, he would rapidly loose his appetite to participate in the network. This argument goes for many of the top-ranking fellow learners. Their dropping out of the LN means there's nobody left to answer questions but the staff. What is needed is an arrangement in which slightly 'smarter' learners answer questions of their slightly 'dumber' peers. Only this way there is a chance of keeping the sociology of the LN in working order.

Finally, this near-peer-matching kind of arrangement is also interesting from a pedagogical point of view. Answering a question that concerns a subject that you have just managed to understand yourself can be quite a valuable experience from an educational point of view. So for all these reasons, and probably others (online availability of people, their recent questioning/answering history, availability of a FAQ) the ranking of persons that results from the comparison of the question with the user portfolios should be modified. All these factors together then should determine the final recommendation to Ann. Negotations between the users' personal agents, perhaps helped by some mediator agent, are a sensible way to arrive at such a recommendation. It offers the flexibility that is required for a network with constantly changing users, user availabilities, and user portfolios.

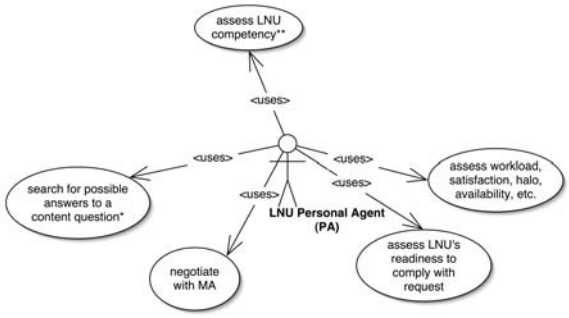

Figure 1 Possible use-case for a learning network user's personal agent

Similar arguments may be used for the positioning and navigation problems. Users are represented by their personal agents which have a particular task. Carrying out that task involves interacting with documents in the LN and with the users behind

those documents. Even modules have their authors (staff) behind them. This means that the personal agents may carry out negotiations on behalf of their owners. And this, in turn, means that the agents help weave the social fabric of the Learning

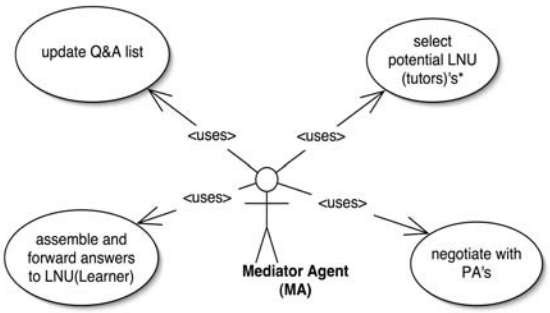

Figure 2 Possible use-case for a mediator agent

Network and thus promote its capacity for self-organisation. Our current efforts are directed towards solving two problems. The first is finding software implementable methods capable of generating document similarities in real time. We are currently looking into the use of latent semantic analysis (Van Bruggen et al, in press). The second is devising an agent architecture – together with a suitable development environment for it – that is conducive to the proper functioning of a Learning Network. No decisions have been made yet here, although agents used in e-business may provide useful role-models.

REFERENCES

Koper, E.J.R., Sloep, P.B. (2002) Learning Networks connecting people, organizations, autonomous agents and learning resources to establish the emergence of effective lifelong learning. RTD Programma into Learning Technologies 2003-2008.
Online available at http://hdl.handle.net/1820/65.

Koper, R., E. Rusman, P.B. Sloep (submitted) Learning Network; connecting people, organisations, software agents and learning resources to establish the emergence of effective lifelong learning.

Van Bruggen, J. P.B. Sloep, P. van Rosmalen, F. Brouns, H. Vogten, R. Koper, C. Tattersall (in press) Latent semantic analysis as a tool for learner positioning in learning networks for lifelong learning.

More information: Peter.sloep@ou.nl

SECTION KNOWLEDGE SYSTEMS IN LAW AND COMPUTER SCIENCE

Section Editor
Marie-Francine Moens

Metalex – XML Standard For The Markup Of Legal Sources

Jurix lecture by Radboud Winkels
Universiteit van Amsterdam

Report by Martin Apistola
VU Amsterdam

The given Jurix lecture on June 10, 2004 on MetaLex (see http://www.metalex.nl) is an XML (eXtensible Markup Language) standard for the markup of legal sources. XML is a markup language designed to describe data and to focus on what data mean (see http://www.w3schools.com /xml). Its tags are not predefined and can be defined by anyone. The aim of the MetaLex standard is improving accessibility, exchange, quality and maintenance of legal documents. Currently, the MetaLex project focuses on the drafting and application of legislation.

Part of MetaLex is its advanced search mechanism which supports retrieving legislation from different locations, levels and versions. This is necessary because in the past it was hard to find applicable legislation because of different jurisdictions, different levels within these jurisdictions (e.g. international, European, national, regional and local levels), different languages, different times and different content providers such as governments, courts and publishers. To make things easier there is a need for a standard of the identification, structure and locations of sources. Or briefly said, we need an open standard to describe legal sources. Although several other research projects for this subject have come to live, such as LeXML, OASIS and LegalXML (see http://www.legalxml.org), these projects still have not produced a practical standard to describe legal sources. Publishers of legal sources also seem interested in such standards.

Unfortunately, the publishers use their own proprietary standards and do not seem to be interested in an open source approach. In the MetaLEX project the researchers propose an open

standard for describing legal documents. This description is based on XML and RDF/OWL. With the help of XML the text and references in legislation is structured. RDF (Resource Description Framework) is used to model meta-data about the resources of the web. RDF is applied in the MetaLex project to describe the role of legislation (see http://www.w3.org/RDF). "OWL is intended to be used when the information contained in documents needs to be processed by applications, as opposed to situations where the content only needs to be presented to humans. OWL can be used to explicitly represent the meaning of terms in vocabularies and the relationships between those terms (see http://www.w3.org/TR/owl-features/)." Features of the MetaLex standard include its generic and extensible character, its independency of language and jurisdiction (the core is English, but language specific vocabularies can be used). The MetaLex standard also meets the newest World Wide Web Consortium (see http://www.w3.org) standards and proposals.

MetaLex does not only describe legal sources. Part of the project is also to develop tools to edit and manage legislation, validate legislation, browse and retrieve legislation, etc. Besides the description of legal sources and development of tools, MetaLex also provides manuals and technical references for users of its standard and tools.

The Metalex standard is maintained, extended and certified by legal publishers, governments, universities and other parties. In the future the MetaLex researchers want to look at the possibility of, amongst others, a standard for jurisprudence, URIs for the Netherlands (these are Uniform Resource Indicators that are independent of the precise location of an object on, for example, the Internet which currently often changes or disappears), a combination with geo-information (that is, a system can automatically determine in which jurisdiction you are and which laws for example are applicable in that jurisdiction and your legal case), the combination of legal standards with standards for the exchange of business information (e.g. the exchange of information on profits and losses between a tax office and a company according to an open standard).

AI & Law researches technologies for the support of law practice. Important technologies are information retrieval systems, case based reasoning systems, rule based reasoning systems and text analysis systems. Such systems offer many opportunities for applying legal standards.

A common problem in using information retrieval (IR) systems is to find information that perfectly suits the information need of a user. Typically these systems look literally for the words or sentences that the user has entered. By assigning unambiguous, standard legal concepts to the texts, IR systems can look at the meaning of the words or sentences, which increases the chances of finding the right legal information.

Case Based Reasoning systems are capable of reasoning with legal cases. Usually relevant information is extracted from a legal case that is used to support an argument in a new case. Again, the extracted information can be described by unambiguous, standard legal concepts, which makes it easier to automatically compare different legal cases and reason with them.

Rule based systems reason with legal rules and facts and try to answer a specific question. Extracting legal rules and facts and converting them into a language understood by the system is a labor intensive job and often comes along with a lot of interpretation problems. If the rules are drafted in standard formalisms, it becomes easier for humans or machines to select appropriate rules and to reason with them.

To summarize, legal standards can offer support to AI & Law technologies. However, in order to use the legal standards on a large scale we need AI technologies for partly automatically assigning the standard markups to the documents. Current AI & Law research looks into automating the analysis of legal documents and their natural language texts. The challenge here is to find a way to overcome the common problems with the interpretation of (legal) texts and concepts.

The Level Theory of Coherence

Jurix lecture by Luc Wintgens, Professor, Dean of the Faculty of Law, Katholieke Universiteit Brussel

June 10, 2004

Report by Luc Wintgens and Henry Prakken
Katholieke Universiteit Brussel

Consistency and coherence are different properties of a set of propositions. According to a current approach, a set of propositions is consistent if P and ¬P cannot be true at the same time and from the same perspective. A set of propositions is coherent if it is at least consistent. It follows from that that consistency is considered a necessary condition for the coherence of a set of propositions. As it was mentioned during the discussion, this approach

raises the question what coherence from this perspective means.

The exposé focuses on sets of propositions that are called "legal systems". The current approach suggests that if a system contains one inconsistency, it becomes incoherent. This consequence, although correct from the formal point of view, can hardly be defended for legal systems, so that the relation between coherence and consistency has to be reconsidered.

The starting point of the exposé is that consistency is not a necessary condition for coherence, if coherence is taken to mean "to make sense as a whole". From that perspective, consistency is a specific form of coherence. The absence of contradictions in a set of propositions makes it coherent in a specific way, that is, consistent. On the basis of this premise the level theory of coherence is set up. The theory from the framework of a decision theory in non-formal sets of propositions like a legal system. In the theory, four different levels of coherence are to be distinguished, as the following schematic overview shows.

FOUR LEVELS OF COHERENCE

The level of coherence0 or simultaneous coherence: every form of rational discourse, including legal discourse, has to correspond to a minimal level of coherence at the "elementary level of speech"; this means that on this elementary level no contradictions are allowed (like contradictions in the judicial decision or the legal rule, if these are considered the elementary level of speech); this requirement is formally universal in that every rational discourse has an elementary level of speech; it is not universal, though, from the perspective of the content, since the elementary level of speech is different for several types of discourse (mathematical discourse as different from literary discourse).

The level of coherence1 or consecutive coherence: consecutive decisions should be consecutively coherent because of the rule character of law; deviation from the requirement of coherence1 is possible (as e.g., a change in the jurisdiction shows); despite the fact that these decisions violate the requirement of formal justice, they can be justified; at the same time, they have to be justified, in as far as following precedents needs no special justification.

The level of coherence2 or system coherence: coherence2 is a further refinement of the requirement of coherence; new decisions are to fit the system as a whole; the justification of new decisions, in as far as they follow the precedent does not require specific arguments apart from arguments on the level of coherence1; however, if a legal system is to make sense as a whole, new decisions deviating from earlier ones may need a specific justification, in that the rules to be applied are to be read in the light of one another; this involves a model of weighing and balancing.

The level of coherence3 or environment coherence: the requirement of coherence of the legal system involves its making sense as a whole; the whole can be considered the set of propositions; apart from this system internal requirement, the set of propositions does not make sense on its own; what is needed is a meta-set of propositions on which the legal system is dependent; this meta-set is called the analytical theory of the legal system, that makes the legal system a legal order; the analytical theory of the legal system consists of an interdependent set of theories (theory of freedom and equality, theory of the state, and the like) that reflect the basic principles of a legal system.

During the discussion a question is raised as to the relation between the level theory of coherence and Dworkin's approach on coherence as integrity. Dworkin's theory of coherence shows at least two different levels of coherence, that is, the dimension of "fit" and the dimension of "integrity". The dimension of fit can be said to correspond to the second level of coherence, while integrity is close to the level of coherence3. Dworkin however is not clear on the theory dependence of the legal system, in that the epistemological idea of theory dependence, as it is articulated in the level theory of coherence, is neglected in his theory.

Theory dependence of the legal system can be explained in relation to the internal point of view that expresses the normative character of law. The internal point of view, when considered from outside the legal system corresponds to MacCormick's "hermeneutical point of view", upon which the internal point of view is included in the description and systematisation of law. The hermeneutical point of view, so it is further explained, can be reversed, in that decision makers like the judge, take cognisance of the theoretical environment of the legal system, that, is, the analytical theory the makes the legal system a legal order.

COMMENTS

This was a talk by a legal philosopher for an AI & Law audience. It is therefore interesting to see to which extent AI & Law researchers have attempted to develop computable notions of coherence.

Professor Wintgen's four-level theory of coherence in law provides an excellent starting point.

Coherence0 (internal coherence). Logicians in AI will agree that logical consistency is not a necessary condition for coherence of a theory. Several logical tools have been developed for making sense of inconsistent theories, such as nonmonotonic logics and the theory of belief revision. These logical tools also allow for precise definitions of the degree of logical coherence of a theory, by looking, for instance, at the number of conflicting but internally consistent arguments that can be generated from the theory.

Coherence 1 (consecutive coherence). Modelling precedent-based legal decision making is an active area of research in AI & Law. Of course, data mining techniques can be and have been used to detect trends in a series of decisions, but most research takes a case-based reasoning (CBR) approach. Unlike mainstream CBR, legal CBR is less interested in finding the most similar precedents and more in generating interesting arguments about the similarities and differences between cases.

Coherence 2 (system coherence). In AI & Law research on argumentation it is commonplace to stress the importance of theory construction and of comparing the degree of coherence of theories. However, actual research on developing measures of coherence is still sparse. Bench-Capon & Sartor (AI Journal 2003) propose symbolic measures of coherence, such as syntactic simplicity of a theory, or the sets of precedents explained and not explained by the theory. However, it remains an open question how such criteria should be combined to yield an overall measure of coherence. In their JURIX-2001 paper Bench-Capon & Sartor address this question by experimenting with a connectionist account of relative coherence, inspired by Paul Thagard's work on the coherence of scientific theories.

Coherence 3 (environment coherence). To my knowledge this level of coherence has not yet been studied in AI & Law.

Concluding, AI & Law tries to take modern philosophical accounts of legal coherence seriously, but still has a long way to go.

REFERENCES

Dworkin, R. (1986). Law's Empire. Cambridge, MA: Harvard University Press.

MacCormick, N. (1978). Legal Reasoning and Legal Theory. Oxford, UK: Clarendon Press.

Thagard, P. (1992). Conceptual Revolutions. Princeton, NJ. Princeton University Press.

Trevor J. M. Bench-Capon and Giovanni Sartor (2001). A quantative approach to theory coherence. Legal Knowledge and Information Systems. JURIX 2001: The Fourteenth Annual Conference (pp. 53-62). Amsterdam: IOS Press.

Trevor J. M. Bench-Capon and Giovanni Sartor (2003). A model of legal reasoning with cases incorporating theories and values. Artificial Intelligence 150 (1-2): 97-143.

ANNOUNCEMENTS

BNAIC 2004
16th Belgian-Dutch Conference on Artificial Intelligence

The 16th Belgian-Dutch Conference on Artificial Intelligence (BNAIC'04) is organised by the Institute of Artificial Intelligence and Cognitive Engineering (ALICE) of the University of Groningen, under the auspices of BNVKI/AIABN (the Belgian-Dutch Association for Artificial Intelligence) and SIKS (the Dutch Research School for Information and Knowledge Systems). One of the special tracks at BNAIC'04 will be related to SNN (the Dutch Foundation for Neural Networks).

BNAIC'04 will be held on Thursday October 21 and Friday October 22, 2004 in conference center "Meerwold" in Groningen. It will be collocated with the workshop "AI in the wild: Cognition in dynamic environments" to be held on Wednesday October 20.

ORGANIZATION

- Lambert Schomaker
- Rineke Verbrugge
- Hanneke Niessink
- Nancy Lokai
- Gerben Blom
- Marleen Schippers

PROGRAM CHAIRS

• Lambert Schomaker
• Niels Taatgen
• Rineke Verbrugge

BNAIC 2004 – PRELIMINARY PROGRAM

Thursday 21 October 2004
09:00 - 09:50 Registration
09:50 - 10:00 Opening (Auditorium)
10:00 - 11:00 Invited lecture: Dr. K. Dautenhahn on social intelligence and robotics (Auditorium)
11:00 - 11:20 Break

11:20 - 12:35 Paper presentations: Session 1
Session 1A: Auditorium, Agents I
Session 1B: Conference room 1, Machine learning I
Session 1C: Conference room 2, Ontology & Semantic web

12:35 - 13:35 Lunch

13:35 - 14:50 Paper presentations: Session 2
Session 2A: Auditorium, Logic in AI
Session 2B: Conference room 1 , Machine learning II
Session 2C: Conference room 2, Communication & Negotiation

14:50 - 15:10 Break

15:10 - 16:50 Paper, poster and demo presentations: Session 3
Session 3A: Auditorium, Short presentations of demonstrations
Session 3B:Conference room 1, Posters
15:35 – 16:50 Session 3C: Conference room 2, Planning

16:50 move to reception

19:00 dinner

Friday 22 October 2004
09:00 - 10:00 Invited lecture: speaker to be announced (Auditorium)

10:00 - 11:15 Paper presentations: Session 4
Session 4A: Auditorium, Agents II
Session 4B: Conference room 1, Machine learning III
Session 4C: Conference room 2, Cognitive modeling

11:15 - 11:35 Break

11:35 - 12:25 Paper presentations: Session 5
Session 5A: Auditorium, Language Session
Session 5B: Conference room 1, Pattern Recognition Session
Session 5C: Conference room 2, Robotics

12:25 - 14:05 Lunch and BNVKI general assembly

14:05 - 15:20 Paper presentations: Session 6
Session 6A: Auditorium, Agents III
Session 6B: Conference room 1, Machine learning IV
Session 6C: Conference room 2, AI in Law and Medicine

15:20 - 15:40 Break

15:40 - 16:45 Paper presentations: Session 7
Session 7A: Auditorium, Games
Session 7B: Conference room 1, Knowledge Technology and Uncertainty

16:45 - 17:00 Award ceremony and closing (Auditorium)
- Elsevier Best Paper Award for the best original paper
- SKBS Prize for the best demo/application

CONTACT INFORMATION

Grote Kruisstraat 2/1
9712 TS Groningen
The Netherlands
+31-(0)50-3636351
bnaic@ai.rug.nl

IJCAI-05: CALLS FOR PAPERS, POSTER PAPERS, TUTORIALS, WORKSHOPS AND AWARDS

19th International Joint Conference on Artificial Intelligence,

30 July-5 August 2005, Edinburgh, Scotland

INTRODUCTION

The Artificial Intelligence community in the United Kingdom is pleased to host IJCAI-05 in Edinburgh. Edinburgh's fusion of fabled streets, castle and other historic buildings is contained within a vibrant, modern city with a long involvement in Artificial Intelligence.

The hosts are the British Computer Society's Specialist Group on Artificial Intelligence (BCS-SGAI), in collaboration with the University of Edinburgh (Scotland). IJCAI-05 will take place in

the first full week of August 2005. This is just prior to the start of the famous Edinburgh International Festival, although the Edinburgh Military Tattoo will begin on 5th August 2005, and the Edinburgh Jazz and Blues Festival during IJCAI. Participants are encouraged to plan to stay for at least the week after to take advantage of these events.

SUMMARY OF CALLS

This posting provides summaries for the following calls.
- Call for Papers
- Call for Poster Papers
- Call for Workshop Proposals
- Call for Tutorial Proposals
- Call for IJCAI Award Nominations

For full details on each of these and the most up-to-date information regarding IJCAI-05, please see http://www.ijcai-05.org/.

CALL FOR PAPERS

The IJCAI-05 Program Committee invites submissions of full technical papers for IJCAI-05, to be held in Edinburgh, Scotland, 30 July – 5 August, 2005. Submissions are invited on substantial, original, and previously unpublished research on all aspects of artificial intelligence. Papers reporting work of high quality and high promise, but which is found by the program committee to be insufficiently mature for publication in the conference proceedings, may be considered for inclusion in the poster session track. Authors who wish to use this option must explicitly state so in the submission and submit to the poster track in parallel.

IMPORTANT DATES FOR TECHNICAL PAPERS

February 1, 2005:	Electronic Paper and Title Page Submission Deadline
February 15, 2005:	Electronic Poster Submission Deadline
April 1, 2005:	Paper & Poster Author Notifications Sent
April 15, 2005:	Camera-Ready Copy Deadline
August 2-5, 2005:	IJCAI-05 Technical Sessions

For full details, see http://www.ijcai-05.org/.

CALL FOR POSTERS

The IJCAI-05 Program Committee invites submissions for the poster track of the 19th International Joint Conference on Artificial Intelligence, to be held in Edinburgh, Scotland, 30 July - 5 August, 2005. The poster track is intended for the presentation of work which meets the high standards of the IJCAI conference, but which is more topical and preliminary than the work presented in the main track.

IMPORTANT DATES FOR POSTERS

February 15, 2005:	Electronic Poster Submission Deadline
April 1, 2005:	Poster Author Notifications Sent
April 15, 2005:	Camera-Ready Copy Deadline
August 2-5, 2005:	IJCAI-05 Technical Sessions

For full details, see http://www.ijcai-05.org/.

CALL FOR WORKSHOP PROPOSALS

The IJCAI-05 Program Committee invites proposals for the Workshop Program, to be held July 30 - August 1, 2005, immediately prior to the technical conference. IJCAI-05 workshops will provide an informal setting where participants will have the opportunity to discuss specific technical topics in an atmosphere that fosters the active exchange of ideas. Members from all segments of the AI community are invited to submit workshop poposals for review. Workshops at the boundaries between sub-areas of AI, and between AI and other fields are particularly encouraged, as are those that focus on new and emerging topics, or on applications. To encourage interaction and a broad exchange of ideas, each workshop will be limited to 40 participants and ample time will be allotted for general discussion. Attendance is limited to active participants only.

Workshops can vary in length, but most will last a full day. Workshop attendees need not register for the main IJCAI conference, but are encouraged to do so.

IMPORTANT DATES FOR WORKSHOPS

October 15, 2004:	Proposal Submission Deadline
November 15, 2004:	Acceptance Notification
December 15, 2004:	Deadline for Posting of Call for Participation
January 15, 2005:	IJCAI-05 Workshops Programme Announced
May 5, 2005:	Camera-ready Workshop Notes Deadline

July 30-August 1, 2005: IJCAI-05 Workshops

For full details, see http://www.ijcai-05.org/.

CALL FOR TUTORIAL PROPOSALS

The IJCAI-05 Program Committee invites proposals for the Tutorial Program. Tutorials will be held July 30-31, immediately prior to the technical conference. Tutorials should serve one or more of the following objectives:

- Motivate and explain a topic of emerging importance for AI
- Survey a mature area of AI research and/or practice
- Provide instruction in established but specialized AI methodologies
- Present a novel synthesis combining distinct lines of AI work

To broaden and improve the topic coverage provided, we also invite suggestions as to what tutorial topics and presenters might be welcome.

IMPORTANT DATES FOR TUTORIALS

November 1, 2004:	Proposal Submission Deadline
December 3, 2004:	Acceptance Notification
January 1, 2005:	Title, Abstract, and Speaker Biography Deadline
May 23, 2005:	Syllabus and Course Handouts Deadline
July 30-31, 2005:	IJCAI-05 Tutorials

For full details, see http://www.ijcai-05.org/.

CALL FOR NOMINATIONS FOR IJCAI-05 AWARDS

At each conference, IJCAI presents awards to distinguished members of the AI community.

- The IJCAI Award for Research Excellence is given to a scientist who has carried out a program of research of consistently high quality, yielding several substantial results.
- The IJCAI Computers and Thought Award is presented to an outstanding young scientist in the field.

Nominations for these two awards are solicited from the AI community at large, with two reference letters being required in support of the nominations.

IMPORTANT DATES FOR IJCAI-05 AWARDS

October 15, 2004:	Names of Nominees Due
November 15, 2004:	Nominations Due
August 2, 2005:	IJCAI-05 Computers and Thought Award Presentation
August 4, 2005:	IJCAI-05 Research Excellence Award Presentation

For full details, see http://www.ijcai-05.org/

CONFERENCES, SYMPOSIA WORKSHOPS

Below, the reader finds a list of conferences and websites or addresses for further information.

SEPTEMBER 1-3, 2004
3rd International Conference on Entertainment Computing (ICEC 2004). Eindhoven, The Netherlands.
http://www.icec.id.tue.nl/

SEPTEMBER 2-4, 2004
The IEEE International Symposium on Intelligent Control (ISIC'04). Taipei, Taiwan.
http://www.mk.ces.kyutech.ac.jp/isic04/

SEPTEMBER 6-10, 2004
12th IEEE International Requirements Engineering Conference (RE'04). Kyoto, Japan.
http://www.re04.org

SEPTEMBER 14-16, 2004
Middle Eastern Simulation Multiconference (MESM 2004). Amman, Jordan.
biomath.ugent.be/~eurosis/conf/mesm/mesm2004/temp.html

SEPTEMBER 18-22, 2004
The Eighth International Conference on Parallel Problem Solving from Nature (PPSN VIII). Birmingham, UK.
http://events.cs.bham.ac.uk/ppsn04/

SEPTEMBER 20-24, 2004
The 15th European Conference on Machine Learning (ECML) and the 8th European Conference on Principles and Practice of Knowledge Discovery in Databases (PKDD). Pisa, Italy.
http://ecmlpkdd.isti.cnr.itecmlpkdd@isti.cnr.it

SEPTEMBER 20-24, 2004
2004 IEEE/WIC/ACM International Conference on Intelligent Agent Technology (IAT'04). Beijing, China.
www.maebashi-it.org/IAT04

SEPTEMBER 27-30, 2004
24th IFIP WG 6.1 International Conference on Formal Techniques for Networked and Distributed Systems (FORTE 2004), Madrid, Spain.
http://antares.sip.ucm.es/~forte2004

SEPTEMBER 27-30, 2004
The 1st International Conference on Quantitative Evaluation of SysTems (QEST 2004). Enschede, The Netherlands.
http://www.qest.org/

SEPTEMBER 27-30, 2004
9th European Conference on Logics in Artificial Intelligence (JELIA'04). Lisbon, Portugal.
http://centria.di.fct.unl.pt/~jelia2004

OCTOBER 4-6, 2004
ABIS04. Annual Workshop of the SIG Adaptivity and User Modeling in Interactive Systems of the German Informatics Society (GI). (In conjunction with LWA04 in Berlin).
http://lwa.informatik.hu-berlin.de/abis.php

OCTOBER 4-7, 2004
First Annual IEEE Communications Society Conference on Sensor and Ad Hoc Communications and Networks. Santa Clara, California.
http://www.ieee-secon.org/2004

OCTOBER 4-8, 2004
12th Annual Meeting of the IEEE/ACM International Symposium on Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS 2004). Volendam, The Netherlands.
http://www.mascots-conf.org

OCTOBER 5, 2004
IT-developments in Medical Care. Heerlen, The Netherlands.
http://alumni.hszuyd.nl/IngenieursNetwerk/

OCTOBER 10-13, 2004
Special Session on Soft Computing in Distributed Optimization to be held at the 2004 IEEE System, Man, and Cybernetics Conference. The Hague, The Netherlands.
http://www.ieeesmc2004.tudelft.nl

OCTOBER 25-27, 2004
Sixth International Conference on Electronic Commerce, ICEC 2004: Towards a new services landscape. Delft, The Netherlands.
http://www.icec04.net/

OCTOBER 25-27, 2004
The European Simulation and Modelling Conference (ESM©'2004).UNESCO, Paris, France.
http://biomath.ugent.be/~eurosis/conf/esmc/esmc2004/index.html

OCTOBER 25-28, 2004
Sixth International conference on Cellular Automata for Research and Industry (ACRI2004). Amsterdam, The Netherlands.
http://www.science.uva.nl/research/scs/events/ACRI2004/

OCTOBER 25-29, 2004
Fifth Annual Conference on Optical Networking and Communications (OPTICOMM 2004). San Jose, USA.
http://www.opticomm.org

OCTOBER 25-29, 2004
12th International Conference on Cooperative Information Systems (CoopIS 2004). Larnaca, Cyprus.
http://www.cs.rmit.edu.au/fedconf/

OCTOBER 28, 2004
International Workshop on Modeling Inter-Organizational Systems (MIOS 2004). Larnaca, Cyprus.
http://wi-se.wiwi.uni-augsburg.de/MIOS04.php

NOVEMBER 1-4, 2004
The 2004 IEEE International Conference on Data Mining (ICDM'04). Brighton, UK.
http://icdm04.cs.uni-dortmund.de

NOVEMBER 4-6, 2004
FOIS-2004 International Conference on Formal Ontology in Information Systems. Torino, Italy.
http://www.fois.org

NOVEMBER 8-10, 2004
International Conference on Computer Games: Artificial Intelligence, Design and Education (CGAIDE 2004). Microsoft Campus, Reading, UK.
http://www.scit.wlv.ac.uk/~cm1822/cgaide.htm

NOVEMBER 23-26, 2004
The 2004 IFIP International Conference on Intelligence in Communication Systems (INTELLCOMM'04). Bangkok, Thailand.
http://intellcomm2004.ait.ac.th

ADDRESSES
BOARD MEMBERS BNVKI

Prof.dr.ir. J.A. La Poutré (chair)
Centrum voor Wiskunde en Informatica
P.O. Box 94079
1090 GB Amsterdam
Tel.: + 31 20 592 9333. E-mail: Han.La.Poutre@cwi.nl

Dr. A. van den Bosch (secretary)
Universiteit van Tilburg, Faculteit der Letteren
Taal en Informatica, Postbus 90153, 5000 LE Tilburg
Tel.: + 31 13 4663117. E-mail: Antal.vdnBosch@uvt.nl

Dr. C. Witteveen (treasurer)
TU Delft, ITS
P.O. Box 5031, 2600 GA Delft
Tel.: + 31 15 2782521. Email: c.witteveen@its.tudelft.nl

Prof.dr. M. Denecker
Katholieke Universiteit Leuven
Dept. of Computer Science, Celestijnenlaan 200A
3001 Heverlee, België
Tel.: + 32 16327544. E-mail: marcd@cs.kuleuven.ac.be

Dr. C. Jonker
University of Nijmegen, Division Cognitive Engineering
Nijmegen Institute for Cognition and Information
Spinoza Building, Montessorilaan 3, 6525 HR Nijmegen
The NetherlandsTel.: +31 24 3612646.
E-mail: C.Jonker@nici.kun.nl

Dr. F. Wiesman
Klinische Informatiekunde J2-278
Divisie Klinische Methoden & Public Health
Academisch Medisch Centrum
Meibergdreef 9, 1105 AZ Amsterdam
Tel.: + 31 20-5666687. E-mail: f.j.wiesman@amc.uva.nl

Drs. B. Zinsmeister
Cap Gemini Ernst & Young
Postbus 2575
3500 GN Utrecht
Tel.: + 31 30 6893394. E-mail: Bas.Zinsmeister@cgey.nl

EDITORS BNVKI NEWSLETTER

Dr. J.W.H.M. Uiterwijk (editor-in-chief)
Universiteit Maastricht, IKAT
Postbus 616, 6200 MD Maastricht
Tel: + 31 43 3883490. E-mail: uiterwijk@cs.unimaas.nl

Prof.dr. E.O. Postma
Universiteit Maastricht, IKAT
Postbus 616, 6200 MD Maastricht
Tel: + 31 43 3883493. E-mail: postma@cs.unimaas.nl

Prof. dr. H.J. van den Herik
Universiteit Maastricht, IKAT
Postbus 616, 6200 MD Maastricht
Tel.: + 31 43 3883485. E-mail: herik@cs.unimaas.nl

Dr. E.D. de Jong
Universiteit Utrecht, Inst. for Information & Computing Science
P.O. Box 80089, 3508 TB Utrecht
Tel.: + 31 30 253.9049. E-mail: dejong@cs.uu.nl

Dr. M.F. Moens (section editor)
KU Leuven, Interdisciplinair Centrum voor Recht & Informatica
Tiensestraat 41, 3000 Leuven, België
Tel.: + 32 16 325383
E-mail: marie-france.moens@law.kuleuven.ac.be

Dr. J. van Looveren (editor Belgium)
Vrije Universiteit Brussel, AI Lab
Pleinlaan 2, 1050 Brussel, Belgium
Tel.: + 32 6293702. E-mail: joris@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
Postbus 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. 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 RABO-Bank no. 11.66.34.200 or Postbank no. 3102697 for the Netherlands, or KBC Bank Veldwezelt No. 457-6423559-31, 2° Carabinierslaan 104, Veldwezelt, Belgium. In both cases, specify *BNVKI/AIABN in Maastricht* 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, 2004.

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@cs.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
Universiteit Maastricht, Marlies van der Mee,
Dept. Computer Science, P.O. Box 616, 6200 MD
Maastricht, The Netherlands
E-mail: newsletter@cs.unimaas.nl
http://www.cs.unimaas.nl/~bnvki