NEWSLETTER

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DIR spreads its wings

Benelearn 2004

Case-based reasoning in the law

News from the Belgium-Netherlands Association for Artificial Intelligence

Display Intelligence

Editor-in-chief

The paperless office is an old dream. The idea was that with the introduction of computers and networks, there would be no need to put anything on paper. All documents would be produced, communicated and read electronically. However, paper is just too versatile; compared to computer screens, paper has a much higher resolution, a higher contrast, a wider viewing angle, and lower power consumption. Moreover it is more durable, flexible, comes in a variety of sizes, and it is cheap. No wonder that the paper consumption keeps increasing; with email and the Web we have more to print then ever. As anybody who works in an office knows, this dream will never turn true.

Or won't it? What if we had a display with the exact properties of paper, with as extra that it can be linked to a computer to set the content? Imagine a book with empty pages, which can be filled by downloading an electronic book. The book can be read with the convenience of a printed book. Moreover, it can be thumbed through and annotated using a special pencil (like the stylus from personal digital assistants). The only missing property is the smell of printed books.

Polymer Vision, a daughter of Philips, has made the first steps to make the above reality. The company published in this month's *Nature Materials* details of their paper-like display. It is flexible, suitable for cheap mass production, and in principle can be made at very large sizes (think in meters instead of inches). The power consumption is low, the contrast high, and the viewing angle wide. The bad news is that the display is monochromous and the resolution is low, but it seems reasonable to expect these shortcomings to be solved in a few years time.

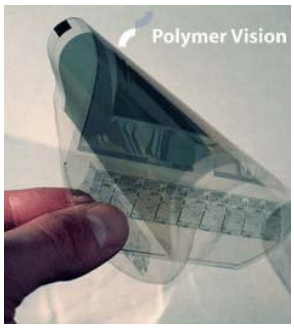
When all the hardware hurdles are cleared, AI software is required to make a medium that is better than paper. After all, to make paper-like displays successful they must offer the user all the power of a wirelessly networked computer while retaining the intuitive 'user interface' of regular paper. AI techniques that come to mind are:

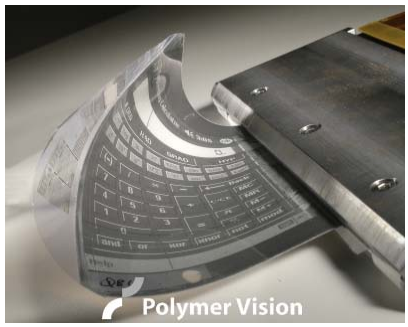
- Handwriting recognition
- Personalization
- Natural language processing
- Intelligent information retrieval

Your editor-in-chief is convinced that at BNAIC 2010 the proceedings will be wirelessly distributed to the electronic books of the participants. However, I fear that with displays almost as cheap as paper, my desk may stay as chaotic as it is now; the only - salient - difference being that I can use my computer to find the very note that should be somewhere in one of the dodgy piles in front of me.

Awaiting the developments in intelligent paper-like displays, the BNVKI Newsletter continues to be published on ordinary paper. For the past three years, the appearance of the Newsletter would not have been possible without Hazel den Hoed, secretary at the BNVKI editorial office. As of February, Hazel has left our department. The Editorial Board thanks her heartily for her efforts in formatting and editing the Newsletter. Finally we welcome her successor, Marlies van der Mee.

Polymer Vision: http://www.polymervision.nl/
Article in *Nature Materials*: http://dx.doi.org/10.1038/nmat1061





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BNVKI-Board News

Han La Poutré

This month's news from the BNVKI Board can be rather brief. This is along the lines of: "no news is good news," but, of course, in a more subtle version of it.

In the past two months, the BNVKI Board has further focused its attention on the financial situation and on future settlements. At this moment, it seems that several targets and developments are moving in the right direction. Of course, it is still far too early to say anything close to final about this year's results, but for now we can be hopeful in our estimations.

Also, a new BNAIS is planned to happen in the start of 2005, tentatively in February. It will be organised in cooperation between the Universiteit Maastricht and the Katholieke Universiteit Leuven. The Board aims at having enough time in between the BNAIC and the BNAIS, in order to stimulate more senior researchers to visit both. Therefore, the date of the BNAIS has been moved towards the beginning of 2005 instead of the end of 2004.

In the next issue of the BNVKI Newsletter, we hope to report more about the BNAIC 2004 and about further progress on the above issues. As always, we will keep you informed...

BENELEARN 2004: The Annual Machine Learning Conference of Belgium and The Netherlands

Report by Edwin de Jong
ICS, Universiteit Utrecht

For Belgian and Dutch machine learning researchers, the new year had a good start with the annual Benelearn conference. The conference was held on January 8 and 9 at the Vrije Universiteit Brussel, and was organized by the Computational Modeling (CoMo) group in cooperation with the Industrial Science and Technology department at the Erasmus Hogeschool Brussel.

The Benelearn conference aims to be a forum for machine learning, evolutionary computation, data mining, and other domains involving adaptive algorithms. This year's Benelearn featured a full two-day program. The fact that the volume of accepted submissions allowed for this may indicate that Belgian and Dutch adaptive algorithms research is on the rise!

Two topics that stood out this year were reinforcement learning and support vector machines. In the past years, both subjects have become substantial topics in the international machine learning field, and the Benelearn reflected this development.

REINFORCEMENT LEARNING

On the first day, half of all presentations concerned reinforcement learning. While machine learning methods usually start from scratch, Marco Wiering, Henk Mannen and Jan Peter Patist trained chess and draughts players using transcripts of games played by human players. Large databases with such games are available, and the approach makes it possible to learn reasonable play quite quickly.

The setup of the learning experiment permits estimating the piece values in chess (5 for a rook, 3 for a bishop or knight etc.), from the influence of winning or losing a piece on the outcome of the game. The outcome was quite comparable to the standard piece values, with one difference: in contrast with its human opponents, the computer finds the bishop to be valued slightly higher than the knight. Can the computer shed new light on the commonly accepted evaluation of chess pieces? While the chosen games represent an infinitesimally small fraction of the space of all chess games, they are highly non-random, and the piece values induced from them may thus be a reasonable estimate.

Reinforcement learning was furthermore applied to the game of Go, often named the Holy Grail of Artificial Intelligence due to its high branching factor. In a joint effort between Groningen and Maastricht, game-specific temporal-difference methods were applied to a small version of the game, and found to be more efficient than the standard temporal-difference methods used in reinforcement learning.

If the state of the environment in a reinforcement learning problem is known completely and with certainty, standard reinforcement learning methods such as Q-learning can be used. An important open challenge is how to deal efficiently with problems where this is not the case, and where the state of the environment is thus only partially observable. Nikos Vlassis and Matthijs Spaan presented a new method for such Partially Observable Markov Decision Processes (POMDPs), using a technique where datapoints representing the agent's belief about the

state of the environment are used to update the value function.

Another open issue in reinforcement learning, and machine learning in general, is how to address problems of much larger sizes than those used currently. Since it is well known in machine learning that the use of the right representation can greatly boost the performance of a learning method, one approach to this scalability question is to let a method develop its own representation. This technique is also used in evolutionary computation, as described in the GECCO conference report in Vol. 20, No. 4 of the Newsletter. Martijn van Otterlo approached the development of representations in reinforcement learning by studying the effects of using a relational language. A framework for specifying abstract and declarative representations of state-action spaces was presented. The question of how to learn such a representation was discussed, and forms a topic of further research. Jan Ramon and Jan Struyf discussed the use of relational representations for frequent pattern discovery.

While reinforcement learning has traditionally studied the question of how an agent may learn in an environment, a question attracting recent interest is what to do if this environment contains other agents. This question is at the intersection between reinforcement learning and game theory, and a main distinction is whether the aim is to maximize the rewards or payoff of one agent in the context of other agents (competition) or to maximize the payoff of the system as a whole (cooperation). Both presentations on this topic concerned the latter question.

In Wolpert's Collective Intelligence (COIN) framework, a multi-agent coordination problem is approached by designing the reward function such that the optimization of private rewards implies the optimization of global rewards. Pieter Jan 't Hoen and Sander Bohte presented a modification of COIN to improve its convergence, and demonstrated the method using dispersion games and the El Farol Bar problem. Jelle Kok and Nikos Vlassis started from the perspective of viewing the agents in a multi-agent system as a single agent selecting a joint action. In states where no coordination is required however, the actions can be learned independently, permitting a sparser representation of the value function. By using the sparse representation where possible and the full composite representation in states where coordination is necessary, the efficiency of multi-agent reinforcement learning can be improved on problems where only limited coordination is required.

The first invited lecture was given by Tim Kovacs on classifier systems. Classifier systems are reinforcement learning methods, and were originally introduced by John Holland. A main problem with early strength-based classifiers systems was the predominance of fit, over general rules; since such rules are applicable in more states, they obtain a higher fitness than more specific rules. More recently, accuracy-based methods such as Wilson's XCS have gained popularity. By using accuracy-based methods, actions with low reward estimates can be maintained in the population if the variance of the estimates is low.

SUPPORT VECTOR MACHINES

A second main topic at the conference was Support Vector Machines (SVMs), a recent supervised learning method which features both a clear theoretical understanding and good practical performance. The basic SVM is a linear classifier that separates two classes by finding a hyperplane between the classes. To apply this method to nonlinear problems, the so-called 'kernel-trick' can be applied: before classification, the dot products of the data are replaced by the kernel function. As a result of the implicit transformation this represents, classification takes place in a high-dimensional or even infinite-dimensional feature space, but the trick is that this space itself does not have to be computed. By working in kernel-space, the resulting decision boundary can be nonlinear in the original space.

Invited speaker Thorsten Joachims, who developed the popular SVM-light library, gave an informative overview of SVM research. One of the observations Joachims made was that SVMs appear to work particularly well on text classification, where SVMs outperform naïve Bayes. A hypothesis to explain the good performance of SVMs compared to methods using complex models such as neural

networks was that SVMs avoid unnecessary biases. Furthermore, an SVM algorithm for learning with complex outputs such as trees was presented. In preliminary experiments with a natural language parsing task, this method was found to perform better than a generative model.

Directly following the invited talk on SVMs, three more papers on SVMs followed. Before discussing the projection of datapoints into higher-dimensional spaces, Bram Vanschoenwinkel initially faced a more down to earth projection problem. When the third attempt was fortunately successful, he discussed an SVM method where polynomial overlap kernels were used for the language-independent named entity recognition problem, with promising preliminary results. Another domain to which SVMs were applied was the classification of percussive sounds by Van Steelant et al. Based on the StatLog comparison, Peter Waiganjo Wagacha et al. presented work comparing the performance of different methods to that of SVMs. The comparison confirmed the view that SVMs perform well for many classification problems, but that the choice of the kernel is an important issue as it can substantially affect performance.

Apart from the SVM-based research, other work dealing with supervised learning used nonparametric classifiers (Sander Bohte and Gregory Grudic) and the well-known version space representation (Smirnov et al.). Kim Cao-Van and Bernard De Baets discuss the specific case of learning a ranking using an instance-based algorithm. Marion Verduijn et al. employ prediction methods to the problem of predicting the length of stay of patients in intensive care. As one of the few papers on unsupervised learning, Nunnink et al. presented a fast approximation of the EM algorithm including a convergence guarantee.

While SVMs project the data into a high-dimensional feature space, the aim of feature subset selection in contrast is to identify a small set of features that permits accurate classification. This reduces the dimensionality of the learning problem, and can thereby improve performance. Yvan Saeys presented work on feature selection in the context of gene structure. Wendy van Olmen and Bart Naudts investigated how future classes may be taken into account in feature selection.

EVOLUTIONARY ALGORITHMS

In the language domain, Guy de Pauw used evolutionary techniques for grammar optimization. Paul Vogt and Andrew Smith presented a model for lexicon formation, and compare the predicted learning time of the model to experimental findings. Several papers on evolutionary computation were presented. Anne Defaweux and Tom Lenaerts investigate how the selective unit may increase in complexity over evolutionary time. A method was presented that combines modules recursively. A difference with the related SEAM and DevRep algorithms is that the fitness function is used to evaluate individual modules rather than combinations of modules. Alexander Tulai and Franz Oppacher presented an evolutionary algorithm for supervised learning. The method evolves rules, and the resulting classifier is represented by the complete population. Edwin de Jong presented an archive that guarantees progress in coevolution. Marco Wiering presented a memory-based memetic algorithm, combining the genetic algorithm with local search and using a memory-based technique for diversity preservation. Finally, Vitaliy Feoktistov and Stefan Janaqi used an evolutionary algorithm in combination with a least squares SVM to approximate the fitness function. The approximation is used to select the next generation, which is found to speed up convergence at the expense of some additional computational cost.

On Thursday evening, attendents of the conference had the chance to meet their colleagues and enjoy a tasteful conference dinner at Brasserie Horta, where the selected Belgian beers that formed part of the menu guaranteed a lively conversation. Altogether, the BeNeLearn conference 2004 was an ideal opportunity to catch up with colleagues and be informed about current research on adaptive methods in Belgium and The Netherlands.

For resources on SVM see: http://www.kernel-machines.org/

The 4th Dutch-Belgium Information Retrieval Workshop

Report by Arjen P. de Vries
CWI

December 8th and 9th, 2003, the Centrum voor Wiskunde en Informatica (CWI) in Amsterdam hosted the 4th Dutch-Belgian Information Retrieval workshop (DIR 2003). The primary aim of the Dutch-Belgium Information Retrieval workshops is to provide a meeting place where researchers from the Netherlands and Belgium (and neighbouring countries) exchange information and present new research developments in the domain of information retrieval and related disciplines. The workshops are student-oriented events, where an important goal is to give PhD students a chance to present their work

in an informal setting, to gain experience and prepare for a future performance at larger conferences. Another goal is to share results obtained on the benchmark initiatives TREC, INEX and CLEF with those who did not get to attend those workshops. The Programme Committee consisted of Anne Diekema (Syracuse University), Theo Huibers (TU Twente and KPMG), Jaap Kamps (Universiteit van Amsterdam), Arjen de Vries (CWI), Erik Tjong Kim Sang (Universiteit van Antwerp), and Maarten de Rijke (Universiteit van Amsterdam). The DIR workshop series started in 2000, as an event collocated with Ruud van der Pol's Ph.D. defence, where Karl Järvelin (one of the committee members) was so nice to give a keynote talk. This excellent idea of using a defence as a source of speakers was then followed in 2001 by Arjen de Vries and Djoerd Hiemstra, when the second DIR (in Twente) was opened by Steve Robertson, who visited for Djoerd's Ph.D. defence. The Belgium part of the conference started in 2002, when Marie-Francine Moens, Djoerd Hiemstra, and Wessel Kraaij organised the thirrd DIR in Leuven, with Karen Spark Jones as (video) keynote speaker. For the first time in the short history of DIR, the extended abstracts were reviewed by a group of well-known, international information retrieval researchers.

The 4th DIR workshop, co-organised by Arjen de Vries, Maarten de Rijke and Jaap Kamps, created another innovation, extending the workshop to two days. We believe this has been a good decision, that allowed for ample discussion. In spite of a longer event, we managed to keep the cost of attendance in student budget (as low as € 20, including lunch), thanks to CWI for providing the venue, and generous sponsorship by the IMIX research programme of the Netherlands Organisation for Scientific Research (NWO), the Dutch Research School for Information and Knowledge Systems (SIKS), Cosinus Computing BV, and, the Institute for Logic, Language and Computation (ILLC).

KEYNOTES

The night before DIR started, the Royal Family was extended happily with a new Princess (who will one day be Queen). So, the workshop started with coffee and 'beschuit met muisjes', a Dutch delicacy traditionally handed out when a baby is born. Thanks to ILLC who flew in the opening speaker, and the (proven successful) strategy of collocating DIR in time and place with Christof Monz's Ph.D. defence (inviting Ph.D. defence committee members to present their own research at the workshop), we could invite three excellent keynotes: Aleksander Øhrn from FAST Search & Transfer, Charlie Clarke from University of Waterloo, CA, and Bonnie Webber from University of Edinburgh.

Aleksander Øhrn gave an overview of the many aspects involved in running a search engine business. FAST's view on the retrieval of both structured and unstructured information was very relevant to those with a research interest in the integration of IR and databases. A most impressive range of search strategies has been implemented in the FAST software, combining information retrieval, information extraction, as well as data mining techniques. For the CWI hosting organisation it was nice to hear that a significant part of their software architecture runs on Python, the scripting language developed at CWI. Finally, although AllTheWeb is no longer owned by FAST, Aleksander had been tricked by a very smart audience member to answer a question whether one should use AllTheWeb ('better for specific information needs') or Google ('better for generic ones'). Aleksander recommends Ph.D. students to work on information extraction as enabling technology for information retrieval in an enterprise setting, or distributed systems and fault tolerance to improve software architectures for search.

Charlie Clarke started his keynote by reassuring us that we were not completely insane to bid on SIGIR 2007 in Amsterdam - though he added that it does take some months to recover after the event of organising the conference... He presented preliminary (and secret) results of a summer workshop sponsored by ARDA NRRC, where a number of groups got together and studied experimentally a variety of pseudo-relevance feedback techniques. The idea of getting together for some weeks over the summer seems very productive, and rumours go that some Dutch groups might follow this example - at least interest has been raised! Main lessons from the many experiments were that pseudo-relevance feedback still involves quite some black magic causing big differences across the systems. The most important cause for failing feedback could be identified as the case when systems emphasise the wrong aspect of a query. Another lesson from these experiments is that 'feedback over the WWW' should be routine practise if you want to perform well on TREC-style ad-hoc search tasks.

Bonnie Webber (see cover of this Newsletter) closed the workshop with her keynote, presenting the Question Answering research taking place at University of Edinburgh. She first discussed the freely available 'reading comprehension Q&A' corpus (available through Lisa Ferro of MITRE), which was developed in her research group. Next, she discussed recent research results by her students

Dalmas and Leidner. The common denominator in these works is that more use is made of global context: from spatial information in the text, or from the context that relates the answers retrieved in the candidate set. In the near future, she expects to make some progress on the issue of multi-sentence support for identifying the right answers in Q&A tasks.

PROGRAMME

Twelve high quality papers were submitted to the workshop, each submission reviewed by two of the Programme Committee members. The resulting programme covers many topics in the field of information retrieval, varying from web search to multilingual information retrieval, and from multimedia retrieval to question answering. The papers reflect the different views in the field, presenting purely statistical approaches as well as advanced natural language processing. The first regular paper was a last-minute improvisation, because the Océ talk was cancelled (due to the flue). Thijs Westerveld was so nice to stand in with a presentation on recent CWI experiments, applying language modelling techniques to content-based video retrieval for the TRECVID search task. Patrick Jeuniaux presented his (NLP oriented) research on improving the accuracy of co-reference resolution. Patrick Watrin followed with a talk on information extraction using lexicon-grammars. Gilad Mishne gave an excellent introduction to the Q&A research at ILLC into Dutch Q&A, one of the tasks at CLEF 2004. He discussed some of the challenges for Dutch Q&A, such as the lack of resources as well as longer sentence spans.

The afternoon opened with a special session on the IMIX research programme, launching their second call – providing an excellent opportunity to extend the Dutch-Belgian IR community with new members. The projects funded in the first call presented their key research questions as well as the first outline of a joint IMIX demonstrator, a question answering system with multi-modal input and output. Wessel Kraaij had an early start on Tuesday, presenting a language modelling approach to crosslingual information retrieval (CLIR). He concluded that transitive generative probabilistic models using dictionaries learnt from the WWW are a viable approach to CLIR. Christof Monz focused on the question whether ad-hoc retrieval for non-English is different from IR on English, concentrating on morphologically rich languages like Dutch. Kees Koster concluded the crosslanguage session with a study into Spanish-English text categorisation on the ILO collection, a patent database.

Roeland Ordelmans presented the research performed for his (recently concluded) Ph.D. thesis on Dutch SDR, giving an insight in the difficulties of developing speech recognition tools for languages other than English. Floris Wiesman, the organiser of the first DIR workshop, gave an overview of the I^2RP architecture, where information retrieval, question answering, and hypermedia presentation generation are brought together in one system. Kate Byrne then demonstrated the (limitations of) content-based image retrieval techniques in building a retrieval system for the National Monuments Record of Scotland. Vojkan Mihajlovic bravely faced the challenge to present his research into an XML IR retrieval model based on region algebras, with Charlie Clarke in the audience; succeeding wonderfully! Börkur Sigurbjörnsson explained in the final regular presentation how language modelling approach to information retrieval can be applied to INEX, revealing the rationale behind the impressive ILLC results on INEX. The free online proceedings are available from the DIR 2003 website, http://lit.science.uva.nl/DIR/.

FUTURE OF DIR

The next DIR has not been scheduled as yet, but there is a high probability that it will be held early November 2004. The organisation of the series of DIR workshops should be strengthened, to make it less of a chance event whether somebody stands up to actually get his or her act together and organise it. One idea is to seek cooperation with the Werkgemeenschap Informatiewetenschappen (WGI), an association that organises events of interest to the Dutch and Belgian Information Retrieval and Library Science communities.

This report will also be published in SIGIR Forum.

Opponent Models in Games

Report by Jeroen Donkers
IKAT, Universiteit Maastricht

On December 4, 2003 an international scientific NWO/SIKS workshop was held at the Universiteit Maastricht on the subject Opponent Models in Games. Six speakers each gave a 45-minutes lecture. About 40 researchers, Ph.D. students, and master students attended the workshop. Both the speakers and the audience of the workshop originated from several universities in the Netherlands and abroad. The workshop was chaired by professor dr. Jaap van den Herik.

Playing games is a challenging task: it is even more challenging when a player anticipates the behaviour of the opponent. An important task of playing games is to detect and employ weaknesses in the opponent's strategy. For human players, it is a part of psychology to anticipate the opponent's move. For computers such things belong to the domain of artificial intelligence. Obviously, most of the current game-playing computer programs do not take the peculiarities of the opponent into account. This holds especially for computer programs that play the classical board games such as chess, go, and checkers. In other areas of computer game-playing, opponent-modelling is an integral part of the strategy, for instance in repeated games such as Roshambo and Poker. This workshop dealt with the use of opponent models by computers in classical board games, repeated games, and in modern action games.

From left to right: Van den Herik, Iida, De Bruin, Fraenkel, Donkers, Spronck, and Markovitch.

The first speaker was professor dr. Avriezi Fraenkel of the Weizman Institute in Rehovot, Israel. The title of his lecture was: *JFK: Ask not how computers can model your opponent's psychology; ask how they can boost your own capabilities!* Professor Fraenkel explained how winning strategies for Wythoff games and some other similar subtraction games show an amazing mathematical structure. At first glance, these strategies appear to be exponential in nature, but a close study reveals that they are in fact polynomial. This result is obtained by expressing the strategies in exotic number systems such as Fibonacci numbers. Furthermore, professor Fraenkel showed that although the winning strategies are chaotic for small instances, they often become regular for large instances.

The second speaker of the workshop was professor dr. Hiroyuki Iida from the Shizuoka University in Hammamatsu, Japan and also from the Japan Science and Technology Agency, PRESTO. Professor Iida is one of the founders of Opponent-Model search. In his talk, titled *The Art of Opponent Models: Uncertainty and Games*, professor Iida explained the cycle that is formed by the three worlds of game-playing. In the first world, the player is a pupil, trying to learn from its master. In the second world, the player has become a master who plays the game with skill and in the third world, the player is a super-master who is able to teach the game to pupils. All three worlds share the usage of an opponent model. In the first world, your opponent is stronger and you have no idea of an opponent model but you are modelled yourself by the teacher. In the second world, you assume the opponent to be (as strong as) yourself. In the third world, the opponent is weaker, but you present the pupil an opponent of a strength that is appropriate for that pupil. Furthermore, the amount of uncertainty and its role in the game decreases from pupil to master to super-master.

The third speaker was Pieter Spronck, who is Ph.D. student at the department of Computer Science of the Universiteit Maastricht. The title of his talk, *Online Adaptation of Game Opponent AI*, refers to artificial opponents in commercial action games. Pieter Spronck explained how unsupervised online learning in commercial computer games allows computer-controlled opponents to adapt to the way the game is being played, thereby providing a mechanism to deal with weaknesses in the game AI and to respond to changes in human player tactics. He indicated that for online learning to work in practice, it must be fast, effective, robust, and efficient. In his lecture a technique is proposed, called dynamic scripting, that meets these requirements. In dynamic scripting an adaptive rulebase is used for the generation of intelligent opponents on the fly. As a short, impressive demonstration showed, dynamic scripting can succeed in endowing computer-controlled opponents with successful adaptive performance, showing that dynamic scripting can be successfully applied to the online adaptation of computer-game opponent AI.

After a truly academic break with pizza for all speakers and attendees, the workshop continued with a lecture by professor dr. Shaul Markovitch of the Technion Institute in Haifa, Israel. Like professor Iida, also professor Markovitch is one of the founders of Opponent-Model search. In his lecture, professor Markovitch presented his joint research with Ronit Reger: *Learning and Exploiting Relative Weaknesses of Opponent Agents*. A shortcoming of Opponent-Model search is the need for an exact opponent model. Professor Markovitch proposed a method in which not the opponent is modelled, but the weakness of the opponent in

certain positions. This weakness-model is constructed by using inductive learning techniques on the opponent's observed behaviour in a set of positions. The obtained model is used to enhance the own evaluation function, so that the computer can benefit from positions for which it is expected that the opponent plays less well. Experiments indicate that the method is indeed promising.

The second speaker after the break was Jeroen Donkers, Ph.D. student at the department of Computer Science of the Universiteit Maastricht. In his talk he presented part of his Ph.D. thesis that was to be defended the day after the workshop. The title of the lecture was: *Probabilistic Opponent-Model Search in Bao*. Probabilistic Opponent-Model (PrOM) Search is an extension of the standard Opponent-Model (OM) Search in which the opponent model used is probabilistic. Instead of a single evaluation function that models the opponent's strategy, a range of evaluation functions is used to form a mixed strategy that aims to approximate the true opponent's behaviour. In the talk experiments with PrOM Search in the mancala game Bao were presented. The development of five different evaluation functions was treated and the automated learning of their probabilities. The experiments showed that PrOM search can be more advantageous, that is, less harmful than OM search. In some cases, PrOM search did better than the traditional approach without opponent models, but only under the condition that enough resources were available.

The last lecture of the workshop was given by professor dr. Arie de Bruin from the Erasmus Universiteit Rotterdam. In his lecture, of which the title *Nosce Obscuros* refers to the previous speaker, he concentrated on the fundamentals of Opponent-Model search. First he explained an alternative look on standard minimax search: instead of a plain recursive implementation of the standard formulation, minimax search can be regarded as finding the optimal response strategy by local adjustments to a suboptimal strategy. This alternative look resulted in the new and powerful search methods SSS* and MTD(*f*). Next, professor De Bruin hypothesized on how the same approach could be used to various types of Opponent-Model search, maybe leading to more efficient implementations.

This first workshop on the topic of opponent models in games was inspiring for both speakers and participants. The combination of speakers from different areas of research in games exposed new connections and opportunities. Much research has to be done in this area, so we look forward to a second issue of the workshop.

The Length of a Short List

Jaap van den Herik
IKAT, Universiteit Maastricht

Ph.D. students are aiming to reach the short list of their University in four years, i.e., they do their utmost for a place on the list of Ph.D. defences which circulates every month among the academic personnel. The shorter the list the more important it is for the University that "you" have completed your Ph.D. research successfully. Your promotor and co-promotor would be pleased too. These feelings are similar at all universities and for all research schools involved (such as SIKS) and even for the BNVKI.

Every year we provide an overview of the performances of our Ph.D. researchers in the domain of Artificial Intelligence and its related research areas. In the December 2003 issue of the BNVKI Newsletter we published the 10th overview under the title: *A Top Performance*. Indeed, it was a top performance (37 Ph.D. defences in 2003; 259 in the last 10 years). However, the computer system with the help of some unexpected events made havoc of what was meant. For instance, it was tabulated that we had 85 Ph.D. theses in 2001 (it should have been 25). Since there was also a small mistake in the successful year 2003, namely 39 instead of the correct 37, it was impossible to figure out what should have been the correct table. Of course, the BNVKI members of long respected standing could have checked the figures in the previous December issues, namely those of 2002 and 2001.

Whatever the case, as a courtesy to our readers, we reproduce the correct table below. Unlike other years we do not have any addition to this table. So, you will find the precise figures in this amended table below.

Year	# of Theses
1994	22
1995	23
1996	21
1997	30
1998	21
1999	28
2000	19
2001	25
2002	33
2003	37
Grand total	259

Overview of number of Ph.D. theses by year.

NEW PH.D. DEFENCES

The BNVKI readers may remember that our expectations were more than 50 successful promovendi in 2008. Some interpolation leads to 2004 (39), 2005 (42), 2006 (45), 2007 (48) and 2008 (51). A first step towards 39 can be seen in this issue. We have the pleasure to announce a long "short list" of 12 Ph.D. defences, among which there are 6 affiliated to the research school SIKS. The Editorial Board of the BNVKI Newsletter congratulates all Ph.D. defenders with the completion of their thesis and their promotors and co-promotors with the success of their students.

V. Dignum (January 12, 2004). *A Model for Organizational Interaction. Based on Agents, Founded in Logic*. Universiteit Utrecht. Promotor: Prof.dr. J-J.Ch. Meyer. Co-promotores: Dr. F. Dignum and Dr. H. Weigand.

M.A.R. Leisink (January 16, 2004) *Graphical models and their (un)certainties.* Katholieke Universiteit Nijmegen. Promotor: Prof.dr. C.C.A.M. Gielen.

T. Gerrits (January 19, 2004) *Coherent Control of Fast Precession Dynamics in Magnetic Films.* Katholieke Universiteit Nijmegen. Promotor: Prof. dr. Th. Rasing.

L.T. Smit (January 23, 2004) *Energy-Efficient Wireless Communication -Een slim mobieltje is een ware kameleon.* TU Twente. Promotores: Prof.dr.ir. Th. Krol and Dr.ir. G. Smit.

L.J. Hommes (January 26, 2004). *The Evaluation of Business Process Modeling Techniques*. TU Delft. Promotor: Prof.dr.ir. J.L.G. Dietz.

H.P. Rörhig (January 27, 2004) *Quantum Query Complexity and Distributed Computing*. Universiteit van Amsterdam. Promotores: Prof.dr. H.M. Buhrman and Prof.dr.ir. P.M.B. Vitányi.

A. Hegyi (February 3, 2004) *Model Predictive Control for Integrating Traffic Control Measures.* TU Delft. Promotor: Prof.dr.ir. J. Hellendoorn. Co-promotor: Dr.ir. B. de Schutter.

L. Xu (February 20, 2004) *Monitoring Multi-party Contracts for E-business*. Universiteit van Tilburg. Promotor: Prof.dr.ir. M.P. Papazoglou. Co-promotor: dr.rer.nat. M.A. Jeusfeld.

P. Groot (March 23, 2004) *A Theoretical and Empirical Analysis of Approximation in Symbolic Problem Solving*. VU Amsterdam. Promotor: Prof.dr. F.A.H. van Harmelen. Co-promotor: dr. A.C.M. ten Teije.

C.A. van Dorp (March 30, 2004) *Reference-data modelling for tracking and tracing*. Universiteit Wageningen. Promotor: Prof.ir. A.J.M. Beulens. Co-promotor: Prof.dr.ir. G. Beers.

V. Popova (April 1, 2004) *Knowledge Discovery and Monotonicity*. Erasmus Universiteit Rotterdam. Promotor: Prof.dr. A. de Bruin. Co-promotor: Dr. J.C. Bioch.

C. van Aart (April 6, 2004) *Organizational Principles for Multi-Agent Architectures.* Universiteit van Amsterdam. Promotores: Prof.dr. B.J. Wielinga and Prof.dr. A. Th. Schreiber.

INAUGURAL ADDRESSES

What can be counted should be counted is an adage of many assessment committees, the OESO among them. It is not sure whether they also count the inaugural addresses per nation but for the case they do, we mention two addresses of which we expect quality to be delivered.

Prof.dr. M. van Vliet (March 19, 2004) *Software or Softwar? Dimensies en dilemma's in software-projecten.* Radboud Universiteit Nijmegen.

Prof.dr.ir. H. La Poutré (March 26, 2004) *Adaptieve systemen: Intelligentie in Software-Agenten en Economische Spelen.* TU Eindhoven.

APPOINTMENT

The Editorial Board would like to congratulate **Professor Sjaak Brinkkemper** (VU Amsterdam) with his full-time appointment at the Universiteit Utrecht. The transfer is recent and we are awaiting a new announcement of an Utrecht inaugural address. Professor Brinkkemper only recently (28 May 2003) delivered his official inaugural address at the Vrije Universiteit in Amsterdam. As a SIKS member we would like to invite him to contribute to this section by submitting one or two reviews of the Ph.D. theses announced above. Our readers would be grateful and a better introduction to the world of Artificial Intelligence cannot be proposed.

Section Editor
Richard Starmans

SIKS Day 2004

March 12, Zeist

On March 12, 2004, the School for Information and Knowledge Systems organizes its annual SIKS day. The location will be the Castle of Zeist (Slot Zeist). The main aim of the event is to give SIKS members -participating in research groups all over the country- the opportunity to meet each other in an informal setting and to inform them about current developments and some new activities and plans for the coming year. This year a small scientific symposium will be organized at the SIKS day, as well. Four guest speakers have agreed to participate:
Prof.dr. Cristiano Castelfranchi (University of Siena & CNR Rome)
Prof.dr. Wiebe van der Hoek (University of Liverpool)
Prof.dr. Erik Proper (KU Nijmegen)
Prof.dr. Guus Schreiber (VU Amsterdam)

By inviting these researchers and by choosing this famous location we hope to have selected the right ingredients for a memorable day, thus celebrating the fact that our research school received re-accreditation by the Dutch Royal Academy of Sciences (KNAW) in 2003 for another period of six years.

All members of our research school (research fellows, associated members and Ph.D.students) as well as the members of SIKS' Advisory Board are invited to join the SIKS day 2004. Participation (lunch included) is free, registration is required. Participants are kindly requested to fill in the registration form at the SIKS site.

Deadline for Registration: March 1, 2004

TOWARDS AN ARTIFICIAL SOCIAL INTELLIGENCE: AUTONOMOUS AGENTS AND THEIR SOCIAL ORDER

Prof.dr. Cristiano Castelfranchi

I will illustrate how and why AI - reacting to strong attacks and criticisms and to a serious crisis - has changed its paradigm, moving from an 'isolated', 'reasoning', 'complete' view of intelligence to a 'social' paradigm were computation mainly is 'communication' and problem solving is due to (emerging) cooperation between decentralized, autonomous, situated, interactive, limited intelligent entities (Agents).

I will analyze the relational and social nature of 'autonomy', how it depends on the cognitive architecture of the agent and on its internal and external powers (like knowledge or material resources and authorizations). What are the necessities and the advantages of Autonomy, and its problems: like collaborative conflicts (for example in user-Agent interaction).

I will discuss how this social paradigm is shaping the entire discipline: the 'social' nature of information and of IT. Why social notions and capacities (like cooperation, negotiation, role, commitments, norms) must be computationalized in order that: (a) computers (and agents) can really mediate and support human cooperation; (b) human-computer and human-robot interaction be natural and effective; and (c) multi-agent systems can really work producing market-like, organization-like, institution-like form of computing and various forms of spontaneous or organized 'social order'.

REASONING ABOUT KNOWLEDGE, RATIONALITY AND ACTION

Prof.dr. Wiebe van der Hoek

Since the work of Hintikka on Logic for Knowledge, researchers from Computer Science, Artificial Intelligence and Multi-Agent Systems have appreciated and added to this formal theory, in which one can reason about how agents (participants in a communication protocol, or in a secret exchange, or in a game-like scenario) are guaranteed to either obtain knowledge or remain ignorant. We will briefly present the basics of this logic, in which in particular the Multi-Agent notions of knowledge are intriguing, like common knowledge as illustrated in the muddy children example.

An important issue of such scenarios that is only recently formally analyzed, however, is that of the dynamics. How do the agents update their

knowledge, and how does their newly acquired knowledge influence their decision making? We will sketch two approaches that address the dynamics of epistemics, in which we can specify formally the muddy children scenario, as well as automatically verify epistemic properties in certain knowledge-exchange scenarios.

DOMAIN MODELLING - ANCHORING SEMANTICS IN INFORMATION SYSTEMS DEVELOPMENT

Prof.dr. Erik Proper

This presentation focuses on domain modelling and its role in the development of information and knowledge systems. We define domain modelling as the activities involved in obtaining and modelling the language (concepts, terminologies; ontologies) used by stakeholders to discourse about a domain.

Achieving conceptual clarity and consensus among stakeholders is an important yet often neglected part of modelling activities in system development. During system development, a myriad of models may be produced, ranging from high level sketches of the problem, via informal/formal requirements, to designs at several levels of technical detail. Underlying each of these models, a domain model can be discerned, comprising the concepts (domain concepts) featuring in the model. The different models used during system development need to be communicated with different stakeholders, ranging from problem owners, contract authorities, perspective users, domain experts, to software engineers and system administrators. This puts an extra burden on task of domain modelling as a shared understanding must be reached of the concepts involved.

In this presentation we will investigate the importance of domain modelling and its role during system development. Based on this we will pose some challenges that we regard as essential in improving the awareness for and practice of domain modelling in a system development context.

THE MAKING OF A WEB ONTOLOGY LANGUAGE: A CHAIR'S PERSPECTIVE

Prof.dr. Guus Schreiber

In the context of the Semantic Web Activity the World-Wide Web Consortium (W3C) installed in 2001 a new working group to define a web standard for representing ontologies. The discussions in this group reflects a long history of debates in knowledge representation and knowledge engineering. In this talk I will discuss the process that led to the Web Ontology Language OWL, both from a technical and social point of view. The technical focus will be on the compromises between expressivity and computability and on the relationship with RDF. Social aspects include observations on strengths and weaknesses of the W3C standardization process and on the art of consensus. Forthcoming W3C semantic-web activities will be briefly outlined.

Spring Course Datamining

April 13-17, 2004, Maastricht

From April 13-17, 2004 a 5-days course on data mining will be organized at the Universiteit Maastricht. For all details on aims, course content, course material and location, please check: http://www.cs.unimaas.nl/springcourse/general.htm

Participating in this course is part of the advanced components stage of SIKS' educational program. SIKS has reserved a number of places, exclusively for those Ph.D. students working on the course topics.

ADMISSION CRITERIA

- fully registered SIKS Ph.D.student;
- actively involved in the educational program;
- working on the course topic(s);

If the number of applicants meeting these criteria exceeds the number of places available, applications to participate will be honoured in a first-come first-serve manner.

REGISTRATION

SIKS Ph.D. students interested in taking the course, should *not* contact the local organization, but send an e-mail to office@siks.nl and confirm that their supervisor supports their participation.

Unlike other SIKS activities, hotel accomodation (bed, breakfast and dinner) is not part of the arrangement. Participants must make their own arrangements.

AI EDUCATION

Section Editor
Evert van de Vrie

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.

Aantallen Studenten en Afstudeerders bij de Nederlandse AI-Opleidingen

Evert van de Vrie

De Nederlandse AI-opleidingen lijken een constante factor te zijn aan de universiteiten, als gekeken wordt naar de aantallen studenten, de instroom en de uitstroom. Een jaar geleden (Vol. 19, No. 5) werden de aantallen gepresenteerd voor het studiejaar 2002/2003; in dit artikel volgen de aantallen voor dit studiejaar.

Gegevens zijn opgevraagd bij de erkende AI-opleidingen in Nederland. Dit zijn de zes opleidingen die gedurende het studiejaar 2001/2002 zijn gevisiteerd: Cognitieve Kunstmatige Intelligentie van de Universiteit Utrecht, Cognitiewetenschappen aan de Rijksuniversiteit Groningen en Katholieke Universiteit Nijmegen, Kennistechnologie aan de Universiteit Maastricht en Kunstmatige Intelligentie aan de Universiteit van Amsterdam en Vrije Universiteit. De informatie voor dit artikel is verzameld bij de verschillende betrokkenen bij de opleidingen, die hartelijk worden bedankt voor hun bereidwillige medewerking.

DE AANTALLEN

	UU-CKI	RUG	KUN	UM	UvA	VU	totaal
aantallen ingeschreven studenten per 1-9-2003	288	225	85	151	215	148	1112
aantallen eerstejaars 2003/2004	68	60	26	23	31	30	238
aantallen eerstejaars 2002/2003	62	48	23	39	50	25	247
afgestudeerden in 2002/2003	30	20	7	12	21	20	110

Van de VU zijn geen getallen bekend, maar van de andere opleidingen zijn de aantallen ingeschreven studenten voor de hele opleiding en de aantallen eerstejaars van dit en voorgaand studiejaar weergegeven. Tevens is het aantal studenten dat gedurende het afgelopen studiejaar is afgestudeerd vermeld.

Bij dezelfde instellingen stonden vorig studiejaar 1116 studenten ingeschreven, vrijwel hetzelfde aantal. Het aantal eerstejaars is in totaliteit enigszins gedaald (-3,6%). Wel zijn er bij de instellingen afzonderlijk fluctuaties waar te nemen: RUG +25%, tegenover UM -41%. Het aantal afgestudeerden is gedaald van ongeveer 115 in het studiejaar 2001/2002 naar 110 in het afgelopen studiejaar.

Als de aantallen vergeleken wordt met de trends in het universitair onderwijs in het algemeen, en bij de informaticaopleidingen in het bijzonder, dan moet geconstateerd worden dat de AI-opleidingen nauwelijks beïnvloed zijn door de ontwikkelingen in het bedrijfsleven en op de arbeidsmarkt, die afgelopen jaren een dalende lijn hebben getoond. Kunstmatige intelligentie heeft zich blijkbaar een vaste en erkende positie verworden in het opleidingenlandschap aan de Nederlandse universiteiten.

Pro-Active Agents with Recurrent Neural Controllers

Guido de Croon
IKAT, Universiteit Maastricht

To obtain my M.Sc. in Knowledge Engineering at IKAT in Maastricht, I have performed research on evolutionary robotics, a methodology that optimises robot controllers with evolutionary algorithms. Part of the research for the thesis has taken place at the CNR (Consiglio Nazionale della Ricerca, Rome), enabling me to collaborate with Dr. S. Nolfi, an expert in the area of Evolutionary Robotics. My supervisors at the Universiteit Maastricht were Prof.dr. H.J. van den Herik and Prof.dr. E.O. Postma.

REACTIVE VERSUS PRO-ACTIVE AGENTS

In my thesis I have focused on a bottom-up approach to artificial intelligence, called embodied cognitive Science. As a consequence of the bottom-up approach, research has emphasised reactive agents. These agents always respond in the same way to the same sensory inputs. It has been shown that these simple agents can perform complex tasks by exploiting sensory-motor coordination: the agents use their actions to obtain advantageous sensory inputs. To reach higher agent capabilities, research focus is currently shifting from reactive to pro-active agents. The actions of pro-active agents

do not only depend on the inputs, but also on the "internal state". An internal state represents a form of memory of the agent's past sensory inputs. Typically, a pro-active agent has a recurrent neural controller. A large variety of such controllers has been proposed, but it is not yet clear in what way the different neural controllers influence the agent capabilities. Therefore, it is also not clear what the next step should be in the bottom-up approach to artificial intelligence.

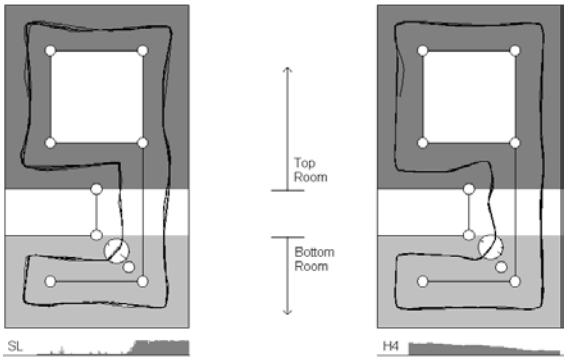
Our research question was: how are a pro-active agent's capabilities influenced by its recurrent neural controller? To answer the research question, five typical recurrent neural networks were applied as controllers of a simulated Kephera robot in three different robotic tasks.

Our conclusion is that the capabilities of a pro-active agent are determined by the mechanism that realises an internal state in its recurrent neural controller. We discern three such mechanisms: recurrency, neural inertia, and adaptable time delays on the neural connections. Neural controllers that employ the mechanisms of neural inertia or adaptable time delays, lead to agents that can exploit regularities on variable time scales. Specifically, these mechanisms offer the agent the ability to determine when sensory inputs influence the outputs. The mechanism of recurrency alone is not sufficient to obtain this ability.

THE SELF LOCALISATION TASK

With an example we illustrate why an inability to determine when sensory inputs influence the outputs leads to lower agent capabilities. One of the tasks requires from the agents that they self-localise in an environment at various speeds. The figure shows two screenshots of the environment. The left part of the figure involves an agent controlled by a Nonlinear AutoRegressive model with eXogenous inputs (NARX), while the right part involves an agent controlled by a Continuous Time Recurrent Neural Network (CTRNN). The agents have to indicate with an output neuron whether they are located in the light grey room or the dark grey room. To exemplify the limited capabilities of an agent that cannot determine when the inputs affect the outputs, we discuss the way in which the agents notice that they enter the bottom room.

The CTRNN-agent (right) uses its internal state to indicate in what room it is located. In particular, its fourth hidden neuron is part of its internal state and determines the activation of the self-localisation output. The CTRNN-agent uses its neural inertia to notice when it enters a new room. Neural inertia is a mechanism in which the neural activation changes with a certain speed, determined by evolution. We discuss the transition to the bottom room. The activation of the agent's fourth hidden neuron slowly decreases in a corridor. Since the activation increases again in a turn, the agent can be said to "measure" how long the current corridor is. The agent can determine when it enters the bottom room, since there is only one corridor in the environment that is long enough to allow the activation of the hidden neuron to decrease to zero. In particular, the self-localisation output indicates the bottom room when the fourth hidden neuron decreases below a certain threshold. The fourth hidden neuron is shown in the bottom of the figure and a dashed circle shows the moment in which the agent indicates the bottom room.



The left agent has a NARX-network, the right agent a CTRNN. Lines represent walls, small cylinders are obstacles. A dotted circle indicate that the agent changes its internal state. Below the environments, the most important neural activations are shown. 'SL' stands for the self-localisation neuron of the NARX-controller, 'H4' is the fourth hidden neuron of the CTRNN-controller.

The NARX-agent (left) uses its self-localisation output, which is part of its internal state, to "remember" in what room it is. However, the agent does not use its internal state to recognise when it has to change its localisation. Instead, it uses sensory-motor coordination to obtain unambiguous information about its location. We again discuss the transition to the bottom room. In the corridors the NARX-agent makes heavier "swings" than the CTRNN-agent. The agent's movements in the long corridor illustrate this best. The swings of the NARX-agent serve to determine approximately where the bottom room is. Namely, there is only one place in which the agent approaches the wall to its left without being in a turn: in the middle of the long corridor. In that moment the internal state changes abruptly, as illustrated by the change in activation of the self-localisation neuron in the bottom of the figure.

The experiments suggest that NARX-agents have lower capabilities than CTRNN-agents, because no successful NARX-agents have been evolved at higher speeds. The higher required speed restricts the possibilities to make swings in the corridors and NARX-agents do not produce a strategy with slowly changing neural activations. The CTRNN-agent however can still perform well at the tasks at a higher speed, since its neural inertia is adjusted to decrease faster. In other words, the agent can determine the time scale on which the inputs experienced in the corridor lead to an indication of the bottom room.

SECTION KNOWLEDGE SYSTEMS IN LAW AND COMPUTER SCIENCE

Section Editor
Marie-Francine Moens

Case-Based Reasoning in the Law - An International Workshop

Report by Bram Roth
Metajuridica,Universiteit Maastricht

On November 25th 2003, a workshop on case-based reasoning in the law was held at the law faculty of the Universiteit Maastricht.

The workshop was sponsored by: NWO – MaGW, JURIX, BNVKI, and the Maastricht Faculty of Law.

The primary aim of the workshop was to discuss the subject of legal case-based reasoning both from an Artificial Intelligence perspective and from a legal theoretical stance. A number of renowned experts were invited to come and speak about legal case-based reasoning from their own professional background. Two speakers were from abroad, and their presence is hoped to have contributed to the international character of Dutch research in the fields of Artificial Intelligence and Law and of Legal Theory.

VALUE AND PURPOSE IN REASONING

There were twelve participants at the workshop, including five speakers. The first speaker was Trevor Bench-Capon (Computer Science Department at the University of Liverpool, UK). He presented results of his work on the role of value and purpose in three approaches to reasoning with cases: theory construction, value-based argumentation frameworks and persuasive argumentation schema. According to Bench-Capon, the role of value and purpose in reasoning with cases can be represented formally in all three approaches.

In the theory construction approach, reasoning with cases comes down to establishing preferences between the values advanced by the legal system. This is done by interpreting decisions in terms of rule preferences, which are in turn interpreted in terms of preferences between the values promoted by the rules. Once such value preferences have been obtained from decided cases, they can be used to decide new ones.

In the approach with value-based argumentation frameworks, reasoning with cases is modelled in terms of arguments that attack other arguments (Dung 1995; Bench-Capon 2002). Given a relation of attack between the members of a set of arguments, one can consider maximal subsets of arguments with the intuitively desirable property that they can be upheld against all attacking arguments. Such subsets of arguments then provide a basis for determining the conclusions that follow. However, the problem then is, that in general there can be more than one different subset of arguments with the desirable property just mentioned. According to Bench-Capon, one can then use a value ordering (an 'audience') to narrow down the attack notion such that an attacking argument must not have a value with a lower preference than the attacked argument. In this way one can use value orderings to prefer certain subsets of arguments over others, yielding an improved account of the conclusions that follow.

In the approach with persuasive argumentation schema, decisions are justified by referring to the goals they apparently serve. Such justifications can then in turn be attacked in a variety of ways, and some of these attacks can be seen as explanations of argument moves in earlier work on case-based reasoning.

QUALITATIVE COMPARATIVE REASONING

The second speaker was Jaap Hage (law faculty, Universiteit Maastricht). He presented results of his work on what he called 'qualitative comparative reasoning', and he discussed this kind of reasoning from three perspectives: case-based reasoning, legal proof and theory construction.

According to Hage, these three ways of reasoning can all be construed in the abstract as a strategy to select the best alternative from a set of possibilities. Within the context of case-based reasoning, for instance, qualitative comparative reasoning can help to select the best possible solution to a problem case, given the way in which earlier cases have been settled by judges. Hage contrasted qualitative comparative reasoning with quantitative comparative reasoning, the latter of which fails if there is no common scale to carry out the comparison, or if the assignment of values on the scale is more or less arbitrary.

Hage deals with qualitative comparative reasoning as the weighing of reasons pro and con certain alternatives, where this weighing involves set inclusion comparisons (Hage 1997) as well as individual weights of reasons. In this way case-based reasoning, for instance, can be treated as a kind of reasoning a fortiori that involves the relative 'strength' of reason sets, whereby relative strength is determined by inclusion relations between the sets of reasons pro and con, and by the individual weights of the reasons involved. Likewise, Hage deals with the comparison of legal proofs in terms of their capability to explain the evidence, or their overall plausibility. Again these measures of quality of proof were treated operationally as a comparison of reason sets. Hage concluded his talk with a reason-based account of the evaluation of theories by their 'coherence', whereby coherence of a theory is measured in terms of the extent to which solutions to cases advance the legal goals pronounced by the theory itself. According to Hage the measure of relative coherence can also be reduced to the comparison of reason sets. If a solution to a case promotes a legally recognised goal, for instance, then in Hage's account this is a reason to prefer theories that include the solution as more coherent than theories that do not include the solution.

Hage presented three different ways of reasoning as a kind of qualitative reasoning, namely case-based reasoning, legal proof evaluation and the goal-based evaluation of theories. According to Hage, all three come down to a comparison of relative strengths of reason sets, as determined by set inclusion relations and weights of individual reasons.

APPLICABILITY IN CIVIL LAW

The third speaker was Kevin Ashley (Department of Law and Intelligent Systems at the University of Pittsburgh, USA). He presented recent results of his on-going research on case-based reasoning, in which he addressed the question to what extent case-based models of legal reasoning (such as HYPO, Ashley 1990) fit in a civil law context.

According to Ashley, the relevance of case-based computational models for civil law jurisdictions depends on many considerations. Evidence suggests that judges in civil law jurisdictions do reason with legal cases, but they seem to reason with cases in a very different way from their common law counterparts. Civil law judges seem to work with what Ashley called an 'Abstract Precedent Scenario', while their common law colleagues prefer to start from a 'Fact-Based Precedent Scenario'.

Ashley claimed that there are some reasons to believe that civil law judges will find it more and more worthwhile to report the facts of a case in their opinions. For one thing, computerised full-text legal information retrieval, a tool that can benefit civil law judges and practitioners as much as anyone, works better with fuller fact descriptions, even if the goal is to retrieve only the principles and abstract rules a court relies upon. For another, international treaties and other considerations suggest that civil law judges will need to rely increasingly on past decided cases for purposes of drawing legal inferences. To the extent that this is true, case-based computational models of legal reasoning offer techniques for improving upon the ability of full-text legal information systems to process retrieved cases in a way that reflects their significance in legal arguments.

Finally, to the extent that judges in a civil law jurisdiction have not yet adopted standards for reporting the facts of cases, there may be an important opportunity for AI and Law researchers to help determine those standards with an eye toward helping their computational models process the cases intelligently and automatically.

Ashley claimed that case-based models of legal reasoning will fit better in a civil law context as civil law judges will rely more and more on decided cases for drawing inferences, and will accordingly increasingly start recording the facts of a case in their opinions.

CASE COMPARISON AND RULE EXTRACTION

The fourth speaker was researcher Bram Roth, who presented a survey of his Ph.D. thesis on case-based reasoning in the law (Roth 2003). Roth discussed some issues that are especially relevant for dealing with case-based reasoning in the law. He presented two methods of adhering to decisions, namely case comparison and rule extraction. Briefly, the difference is that in the case comparison method a

settled case is followed directly after a comparison with the case at hand, while in the rule extraction method the decision is first summarised into a general rule.

According to Roth, any formal model of case-based reasoning should account for both the conclusions that follow, and the reasoning patterns along which they follow. Patterns of reasoning typically found in case-based reasoning are 'analogising' and 'distinguishing'. The former involves pointing out similarities between a decided case and the case at hand, while in the latter the relevant differences between the cases are stressed. Another important point that Roth made was that in the law it depends on a contingent choice which case features are relevant in case comparison. In particular, it is important at which level of generality the relevant case features are to be stated.

Roth went on to present the formal theory that he developed as a model of reasoning by case comparison. The main objective of the theory is to specify precisely the conclusions that follow on the basis of the case comparison method. A secondary aim is to account for reasoning patterns involved in case comparison, such as analogising and distinguishing. The theory treats reasoning by case comparison as a variant of reasoning a fortiori, which is generalised in two respects. First, it is possible to involve multi-step arguments in the comparison of cases. Second, the arguments involved in case comparison can be entangled, that is, it is possible to support or attack that a statement supports or attacks a conclusion as a reason.

An important feature of Roth's formal theory is, that it is acknowledged explicitly that in the law it depends on a contingent choice which case features are relevant in comparing cases. In accordance with this, the relevant case features are given by what is called a comparison basis.

After having presented his formal theory of reasoning by case comparison, Roth went on to discuss some related research. One issue thereby was whether the conclusions that follow from settled cases are defined, another issue is whether there is an account of the reasoning patterns along which these conclusions follow. It appeared that none of the discussed approaches presents a formal account of the case comparison method that includes both the conclusions that follow, and the reasoning patterns along which they follow. A third issue was whether it is acknowledged explicitly that in the law it depends on a contingent choice which case features are relevant for case comparison. It appeared that none of the discussed approaches explicitly deals with the contingency of the set of relevant case features.

Roth concluded his talk with some recommendations for future research. Among other things he wants to investigate his model's relevance for legal practice, and he also wants to include reasoning with hypothetical cases in his formal account.

THE LOGIC OF CASE-BASED REASONING

The fifth speaker was Henry Prakken (Intelligent Systems group of the Computer Science Faculty of the University of Utrecht, Nederland). He presented some results of his research on the logic of case-based reasoning. According to Prakken, case-based reasoning and rule-based reasoning can be modelled by essentially the same logic, namely some logic of defeasible reasoning. Briefly, in defeasible reasoning conclusions can cease to be derivable due to the addition of information that makes new attacks possible. Such attacks can take the form, for instance, of exceptions to the rules that have been applied to arrive at the original conclusions. According to Prakken, reasoning from precedents can be captured as a kind of reasoning with rules extracted from the precedents (Prakken and Sartor 1998). There are some differences between rules extracted from precedents and those that are in statutes, however. Statutory rules tend to be more abstract than rules extracted from precedents, and for this reason the former are often interpreted for the purpose of applying them to concrete cases, while the latter tend to be more often adapted to that end.

According to Prakken, the analogical reasoning that involves such adaptations is a 'shallow', preliminary kind of reasoning. By that he meant that reasoning by analogy at first instance only involves pointing out superficial similarities and differences between cases, without any deeper explanation of why these similarities or differences matter. As a result, the similarities and differences can be attacked simply by questioning them, thereby forcing the party who pointed them out to back them with reasons. Essentially the only difference between case-based reasoning and other rule-applying arguments then is, that one uses a different source for one's backings. In reasoning with statutory rules the backings are provided by the law, while in case-based reasoning they are provided by judicial decisions.

Prakken presented case-based reasoning as a brand of rule-applying reasoning, whereby the rules are extracted from settled cases. A typical difference between case-based reasoning and rule-based

reasoning is the prominent role of analogy in the former. However, according to Prakken reasoning by analogy is only a shallow, preliminary way of reasoning that requires backing from judicial decisions, in essentially the same way as rule-based reasoning requires backing from the law.

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Development of Standards for Describing Legal Documents

JURIX Workshop, December 11, 2003

Report by Hannelore Dekeyser
ICRI, KU Leuven

Currently available technology offers powerful ways to manage legal documents: law texts can be structured and linked using XML, common databases can be queried with custom searches and web interfaces can provide different standardized views of the texts. In many countries initiatives have been set up to implement such sophisticated legal databases. Is there any need to develop international standards in this domain? This was the main question at the Jurix Workshop on the Development of Standards for Describing Legal Documents, organised at the Universiteit Utrecht.

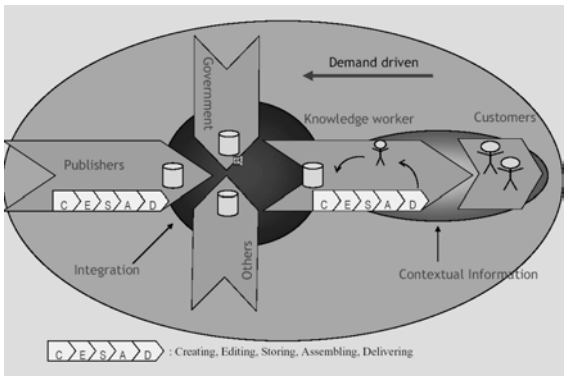
DISTRIBUTION AND INTEROPERABILITY

The Italian 'Norme in rete' project identifies two separate developments from a centralized to a distributed environment. On the one hand, legislation is no longer the product of the nation-state alone. Many norms originate on the European or international level and it makes sense to treat these texts in a uniform manner. On the other hand, technology has evolved from stand-alone mainframes to distributed networks. In such an environment, some type of coordination is necessary in order not to end in total chaos. The Italian solution sets forward a single clearing-house for legislative texts that functions as a single point of access. All institutes involved in the creation of legal norms only send and receive data directly with the clearing-house. Obviously, this scenario is only feasible if all institutes agree on a common format to describe and structure their data.

Interoperability is an issue not only for the producers of legal norms, but for all concerned parties. The case of tax law, as presented by Harm Jan van Burg of OASIS, provides an excellent example. Globalisation, as well as the integration of the European Market, have lead companies and individuals to come into contact with different tax laws more often. First of all, companies must be able to obtain comprehensive and up to date information on tax regulations from the government. Likewise, the government must obtain information from the company in order to calculate the amount of taxes due. Finally, companies also exchange financial information internally and with other companies. Many governments are turning to e-government applications to increase the efficiency of tax administration. Developing such applications demand a substantial investment, not only from the government, but also from users who want to use the system. When every country implements its own distinct e-government system, complexity and costs are multiplied without any benefit. OASIS offers a forum for all interested parties to exchange views on available standards and, when necessary, to develop new ones.

Widespread use of a common standard to describe legal norms opens other opportunities as well. Publishers and other content providers could build upon the existing network to add contextual information, for instance commentaries, links to national and foreign court decisions. Integrating information from several sources adapted to the needs and wishes of the end users creates enormous added value, as was explained by Thei Geurts of Be Value BV. The traditional role of a publisher, assembling information in a static form for a large group of readers, will have to evolve into providing

information components, from which the user can select what he needs and assemble it with information from other sources, added Diederik Gerth van Wijk from Kluwer.



Demand-driven approach: integration of information adapted to end users.

REQUIREMENTS FOR STANDARDS

General agreement exists that standards to describe legal documents are necessary in order to achieve interoperability, automated life cycle management and efficient reuse of information. But what are the requirements these standards must meet?

A first obstacle to overcome is the legacy of existing legal texts already organised according to certain systems, which may or may not be compatible with the newly developed standard. In the case of Switzerland, the 27 cantons each have their own distinct legal classification system. On top of this, there are four official languages to take into account. As Urs Paul Holenstein from the Swiss Federal Government presented, this problem can only be solved by using a common schema on a conceptual level, which provides enough latitude for differing solutions on the more practical level. The Danish government is taking a similar approach by developing a meta schema composed of generic building blocks that can be refined for use in particular applications, and refined even more for specific document type schemes.

The existing legal texts must be structured and contextualised. This task could be performed manually, but the investment in time and money would be prohibitive. The 'Norme in Rete' project developed several tools to automate this task. A cross-reference parser was implemented to automatically recognize references to other legal documents. An automatic provisions classifier was designed to classify the provisions of the law and add meta data according to the analytical meta data scheme. Once the links between provisions have been identified, they must be recorded in a robust way independent of the physical location of the files. The 'Norme in Rete' project solves this by giving each norm a Uniform Resource Name. Upon each request, the URN must be translated into an URL by a directory server.

TOWARDS THE LAW WIDE WEB

The results of ongoing projects are promising, but there is still a long way to go before a pan-European network of legal databases emerges. Hopefully, one day there will be a 'law wide web' where it is possible to navigate seamlessly from one norm to the next by following the links between nodes. One thing is clear from all the above initiatives. We will need largely the support of artificial intelligence tools to automatically structure existing and perhaps new law texts and to consistently assign metadata to the texts, otherwise the whole initiative will have difficulty to survive.

See www.lri.jur.uva.nl/standards2003 for the presentations.

ANNOUNCEMENTS

Theoriedag 2004 van de NVTI

5 maart 2004, Utrecht

Het is ons een genoegen u uit te nodigen tot het bijwonen van de Theoriedag 2004 van de NVTI, de Nederlandse Vereniging voor Theoretische Informatica die zich ten doel stelt de theoretische informatica te bevorderen en haar beoefening en toepassingen aan te moedigen. De Theoriedag 2004 zal gehouden worden op vrijdag 5 maart 2004, in Vergadercentrum Hoog Brabant te Utrecht, gelegen in winkelcenrum Hoog Catherijne, op enkele minuten loopafstand van CS Utrecht, en is een voortzetting van de reeks jaarlijkse bijeenkomsten van de NVTI die negen jaar geleden met de oprichtingsbijeenkomst begon.

Evenals vorige jaren hebben wij een aantal prominente sprekers uit binnen- en buitenland bereid gevonden deze dag gestalte te geven met voordrachten over recente en belangrijke stromingen in de theoretische informatica. Naast een wetenschappelijke inhoud heeft de dag ook een informatief gedeelte, in de vorm van een algemene vergadering waarin de meest relevante informatie over de NVTI gegeven zal worden, alsmede een

presentatie door dr. M. Kas (NWO/EW), die informatie zal verstrekken over de diverse subsidieprogramma's van NWO voor de informatica.

PROGRAMMA

09.30-10.00	Ontvangst met koffie
10.00-10.10	Opening
10.10-11.00	Prof.dr. U. Schoening (University of Ulm): *Algorithms for satisfiability testing*
11.00-11.30	Koffie
11.30-12.20	Dr. P. Gruenwald (CWI): *Two theories of information: Shannon & Kolmogorov*
12.20-12.50	Dr. M. Kas (NWO/EW): *De omgekeerde wereld. Over de informaticaplannen van het NWO-gebied Exacte Weten-schappen*
12.50-14.10	Lunch
14.10-15.00	Prof.dr. S. Abramsky (University of Oxford): titel nog niet bekend
15.00-15.20	Thee
15.20-16.10	Prof.dr. J. van Benthem (UvA, Stanford University): *Games, logic and computation*
16.10-16.40	Algemene ledenvergadering NVTI

LIDMAATSCHAP NVTI

Alle leden van de voormalige WTI (Werkgemeenschap Theoretische Informatica) zijn automatisch lid van de NVTI geworden. Aan het lidmaatschap zijn geen kosten verbonden; u krijgt de aankondigingen van de NVTI per email of anderszins toegestuurd. Was u geen lid van de WTI en wilt u lid van de NVTI worden: u kunt zich aanmelden bij Susanne van Dam (susanne@cwi.nl), met vermelding van de relevante gegevens (naam, voorletters, affiliatie indien van toepassing, correspondentieadres, email, URL, telefoon-nummer).

STEUN

De activiteiten van de NVTI worden mede mogelijk gemaakt door de ondersteuning (financieel en anderszins) van de volgende instellingen: NWO/EW, CWI, Onderzoeksscholen IPA en SIKS, Elsevier Science B.V.

TWO THEORIES OF INFORMATION: SHANNON AND KOLMOGOROV

Peter Grunwald

We introduce, compare and contrast the theories of Shannon information and Kolmogorov complexity. We investigate the extent to which these theories have a common purpose and where they are fundamentally different. We discuss the fundamental relations 'entropy = expected Kolmogorov complexity' and 'Shannon mutual information = expected algorithmic information'. We show how 'universal coding/modeling' (a central idea in practical data compression) may be viewed as a middle ground between the two theories, and how it leads to the 'minimum description length principle', a practically useable theory for statistical inference with arbitarily complex models (Joint work with P.M.B. Vitanyi).

GAMES, LOGIC AND COMPUTATION

Johan van Benthem

Games are a natural model for interaction and communication. Logic and games go well together, witness the widespread use of 'logic games' for argumentation, semantic evaluation, or model comparison. But the connection runs more deeply. Logic provides a natural fine-structure to game theory. In particular, both strategic and extensive game forms look like models that logicians are used to in studies of actions, knowledge, and belief revision. We will show how key issues in analyzing games link up with recent work in modal logics of knowledge, communication and action. Our examples are (a) reasoning about strategic equilibrium, (b) information update during a game, and (c) revision of expectations about the future.

ALGORITHMS FOR SATISFIABILITY TESTING

Uwe Schoening

Despite its NP-completeness, designing good satisfiability testing algorithms (SAT solver) has a lot of practical applications. Such SAT solvers use various heuristics which make them hard to analyze theoretically. We present a couple of theoretically well understood algorithms for k-SAT. It was especially realized during the last years that certain probabilistic algorithms can have better running times than the best known deterministic ones.

DECIS Colloquia

March 25, 2004, Delft

The Decis lab in Delft organizes a monthly colloquium. The colloquia take place at the DECIS lab, Delftechpark 24, 2628 XH Delft. More info on DECIS can be found at www.decis.nl.

ERRONEOUS PLANNING, SENSE-MAKING, AND COMMAND & CONTROL

Prof.dr. Tim Grant, University of Pretoria, Atos Origin
March 25, 2004, 15.00-17.00

It can be safely said that the overwhelming majority of all plans generated contain errors. Spectacular failures of plans during execution are fortunately rare. More frequently, plans have to be modified at execution time because some piece of information on which the plan was based has changed in the meantime. Indeed, in some domains change is so endemic that people say: "the only constant is change". Less visibly, planners are continually generating improved versions of plans before the final version is approved for execution. Clearly, all the discarded earlier versions must have been erroneous.

Despite the prevalence of erroneous plans there has been surprisingly little study of them. In the AI planning literature few authors admit to errors in their plans, and those that (sheepishly but creditably) do own up to making errors tend to diminish their importance. For example, in his classic *Principles of AI* Nilsson (1980, p.352) mentions a "contradictory state description [that] causes no problems". Those techniques that have been developed to handle errors - such as reactive planning, conditional planning, continuous planning, execution monitoring, interleaving planning and execution, and plan repair – appear to be chiefly concerned with bypassing the error or getting rid of it as quickly as possible. The psychological literature distinguishes slips (erroneous actions) and mistakes (erroneous plans), but has focused exclusively on human erroneous action.

By contrast, Professor Grant argues that erroneous plans and erroneous planning processes are legitimate objects of study. The motivation is that not only are they academically interesting, but also that they have important practical consequences. Interesting research questions include investigating the causes of errors in plans, predicting their likely impact, developing techniques for detecting, isolating, diagnosing and recovering from errors in plans, and comparing erroneous planning with other error-prone processes, like knowledge acquisition for expert systems, programming conventional software, and even designing hardware and organisations. Professor Grant's research has centered on faulty domain models.

In his presentation, Professor Grant will describe erroneous planning, outline a research programme, summarise the key results of his research to date, and make the links to knowledge engineering, to sense-making in organisations – a red-hot topic after the 9/11 attacks – and to extending the OODA model for command and control.

SELF-ORGANISATION OF SOCIAL BEHAVIOUR IN ANIMALS

Dr. Charlotte Hemelrijk, RU Groningen
April 27, 2004, 15.00-17.00

Abstract not yet available.

ToKeN2000 Workshop 2004

March 26, 2004, Groningen

The 2004 workshop of the interdisciplinary NWO research programme ToKeN2000 takes place at March 26, 2004 at De Nieuwe Academie building in Groningen. The workshop is organised by NWO and the AI Institute of the RU Groningen.

The day will consist of talks and poster presentations and is intended to review and discuss the latest developments within the ongoing ToKeN2000-projects as well as future plans.

The organizing committee is happy to announce the invited speaker of the workshop, Prof. Anthony Jameson. Prof. Jameson is a principal researcher in the Intelligent User Interfaces department of the German Research Center for Artificial Intelligence (DFKI) and adjunct professor for human-computer interaction at the International University in Germany. He has been active in the areas of artificial intelligence and cognitive science. In his presentation he will focus on the consequences of the rapid developments in small mobile systems for user-system communication and the use of adaptive agents: topics; which are at the core of the ToKeN2000 research programme.

For more information about ToKeN2000 in general or the workshop in particular, please contact the

programme coordinator, Dr.ir. Christiane Klöditz (e-mail: token2000@nwo.nl).

PROGRAMME

10:30	Registration and welcome with coffee/tea
11:00-11:15	Opening by Jaap van den Herik, UM, Chairman Programme Commitee ToKeN2000
11:15-12:00	Keynote presentation: *Intelligent Mobile Companions: New Assistance or Nuisance?* Prof. Anthony Jameson, German Research Center for Artificial Intelligence (DFKI) and International University in Germany
12:00-12:15	Coffee/Tea Break
12:15-12:35	*User-centered intelligent content-based image retrieval (EIDETIC)*, E.L. van den Broek, NICI/KUN
12:35-12:55	*Vascular Reconstruction Procedure: Simulated and Real. First Lessons of User Profiling (DIME),* E. Zudilova, UvA
13:00-14:00	Lunch
14:00-15:00	Poster session
15:00-15:20	*Uncertainty, Causality and Medical Decision Support (TIMEBAYES)*, T. Charitos, UU
15:20-15:50	*Administrative Normative Information Transaction Agents (ANITA)*, W. Teepe, RUG
15:50-16:10	*CHIME - Cultural Heritage in an Interactive Multimedia Environment,* F. Nack, CWI
16:10-16:30	Coffee/Tea Break
16:30-16:50	*Agent-Based Support for Physicians (MIA)*, F. Wiesman, IKAT/UM
16:50-17:10	Closing remarks, Chair of the conference
17:15	Reception

Current Developments in Answer Set Programming

April 1, 2004, Leuven

On April 1 2004, Nikolay Pelov, Ph.D. student in the research group Declaratieve Talen en Artificiele Intelligentie (DTAI) of the Departement of Computer Science of the KU.Leuven, will defend his Ph.D. thesis titled *Answer Set Programming with Aggregates and Open functions*.

On the same day, two prominent researchers from the area of Nonmonotonic Reasoning and Logic Programming, both members of the jury of Mr. Pelov, will present their latest research. Professor Mirek Truszczynski of the University of Kentucky will give a seminar on *Logic programs with abstract constraint atoms*. Professor Michael Gelfond, from Texas Tech University, will give a talk *Probabilistic Reasoning with Answer Sets*. The event is open and free. Anybody with an interest in these topics is most well-come to attend. More information about this event will be made available on the web page http://www.cs.kuleuven.ac.be /~pelov/asp.html.

Let's Fight! ... But Only on a Computer Screen

May 6, 2004, Delft

Let's confine battles to where they should be: inside computer. Equip your tank with a smart Java control program and send it out into virtual blue. Join the fun and games... there's a drink afterwards!

RULES

With respect to the game-setup:
- 800x800 playfield size
- teams only, with 5 robots per team
- 2 teams head-to-head
- 10 matches per duel
- winner stays
- no cheating, no spawning multiple threads;sources will be checked afterwards!

DATES

Combat time: May 6, 2004 at the DECIS Lab
Application: until end of March 2004
For application, please send an email to info@decis.nl, subject 'Application Robocode'.

PRIZES

The winner of this great event will undoubtedly have obtained eternal respect, fame and glory; and to commemorate that also a winner's cup. Everybody else will have learned much about multi-agent cooperation and machine teamwork.

LINKS

Download Robocode from its own website at IBM. The tutorials *Rock 'em, sock 'em, Robocode!* and *Rock 'em, sock 'em, Robocode, Round 2* provide an excellent overview of programming Robocode.

MORE INFORMATION

Contact Jeroen de Jong or Filip Miletic or send a mail to info@decis.nl.

Computers and Games 2004

July 5-7, 2004, Ramat-Gan, Israel

The biennial Computers and Games conference series is a major international forum for researchers and developers interested in all aspects of artificial intelligence in computer game playing. After two terms in Japan, one in North America, the fourth conference will be held in Israel. The conference will take place on July 5-7. The Bar-Ilan University will act as host and organize the CG'04 conference together with the 12th World Computer Chess Championship and the 9th Computer Olympiad.

TOPICS OF INTEREST

Relevant topics include, but are not limited to:
- the current state of game-playing programs
- new theoretical developments in game-related research
- general scientific contributions produced by the study of games
- AI techniques applied to games, such as machine learning, heuristic search, knowledge representation, data-mining, and path finding
- social aspects of computer games, cognitive research on how humans play games, and issues related to networked games

PAPER SUBMISSION

The conference proceedings will be published by Springer-Verlag in the Lecture Notes in Computer Science series. The authors of the best papers will also get the opportunity to publish extended versions of their papers in the International Journal of Intelligent Games & Simulation (commercial games), and the International Computer Games Association Journal (classic games). All submitted papers are refereed. Accepted papers will be presented at the conference and printed in the conference proceedings.

IMPORTANT DATES

Deadline for paper submissions: March 1, 2004
Accept/Reject notifications sent to author: March 31, 2004
Camera ready: May 1, 2004
Early registration deadline: June 1, 2004

PROGRAMME CHAIRS

Jaap van den Herik
Yngvi Björnsson
Nathan Netanyahu

INFORMATION

Email: M.Tiessen@cs.unimaas.nl or cg2004@ru.is
Homepage: http://www.ru.is/cg2004

Third International Conference on Entertainment Computing

September 1-3, 2004, Eindhoven

We invite you to participate at the 3rd International Conference on Entertainment Computing at the TU Eindhoven. Based on the very successful first international workshop and the second international conference, the next ICEC'04 has been set up as an international forum to exchange experience and knowledge among researchers and developers in the field of entertainment computing. Research papers, demonstrations and case studies are invited that present scientific ideas or improvements to existing techniques in the broad multi-disciplinary field of entertainment and edutainment applications.

SUGGESTED RESEARCH TOPICS

- Advanced interaction design, e.g. haptic interfaces
- Art, design and media
- Augmented, virtual and mixed reality
- Avatars and virtual action
- Computer games and game based interfaces
- Education, training, and edutainment technologies
- Evolutionary platforms / hardware
- Graphics techniques
- Human factors of games
- Human sciences and entertainment
- Interactive digital storytelling, and interactive TV
- Simulation applications of games, and military training
- Mobile entertainment; mobile phones
- Narrative environments and virtual characters
- Networking
- New genres, new standards
- Novel hardware devices
- Robots and pets
- Social computing and presence
- Sound and music
- Sport and entertainment
- Video games

Case studies are invited from any entertainment and edutainment application, including: Computer

Games, E-Commerce, E-Learning, Home Entertainment, Authoring, Media System Design, Cultural Heritage, Event-Marketing.

IMPORTANT DATES

Full Papers (8-12 pages):
Deadline Submission: March 22, 2004.
Notification of Acceptance: June 15, 2004.

Short papers, case studies, demonstrations (4-6 pages):
Deadline Submission: June 22, 2004.
Notification of Acceptance: June 30, 2004.

Camera ready version for all submission categories: July 4, 2004.

INFORMATION

http://www.ipo.tue.nl/homepages/mrauterb/conferences/ICEC-2004.htm

Sixth International Conference on Cellular Automata for Research and Industry

October 25-28, 2004, Amsterdam

Cellular Automata, in spite of their apparent simplicity represent a very powerful approach to study spatio-temporal systems in which complex phenomena build up out of many simple local interactions. They often provide solutions to real problems for which other, conventional approaches fail.

John von Neumann, who is recognized as the father of cellular automata, would have been a hundred years old in 2004. ACRI 2004 wants to commemorate this important date by inviting researchers to submit contributions related to von Neumann's work or to the emergence of organisation in systems in which collaboration between components wins over the individual behaviour.

The goal of this conference is to collect contributions concerning Cellular Automata in various fields such as theory, implementations and applications.

INVITED SPEAKERS

Prof. Toffoli (in view of the von Neumann 100th anniversary memorial session)
Prof. P. Hogeweg
Prof. J. Crutchfield
Prof. James A. Glazier
Prof. Andrew Adamatzky
Prof. Vollmar
Prof. Zafer Gürdal

ORGANIZING COMMITTEE

Chair: P.M.A Sloot,Universiteit van Amsterdam
Co-Chair: B. Chopard, University of Geneva
Local Organization: A.G. Hoekstra, Universiteit van Amsterdam

IMPORTANT DATES

Paper submission: May 10
Notification of acceptance: June 7
Camera ready version: July 1
Registration deadline: July 1
Conference: October 25-27

We welcome contributions related to the following domains:
- Complex systems, emergent behaviour versus local behaviour
- Environment: pollution models, biomass evolution, desertification, erosion processes, landslides
- Biological systems: ecological models, species evolution, immune systems, contamination processes, artificial life
- Socio-economical models: (vehicular and pedestrian traffic, urbanism, social models, economical and financial processes
- Tools and theory: new algorithms based on CA, theory of computation, CA environments, parallel cellular computing
- Modelling of physical or chemical systems: hydrodynamics, reaction diffusion systems, complex flows

INFORMATION

http://www.science.uva.nl/research/scs/events/ACRI2004/

Second European Symposium on Ambient Intelligence

November 8-10, Eindhoven

Ambient Intelligence represents a vision of the future where we shall be surrounded by electronic environments, sensitive and responsive to people. Ambient intelligence technologies are expected to combine concepts of ubiquitous computing and intelligent systems putting humans in the centre of

technological developments. Ambient Intelligence represents a long-term objective for European research bringing together researchers accross multiple disciplines: computer science, electronics and mechanical engineering, design, architecture, social sciences, software engineering, to name a few.

Following a successful first event last year, the 2nd European Symposium on Ambient Intelligence will be held in Eindhoven, on November 8-10, 2004. It aims to provide a venue for an emerging multi-disciplinary community of researchers that work on Ambient Intelligence.

KEYNOTES

Ted Selker (MIT Media Lab, USA)
Tom Rodden (Univeristy of Nottingham, UK)

TOPICS

- Ubiquitous computing: wired, wireless and ad-hoc networking, discovery mechanisms, software architectures, system integration and prototyping, portable devices
- Context Awareness: sensors, tracking and positioning, smart devices, wearable, models of context of use, software architectures for multi platform interfaces
- Intelligence: learning algorithms, user profiling, personalisation and adaptivity, recommenders, autonomous intelligence, agent based user interfaces
- Natural user-system interaction: ambient interfaces, multimodal interaction, innovative interaction styles and concepts

IMPORTANT DATES

Full Papers (up to 12 pages), workshop proposals, tutorials: May 10, 2004
Short Papers (up to 4 pages), Posters: June 28, 2004

INFORMATION

Homepage: http://www.eusai.net

CONFERENCES, SYMPOSIA WORKSHOPS

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

MARCH 14-17, 2004
The 19th ACM Symposium on Applied Computing (SAC 2004). Nicosia, Cyprus.
http://www.acm.org/conferences/sac/sac2004

MARCH 17-18, 2004
Action in Language, Organisations and Information Systems. The 2nd International Conference (ALOIS 2004). Linköping, Sweden.
http://www.vits.org/konferenser/alois2004/

MARCH 17-19, 2004
The 16th IFIP International Conference on Testing of Communicating Systems. Oxford, United Kingdom.
http://www.testcom2004.org/

MARCH 25-27, 2004
The 5th WSEAS Int.Conf. on Fuzzy Sets and Fuzzy Systems (FSFS '04) and on Neural Networks and Applications (NNA '04) and on Evolutionary Computation (EC '04), Udine, Italy.
http://www.wseas.org

MARCH 28, 2004
Workshop on Constraint Programming and Constraint for Verification (CP+CV'04). Barcelona, Spain.
http://www.disi.unige.it/person/DelzannoG/CP+CV

APRIL 5-7, 2004
2nd European Workshop on Evolutionary Music and Art. (evoMUSART2004). Coimbra, Portugal.
http://evonet.dcs.napier.ac.uk/eurogp2004/

APRIL 26-30, 2004
Mexican International Conference on Artificial Intelligence. Mexico City, Mexico.
http://gsidom.iie.org.mx/micai2004.html

MAY 25, 2004
Workshop on Directions in Software Engineering Environments (WoDiSEE2004). Edinburgh, United Kingdom.
http://www.cs.auckland.ac.nz/~herm/WoDiSEE2004

MAY 26-28, 2004
Seventh International Workshop on Deontic Logic in Computer Science (DEON04). Madeira, Portugal.
http://www.dcs.kcl.ac.uk/events/deon04/

JUNE 2-5, 2004
Ninth International Conference on the Principles of Knowledge Representation and Reasoning (KR2004). Whistler, Canada.
http://www.kr.org/

JUNE 7-9, 2004
The second International Industrial Simulation Conference (ISC2004). Malaga, Spain.
http://biomath.ugent.be/~eurosis/conf/isc/isc2004/index.html

JUNE 19-23, 2004
The 2004 Congress on Evolutionary Computation, Portland, USA.
http://cec2004.org/home

JUNE 21, 2004
First International Workshop on Coordination and Petri Nets (PNC04). Bologna, Italy.
http://www.cs.unibo.it/atpn2004/

JUNE 27 - JULY 2, 2004
IEEE Workshop on Real-Time Vision for Human-Computer Interaction (RTV4HCI). Washington DC, USA.
http://www.delphi.com/news/call_papers/cvpr2004

JULY 4, 2004
The 5th International Workshop on Strategies in Automated Deduction (STRATEGIES 2004). Cork, Ireland.
http://www-leibniz.imag.fr/~boydelat/Strategies04/

JULY 4-8, 2004
Second International Joint Conference on Automated Reasoning (IJCAR 2004). Cork, Ireland
http://4c.ucc.ie/ijcar/

JULY 5-7, 2004
Third International Workshop on SOCIAL INTELLIGENCE DESIGN (SID 2004). Enschede, the Netherlands.
http://parlevink.cs.utwente.nl/sid04.html

JULY 19-20, 2004
AAMAS 2004 Workshop on Agent Communication (AC2004) New York, USA.
http://www.cs.uu.nl/people/rogier/AC2004/

JULY 19-23, 2004
12th International Conference on Conceptual Structures (ICCS 2004): Conceptual Structures at Work. Huntsville, Alabama.
http://concept.cs.uah.edu/

JULY 25-29, 2004
Nineteenth National Conference on Artificial Intelligence. San Jose, USA.
http://www.aaai.org/Workshops/2004/ws-04.html

JULY 29 - AUGUST 5, 2004
16th International Conference on Systems Research, Informatics and Cybernetics (InterSymp-2004). Baden-Baden, Germany.
http://www.iias.edu

AUGUST 09-20, 2004
The Student Session of the 16th European Summer School in Logic, Language and Information (ESSLLI-2004). Nancy, France.
http://esslli2004.loria.fr/

AUGUST 22-27, 2004
Sixteenth European Conference on Artificial Intelligence (ECAI 2004). Valencia, Spain.
http://www.dsic.upv.es/ecai2004/

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