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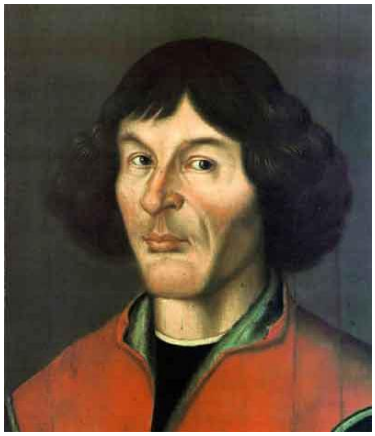
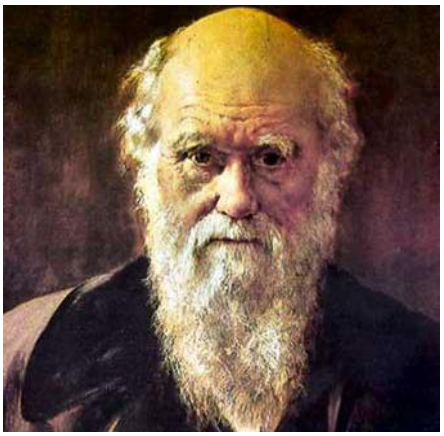
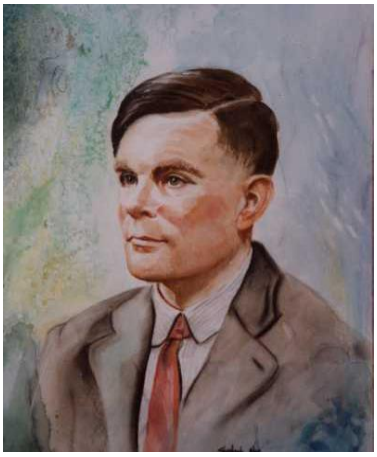
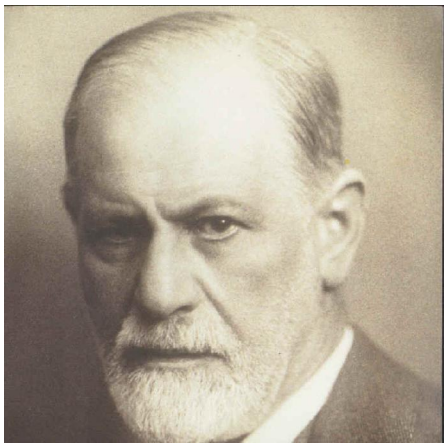








The Fourth Revolution?

Thomas Reid, the Veil of Perception

Formal Models of Norm Change

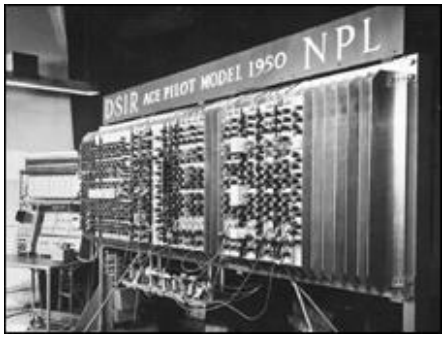
News from the Benelux Association for Artificial Intelligence

Ace

Editor-in-chief

The BBC News publishes a series on British computer pioneers and pioneering British computers. The most recent contribution tells the story of Alan Turing and the Ace computer, which brought together a team who would go on to design the technology that underpins the internet.

At the end of World War II Alain Turing started the design of a completely different type of computer. His work, first private and then at a new post at the National Physical Laboratory (NPL), resulted in an (for many years) unpublished report in March 1946 containing detailed plans for the Automatic Computing Engine (Ace). Since the NPL engineers and scientists blanched it as too complex, they decided to build a smaller machine, Pilot ACE. When Turing left NPL shortly after for a sabbatical at Cambridge, it fell to Jim Wilkinson, Harry Huskey and, later on, Donald Davies to get on with the construction. The machine ran for the first time on May 10, 1950. By modern standards it was sluggish but in its day was the fastest in the world.



The Pilot Ace machine.

One of the biggest problems of the Ace computer was how to deal with the accuracy problem. When doing decimal calculations, conversions to digital were not exact, resulting in inaccurate results. It was mainly Jim Wilkinson's contribution to develop algorithms that produced accurate results. In fact the worldwide Numerical Algorithms Group (NAG) builds upon his work. Unluckily Wilkinson's fame went largely overshadowed by Turing's. But if Jim Wilkinson hadn't done this work and if the NAG organization hadn't continued taming the accuracy problems inherent in decimal point calculations in binary code it is highly doubtful that AI researchers could be doing the work that they are doing today. In 1970 he received the Turing Award "for his research in numerical analysis to facilitate the use of the high-speed digital computer, having received special recognition for his work in computations in linear algebra and 'backward' error analysis." This also was the year that the NAG group was founded as an inter-university activity, with Wilkinson's support, which means that NAG will celebrate its 40th birthday this year.


James Hardy (Jim) Wilkinson.

Another NPL pioneer, Donald Davies, also cut his teeth on the Ace. He joined NPL at the same time as Jim Wilkinson and was, for a while, Turing's assistant. Much later, when he was head of the computer section at NPL, he did ground-breaking work on the best way to organise computer networks. Davies realised that the time gaps in data communication could be used. By splitting data into packets and threading them on the same line, the carrying capacity of that link could be boosted and the whole network made more powerful. This idea of 'packet switching' certainly was at the base of the internet invention.


Donald Watts Davies.

And now for something completely different: I'm very pleased to introduce a new section in your newsletter, the section "AI & Industry", with section editor Koen Hindriks. Starting from the next issue we hope to have regular contributions in this section, showing the use of AI in industry and the stimuli from industry to AI. If you are interested in contributing to this section, please contact Koen Hindriks (see the back site of this newsletter for contact details). As a coincidence, supporting the introduction of this new section, I stumbled on a new website, Research and Practice.com, which aims at closing the gap between academia and industries in general. To quote them: "This web site aims to bring together the research and the industrial communities, to enable them to learn from one another." The website is clearly still under construction, but as a first example, they included the well-known Vehicle Routing Problem at their site. Well worth having a look at.

The BBC story on the Ace computer: **http://news.bbc.co.uk/2/hi/technology/8498826.stm**
The Numerical Algorithms Group (NAG): **http://www.nag.co.uk/**
The vehicle routing website: **http://www.researchandpractise.com/vrp/**

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Front cover: The initiators of the four caesurae in the history of ideas: clockwise, starting from the upper left: Nicolaus Copernicus, Charles Darwin, Sigmund Freud, and Alan Turing (see Richard Starmans' article *The Fourth Revolution?* on pp. 5-6 of this issue).

The deadline for the next issue is: **April 1, 2010**.

BNVKI-Board News

Antal van den Bosch

A large amount of snow lies between the previous "News from the Board" and this one. I noted snowfall then and behold, it is now March, and the snow is still falling. Weathermen remind us that the winter of 1979 was still worse, however. To us AI researchers, an easy analogy with the "AI winter" comes to mind, that raged around 1979. Is the current world-wide crisis affecting AI as much as it affects so many other areas? I leave this question for speculation, yet I hope for the best.

The board is happy to have been awarded a grant from NWO Exact Sciences for BNAIC-2010. NWO has been a staunch and steady supporter of our association and our conference. Their grant programme on "Incidental support for special events" helps associations like ours to uphold a presence in the "local" sphere, to allow the field to remain connected with geographically close colleagues in a world that has otherwise become highly international and increasingly virtual – to the better of the field of course, but we are all quite convinced by experience how valuable local events such as BNAIC remain.

Let's hope we can wave the last snow goodbye soon – winter is over!

The AI Winter on Wikipedia: http://en.wikipedia.org/wiki/AI_Winter.

Thomas Reid, the Veil of Perception, and the Pillars of AI

Richard Starmans
Utrecht University

It is not to be expected that the 300th birthday of the 18th century Scottish philosopher Thomas Reid (1710-1796) will receive disproportional media-attention in 2010. He even seems a little forgotten today, but in the 18th and 19th century he was hardly less prominent than his famous contemporary and compatriot David Hume. With his philosophy of common sense he fought the prevailing epistemic views of his era, if not a mainstream tradition in western philosophy. He deeply influenced C.S. Peirce and the pragmatist movement of the 19th century, and more importantly, his ideas lie behind much of nowadays research in Artificial Intelligence.

Portrait of Thomas Reid by Sir Henry Raeburn, 1796.

Thomas Reid owes much of his prestige to the fact that he severely criticized famous predecessors and contemporaries, such as the rationalist philosopher Descartes and the empiricist philosophers Locke, Berkeley and Hume. Encouraged by the successes of the natural sciences in understanding the "outer world", these philosophers started scrutinizing the "inner world", focusing on perception, mental representations and developing "theories of ideas". According to Reid they all, each in his own way, wrongly placed perceptions and mental representations between the objects in reality and the subjects who perceive this reality, thus creating an unnecessary gap between subject and object, inner and outer world, causing paradoxes, solipsism or skepticism. Some mistrusted the senses or at least part of the sensorial input (Descartes), or made experiences of color, taste and sound "secondary" to real or "primary" properties of the world (Locke). Others claimed that material objects in the outer world didn't exist, were not mind-independent (Berkeley), or in fact not-knowable to the subject (Hume). At the best, reality remained hidden behind a "veil of perception".

By contrast, Reid embraced a direct realism, that precedes more sophisticated positions in the Scientific Realism Debate today. There is an external world, which is knowable and our ideas do not close the way to the "outside", but open it correctly. God has given mankind some mechanisms to knowledge that we can rely on, such as the principle of induction and the ability to see some self-evident truths. These and other "axioms" were proposed and elaborated by Reid, building up a theory of common sense that accounts for the fact that we have sensations, as a part of our sensus communis, which is not only a precondition for humans to reason with each other rationally, but also a sufficiently reliable basis for philosophical analysis. But Reid did more than just combating the

spirit of the times. He opposed an entire tradition that dominated the history of Western ideas since the pre-Socratics and that has reached a peak in contemporary naturalistic / physicalist epistemology. In this tradition the world has lost much of its intuitive and familiar nature; our everyday experiences, as well as the concepts and natural categories we use to explain these experiences and to understand ourselves, have few in common with the underlying mechanisms, abstract principles and laws, that govern the "real" world, studied by science and described with the scientific vocabulary.

Another contemporary of Reid, Immanuel Kant came up with a solution, or rather a compromise. Indeed, he created a "gap" himself by postulating a real, but inaccessible noumenal reality and a knowable phenomenal reality, constituted by the knowing subject itself with "Anschauungsformen" of time and (Euclidean) space, and categories such as causality, necessity and other prerequisites for having any experience at all. Yet, it is this phenomenal world that is actually studied in the physical sciences, and therefore the aforementioned "common-sense categories" are valid by definition. In fact, they even make pure "synthetic knowledge apriori" possible in mathematics, science and philosophy. However, this "solution" didn't remain undisputed for long. In the nineteenth century non-Euclidean geometry was developed, at the turn of the century the theory of relativity explained absolute time and space problematic if not untenable, and even worse, the famous Copenhagen Interpretation of quantum mechanics cracked our intuitive notion of causation as a Kantian building block of reality.

The gap deepened in the 20th century, especially since the rise of philosophy of mind and the neurosciences. Paul Churchland notoriously attacked a tradition which is sometimes pejoratively labeled as folk psychology: people try to understand, explain and predict the behavior of themselves and others in terms of (causally relevant) factors such as motives, intentions, beliefs, morals and abilities. Churchland advocates a radical "eliminative materialism" in these matters, claiming that the whole idea of folk psychology, including the concept of consciousness, fully misrepresents the human mind and its internal processes. Progress in neuroscience will lead to its elimination in the end.

Despite the dominance of naturalist philosophy and Churchland's eliminative materialism, the idea of common sense – albeit in different guises – appeared persistent and successful in the project of AI from the very start. The intuitive concepts and categories we use to understand our environment and ourselves, to represent our knowledge, and to reason with it, are encoded and exploited in intelligent systems, rather than being suppressed or eliminated. Founding father John McCarthy published his seminal paper *Programs with common sense* in 1958 and introduced his famous Advice Taker, a milestone in knowledge representation / symbolical AI. Another good example is the area of qualitative reasoning. It uses the fact that people reason about the world that surrounds them with only common-sense notions of time and space, force, movement and acceleration, without the use of numerical information or solving differential equations, and implements these concepts in systems for common-sense reasoning. Patrick Hayes' Naïve Physics Manifesto (1978) highlights this tradition. Also noteworthy are the CYC-project that attempts to develop a wide-ranging knowledge base and ontology of everyday knowledge to perform human-like reasoning, and more recently the Open Mind Common Sense project was launched at MIT in 1999. But, no doubt the most pervasive example in AI is the subfield of (multi-)agent systems, where agents operate "autonomously" in a complex environment, have mental states with beliefs, desires and intentions, and are even supposed to show moral behavior and emotions. The idea that the behavior of a system is explained and understood in terms of intentional subjects, is not only in full accordance with the aforementioned folk psychology, but in a way it even restores or revaluates such ideas as Aristotelian teleology, that were banned since the Scientific Revolution in the 17th century.

Of course the idea of common sense has many uses and connotations that were not covered or foreseen by Reid. But, despite the fact that AI is still troubled by the sometimes overemphasized Cartesian body and mind problem, and Churchland's eliminative materialism undoubtedly has become influential as well, the tradition that was driven and continued by Reid, is highly relevant today and particularly this year a modest attention for his legacy seems justified.

The Fourth Revolution?

Richard Starmans
Utrecht University

In his paradigm theory Thomas Kuhn stressed the importance of discontinuity and "revolutions" in the history of the natural sciences. Michel Foucault did more or less the same for the humanities with his "archaeological" method. Both showed that history

has crucial events, periods of radical change, that forced mankind to rethink his own fundamental nature, his position in the cosmos, responsibilities and identity. Both seek to identify and depict these fundamental caesurae in the history of ideas. The Italian philosopher Luciano Floridi marks the rapid rise of IT and ICT as such a caesura. In fact, he postulates a Fourth Revolution, initiated by the British mathematician and philosopher Alan Turing. First, the Copernican Revolution taught us that we are not stationary at the center of the universe. Then, the Darwinian Revolution caused a radical break with our familiar conceptions of the human species and its origin. Thirdly, the Freudian revolution taught us that we are far from completely transparent to ourselves. According to Floridi, ICT makes us realize that we are not an isolated entity, but informational organisms (inforgs), inhabiting with other (possibly artificial) agents a common living environment, called the "InfoSphere", which is essentially made of information. The moral challenges caused by ICT call for a reconsideration and recalibration of many traditional metaphysical and ethical insights.

Floridi presented these and other ideas during the five-day international LORENTZ workshop, "The Philosophy of Information and Computing Sciences", that took place at Leiden University from February 8-12, 2010. Currently, Floridi is considered one of the leading philosophers in the field of Information and ICT. Among other things, he holds the UNESCO Chair in Information and Computer Ethics and is chairman of the International Association for Computing and Philosophy (IACAP). Initiator and organizer of the workshop, the Dutch computer scientist Jan van Leeuwen, had succeeded to attract a large number of prominent experts in the field of philosophy and the foundations of computer science and ICT. The workshop focused on the foundations of the multidisciplinary field of IT, but also very strongly on the relationship between the philosophy of computer science and philosophy in general. What are the fundamental questions of the field? What are the key paradigms and how do they develop? What is the position of IT among the other sciences? What progress has the philosophy of information made in addressing these issues?

Many approaches were discussed: from theoretical computer science and the philosophical reflection on such notions as "computability" and "complexity" to ethical issues concerning social networking and virtual reality. From Philosophy of ICT as a form of Philosophy of Technology to sense and nonsense of the Project of Artificial Intelligence. Among others, the Dutch logician Johan van Benthem demonstrated which role logic can play in developing a unifying theory of information, Barry Cooper analyzed the recalcitrant philosophical concepts of causality and determinism from the perspective of a computer scientist, and ethicist Charles Ess explained how digital media may lead to a new perspective on personal identity, society and even religion or spirituality. Unsurprisingly, there was ample consideration for the Philosophy of AI, especially for the paradigm of multi-agent systems, where agents 'autonomously' act in a complex, changing environment, have 'mental' states (beliefs, desires and intentions) and are even assumed to show moral behavior and emotions.

To get an impression of current philosophical reflection on the Fourth Revolution, you can visit the website of the Lorentz Center. All presentations are available at http://www.lorentzcenter.nl/lc/web/2010/374/info.php3?wsid=374

Formal Models of Norm Change

January 18-19, 2010

Davide Grossi, Jan Broersen, and Leon van der Torre

After the first successful edition held in 2007 at the University of Luxembourg, the second edition of the workshop "Formal Modes of Norm Change" has been held this year on 18th-19th January under auspices of the University of Amsterdam and Utrecht University, in the historical Doelenzaal of the University Library in Amsterdam. This second edition of the workshop has brought together, for two days, several researchers interested in norm change and active in neighboring research fields such as philosophy, computer science, artificial

intelligence, and theory of law. The aim of the workshop was to foster the interaction between these research fields on the common topic of norm change and, in general, on topics related to the dynamics of evaluative and deontic notions such as preferences, obligations, permissions, and rights.

The organising trio: from left to right, Davide Grossi, Leon van der Torre, and Jan Broersen.

The program of the workshop contained four groups of talks. The first group focused on highlighting similarities as well as differences between the dynamics of norms and the dynamics of informational attitudes such as belief and knowledge, the latter being a well-established object of research in the fields of belief revision and dynamic epistemic logic. After the first talk *What is Norm Change?* by Leon van der Torre (University of Luxembourg), Gabriella Pigozzi (University of Luxembourg) and Guido Boella (University of Turin), which set the stage for the workshop, Richard Booth (University of Luxembourg) tested the application of the AGM postulate-based methodology to provide an abstract high-level framework for the analysis of norm change. Still in line with established research on the dynamics of knowledge and belief, Alexandru Baltag (University of Oxford) provided a fascinating insight into norm change by looking at how agents change policies for interpreting incoming information when confronted with a belief-change process: *Dynamic-Doxastic Norms versus Doxastic-Norm Dynamics.*

The second group of talks focused on issues relating norm change to argumentation and to the dynamics of legal codes. Henry Prakken (Universities of Utrecht and Groningen) argued for the incorporation in the design of argumentation procedures of social-theoretic aspects of multi-agent procedures such as fairness and efficiency. Guido Boella (University of Turin) looked at the interesting problem of the dynamics of the interpretation of legal rules. The interpretation of the law varies as it is confronted by new cases: e.g., (from a real legal case) if it is forbidden to fish, does this mean that it is also forbidden to fish frogs? Finally, Antonino Rotolo (University of Bologna) offered a logical analysis (in the framework of defeasible logic) of the sort of subtleties involved in the dynamics of legal provisions, a dynamics dictated by changes concerning not only the validity and existence of the provisions themselves, but also of their scope and time of force, their efficacy, and their applicability.

The third group of talks concerned issues related to deontic logic proper and to the logic of normative systems and institutions. Emiliano Lorini (Université Paul Sabatier, Toulouse) presented an extensive logical analysis of multi-agent institutions based on the notions of acceptance (roughly, what is true in the context of an institution is what all agents in that institution accept / agree to be true) and formally captured a number of operations of "acceptance change", accounting for a bottom-up perspective on institutional change. Dov Gabbay (King's College) provided an original new analysis of a traditional theme in deontic logic, the issue of contrary-to-duty norms, by means of reactive Kripke models. Davide Grossi (University of Amsterdam) proposed an analysis of norm change by interfacing standard preference logics with dynamic context logic, pointing then at a number of open issues concerning the application of preference logics to deontics.

Dov Gabbay.

The last group of talks focused on applications of modal logic techniques to the study of norm change. Paolo Turrini (University of Utrecht) performed a coalition logic analysis of the standard deontic notions of permission, prohibition and obligation, in terms of a game-theoretic notion of optimality. Guillaume Aucher (University of Luxembourg)

presented a system of dynamic deontic epistemic logic in which issues of knowledge dynamics are put side by side with deontic notions, allowing for the formal analysis of concepts such as "being obliged to know". The last talk was given by Johan van Benthem (Universities of Amsterdam and Stanford) who contoured the problem of norm change from the point of view of the general program of logical dynamics, giving to it a precise place concerned with the dynamics of agents' preferences and evaluations: norms and, more generally, evaluations are essential ingredients of the decision-making of rational agents in social contexts.

Johan van Benthem.

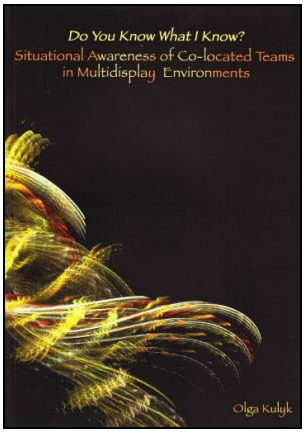
All in all, the workshop gave a lively snapshot of the interests of a growing research community working at the interface of several disciplines, and sharing a common trust in logic-based methods.

PH.D. THESIS ABSTRACTS

Do You Know What I Know? Situated Awareness of Co-located Teams in Multidisplay Environments

Ph.D. thesis abstract
Olga Kulyk

Promotores: Prof.dr.ir. A. Nijholt, Prof.dr. G.C. van der Veer
Copromotor: Dr. E.M.A.G. van Dijk
Date of defense: January 14, 2010



Modern collaborative environments often provide an overwhelming amount of visual information on multiple displays. In complex project settings, the amount of visual information on multiple displays, and the multitude of personal and shared interaction devices in these environments can reduce the awareness of team members on ongoing activities, the understanding of shared visualisations, and the awareness of who is in control of shared artefacts. Research reported in this thesis addresses the situational awareness (SA) support of co-located teams working on team projects in multidisplay environments.

Situational awareness becomes even more critical when the content of multiple displays changes rapidly, and when these provide large amounts of information. This work aims at getting insights into design and evaluation of shared display visualizations that afford situational awareness and group decision making.

This thesis reports the results of three empirical user studies in three different domains: life science experimentation, decision making in brainstorming teams, and agile software development. The first and the second user studies evaluate the impact of the Highlighting-on-Demand and the Chain-of-Thoughts SA on the group decision making and awareness. The third user study presents the design and evaluation of a shared awareness display for software teams. Providing supportive visualisations on a shared large display, we aimed at reducing the distraction from the primary task, enhancing the group decision-making process and the perceived task performance.

Part I focuses on the theory of situational awareness (SA). Chapter 2 gives an overview of the related studies on team collaboration and situational awareness support. We discuss how to afford situational awareness in scientific teams and present an overview of the state of the art on evaluation of visualisations in multidisplay environments. Part I

also presents an overview of the related work on the role of shared large displays in supporting situational awareness.

Part II starts with an introduction of the three domains in which we performed empirical user studies presented in Part III. Chapter 4 presents the results of an exploratory user study and requirements elicitation in the first, life science experimentation domain. In situ observations, questionnaires and interviews with life scientists of different levels of expertise and various backgrounds were carried out in order to gain insight into their needs and working practices. The analyzed results are presented as a user profile description and user requirements for designing user interfaces that support situational awareness and group decision making in co-located multidisplay environments. Life sciences is used as an example domain in this study. In chapter 4 we also discuss the results of the task analysis study describing the current collaboration practices in life science experimentation.

The outcome of the requirements elicitation and the task analysis studies leads to the discussion of three new concepts for SA support, namely (1) *Highlighting-on-Demand*, (2) *Chain-of-Thoughts*, and (3) *Control Interface*. The purpose of these concepts is to explore various alternative solutions for SA support in multidisplay environments to enhance group decision making and to facilitate co-located group discussions.

Part III presents the results of the three empirical user studies in different domains, aimed at fostering *shared* situational awareness and accessing the effect of situational awareness support on team decision making and group process in co-located multidisplay environments.

Chapter 5 discusses the results of the first empirical user study on the effect of the Highlighting-on-Demand concept on the group decision-making process. The Highlighting-on-Demand interface enables a team member who is currently controlling the shared display to draw attention of the other team members by highlighting a certain visualisation using a touch display. The results show that when group members used the Highlighting-on-Demand interface during the discussion, the satisfaction with the final group decision increased.

Then, chapter 6 presents the results of the second empirical user study on evaluation of the Chain-of-Thoughts concept that enables group members to capture, summarise and visualise the history of ideas on a shared display to provide an awareness on the group decision making progress and status. Participants liked the fact that the awareness visualisation enables the group to summarize the enormous set of brainstorming ideas to general important solutions. The results indicate that the Chain-of-Thoughts visualisation presented on a shared large display had a positive influence on the participants' satisfaction with their contribution to the final group decision, and with some of the aspects of the group process and decision making. Team members reported that interacting via a shared display was beneficial for the awareness of the group about what is actually being put into the shared Chain-of-Thoughts visualisation.

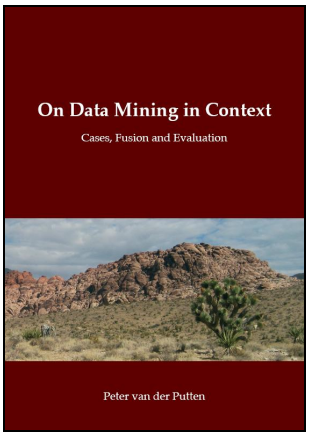
In chapter 7 we discuss the results of the design and evaluation of an Awareness Display (WIPDash – Work Item and People Dashboard) of software teams' activities and project progress were discussed. This chapter includes (1) detailed findings about how software developers maintain awareness of ongoing team activities using existing techniques and tools, (2) a novel awareness visualisation based on developers' needs. The results of the study suggest benefits from providing awareness of teams' activities and project progress and give insights into the use of a shared display to support software teams' collaboration.

Finally, we present general conclusions, design implications for large display applications and visualisations for situational awareness support, and future work directions. We also discuss challenges in evaluation of merging collaborative workspaces.

On Data Mining in Context: Cases, Fusion and Evaluation

Ph.D. thesis abstract
Peter van der Putten

Promotor: Prof.dr. J.N. Kok
Date of defense: January 19, 2010



Data mining can be seen as a process, with the modeling step as the core step in which descriptive patterns are extracted or predictive models are built. However for applications of data mining, the other steps in the process such as planning, data preparation, evaluation and deployment are of key importance for the quality of the end result. This thesis studies data mining in the context of these other steps with the goal of improving the applicability of data mining. We present a number of cases of applications we have worked on that provide an end to end overview and serve as motivating examples for studying data mining in this context, from a range of areas such as direct marketing, cancer survival prediction, yeast image classification and content-based video retrieval for television archives, sewage inspection robots and internet porn filtering.

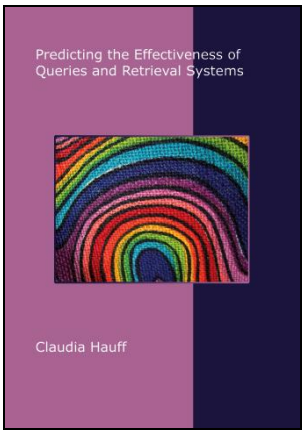
We then zoom in on a number of research topics that are of interest across problems or problem domains. We discuss the problem of data mining when information is distributed over different source data sets, and present data fusion as a potential solution. This is an interesting topic for data mining research, as it removes barriers for more widespread application and data mining algorithms can be used to carry out the fusion itself. We then discuss the results of a data mining competition, which can be seen as a large scale experiment in real-world data mining. There is a large spread in the results for the prediction task, and we use the bias variance evaluation framework to investigate the potential sources of these differences in all steps of the process. We conclude with a study advocating model profiling for novel classification algorithms. Given the No Free Lunch theorem it is unlikely that novel classifiers perform substantially better across all competing classifiers and problems. So it is more interesting to characterize a novel method, by outlining on what problems it perform better or worse and to what other algorithm it behaves similar in terms of patterns of over- or underperformance.

This thesis covers a broad range of issues from quite a few angles. However, we aim to have provided a small number of consistent key messages. First and foremost we want to emphasize the importance and relevance to study data mining as an end to end process, rather than limit research to developing new modeling algorithms. The steps beyond the modeling step in the process are key, and methodologies and tools can be developed that apply not just to a single problem, but to a problem domain or even in general. Data fusion, model diagnosis and profiling are examples of these kind of tools. Taking an end to end view, and providing tools for all phases, will enable key steps forward such as end to end process automation, linking data mining to action to improve deployment and putting data mining in the hands of the end user, the domain expert rather than the data mining expert. These will be key factors in further scaling up to widespread application of data mining.

Predicting the Effectiveness of Queries and Retrieval Systems

Ph.D. thesis abstract
Claudia Hauff

Promotor: Prof.dr. F.M.G. de Jong
Copromotor: Dr.ir. D. Hiemstra
Date of defense: January 29, 2010



In this thesis we consider users' attempts to express their information needs through queries, or search requests and try to predict whether those requests will be of high or low quality. Intuitively, a query's quality is determined by the outcome of the query, that is, whether the retrieved search results meet the user's expectations. The second type of prediction methods under investigation are those which attempt to predict the quality of search systems themselves. Given a number of search systems to consider, these methods estimate how well or how poorly the systems will perform in comparison to each other.

The motivation for this research effort stems primarily from the enormous benefits originating from successfully predicting the quality of a query or a system. Accurate predictions enable the employment of adaptive retrieval components which would have a considerable positive effect on the user experience. Furthermore, if we would achieve sufficiently accurate predictions of the quality of retrieval systems, the cost of evaluation would be significantly reduced.

In a first step, pre-retrieval predictors are investigated, which predict a query's effectiveness

before the retrieval step and are thus independent of the ranked list of results. Such predictors base their predictions solely on query terms, collection statistics and possibly external sources such as WordNet or Wikipedia. A total of twenty-two prediction algorithms are categorized and their quality is assessed on three different TREC test collections, including two large Web collections. A number of newly applied methods for combining various predictors are examined to obtain a better prediction of a query's effectiveness. In order to adequately and appropriately compare such techniques the current evaluation methodology is critically examined. It is shown that the standard evaluation measure, namely the linear correlation coefficient, can provide a misleading indication of performance. To address this issue, the current evaluation methodology is extended to include cross validation and statistical testing to determine significant differences.

Building on the analysis of pre-retrieval predictors, post-retrieval approaches are then investigated, which estimate a query's effectiveness on the basis of the retrieved results. The thesis focuses in particular on the Clarity Score approach and provides an analysis of its sensitivity towards different variables such as the collection, the query set and the retrieval approach. Adaptations to Clarity Score are introduced which improve the estimation accuracy of the original algorithm on most evaluated test collections.

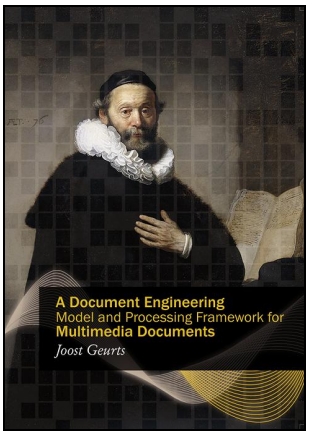
The utility of query effectiveness prediction methods is commonly evaluated by reporting correlation coefficients, such as Kendall's Tau and the linear correlation coefficient, which denote how well the methods perform at predicting the retrieval effectiveness of a set of queries. Despite the significant amount of research dedicated to this important stage in the retrieval process, the following question has remained unexplored: what is the relationship of the current evaluation methodology for query effectiveness prediction and the change in effectiveness of retrieval systems that employ a predictor? We investigate this question with a large-scale study for which predictors of arbitrary accuracy are generated in order to examine how the strength of their observed Kendall's Tau coefficient affects the retrieval effectiveness in two adaptive system settings: selective query expansion and meta-search. It is shown that the accuracy of currently existing query effectiveness prediction methods is not yet high enough to lead to consistent positive changes in retrieval performance in these particular settings.

The last part of the thesis is concerned with the task of estimating the ranking of retrieval systems according to their retrieval effectiveness without relying on costly relevance judgments. Five different system ranking estimation approaches are evaluated on a wide range of data sets which cover a variety of retrieval tasks and a variety of test collections. The issue that has long prevented this line of automatic evaluation to be used in practice is the severe mis-ranking of the best systems. In the experiments reported in this work, however, we show this not to be an inherent problem of system ranking estimation approaches, it is rather data set dependent. Under certain conditions it is indeed possible to automatically identify the best systems correctly. Furthermore, our analysis reveals that the estimated ranking of systems is not equally accurate for all topics of a topic set, which motivates the investigation of relying on topic subsets to improve the accuracy of the estimate. A study to this effect indicates the validity of the approach.

A Document Engineering Model and Processing Framework for Multimedia Documents

Ph.D. thesis abstract
Joost Geurts

Promotor: Prof.dr. L. Hardman
Copromotor: Dr. J. van Ossenbruggen
Date of defense: February 3, 2010



Electronic documents are different from their traditional counterparts in the sense that they do not have an inherent physical representation. Document engineering uses this notion to automatically adapt the presentation of a document to the context in which it is presented. The document-engineering paradigm is particularly well suited for textual documents. Nevertheless, the advantages of document engineering are also desirable for documents which are not based on text-flow, such as time-based multimedia documents. Existing document engineering technology, however, makes

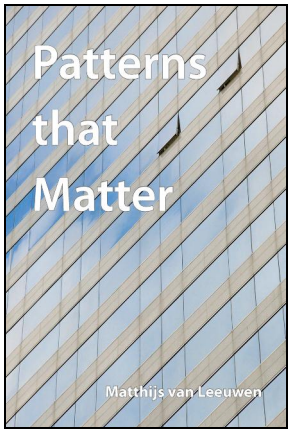
implicit assumptions about documents based on text-flow that do not hold for multimedia documents. As a result, current document engineering tools do not work as well for multimedia documents.

In our research we make the underlying assumptions of text-flow-based document engineering explicit and study the way these assumptions conflict with multimedia documents. We use this to define requirements for a document-engineering model and framework that apply to multimedia documents. The resulting model defines a source document as an explicit representation of the message intended by the author. The transformation rules exploit knowledge about domain, design and discourse in order to convey the intended message effectively and ensure that the result meets the constraints imposed by the delivery context. We have implemented this model in a software framework called "Cuypers", which integrates elements from web, document processing and knowledge-intensive architectures.

Patterns that Matter

Ph.D. thesis abstract
Matthijs van Leeuwen

Promotor: Prof.dr. A.P.J.M. Siebes
Date of defense: February 9, 2010



Pattern mining is one of the best-known concepts in *Data Mining*. A big problem in pattern mining is that humongous amounts of patterns can be mined even from small datasets. This makes it hard for domain experts to discover knowledge using pattern mining, for example in the field of *Bioinformatics*. In this thesis we address the *pattern explosion* using compression.

We argue that the best pattern set is that set of patterns that compresses the data best. Based on an analysis from MDL (Minimum Description Length) perspective, we introduce a heuristic algorithm, called KRIMP, which finds the best set of patterns. High compression ratios and good classification scores confirm that KRIMP selects patterns that are very characteristic for the data.

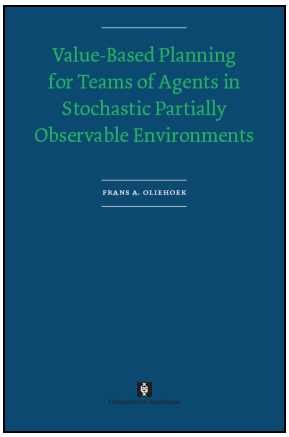
After this, we proceed with a series of well-known problems in *Knowledge Discovery*, which we each unravel with our compression approach. We propose a database dissimilarity measure and show how compression can be used to characterise differences between databases. We present an algorithm that generates synthetic data that is virtually indiscernible from the original data, but can also be used to preserve privacy. Changes in data streams are detected by using a KRIMP compressor to check whether the data distribution has been changed or not. Finally, compression is used to identify the components of a database and to find interesting groups in a database.

In each chapter, we provide an extensive experimental evaluation to show that the proposed methods perform well on a large variety of datasets. In the end, we conclude that having less, but more characteristic patterns is key to successful *Knowledge Discovery* and that compression is very useful in this respect. Not as goal in itself, but as means to an end: compression picks the patterns that matter.

Value-Based Planning for Teams of Agents in Stochastic Partially Observable Environments

Ph.D. thesis abstract
Frans Oliehoek

Promotor: Prof.dr.ir. F.C.A. Groen
Copromotor: Dr. N. Vlassis
Date of defense: February 12, 2010



Situations in which multiple decision makers influence an environment arise in many important current and future real-world problems such as crisis management, network control, robotic teams and distributed software applications. Making decisions in such multiagent systems is of crucial interest to artificial intelligence and related fields.

This thesis is concerned with the task of computing a plan for a team of cooperative agents. Many real-world planning tasks for such teams of agents are subject to uncertainty: both the outcome of the actions and the perception of the current state of the environment may be uncertain and each of the agents may have a different partial view of this environment. Also, the agents may be uncertain with respect to each other's actions. Such settings can be captured by the decentralized partially observable Markov decision process (Dec-POMDP), a decision-theoretic model that allows a principled treatment of the mentioned uncertainties. Unfortunately, computing an optimal plan, or *joint policy*, that specifies for each agent what to do in each possible situation is proven to be intractable and even finding a bounded approximation to the optimal solution is NEXP-complete. This means that for many interesting problems we have to resort to approximation methods that will not be able to guarantee a bound on the quality of the joint policy.

One option is to apply optimization methods such as genetic algorithms or cross entropy to find a joint policy. However, such methods do not exploit the structure of the problem nor do they provide any insight in how the found approximation relates to an optimal solution. Therefore, this thesis describes a *value-based* approach. For single-agent planning (as formalized by the Markov decision process) many algorithms exist that find an (approximate) solution by constructing an optimal *value function* that represents the expected cumulative reward from each state, and subsequently extracting an optimal policy from the value function. This thesis discusses how a similar procedure can be applied in decentralized settings by identifying optimal value functions for Dec-POMDPs. By using the optimal value function as the payoff function in a series of *Bayesian games (BGs)* the optimal policy can be found, thereby extending the solution method of Emery-Montemerlo et al. (2004), to which we refer as *forward-sweep policy computation (FSPC),* to include the exact setting.

It may come as no surprise that computing an optimal value function is also intractable, therefore this thesis proposes to use approximate value functions that are easier to compute. In particular, it covers Q_{MDP} and Q_{POMDP} and proposes a new approximation Q_{BG} and applies them in a heuristic policy search method dubbed *generalized multiagent* A* (GMAA*). GMAA* unifies FSPC and multiagent A* (MAA*) (Szer et al., 2005) and works by solving BGs for different stages. In a BG for a particular stage *t*, each agent has to select an action for each of its possible histories. By setting a parameter *k* to 1 GMAA* reduces to FSPC and gives an approximate solution, while for $k = \infty$ the behavior is identical to MAA* and the method is exact. Still, the scalability of GMAA* is limited by the fact that the BGs grow exponentially with respect to the number of agents and time (because the number of histories grows exponentially with time).

To counter the first type of growth, the thesis explores how independence between agents can be exploited: in typical problems not all agents will have to interact at the same time which leads to sparseness in interaction. We propose to exploit this sparseness by using collaborative graphical Bayesian games (CGBGs), which can be represented much more compactly than the regular BGs. For these CGBGs it is possible to efficiently find approximate solutions by converting them to a factor-graph and applying Max-Plus, a message passing algorithm that operates on this graph.

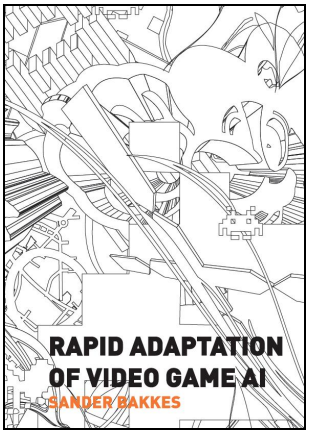
To reduce the growth induced by the number of histories, we consider clustering histories, an idea first introduced by Emery-Montemerlo et al. (2005). However, their approach uses an ad-hoc heuristic to determine which histories to cluster and consequently finds only approximate solutions. By contrast, the work presented in this thesis identifies a criterion that *guarantees* that two individual histories have the same optimal value, allowing *lossless clustering* and therefore faster optimal solutions of Dec-POMDPs and solutions over longer horizons.

The thesis closes with some general conclusions and a discussion of the main directions of future work for practical Dec-POMDP solutions.

Rapid Adaptation of Video Game AI

Ph.D. thesis abstract
Sander Bakkes

Promotor: Prof.dr. H.J. van den Herik
Copromotor: Dr. P.H.M. Spronck
Date of defense: March 3, 2010



Over the last decades, modern video games have become increasingly realistic in their visual and auditory presentation. The games in question generally rely on Artificial Intelligence (AI). However, AI in games has not yet reached a high degree of realism. Now and in the future, game AI may be enhanced by enabling it to adapt intelligently exhibited behaviour to game circumstances. Such enhanced game AI is called 'adaptive game AI'.

Our research is motivated by the fact that, in practice, adaptive game AI in video games is seldom implemented because currently it requires numerous trials to learn effective behaviour in online gameplay (i.e., game adaptation is not rapid). In addition, game developers are concerned that applying adaptive game AI may result in uncontrollable and unpredictable behaviour (i.e., game adaptation is not reliable).

From the above motivation for the research, we derive the following problem statement: *To what extent can adaptive game AI be created with the ability to adapt rapidly and reliably to game circumstances?* To address the problem statement, we first investigate the currently typical approach to adaptive game AI: incremental adaptive game AI. Subsequently, we investigate an alternative, novel approach to adaptive game AI: case-based adaptive game AI.

After providing some background in Chapter 2, we start our research in Chapter 3 by studying RQ1: *To what extent is incremental adaptive game AI able to adapt rapidly and reliably to game circumstances in an actual video game?* To answer the question, we implement the approach in the game QUAKE III CTF. From experiments that test the approach we may conclude that the approach is capable of adapting successfully to changes in the opponent behaviour. However, application of the approach as an *online* learning mechanism is hampered by occasionally very long learning times due to an improper balance between exploitation and exploration. We discuss why this issue characteristically follows from the incremental adaptive game AI approach, which requires either (1) a high quality of the domain knowledge used (which generally is unavailable to the AI), or (2) a large number of trials to learn effective behaviour online (which is highly undesirable in an actual video game). From the results of the chapter we may conclude that the characteristics of incremental adaptive game AI prohibit our goal of establishing game AI capable of adapting rapidly and reliably to game circumstances. Therefore, we examine an alternative for the incremental approach, which we coin *case-based adaptive game AI.*

In Chapter 4 we define case-based adaptive game AI as an approach to game AI where domain knowledge is gathered automatically by the game AI, and is immediately (i.e., without trials and without resource-intensive learning) exploited to create effective behaviour. The approach collects character and game-environment observations, and extracts from those a 'case base'. In the chapter we report on two experiments to obtain an early indication of the effectiveness of case-based adaptive game AI. The results of these two experiments indicate that effective AI in an actual video game may indeed be established by following the approach to case-based adaptive game AI. For case-based adaptive game AI to be successful in an actual, complex video game, three main components are required. The three components are (1) an evaluation function, (2) an adaptation mechanism, and (3) opponent modelling. The three main components are investigated in Chapter 5, 6, and 7, respectively.

In Chapter 5, we study RQ2: *To what extent can a suitable evaluation function for a complex video game be established?* To answer the question, we establish an evaluation function for the SPRING game. SPRING is an actual, complex real-time strategy (RTS) game. We incorporate machine learning techniques to automatically tune the evaluation function on the basis of a case base of game observations. Experiments that test the evaluation function show that just before the game's end the function is able to predict correctly the outcome of the game with an accuracy that approaches one hundred per cent. Considering that a SPRING game may be won suddenly, and thus the outcome of the game is difficult to predict, this is a satisfactory result. In addition, the evaluation function makes fairly accurate predictions before half of the game is played. From these results, we may conclude that a suitable evaluation function for SPRING can be established by exploiting a case base of game observations.

In Chapter 6, we study RQ3: *To what extent can a mechanism be employed to provide online adaptation of game AI?* To answer the question, we establish an adaptation mechanism for video games. The mechanism aims at allowing game AI to adapt rapidly and reliably to game circumstances. To this end, it is incorporated in a framework for case-based adaptation. The mechanism exploits game observations that are gathered in a case base to (A) generalise offline over observations, (B) initialise the game AI with a predictably effective game strategy, and (C) adapt online the game AI to game circumstances. The case-based adaptation mechanism is tested on three different maps in the SPRING game. Experiments that test the adaptation mechanism in online play show that the mechanism can successfully obtain effective performance. In addition, the adaptation mechanism is capable of upholding a draw for a sustained period of time. From these results, we may conclude that the mechanism for case-based adaptation of game AI provides a strong basis for adapting rapidly and reliably behaviour online, in an actual video game.

In Chapter 7, we study RQ4: *To what extent can models of the opponent player be established and exploited in a complex video game?* To answer the question, we implement techniques to establish and exploit models of the opponent player in the game AI of SPRING. Experiments with establishing opponent models in SPRING reveal that for the game relatively accurate models of the opponent player can be established. Furthermore, an experiment with exploiting opponent models shows that in SPRING, exploiting the established opponent models in an informed manner leads to more effective behaviour in online play. From these results, we may conclude that opponent modelling may successfully be incorporated in game AI that operates in actual video games, such as the complex SPRING game.

After the investigation of the three main components of case-based adaptive game AI, in Chapter 8 we study RQ5: *To what extent is case-based adaptive game AI able to adapt rapidly and reliably to game circumstances in an actual video game?* To answer the question, we perform experiments that integrate the three main components of case-based adaptive game AI. The experiments test case-based adaptive game AI in SPRING. Without opponent modelling, case-based adaptive game AI already provides a strong basis for adapting rapidly and reliably the player's behaviour in the game. In our case-based approach to adaptive game AI, opponent models are generated automatically, on the basis of player observations that are gathered in the case base. When enhancing the approach by incorporating opponent modelling, in the experiments, we observe an increased effectiveness of the player's behaviour. From these results, we may conclude that opponent modelling further improves the strength of case-based adaptive game AI, and thus makes its implementation in an actual video game even more worthwhile. In addition, we provide an analysis of the practical applicability of case-based adaptive game AI. We discuss four topics, namely (1) scalability, (2) dealing with imperfect information, (3) generalisation to different games, and (4) acceptance by game developers.

Chapter 9 concludes the thesis by answering the five research questions and the problem statement. Given that *case-based adaptive game AI* is capable of adapting to game circumstances rapidly and reliably, and considering that we demonstrated its effectiveness in an actual, complex video game, we may conclude that the approach is a strong candidate to be incorporated in game AI of the future, i.e., in actual, commercially released video games. In addition to the above conclusion, Chapter 9 presents recommendations and ideas for future research.

Even Better

Jaap van den Herik
TiCC, Tilburg

In the December issue I was pleased to inform you on the acceleration of the publication of Ph.D. theses. Their number for 2009 was 76, as you remember. Our distinguished AI colleague Professor Maurice Bruynooghe (K.U. Leuven) read the article with interest and compared my Belgium-Netherlands-Luxembourg results with the results by the K.U. Leuven. It turned out that some of the Leuven Ph.D. defences had escaped registration in the BNVKI Newsletter. They follow below. In an email Maurice made me even more happy by explicity mentioning that his list of five defences would make my prediction of 80 announcements in 2009 true. We are now at 81. Thank you Maurice, I am grateful for the addition.

ADDITIONAL PH.D. THESIS DEFENCES IN 2009

1. **Albrecht Zimmerman** (KUL) (May 29, 2009). *Mining Sets of Patterns*. Promotor: Prof.dr. L. De Raedt.
2. **Tom Croonenborghs** (KUL) (September 3, 2009). *Model-Assisted Approaches for Relational Reinforcement Learning*. Promotores: Prof.dr. M. Bruynooghe and Prof.dr. H. Blockeel.

3. **Björn Bringmann** (KUL) (September 21, 2009). *Mining Patterns in Structured Data*. Promotor: Prof.dr. De Raedt.
4. **Fabian Guiza Grandas** (KUL) (September 23, 2009). *Predictive Data Mining in Intensive Care*. Promotores: Prof.dr. M. Bruynooghe and Prof.dr. H. Blockeel.
5. **Robby Goetschalckx** (KUL) (September 29, 2009). *The Use of Domain Knowledge in Reinforcement Learning*. Promotores: Prof.dr. M. Bruynooghe and Prof.dr. H. Blockeel.

For a proper overview and adequate reference possibilities at the end of this year, I reproduce the table with the scores and grand total below (see figure 1).

Year	# of Theses	# of SIKS Theses
1994	22	-
1995	23	-
1996	21	-
1997	30	-
1998	21	5
1999	28	8
2000	19	11
2001	25	11
2002	33	17
2003	37	18
2004	45	20
2005	45	21
2006	54	28
2007	46	25
2008	55	35
2009	**81**	**46**
Grand Total	**585**	**245**

Figure 1: Scores and grand total.

NEW ANNOUNCEMENTS 2010

The economic crisis has a variety of consequences. Some have an immediate-following character. Others have a longer interval. It is related to the degree of dependence on the financial deficit. Fore sure, in the years to come the Ministry of Science and Education will face difficulties in financing the Universities, which implies that the number of Ph.D. students may decrease. For the moment we are at the end of the BSIK incentive of four to five years ago. The Ph.D. researchers, then hired for their job, are now completing their theses. Their number is impressive as can be read from the list below. The Editorial Board of the *BNVKI Newsletter* wishes all candidates a marvellous defence and a successful follow-up of their efforts in the passed four years.

Joost Geurts (CWI) (February 3, 2010). *A Document Engineering Model and Processing Framework for Multimedia Documents.* Centrum voor Wiskunde en Informatica . Promotor: Prof.dr. L. Hardman (CWI-TU/e), Copromotor: Dr. J. van Ossenbruggen (CWI).

Matthijs van Leeuwen (UU) (February 9, 2010). *Patterns that Matter*. Utrecht University. Promotor: Prof.dr. A.P.J.M. Siebes (UU).

Frans Oliehoek (UvA) (February 12, 2010). *Value-Based Planning for Teams of Agents in Stochastic Partially Observable Environments.* Universiteit van Amsterdam. Promotor: Prof.dr.ir. F.C.A. Groen (UvA). Copromotor: Dr. N. Vlassis (Technical University of Crete).

A.W. Keizer (UL) (February 18, 2010). *The Neurocognitive Basis of Feature Integration.* Leiden University. Promotor: Prof.dr. B. Hommel (UL).

Sicco Verwer (TUD) (March 2, 2010). *Efficient Indentification of Timed Automata: Theory and practice*. Promotor: Prof.dr. C. Witteveen (TUD), Copromotor: Dr. M. de Weerdt (TUD).

Sander Bakkes (UvT) (March 3, 2010). *Rapid Adaptation of Video Game AI.* Tilburg University. Promotor: Prof.dr. H.J. van den Herik (UvT), Copromotor: Dr.ir. P.H.M. Spronck (UvT).

Wim Fikkert (UT) (March 11, 2010). *A Gesture Interaction at a Distance*. University of Twente. Promotor: Prof.dr.ir. A. Nijholt (UT), Prof.dr. G.C. van der Veer (OU), Copromotor: Dr. P. van der Vet (UT).

Susan van den Braak (UU) (March 15, 2010). *Sensemaking Software for Crime Analysis.* Utrecht University. Promotores: Prof.dr. J.-J.Ch. Meyer (UU) and Prof.dr.mr. H. Prakken (UU/RUG), Copromotores: Dr. H. van Oostendorp (UU) and Dr. G.A.W. Vreeswijk (UU).

Adriaan Ter Mors (TUD) (March 15, 2010). *The World According to MARP: Multi-Agent Route Planning.* Promotor: Prof.dr. C. Witteveen (TUD), Copromotor: Dr.ir. F.A. Kuipers (TUD).

Gianluigi Folino (RUN) (March 22, 2010). *High Performance Data Mining using Bio-Inspired Techniques.* Promotor: Prof.dr. T.M. Heskes (RUN), Copromotor: Dr. E. Marchiori (RUN).

Spyros Kotoulas (VU) (March 24, 2010). *Scalable Discovery of Networked Resources: Algorithms, Infrastructure, Applications.* Promotor: Prof.dr. F. van Harmelen (VU), Copromotor: Dr. R. Siebes (VU).

Sander van Splunter (VU) (March 29, 2010). *Automated Web Service Reconfiguration.* Promotor: Prof.dr. F.M.T. Brazier (TUD), Copromotor: Dr. P.H.G. van Langen (TUD).

Charlotte Gerritsen (VU) (April 12, 2010). *Caught in the Act: Investigating Crime by Agent-Based Simulation.* Promotor: Prof.dr. J. Treur (VU). Copromotor: Dr. M.C.A. Klein (VU).

Hugo Kielman (UL) (April 14, 2010). *Politiële Gegevensverwerking en Privacy: Naar een effectieve waarborging.* Promotores: Prof.dr. H.J. van den Herik (UvT/UL), Prof.mr. A.H.J. Schmidt (UL), Copromotor: Mr.dr. L. Mommers (UL).

Krzysztof Siewicz (UL) (April 20, 2010). *Towards an Improved Regulatory Framework of Free Software. Protecting user freedoms in a world of software communities and eGovernments.* Promotores: Prof.dr. H.J. van den Herik (UvT/UL), Prof.mr. A.H.J. Schmidt (UL).

Rebecca Ong (UL) (April 22, 2010). *Mobile Communication and Protection of Children.* Promotor: Prof.dr. H.J. van den Herik (UvT/UL), Copromotor: Mr.dr. B.W. Schermer (UL).

Maria Mos (UvT) (May 12, 2010). *Complex Lexical Items.* Tilburg University. Promotor: Prof.dr. A.P.J. van den Bosch (UvT), Copromotores: Dr. A. Vermeer (UvT), Dr. A. Backus (UvT).

Lianne Bodenstaff (UT) (June 17, 2010). *Managing Dependency Relations in Inter-Organizational Models*. Promotor: Prof.dr. R.J. Wieringa (UT), Prof.dr. M. Reicherts (University of Ulm).

Marieke van Erp (UvT) (June 30, 2010). *Accessing Natural History: Discoveries in Data Cleaning, Structuring and Retrieval.* Tilburg University. Promotor: Prof.dr. A.P.J. van den Bosch (UvT), Copromotor: Dr. P. Lendvai (UvT/ Hungarian Academy of Sciences).

INAUGURAL ADDRESSES

With much pleasure we announce the following six inaugural addresses.

Dr. M. van Eekelen (March 5, 2010). *Leven lang computeren, leven lang foeteren? Er valt nog veel te leren!*. Open Universiteit Heerlen.
Dr. R.E. Leenes (April 16, 2010). *Harde lessen – apologie als reguleringsinstrument*. Tilburg University.
Dr. N.A. Taatgen (May 9, 2010). *Draden door de geest: hoe de touwtjes in handen houden in een wereld van multitasking*. Groningen University.
Dr. R. Verbrugge (May 25, 2010). *Title to be announced.* Groningen University.
Dr. A. Plaat (June 11, 2010). *De Samenwerkings-machine*. Tilburg University.
Dr. M. Diocaretz (June 18, 2010). *The Human and the Digital*. Tilburg University.

VALEDICTORY ADDRESSES

With much pleasure we announce the following two valedictory addresses.

Prof.dr. A.M.J. Schmidt (March 26, 2010). *Met de kennis van nu.* Leiden University.
Prof.dr. H. de Swart (May 21, 2010). Tilburg University.

Section Editor
Richard Starmans

Advanced SIKS Course on "Computational Intelligence"

INTRODUCTION

On March 11 and 12, 2010, the School for Information and Knowledge Systems (SIKS) will organize an advanced course on "Computational Intelligence". The course takes two days, will be given in English and is part of the so-called Advanced Components Stage of the Educational Program for SIKS-Ph.D. students. Although these courses are primarily intended for SIKS-Ph.D. students, other participants are not excluded. However, their number of passes will be restricted and depends on the number of students taking the course. The course is given by experienced lecturers actively involved in the research areas related to the topics of the course.

Location: Hotel Mitland, Utrecht
http://www.mitland.nl/home_e.htm

Date: March 11-12, 2010

SCIENTIFIC DIRECTORS

- Dr. Ad Feelders (UU)
- Prof.dr. Tom Heskes (RUN)
- Prof.dr. Arno Siebes (UU)

PROGRAM

Thursday, March 11, 2010

09.45 - 10.00 Registration, Coffee and Tea
10.00 - 10.15 Welcome
10.15 - 11.45 Dr. Maarten van Someren (UvA): Transfer- and Multi-Task Learning
11.45 - 12.00 Break
12.00 - 13.30 Dr. Peter Bosman (CWI): Dynamic Black Box Optimization with Evolutionary Algorithms
13.30 - 14.30 Lunch
14.30 - 16.00 Dr. Martijn Schut (VU): Situated Evolution
16.00 - 16.15 Break
16.15 - 17.45 Prof.dr. Pieter Adriaans (UvA): The Quest for Meaningful Information

Friday, March 12, 2010

09.30 - 11.00 Dr. Perry Groot (RUN): Gaussian Processes
11.00 - 11.30 Break
11.30 - 13.00 Prof.dr. Antal van den Bosch (UvT): Machine Learning for Language Modelling
13.00 - 14.00 Lunch
14.00 - 15.30 Dr. Toon Calders (TU/e): Discrimination Aware Data Mining
15.30 - 15.45 Break
15.45 - 17.15 Dr. Marina Velikova (RUN): Causal Independence Models for Information Fusion

REGISTRATION

For registration, please visit www.siks.nl.

2nd NIRICT-SIKS International Springschool on Human-Computer Interaction

Social Interaction Computing
March 22-26, 2010

Organized by NIRICT (3TU Federation: University of Twente, Technical University Delft, Technical University Eindhoven) in cooperation with the Netherlands Research School for Information and Knowledge Systems (SIKS) and the EU Network of Excellence SSPNet on Social Signal Processing. Website: http://hmi.ewi.utwente.nl/lenteschool2010.

STEERING COMMITTEE

- Anton Nijholt, University of Twente
- Catholijn Jonker, Technical University of Delft
- Cees Midden, Technical University of Eindhoven

COURSE DIRECTORS

- Dirk Heylen, University of Twente
- Betsy van Dijk, University of Twente
- Emile Hendriks, Technical University of Delft

INTRODUCTION

In the week of March 22nd till 26th, the three Dutch technical universities (Eindhoven, Twente and Delft) in cooperation with the Dutch SIKS Ph.D. Research School organize a Springschool "Social Interaction Computing". This school is organized for Ph.D.s and Master students who study or work in the fields of 'Human Technology Interaction' and 'Human Media Interaction'. This is the second NIRICT-SIKS School on human-computer interaction. The first school presented a broad multidisciplinary view of how fundamental insights into human physical and cognitive capabilities can be used to design human-centred technologies that can collaborate symbiotically with humans to enhance human capabilities. The focus of this second School is on all aspects of social and affective interfaces.

PROGRAM

The program of this Springschool consists of lectures and hands-on assignments on designing and evaluating intelligent user interfaces and a special Ph.D. training program. The school offers courses in which different approaches and methods for interface design are put into practice.

Conversational interfaces (dialogue systems, conversational agents, or human-robot interaction) form a special type of interaction that will be considered in depth as one of the case studies during this one-week school, with a focus on social signal processing and affective computing. This involves overviews and in-depth lectures combined with hands-on practice in areas such as data-collection and observation; sensing, social-signal processing, and machine learning; interface and experience design; models of affect and personality; synthesis of verbal and nonverbal behaviours.

Using this and other case studies, students will learn more about crucial aspects of and methodologies for designing user interfaces such as user-profiling, ethnography and interviewing, lo-fi and hi-fi prototyping, usability testing and user experience evaluation.

For the Ph.D. training and consultancy program, round tables will be organized where students can

discuss issues relevant to their research and their career and can get advice from senior researchers.

LECTURERS

Courses will be mainly given by professors of the three Dutch technical universities. The lecturers have extensive background in human-computer interaction and have been chosen because of their interest in advanced interaction technologies including multimodal interaction, user interface design, brain-computer interfacing, computer vision, gesture interfaces, computer vision, animation techniques and machine learning. In addition to these lectures there will be two or three invited talks by well-known HCI specialists who will present surveys of the research areas. The language spoken is English.

VENUE

The school will be held in the Best Western Hotel Ehzerwold in Almen (near Zutphen), The Netherlands: http://www.ehzerwold.nl/hotel/.

COSTS AND REGISTRATION

The early registration fees (before March 1) are:

- PhD Students: € 600 (however, see below for SIKS Ph.D. students)
- Others € 800
- Late registration fees are: early registration fees + € 100

Registration includes full boarding in Hotel Ehzerwold during the period of the Spring School. More detailed information about program and registration will be made available on the website of this Springschool: http://hmi.ewi.utwente.nl/lenteschool2010.

INFORMATION FOR SIKS PH.D. STUDENTS

As a result of the cooperation between SIKS and NIRICT, a number of SIKS-Ph.D. students can participate in the NIRICT-SIKS Springschool without paying fee. Participating in this course is a part of the Advanced Components stage of SIKS' educational program. However, the number of places available is limited. SIKS has reserved a number of places, primarily intended for those Ph.D. students working in the field of Human Computer Interaction. Other SIKS-Ph.D. students are not excluded, however if the number of applicants exceeds the number of places available, the students working on HCI come first.

SIKS-Ph.D. students interested in taking the course, should NOT contact the local organization, but register at office@siks.nl, inform Mrs. Corine Jolles that they want to participate and confirm in the mail that their supervisor supports the participation! Students will receive a notification whether they can participate as soon as possible.

Free Participation for SIKS Members in Benelearn 2010

May 27 and 28, 2010
Katholieke Universiteit Leuven, Belgium

The 19th annual machine learning conference of Belgium and The Netherlands. See http://www.cs.kuleuven.be/~dtai/events/Benelearn2010/.

Benelearn is the annual machine learning conference of Belgium and The Netherlands. It serves as a forum for researchers to exchange ideas, present recent work, and foster collaboration in the broad field of Machine Learning and its applications.

Benelearn 2010 will be organised by the Department of Computer Science of the Katholieke Universiteit Leuven. The conference will take place on May 27 and 28, 2010 in Leuven, Belgium.

Due to the cooperation between SIKS and Benelearn, SIKS members can participate for free. More details will be made available at the SIKS-site.

DESRIST 2010 for SIKS-Ph.D. Students

On June 4 and 5, 2010 DESRIST 2010 will take place at the University of St. Gallen, Switserland. Prior to the conference a Doctoral Consortium is scheduled on June 3, 2010. The Fifth DESRIST Conference will bring together researchers and practitioners engaged in Design Science Research in the broadest sense. Design Science Research is becoming firmly established as a research paradigm in several disciplines related to information sciences, information systems and technologies. See http://desrist2010.iwi.unisg.ch/home/ for details.

As a result of the cooperation between SIKS and the organizers of DESRIST 2010, SIKS-Ph.D. students can participate in the DESRIST conference, the doctoral consortium and the CIAO! workshop without paying fee. Participating in this event is a part of the advanced components stage of SIKS' educational program. However, the number of places available is limited and an early registration is required.

REGISTRATION

SIKS-Ph.D. students interested in participating in DESRIST, should NOT contact the local organization, but register at office@siks.nl, inform Mrs. Corine Jolles that they want to participate and

confirm in the mail that their supervisor supports the participation! Students will receive a notification whether they can participate as soon as possible.

Hotel accomodation (bed, breakfast, lunch and dinner) is not part of the arrangement. Participants must make their own arrangements.

SIKS Basic Courses "Interactive Systems" and "Combinatory Methods"

INTRODUCTION

From June 7-10, 2010, the School for Information and Knowledge Systems (SIKS) organizes two basic courses "Interactive Systems" and "Combinatory Methods". Both courses will be given in English and are part of the obligatory Basic Course Program for SIKS-Ph.D. students. Although these courses are primarily intended for SIKS-Ph.D. students, other participants are not excluded. However, their number of passes will be restricted and depends on the number of SIKS-Ph.D. students taking the course.

Location: NH Hotel Best

Date: June 7-10, 2010

SCIENTIFIC DIRECTORS

- Prof.dr. P. de Bra (TU/e), Interactive Systems
- Prof.dr. G. van der Veer (OU, UT), Interactive Systems
- Dr. N. Roos (UM), Combinatory Methods
- Prof.dr. E.O. Postma (UvT), Combinatory Methods

PROGRAM

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

Combinatory Methods (June 7-8):

- Neural networks
- Genetic algorithms
- Complexity of graph algorithms
- Constraint Satisfaction Problems
- Intelligent search algorithms

Interactive Systems (June 9-10):

- Human Computer Interaction
- Man-Machine Interaction
- Adaptive Hypermedia
- Intelligent multimedia research
- Web-based Information Systems

REGISTRATION

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

Free Participation for SIKS-Ph.D. Students in HuCom 2010

From June 21 – 24, 2010, the Second International Working Conference on Human Factors and Computational Models in Negotiation (HuCom 2010 @ GDN) takes place at Delft University. See http://mmi.tudelft.nl/HuCom10/.

Due to the cooperation between SIKS and the local organisation of HuCom 2010, SIKS-Ph.D. students can participate without paying the entrance fee. The event is part of the Advanced Components stage of SIKS' educational program. There is a fixed number of places available, therefore an early registration is required.

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

IMPORTANT DATES

April 1, 2010:	Paper Submissions Due
April 16, 2010:	Notification of paper acceptance/rejection
May 1, 2010:	Camera-ready copies of accepted papers
June 21-24, 2010:	Working Conference on Human Factors and Computational Models in Negotiation

Free Participation for SIKS-Ph.D. Students in SSAIE Summer School

This year again there will be a Software, Services Architecture Infrastructure and Engineering Summer School, and again on Crete. The SSAIE summer school brings together a couple of top researchers in service engineering and provides state-of-the-art tutorials as well as research presentations. Please visit the site at http://www.ssaie.eu for more details.

Due to the cooperation between SIKS and SSAIE there is a fixed number of seats available for SIKS-Ph.D. students. That means that SIKS will cover the registration and accommodation costs.

REGISTRATION

If you are interested in a SIKS seat, please express your interest in an email to office@siks.nl. Add a one- or two-lines description of your research and

confirm that your supervisor supports your application.

You will be informed shortly after about the results. Note that you also can register yourself directly at SSAIE, but then it is at your own costs.

This offer applies primarily to those students who could not participate in last year's edition of the summer school.

Advanced SIKS Course on "Smart Auditing"

INTRODUCTION

On October 5 and 6, 2010, the School for Information and Knowledge Systems (SIKS) will Organize an advanced course on "Smart Auditing". The course takes two days, will be given in English and is part of the so-called Advanced Components Stage of the Educational Program for SIKS-Ph.D. students. Although these courses are primarily intended for SIKS-Ph.D. students, other participants are not excluded. However, their number of passes will be restricted and depends on the number of students taking the course. The course is given by experienced lecturers actively involved in the research areas related to the topics of the course.

Location: Landgoed Huize Bergen, Vught

Date: October 5-6, 2010

Scientific Director: Dr. H. Weigand (UvT)

COURSE DESCRIPTION

In this course you will learn about innovative approaches, models and especially computational solutions that may support the auditing of business processes. Computational solution directions include Process Mining, Complex Event Processing and Data Stream Querying. The focus of the course is on auditing "real" business processes, not auditing the IT itself (EDP auditing). Since nowadays business processes are represented often as composite services, Smart Auditing is related to Service Monitoring.

Business Process Management (BPM)

Modern business processes are required to operate and evolve in highly dynamic environments, being able to adequately react to various changes in these environments. This makes adaptation, i.e., the process of modifying a process in order to satisfy new requirements and to fit new situations dictated by the environment on the basis of adaptation strategies designed by the system integrator, one of the key aspects of process management.

Depending on the type of the changes in the business process and its environment, BPM may have different forms. In particular,

- optimization is the modification of a process to make some aspects of it work more efficient or use fewer resources;
- recovery (repair) is restoring a process after failure to fully satisfactory execution by any means other than a complete rollback;
- compliance means assuring that the process behaves and continues to behave according to norms and regulations.
- risk mitigation is the modification of the process to reduce the risks, for different stakeholders

In order to detect critical changes, BPM strongly relies on the presence of monitoring mechanisms and facilities. With monitoring we mean a process of collecting and reporting relevant information about the execution. Such information, namely monitoring events, represents evolution of the process and changes in the environment. These events define the "What?" dimension of the monitoring process: they are used to indicate whether the process is executed and evolves in a normal mode, whether there are some deviations or even violations of the desired or expected functionality.

Monitoring mechanisms are the tools and facilities for continuous observing and detecting relevant monitoring events; they identify the "How?" dimension of the monitoring process.

Service Monitoring

Service-Oriented Architecture (SOA) is a software engineering style in which the basic software components are called services whose relevant behavior is defined in the service interface. A distinction is made between basic services and composite services. Composite services are defined by means of a process specification that says how the services taking part of the composition are orchestrated. The monitoring of a (composite) service – a BPEL process – has two levels. The BPEL-process describes the way a real-world rocess is coordinated, e.g., a logistic business process. The monitoring of the logistic process is typically focused on business-level performance indicators such as average inventory level. This information can be derived from events generated by the BPEL process execution.

Business Activity Monitoring (BAM)

Business Activity Monitoring (BAM) is the term for the activity of reading events, aggregating and interpreting these data and producing information

for the business. BAM differs from traditional data warehousing and business intelligence in the real-time aspect. With Business Intelligence, a manager or analyst performs complex queries offline, typically on historical data collected in a data mart. In BAM, the events on which the monitoring is based are part and parcel of the runtime process. BAM can be seen as a major application area of the scientific domain Complex Event Processing.

Complex Event Processing (CEP)
Complex event processing, or CEP, is primarily an event processing concept that deals with the task of processing multiple events with the goal of identifying the meaningful events within the event cloud. CEP employs techniques such as detection of complex patterns of many events, event correlation and abstraction, event hierarchies, and relationships between events such as causality, membership, and timing, and event-driven processes. CEP is to discover information contained in the events happening across all the layers in an organization and then analyze its impact from the macro level as "complex event" and then take subsequent action plan in real time (Wikipedia).

REGISTRATION

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

SIKS Basic Course "Research Methods and Methodology for IKS"

INTRODUCTION

On 24, 25, and 26 November, 2010, the School for Information and Knowledge Systems (SIKS) organizes the annual three-day course "Research Methods and Methodology for IKS". The location will be Conference center Woudschoten in Zeist. The course will be given in English and is part of the educational Program for SIKS-Ph.D. students. Although the course is primarily intended for SIKS-Ph.D. students, other participants are not excluded. However, their number of passes will be restricted and depends on the number of SIKS-Ph.D. students taking the course.

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

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

COURSE COORDINATORS

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

PROGRAM

The program is not known yet, but the 2009 edition may give you a first impression of the content.
See http://www.siks.nl/2009_research_methods_methodology.php.

Registration
Details on registration will be made available in due course.

ANNOUNCEMENTS

Call for Papers and Participation

1st Workshop on Logical Aspects of Multi-Agent Systems

LAMAS 2010

(satellite workshop of AAMAS 2010)

May 10, 2010, Toronto, Canada
http://icr.uni.lu/lamas/

INTRODUCTION

There is a growing interdisciplinary community of researchers and research groups working on logical aspects of MAS from the perspectives of logic, artificial intelligence, computer science, game theory, etc.

This workshop is planned to serve two mutually supporting purposes.

First, it will be used as a conference workshop, hosting presentation, exchange, and publication of original research ideas. Secondly, we would like to discuss the possibility of setting up a long-term coordination structure for scientists working in logical aspects of MAS. In the long run, LAMAS can play the role of a regular meeting for that structure.

The workshop is intended to cover the following subjects:

- Logical systems for specification, analysis, and reasoning about MAS
- Modeling MAS with logic-based models
- Deductive systems for logics for MAS
- Development, complexity analysis, and implementation of algorithmic
- methods for formal verification of MAS
- Applications of logics in MAS.

SUBMISSION

We encourage submission of papers reporting original unpublished research. Position papers and visionary work in progress can also be submitted. Submissions should be anonymous (subject to double-blind reviewing procedure), and not exceeding 15 pages in the Springer LNCS format. For templates and instructions for authors, see http: //www.springer.de/comp/lncs/authors.html. Each submission will be reviewed by at least 2 Program Committee members.

PROCEEDINGS AND POST-PROCEEDINGS

All the accepted papers will appear in the informal workshop proceedings (published together with the AAMAS proceedings). We envisage that selected papers will be invited to a special issue of JANCL (Journal of Applied Non-Classical Logics).

INVITED SPEAKER

Wiebe van der Hoek, University of Liverpool, UK

IMPORTANT DATES

Paper submission:	February 2, 2010
Author notification:	March 2, 2010
Camera-ready deadline:	March 19, 2010
Workshop:	May 10, 2010

ORGANIZATION AND CONTACT

The workshop is organized by Valentin Goranko, Technical University of Denmark, and Wojtek Jamroga, University of Luxembourg. In case of questions, do not hesitate to contact us at vfgo@imm.dtu.dk or wojtek.jamroga@uni.lu.

CONFERENCES, SYMPOSIA WORKSHOPS

MAY 27-28, 2010
Benelearn 2010. The annual machine learning conference of Belgium and The Netherlands. Leuven, Belgium.
http://www.cs.kuleuven.be/~dtai/events/Benelearn2010/

JUNE 2, 2010
The Evolution of Deception. Annual USCKI Incognito Student Symposium. Utrecht, The Netherlands.
http://symposium.uscki.nl

JUNE 21-24, 2010
Human Factors and Computational Models in Negotiation (HuCom 2010). Delft, The Netherlands.
http://mmi.tudelft.nl/HuCom10/

OCTOBER 25-26, 2010
22nd Benelux Conference on Artificial Intelligence (BNAIC 2010). University of Luxembourg, Luxembourg.
http://bnaic2010.uni.lu

HOW TO SUBSCRIBE

The BNVKI-AIABN Newsletter is a direct benefit of membership of the BNVKI-AIABN: Benelux Association for Artificial Intelligence. Membership dues are € 40 for regular members; € 25 for doctoral students (AIO's); and € 20 for students. In addition, members will receive access to the electronic version of the European journal *AI Communications*. The Newsletter appears bimonthly and contains information about conferences, research projects, job opportunities, funding opportunities, etc., provided enough information is supplied. Therefore, all members are encouraged to send news and items they consider worthwhile to the editorial office of the BNVKI/AIABN Newsletter. Subscription is done by payment of the membership due to Postbank no. 3102697 in The Netherlands (IBAN: NL 74 PSTB 0003 1026 97; BIC: PSTBNL21). Specify *BNVKI/AIABN* as the recipient, and please do not forget to mention your name and address. Sending of the BNVKI/AIABN Newsletter will only commence after your payment has been received. If you wish to conclude your membership, please send a written notification to the editorial office before December 1, 2010.

COPY

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

ADVERTISING

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

CHANGE OF ADDRESS

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

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