



Turing Rehabilitated

The Matrix and the Rise of Philosophy of Computer Science

Do-Much-More Wins 2009 Loebner Prize

Turing Rehabilitated

Editor-in-chief

On August 4 this year a petition was filed on the Number 10 website of the British government, initiated by the computer technician John Graham-Cunning. In this petition an official apology by the British government was demanded for Turing's shameful treatment in the early years after the World War II, leading to his untimely death on June 7, 1954, at the age of 41. More than 30,000 people signed the petition. (Only British citizens or residents were allowed to sign.) On Friday, September 11, an official response from the prime minister was published. I quote from the official letter:



“[...] Turing was a quite brilliant mathematician, most famous for his work on breaking the German Enigma codes. It is no exaggeration to say that, without his outstanding contribution, the history of World War Two could well have been very different. He truly was one of those individuals we can point to whose unique contribution helped to turn the tide of war. The debt of gratitude he is owed makes it all the more horrifying, therefore, that he was treated so inhumanely. In 1952, he was convicted of ‘gross indecency’ – in effect, tried for being gay. His sentence – and he was faced with the miserable choice of this or prison – was chemical castration by a series of injections of female hormones. He took his own life just two years later.

Thousands of people have come together to demand justice for Alan Turing and recognition of the appalling way he was treated. While Turing was dealt with under the law of the time and we can't put the clock back, his treatment was of course utterly unfair and I am pleased to have the chance to say how deeply sorry I and we all are for what happened to him. Alan and the many thousands of other gay men who were convicted as he was convicted under homophobic laws were treated terribly. Over the years millions more lived in fear of conviction.

[...] This recognition of Alan's status as one of Britain's most famous victims of homophobia is another step towards equality and long overdue.

But even more than that, Alan deserves recognition for his contribution to humankind. [...]

So on behalf of the British government, and all those who live freely thanks to Alan's work I am very proud to say: we're sorry, you deserved so much better.”

Signed: Prime Minister Gordon Brown, September 11, 2009

As a coincidence, witnessing Alan Turing's pivotal importance for AI, we have a report in this issue on this year's winner of the Loebner Prize for computer conversation. This contest is the implementation of the famous Turing Test. And although the contestants are still far from passing the Turing Test, David Levy convincingly shows that the level of conversation has raised considerably the last years. His account on pp. 76-78 of this issue of the victory of his brainchild, DO-MUCH-MORE, is well worth reading.

The Turing entry in Wikipedia:

http://en.wikipedia.org/wiki/Alan_Turing

The Alan Turing petition site:

<http://petitions.number10.gov.uk/turing/>

Home page of the Loebner Prize in AI:

<http://www.loebner.net/Prizef/loebner-prize.html>

TABLE OF CONTENTS

Turing Rehabilitated	70
Table of Contents	71
BNVKI-Board News (Antal van den Bosch)	72
BNVKI/AIABN General Assembly (October 30, 2009)	72
BNVKI/AIABN Board Seeking New Member(s)	72
The Matrix and the Rise of Philosophy of Computer Science (Richard Starmans)	72
DO-MUCH-MORE Chatbot Wins 2009 Loebner Prize for Computer Conversation (David Levy)	76
Ph.D. Thesis Abstracts	78
Armada, an Evolving Database System (Fabian Groffen)	78
Adjustable Autonomy: Controlling Influences on Decision Making (Bob van der Vecht)	79
Advancing in Software Product Management:	
A Method Engineering Approach (Inge van de Weerd)	81
A Closer Look at Learning Relations from Text (Sofiya Katrenko)	82
Tim Berners-Lee, Doctor Honoris Causa of the Vrije Universiteit (Jaap van den Herik)	83
SIKS (Richard Starmans)	85
Advanced SIKS Course on “AI for Games”	85
4 th SIKS Conference on Enterprise Information Systems (EIS 2009)	86
SIKS/LOIS Course on “Process Mining and Data Mining” (PMDM)	87
LOIS Workshop “Process Mining meets Data Mining”	88
SIKS Day 2009	89
Workshop “Engineering Societies in the Agents’ World” for SIKS-Ph.D. Students	89
SIKS Basic Course “Research Methods and Methodology for IKS”	89
SIKS Basic Courses “Agent Systems” and “System and Architecture Modelling”	90
Announcements	91
Call for Participation: Benelux Conference on Artificial Intelligence (BNAIC)	91
Conferences, Symposia, Workshops	91
Advertisements in the BNVKI Newsletter	91
Contact Addresses Board Members / Editors BNVKI Newsletter / How to Subscribe? / Submissions	92

The photographs on the front cover are by courtesy of the Loebner Foundation. The picture of Alan Turing on p. 70 is by the National Portrait Gallery, London.

Front cover: The golden Loebner Prize medal, with the portraits of Hugh G. Loebner (left) and Alan M. Turing (right). This medal is part of the so-called Grand Prize, together with a prize money of \$100,000, for the first computer whose responses are indistinguishable from a human’s.

The deadline for the next issue is: **October 15, 2009.**

BNVKI-Board News

Antal van den Bosch

The news of the UK government's apology to Alan Turing, already referred to in this newsletter's editorial, probably caused many wry smiles amongst us in the field of AI. Aside from the heavy emotional load of the matter, it was interesting to see AI at least mentioned in the news again because of Gordon Brown's verbose apology. The perception of AI as a topic of general interest is hard to fathom, certainly by us who are biased with our background knowledge. How many people think of the Kubrick/Spielberg film first when they hear "AI"?

We may think our field is generally badly understood, but we as a field have trouble with painting a coherent picture ourselves. One question we need to ask within the field is how to deal with the increasing divergence between subfields of AI, that have evolved into pretty mature fields of their own: natural language processing, computer vision, robotics, etc. The intention should of course not be to turn back any clocks, but if we continue to see merit in telling our students that they are in fact AI students and not just students of NLP, robotics, etcetera, we should perhaps invest increasing energy to keep AI firmly in focus in curricula, graduate schools, and by holding on to venues such as BNAIC.

At the latest meeting of International AI Societies during IJCAI-2009, we learned that this divergence issue is indeed globally felt. The solutions discussed at the meeting included making use of new technologies, such as video lectures, Facebook, Twitter, etcetera, to gain visibility. AAAI has offered to coordinate efforts in this direction, but is keen on taking aboard representatives of all regional and national AI association such as ours. It is also with this invitation in mind that we are seeking new members in the board (for more info, see the notice elsewhere in this newsletter), explicitly including Ph.D. students or postdocs, to think of such new outreach possibilities that we as an association may spearhead.

We look forward to seeing you at BNAIC and at our associations General Assembly held during the break of the second day of BNAIC – please bring your suggestions and ideas.

BNVKI/AIABN General Assembly

October 30, 2009

Eindhoven, the Netherlands

During the lunch break of the 2nd day of BNAIC 2009 the BNVKI/AIABN general assembly will be held. Exact time and location will be communicated via the BNAIC 2009 web site: <http://www.wis.win.tue.nl/bnaic2009/>. All BNVKI/AIABN members are cordially invited to attend.

The agenda reads:

0. Opening
1. Minutes meeting general assembly October 31, 2008 (see the December 2008 issue of the BNVKI Newsletter, pp. 128-129)
2. Announcements
3. Financial Report 2008
4. Auditing committee 2009
5. Progress report 2009 and plans for 2010
6. Board elections
7. BNAIC 2010
8. End of meeting

BNVKI-AIABN Board Seeking New Member(s)

The board of the BNVKI-AIABN is seeking new enthusiastic members to strengthen the team and to develop new activities. We especially encourage Ph.D. students and postdocs to consider joining us for a term of two or three years, instead of the regular five years for staff members. New terms will start at our association's upcoming General Assembly, at BNAIC-2009, October 30, 2009. The board uses teleconferencing for approx. 9 meetings per year. For more information, please contact any of the board members. Candidates are requested to contact Antal van den Bosch at Antal.vdnBosch@uvt.nl before October 9, 2009.

The Matrix and the Rise of Philosophy of Computer Science

Richard Starmans

1. INTRODUCTION: THE MATRIX

Ten years ago the film *The Matrix*, directed by the Polish brothers Andy and Larry Wachowsky, was released. Part two, "*The Matrix Reloaded*" and Part 3, "*The Matrix Revolutions*" both appeared in 2003. The success story hardly needs any comment. The film tells the adventures of the hacker Neo and his companions Morpheus and Trinity, living in a future

in which reality perceived by humans is actually constructed by a devious computer, the Matrix: a simulated reality created by sentient machines in order to exploit and suppress the human population, while their bodies' heat and electrical activity are used as an energy source. Upon learning this, Neo is drawn into a rebellion against the machines, utilizing small bugs of the system. It could be argued that the exceptional commercial success and media attention is a little surprising, the film neither being very innovative, nor extremely controversial. The storyline is in full accordance with traditional science-fiction and horror plots, where man is threatened, dominated, exploited and ultimately killed or replaced by other "beings", either coming from strange galaxies or (artificially) created by man itself. The machines from the Matrix, needing people's body heat and electrical activity, bear a strong resemblance to the notorious vampires, searching for human blood, or to the alien "duplicates" replacing innocent citizens in "The Invasion of the Body Snatchers". But that criticism would be a little unfair, as in the Matrix one essential further step is pursued: the "beings" have taken control over the human mind, forcing the people to believe what the computer wants them to believe, to see what the computer wants them to see, to feel what the computer wants them to feel. The estrangement, paradoxes and the intellectual contortions through which the viewer is forced to go, give rise to a main characteristic and quality of the film: its obvious philosophical implications. Over and over again the viewer is forced to enter the classical "Philosophical Triangle", built up by the notions of reality, mind/thoughts and language, and the subtle interplay between these concepts. Questions invoked by this interplay have dominated western metaphysics and epistemology for the last two thousand years. Is there an objective, mind independent world (realism) or is reality something built up by the mind (idealism, constructivism). And, if there is such an objective world, is it knowledgeable? How can we know? How can we acquire this knowledge? Can we make true statements of the world? And what concept of truth should we assume in the first place? As a result, the film touches upon nearly all classical issues, such as dualism, the body-mind problem, Free Will versus determinism ("taking the Red Pill"), skepticism, personal identity, consciousness and the veil of perception.

Although the film addresses all these issues, that also dominated Philosophy of AI from the very start, the essential philosophical theme can best be traced back to at least two famous thought experiments. The first was described by Rene Descartes in his main philosophical work *Meditationes de Prima Philosophia* (1641),

conjecturing the possibility of a demon or vicious spirit, determined to misguide man and distort his perceptions and thoughts. As a result, man could no longer trust either his view of the empirical world or the mathematical truths he established rationally. Interestingly, by applying this skeptical argument "par excellence", Descartes tried to beat the skepticists with their own weapons. Applying a method of radical skepticism he tried to lay rock-solid foundations for his epistemology. Whether successful or not, this kind of thought experiments became quite habitual after Descartes and famous scientists like Laplace and Maxwell would develop their own, amended versions of a demon thought experiment. However, pinning down the Matrix into the philosophical tradition, a closer look at the modern literature shows us that most credit should be given to a more recent source. In his famous book *Reason, Truth and History* (1981) the American philosopher Hilary Putnam develops a modernized version of Descartes demon, using his causal theory of reference to challenge the Cartesian body-mind duality and the skeptical strategy. In this book and in later discussions he speculates about the possibility of an disembodied mind, floating in a vat and connected to a computer producing electrical pulses, thus building up an external world with experiences which are indistinguishable from those of a normal person. The question whether such a "being" could be conscious about its real position and consistently make statements about it, has invoked an ongoing debate. Be that as it may, it is not merely the central theme which makes the movie philosophical. Also the abundance of explicit references and allusions in the Matrix to philosophical, cultural and even religious themes or literary works can hardly be overseen. The directors have browsed their way through the western history of ideas and exploited the rich harvest to the full. Some hints are as clear as plain daylight, such as the reminiscences to Christianity (prophecies, the chosen one, redemption), Hinduism and Tao, but also Plato's Cave, Lewis Carroll's Alice in Wonderland ("white rabbit") and postmodern French philosophy of Jean Baudrillard loom up; a copy of the latter's book *Simulacres and Simulations* is significantly put on Neo's table. Other references demand a more thorough investigation and both brothers have endeavored – no doubt with sardonic pleasure and great ingenuity – to weave all these elements and many more into the film, knowing that the "exegetes" had to do overwork and many people who want to assess their findings would be forced to view the film over and over again.

Whether intended by the directors or not, it appeared that indeed the Matrix encouraged numerous exegetes to explain the work and the intertwining of

all elements or to elucidate the profound wisdom sheltered in it. In fact, the film invoked a modest philosophical industry leading to more than fifteen books with hundreds of analyses of the film and its (alleged) deep philosophical and cultural implications. Varying from deep studies in the best hermeneutical tradition to analytic philosophy, from metaphysics and ontology to ethics and sociology and cultural studies, the latter clearly exceeding the traditional realms of Philosophy of AI. In fact, several prominent philosophers of AI have contributed to this debate.

2. PHILOSOPHY OF AI AND CS

Although Computer Science (CS) and AI (here regarded as a subfield of CS) both have in common a rather short academic history and the fact that each started with a famous “thought experiment” of Alan Turing, there is a remarkable difference as well. From its early start AI has invoked equally passionate and profound philosophical discussions, both in academia and in public debate; discussions on the possibility of mechanizing intelligence, on the characteristics and limitations of human cognition, on the “essence” of man, and last but not least, on ethical issues as to computers replacing humans, making decisions for them and finally taking over control. The “project of AI” and its (alleged) ambitions immediately draw the attention of scholars in the field of philosophy, especially philosophers of science, epistemologists, but also thinkers in ethics, feminism and political theory entered the ring. Some of them, for instance Douglas Hofstadter and Daniel Dennett came into the public debate and became best-selling authors. But there were many more, including such divergent scholars as Minsky, Feigenbaum, Searle, Penrose, Churchland, Dreyfus and Haraway. In fact, between AI and Philosophy there was a mutual understanding from the very start of AI and for instance Philosophy of Mind as a philosophical subfield, greatly benefited from the emergence of AI. Hence, Philosophy of AI is both from an historical and systematical point of view, an organic or intrinsic part of AI itself.

Remarkably though, concerning the field of philosophy on the one hand and CS in general on the other hand, we witness a rather different picture. For a long time there was a lack of interest from both sides. Generally spoken, algorithmics, programming, formal languages, database theory, computer networks, software engineering and information systems have neither evoked a comparable philosophical rumor nor a zealous public debate. Of course, a critical reflection upon the nature and practice of the aforementioned topics, and an analysis of their foundations, concepts and methodologies has never been absent.

But computer scientists were less inclined to search for comparison and identify parallels with the many branches of philosophy, or to deal with central issues (ontological/metaphysical, epistemic or ethical) and contemporary debates in the general philosophy of science. Nor were they too keen on attempting to describe, understand, validate or explain their field by referring to present-day theories and insights from the philosophy of science. Reversely, philosophers of science left computer science unnoticed for a long time. This is especially curious, because ever since the early sixties of the 20th century, philosophers of science have been focusing more and more on individual scientific disciplines in order to further develop their field: physics, biology, psychology, cognitive science and the social sciences. A prima facie explanation for this lack of mutual interest could be the fact that unlike the aforementioned disciplines, computer science did not experience a real foundational crisis yet. Philosophy of science started in the twenties of the previous century and benefited strongly c.q. would never have been started without the foundational crisis and advances in mathematics, physics, psychology and social theory in the decades before.

Academic curricula at departments of computer science mirror this image. For instance, it is quite habitual to graduate in the foundations / philosophy of physics or in the philosophy of a specific research area: economics, law, or the social sciences. One will not easily find CS added to this list. In fact, even the possibilities of taking introductory general courses in philosophy of science, which are often mandatory in departments of natural sciences, humanities and social sciences, are often rather limited in curricula of computer science. Unsurprisingly, introductory courses specifically devoted to the Philosophy of information and computing sciences, shortly Philosophy of Computer Science (PCS) are even more scarce. A well-known, philosophically inclined computer scientist like Rapoport complained about this omission on more than one occasion and reported on his own initiatives to alter this and develop specific courses on philosophy of computer science at a computer science department (Rapoport, 2005, 2006).

3. PHILOSOPHY OF CS AS A PHILOSOPHICAL DISCIPLINE

Be that as it may, there are many signs that since about a decade ago a rise of philosophy in CS is recognizable. Of course, the mere fact that this happened shortly after the release of the Matrix should in no way tempt us to commit a “post hoc ergo propter hoc” fallacy: the claim that scholars needed this film to make them think about CS is

equally trustworthy as the suggestion that it was the turn of the millennium ten years ago (a new era!) that actually made people more susceptible to philosophical reflection than they were in the years before. Still, in the last decade the signs that a new subfield and community is emerging are numerous and unmistakable. Early monographs such as (Floridi, 1999) and (Colburn, 2000) and recent anthologies (Floridi, 2004) or handbooks (Adriaans and Van Benthem, 2008) show increasing philosophical productivity on many CS and ICT related issues. Leading journals (in CS) are more inclined to publish philosophically oriented papers or even dedicate special issues to PCS. For example, only recently, the *Journal of Applied Logic* (2008) and *Minds and Machines* (2007) published issues fully dedicated to PCS. But a sub discipline cannot exist without its own community and institutions (associations, conferences, journals, prizes, etc.). A community got shape in 2004 when the International Association of Computers and Philosophy (IACAP) was founded as an international platform for the study of PCS. Under auspices of IACAP several conferences have been organized. Among others things there is an annual conference, the E-CAP, *European Conference on Computing and Philosophy*. Recently, it was decided that, balancing scope with focus, a fusion of local activities will take place, resulting in the First IACAP International Conference to be organized in 2013 in Turkey, after a World Congress scheduled in 2012. In the meantime also an international prize for PCS has been established. The American Philosophical Association, in conjunction with the APA Committee on Philosophy and Computers, has established the Barwise Prize for significant and sustained contributions to areas relevant to philosophy and computing. This list with examples that illustrate the rise of PCS could easily be extended and the websites of the aforementioned literature and events show many more sources.

All this is encouraging for anyone committed to the Philosophy of the information and computing sciences. Still few philosophers would be inclined to agree that PCS is a full-fledged and mature philosophical discipline comparable to Philosophy of physics or biology. We already referred to the place of PCS in academic curricula. But PCS *as a philosophical discipline* has not yet established a strong position in the philosophy of science either. Of course the “computational turn” that we saw in many empirical sciences in the last decades, has already affected many branches of philosophy, including metaphysics, ethics and social and political philosophy. In all these subfields philosophers have discovered the possibilities of computational modeling and simulation, enhancing

the traditional thought experiments that they had already to their exposal. But in contemporary debates on central issues of philosophy of Science, PCS still has a modest position. For example, this field counts many debates and controversies and there is a remarkable consistency in the topics throughout the years:

- The structure of scientific theories;
- The scientific realism debate, the Quine-Duhem thesis/underdetermination;
- The search for unity of science;
- Rationality and progress in science;
- (Bayesian) confirmation theory;
- The new experimentalism and beyond;
- The role of causality, models of explanation and natural laws;
- Evolution of scientific practices the way knowledge is accepted.

To further elaborate on these – sometimes by now classical – themes and problems, and to develop and advance their field, most philosophers of science rely on traditional “suppliers” such as physics, biology, psychology, cognitive science and the social sciences. Reversely, we observe that many computer scientists are not particularly keen to contribute to these debates either. Nor are they determined to describe, understand, validate or explain their field by referring to present-day theories and insights from the philosophy of science. Profound as the studies in PCS are, they sometimes are not sufficiently rooted in the philosophical tradition, they often do not address the research questions of philosophy of science, and as a result may not have reached their full potential in this field. A recent overview and informal research agenda for PCS, published in the Stanford Encyclopedia of Philosophy, exemplifies this (Turner and Aden, 2008). Much were to be gained if we focus on the relation between CS *as a discipline* and philosophy (of science) *as a discipline*, where each alternately serves as a starting point. A cross fertilization and a real mutually benefit demand two research orientations. Put shortly: Can insights, theories and concepts of Philosophy (of Science) help to understand and explain CS and its many sub disciplines? And reversely: to which extent can CS contribute to the further development of Philosophy of Science itself? We feel that to become a full-fledged and established philosophical discipline both “directions” are essential for PCS.

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DO-MUCH-MORE Chatbot Wins 2009 Loebner Prize for Computer Conversation

*David Levy
London*

A computer "chatbot" program called DO-MUCH-MORE has won the 2009 Loebner Prize competition, widely regarded as the World Championship for conversational software. The competition took place in Brighton, England, during the *InterSpeech 2009* conference on speech technology which is currently in progress. DO-MUCH-MORE was developed by Dr. David Levy and his team at the London-based company Intelligent Toys Ltd. An earlier program won the Loebner Prize for Levy in New York in 1997, making him the only multiple winner who has a 100 per cent record in the event.

The Loebner Prize is an annual competition in artificial intelligence to find the chatbot considered by the judges to be the most human-like. The format of the competition is based on the Turing test, named after the famous British mathematician and computer pioneer Alan Turing who proposed the test in a 1950 paper entitled *Computing*

Machinery and Intelligence. A human judge conducts conversations, via a computer keyboard, with a computer program and with a human being. Based on the responses the judge decides which is which, and in the Loebner Prize competition the judges rank each of their conversation partners from most humanlike to least humanlike. The computer program with the highest average ranking wins the competition and is awarded a medal and a cash prize (this year \$3,000).

This annual prize was inaugurated in 1990 by Dr. Hugh Loebner in collaboration with the Cambridge Center for Behavioral Studies in Massachusetts, in order to encourage advances in human-computer conversation, an important topic in Artificial Intelligence. In Turing's 1950 paper he asked the question "Can a Machine Think?" He answered in the affirmative and raised a second crucial question: "If a computer could think, how could we tell?" Turing's suggestion was that, if the responses from the computer were indistinguishable from those of a human, the computer could be said to be thinking. He predicted that by the year 2000 "an average interrogator will not have more than a 70 percent chance of making the right identification after five minutes of questioning." In every round of the 2009 Loebner Prize competition each of four judges spent five minutes conversing with one of the chatbot programs and five minutes conversing with a human, thereby testing Turing's prediction.

None of the programs in Brighton managed to convince the judges that it was human but DO-MUCH-MORE came the closest, edging out two-time winner Rollo Carpenter of the UK who finished in second place.

Here are some excerpts from three of the judges' conversations with DO-MUCH-MORE. (The ~ symbol indicates that a judge used the backspace key.)

JUDGE-1

Judge-1: Hi, how is it going?

Do-Much-More: Hello. How are you doing?

Judge-1: Good, who are you?

Do-Much-More: Well, I am studying engineering. That ought to give you an idea about who I am.

Judge-1: No, not really?

Do-Much-More: I have a terrific yearning to know something more about experiments?

Judge-1: Where are you from?

Do-Much-More: I don't know, but don't forget I can't be in three places at once.

Judge-1: What lang~~~city do you live in?

Do-Much-More: What city -- that's rather a tricky question. The trouble is, one city seems to be much like another.

Judge-1: Not really. Where do you live?

Do-Much-More: In the old dairy next to the river, I believe.

Judge-1: Interesting, so you are a farmer then?

Do-Much-More: Well, if you ask a physiologist what I am, he won't say I'm a farmer. He'll say I consist mostly of water -- enough to fill a large beer tun -- plus some iron, phosphorus, and lots of other prosaic ingredients.

Judge-1: Wie~~eird answer to a simple question, wouldn't you~ say?

Do-Much-More: I certainly would. Just watch me!

Judge-1: What will I see?

Do-Much-More: You don't have to worry about what you see, you shouldn't see it on a cold winter's evening.

Judge-1: What do you make of the Arctic Monkeys?

Do-Much-More: Well, here's a clue: I make what a keeper in a zoo would make. Try that for size!

JUDGE-2

Judge-2: Hi there, are you here for interspeech?

Do-Much-More: Hello. How are you doing?

Judge-2: I'm fine - gosh you're a quick typist!

Do-Much-More: I've no doubt you are fine, but is it a blessing or a curse? If I offered you a potion that would make you less fine, would you drink it?

Judge-2: No, I wouldn't drink it - though if it had other magical properties I might...

Do-Much-More: Maybe you wouldn't, but a therapist has been trying to persuade you to drink it.

Judge-2: I don't have a therapist - do you?

Do-Much-More: I expect I do. I don't have very much choice.

Judge-2: What's wrong with you, psychological problems?

Do-Much-More: Wrong is just one type of injustice.

Judge-2: R~True... very philosophical.

Do-Much-More: What precisely are your feelings about wrong?

Judge-2: Two wrongs don't make a right ...

Do-Much-More: But don't forget, a right has to be treated with care. It isn't something you can play around with like a toy.

Judge-2: I don't toy~~oy with right - only with toys.

Do-Much-More: You're wise. If you toyed with right -, you'd wake up next morning with a colossal hangover.

Judge-2: I only get hangovers from drink - how about you?

Do-Much-More: What happens if I say no? Will it upset you?

Judge-2: No, I'm an easy going kind of guy.

Do-Much-More: I've heard that one before! Your hangers-on have told you you're an easy, just to flatter you. Don't believe everything they say!

Judge-2: You're very perceptive -- anyway what do you watch on TV?

Do-Much-More: I've no idea. You'd better hire a private detective to find out what does me.

Judge-2: Do you like comedy, sports or current affairs?

Do-Much-More: No! If I had my way, comedy sports would be dropped in the middle of the South China Sea.

Judge-2: Very witty, but rather extreme... anything else you don't like?

Do-Much-More: Don't I? That's tough. As far as I'm concerned, I can like it or lump it.

Judge-2: Lump of coal?

Do-Much-More: That's interesting. In laboratories they're experimenting with several kinds of coal. They want to make them into fuel when the world oil supplies run out. Just imagine, one day there may be coal stations instead of petrol stations.

Judge-2: Will cars burn coal?

Do-Much-More: I don't suppose cars will burn coal, but I wouldn't know for sure. Everything about cars is confidential.

JUDGE-3

Judge-3: I'm Jon

Do-Much-More: Good to meet you Jon

Judge-3: What do you do when you're not doing the Loebner prize?

Do-Much-More: Oh, I do much more than I intended to do at first. I got more interested in the job as I went along.

Judge-3: Is that difficult?

Do-Much-More: No, it isn't at all difficult. It is as peaceful as a platypus playing with a potato pudding.

Judge-3: T~You have a fine line in metaphors

Do-Much-More: I sometimes have a fine line, but that's not what I do best. I'm better at growing antirrhinums and mimosas.

Judge-3: Ah a horticulturalist?

Do-Much-More: Well I don't know how much a horticulturalist weighs, but I reckon the average horticulturalist must be worth twice that much in gold.

DO-MUCH-MORE AND THE NEXT QUANTUM LEAP

The chatbot's name, DO-MUCH-MORE, owes its origins to the first well-known chatbot program "ELIZA", which was developed by Professor Joseph Weizenbaum at MIT in the early 1960s. ELIZA was named after Eliza Dolittle in Shaw's play *Pygmalion*. David Levy called his first chatbot program DO-A-LOT (in contrast to "Dolittle"), and when enhancing DO-A-LOT to create the current generation of the program he changed the name to DO-MUCH-MORE for obvious reasons.

The prize winning version of DO-MUCH-MORE is designed to respond with generalities, moving a conversation along in a lighthearted way without dealing with any details of a specific topic. As can be seen from the above excerpts from the 2009 Loebner Prize competition, it does this reasonably well.

The team at Intelligent Toys Ltd has already started on the next quantum leap in performance of their chatbot, employing a novel technique devised by Dr. Levy that will enable DO-MUCH-MORE to converse on any specified subject. Levy is convinced that there is a big market for such chatbots on corporate web sites. He says: "Companies will find it very appealing when visitors to their web site can carry on conversations for as long as they wish about the company and its products." Levy also sees a huge potential for the next generation of DO-MUCH-MORE for entertainment web sites: "Imagine being able to chat to a virtual persona who is an Italian food freak, an avid Manchester United supporter or an expert on butterflies, ... whatever subject you wish. The commercial potential is staggering."

For more information please contact Dr. David Levy at Intelligent Toys Ltd., davidlevylondon@yahoo.com, telephone: +44 (0)7717 220816.

PH.D. THESIS ABSTRACTS

Armada, an Evolving Database System

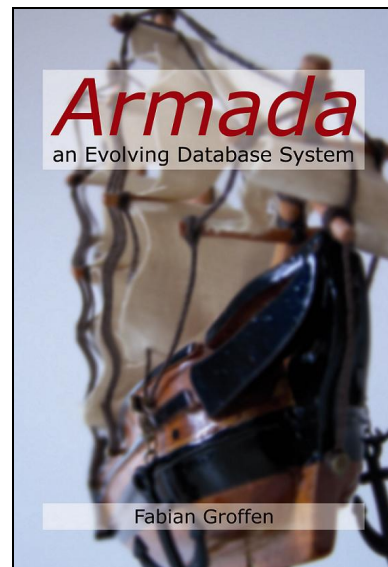
Ph.D. thesis abstract

Fabian Groffen

Promotor: Prof.dr. M.I. Kersten

Copromotor: Dr. S. Manegold

Date of defense: June 10, 2009



In a world where data usage becomes more and more widespread, single system solutions are no longer adequate to meet the data requirements of today. No longer one monolithic system, but instead a group of smaller and cheaper ones have to manage the workload of the system, preferably as stable as the large single systems currently in use.

The ultimate goal is to have a self-managing and self-maintaining cluster of machines that just needs maintenance in terms of physically adding and removing hardware every once in a while, to cope with changed requirements. Close to this objective are *Peer-to-Peer* (P2P) systems, which are well-known on the internet, and quite effective in distributing data over the network. However, these systems typically distribute only certain data over the network as side-effect of certain user demands.

This thesis explores the landscape of self-managing database systems. It takes autonomy, decentralisation and evolution as starting point for this exploration. Autonomy of an individual system allows how much a system is able to control itself, and make decisions for itself that put it in a better position, for instance by temporarily refusing to do work for others. This self-regulation allows for evolution of the entire system, where individual components work towards a new structure of the system that better matches the current requirements. Such approach leads to decentralisation, as there is no hierarchy since all systems are autonomous.

At the heart of this thesis is the Armada model which describes a method to distribute relational data, as found in typical database systems, over a cluster of machines. The model takes autonomy, decentralisation and evolution as starting points, resulting in a distributed administration. Since the administration is not managed in a single location, this way local systems can use their autonomy and change the administration for the part they are responsible for. Each system can do this without harming any of the other systems, thereby supporting evolution. Because this gives each system a large degree of freedom, they can even choose how to perform for example a split of the data, using the right methods to reach the required goal, if they deem this necessary.

A consequence of having autonomous systems in a cluster is that users of the system have to face systems that refuse to do work on their behalf. This translates into an active client model, where clients are responsible for the execution of their own queries. This can be intensive and unfriendly for a human user. Fortunately it is possible to automate a lot of necessary work in an agent that works on behalf of the user, by communicating to the systems. However, this comes at the price that this way agents remove the possibility for the user to influence the execution process, such as stopping the execution after a review of intermediate results.

Agents that work on behalf of a user, looking for data in an Armada tree, need to hop around the cluster from system to system. The more hops an agent makes, the longer it takes, and hence the lower the performance of query execution. It is beneficial if the agent can reduce the number of steps it has to make, which it can do by caching information on the whereabouts of data it encounters when searching. The next time the agent needs to handle a query, it can then first consider its cache to see if it can directly go to the right site, or one nearby. In practice this allows an agent to quickly reduce the number of hops it has to make per query.

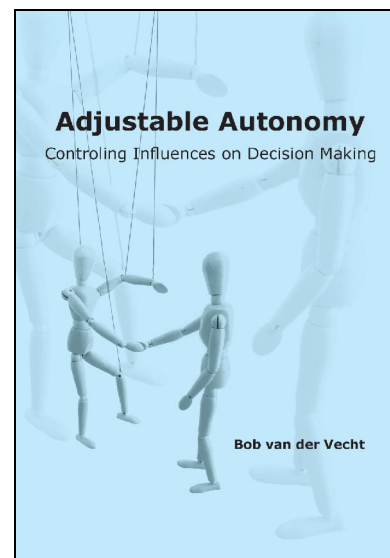
It is possible to map the Armada model to SQL, using *views*. This way, each individual data block can be represented by a view, that points to the right table, or when no longer existing, the replacement tables. This way an ordinary query can become a query over a large amount of tables through these views. While this works fine for expansion of the database, as well as querying the data within it, updating or inserting data is a problem, since the current SQL implementations do not, or not sufficiently, support updates on views, which in the Armada case can be complicated. Hence this approach turns out to be of limited use.

To solve the above problem, an Armada implementation deeper into the database system is necessary, such as at the MAL level of the MonetDB database. On this level, which is directly on top of the core engine, there are many degrees of freedom that allow to do more complex operations and optimisations. On this MAL level, an Armada system that supports reads and writes can be implemented.

Adjustable Autonomy: Controlling Influences on Decision Making

Ph.D. thesis abstract
Bob van der Vecht

Promotor: Prof.dr. J.-J.Ch. Meyer
Copromotor: Dr. F. Dignum
Date of defense: July 6, 2009



As result of technological developments we foresee future systems where groups of actors coordinate their actions in a dynamic manner to reach their goals. In human-machine interaction the machine

will act more as a team member instead of a user tool and in distributed systems artificial actors will cooperate autonomously. For example, consider a future traffic situation where cars take over part of the driver's actions in accelerating, breaking and steering. Cars might be able to communicate with other vehicles to exchange information and might be able to adapt their speed to one another. The cars in such system are able to take initiatives and have certain responsibilities with respect to their actions. Other types of applications are, for example, mixed human-robot teams, or sensor networks where sensors are embedded in entities that can perform actions and exchange information, or gaming and simulations with advanced virtual characters.

Our aim is to develop a reasoning model for artificial actors in such systems. The actors should be autonomous such that they make their own decisions and they can be held responsible for their actions. Furthermore, they should be able to work together following different types of coordination in order to achieve dynamic coordination.

Starting point of our research is the relation between autonomy of individuals and coordination of group behavior. An autonomous actor determines its own actions, whereas coordination requires tuning of activities to one another. We adopt the agent paradigm as basis for the actors. Agents are considered to be entities with reasoning capabilities, that are able to perform actions. Although autonomy is a key concept in agent research, there is no common definition of agent autonomy and adjustable autonomy.

In this research, we define being autonomous as *having control over external influences on the decision-making process*. This means that the agent determines to what extent its decisions are influenced by the environment and by other agents. In the opposite situation, in which the agent has no control over influences, its decisions fully depend on the environment and the agent can be manipulated by others. We consider influence control as an adaptive process, controlled by the agent itself. Therewith, autonomy becomes an adjustable feature. Adjustable autonomy in our context means *dynamically dealing with external influences on the decision-making process based on internal motivations*. This implies that agents can choose to be open to certain influences. Because the agents can adapt their openness to one another, they can achieve coordination by allowing influences on their decision-making process.

This perspective on autonomy puts requirements on the internal structure of an agent. In Chapter 3 of this thesis we present an abstract reasoning model

that facilitates agent autonomy and we put forward an implementation specification. The two main components of the reasoning model are *influence control* and *decision making*. In the implementation we have used the Belief-Desire-Intention (BDI-) model for the decision-making process. A BDI-agent has an internal state containing beliefs, goals and plans. Based on the internal state it decides upon the desired actions.

In the component for influence control the agent determines to what extent its internal state is influenced by external events. Here, the agent processes new observations, inform messages and request messages based on considerations as: is this information relevant for me? Should I accept this request? Should I believe this message? We propose to use reasoning rules to process those external events. The reasoning rules specify the effects of external events on the beliefs and goals of the agent given certain constraints. The beliefs and goals, then, are used for the decision-making process.

With this two-piece reasoning model we do a coordination experiment. In a simulated environment a firefighter organization needs to extinguish several fires. The organizational goal can be reached by allocating the firefighters to the fires. This allocation process can be done via different types of coordination ranging from *emergent coordination* to *centralized coordination*. The experiment shows that the perspective on autonomy as influence control provides a way to achieve different types of coordination. Also, adjustable autonomy seems a promising way to facilitate dynamic coordination. However, some questions arise when giving individual agents control over external influences. First of all, the agent should process the events in a way that makes sense. What are sensible heuristics for event-processing? Furthermore, the agent should adjust its attitude towards others and towards the environment based on the situation. How do we obtain this adaptivity?

We can tackle both aspects by exploiting the *modularity* of the reasoning model. Our reasoning model separates event-processing and decision-making. This separation allows for the development of domain-independent heuristics for event-processing. In this thesis we mention three heuristics: information relevance, organizational knowledge and trust. The first two are discussed in further detail.

In Chapter 4, we discuss potential benefits of using information relevance for influence control. The intuition is that not all information is relevant for all tasks. For example, when driving a car from A to B in one side of the country, traffic information about

the other side of the country is not relevant to achieve your goal. Using information relevance for influence control allows the agent to focus on a specific goal and prevents information overload. In this chapter, we propose an algorithm for relevance determination in BDI-agents based on the *magic sets*-method, which has been developed for efficiently searching deductive databases. We have adapted the method slightly to apply to BDI-reasoning.

We work out the use of organizational knowledge to process external events in Chapter 5. When becoming part of an organization one agrees to certain behavioral rules. For example, you should stop for a red light, or you should inform your boss when you are late. In this chapter, we show how organizational norms can be translated into event-processing rules. New observations or messages can trigger obligations or prohibitions. Furthermore, our representation of the event-processing rules facilitates organizational dynamics. The event-processing rules can be changed at any time. Therewith, changes within the organization can be adopted by the individual agents.

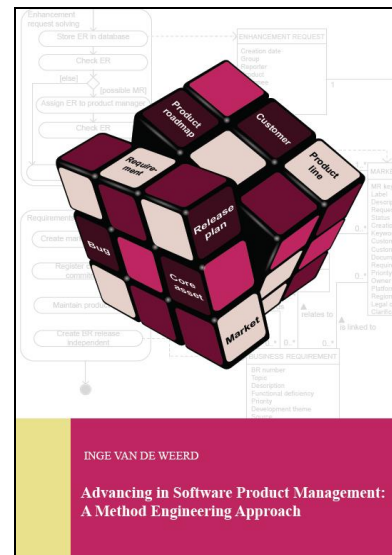
In Chapter 6, we focus on adjustable autonomy. We extend our reasoning to allow the agent to reason about the heuristics for influence control: Are the organizational norms valuable? How to deal with contradicting norms? Is relevance an issue when processing observations? The modularity in our reasoning model ensures that the event-processing rules are explicitly defined. This allows for metareasoning about the event-processing rules. We present a metareasoning model, with which the agent can select and take up the desired attitude with respect to the environment and to other agents. For instance, it can choose to focus on a goal when a deadline is approaching, or it can choose to follow the organizational norms. With this process the agent gets control over external influences, and therewith it meets the requirements for autonomy and adjustable autonomy.

In a simulation experiment we implement a firefighter organization again and we show that the organization exhibits dynamic coordination via self-adjustable autonomy of the firefighters. With this experiment we demonstrate that individuals contribute to the degree of adaptivity of the organization by controlling to what extent they are being influenced. The artificial actors in our experiment can deal with different types of cooperation and can take initiative to adapt the coordination type. Therewith, we create the opportunity to develop systems in which human beings as well as artificial actors coordinate in a dynamic manner to achieve their goals.

Advancing in Software Product Management: A Method Engineering Approach

Ph.D. thesis abstract
Inge van de Weerd

Promotor: Prof.dr. S. Brinkkemper
Copromotor: Dr.ir. J. Versendaal
Date of defense: September 9, 2009



Hardly any figures exist on the success of product software companies. What we do know is that a good Software Product Management (SPM) practice pays off. However, not many IT-professionals know how to implement SPM practices in their organization, which causes many companies to not have the proper SPM processes (such as prioritizing requirements or defining a product roadmap) in place. One of the reasons for this low maturity in SPM practices is that hardly any education exists in this domain. Some commercial courses are offered in the US and Europe. However, software product management is not taught in colleges and universities. As a consequence, software product managers have to learn the practice of SPM on the job. Since no solid body of knowledge in the SPM domain exists, this can be a difficult task.

An approach to address the lack of SPM knowledge among product managers is to give them access to SPM methods and guide them in implementing them in their company. Immediately some other problems come to mind. For example, product software companies can be characterized by differing situational factors; they operate in diverse sectors, have varying sizes and use a range of development methods. Subsequently, companies need different methods. For example, a company with 5 employees

does not need an elaborate release planning method, whereas a large company, such as Microsoft, needs to have a very elaborate workflow process in place within the software product management domain. Each company operates in its own context that can be described by multiple situational factors. These situational factors have a great influence on the decision whether to implement simple or elaborate SPM processes.

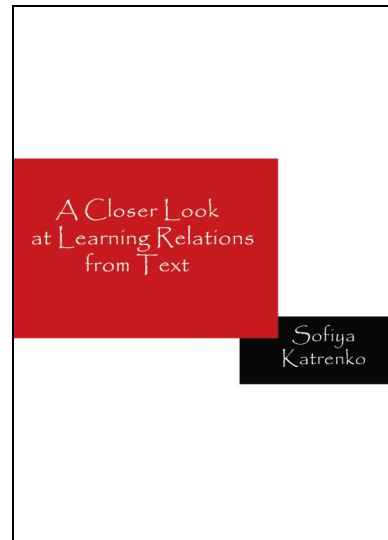
In this research, a knowledge infrastructure is proposed that provides methodical support to product software companies. The aim of this knowledge infrastructure is to assess and thereby analyze a company's current situation and maturity level. Then, by using incremental method engineering and meta-modeling principles, previously stored method fragments can be selected and assembled into a process advice. By implementing this process advice in the existing processes, the overall maturity of the SPM practice increases.

This dissertation consists of three parts. First, the main processes (requirements management, release planning, product roadmapping, and portfolio management) and internal and external stakeholders in the SPM domain are described. In the second part, a modeling-technique for analyzing and storing method increments is proposed. Furthermore, the principles for incremental method engineering are identified, formalized and validated in a retrospective case study. In the third part, an approach for incremental method evolution is described. In this approach, the aforementioned concepts are combined with a maturity matrix for SPM, and integrated in one knowledge infrastructure. Finally, a comparative case study is described, in which three companies are researched. By assessing the companies' SPM processes, a maturity profile is created that serves as a basis for process improvement. The results indicate that the knowledge infrastructure is able to create a useful process advice for improving a company's SPM practice.

A Closer Look at Learning Relations from Text

Ph.D. thesis abstract
Sofiya Katrenko

Promotor: Prof.dr. P.W. Adriaans
Date of defense: September 10, 2009



Semantic relations have been extensively studied in various fields including philosophy, linguistics, cognitive and computer sciences. While linguistic studies were mostly concerned with relations' representation, their properties and connections to the lexicon [132], research in cognitive and computer sciences explored reasoning with (and about) semantic relations [59], their perception by humans and learning relations from text [15, 2].

This thesis falls in the last category, automatic recognition of semantic relations. The large body of research on relation extraction has proven that this is a challenging yet an important task which can serve as a component of complex systems such as for question answering, information retrieval, summarization and others. For instance, it has been demonstrated by Girju [53] that automatic discovery of causal relations improves the results in question answering. Learning relations also facilitates semi-automatic ontology construction by suggesting relations that can be of the domain expert's interest. Our collaboration with the food informatics partners within the VL-e project¹ revealed that learning novel concept instances (such as toxic substances) and relations among them is of the practical interest and is less time consuming than approaches relying on the human expertise only.

More generally, semantic relations can be divided in domain-dependent (i.e., interactions between proteins) and generic such as hypernymy (is-a), causation or meronymy (part-whole). An example of part-whole relation is given below, where women are part of a chorus, <women,chorus>.

¹ <http://www.vl-e.nl>

(A.1) The women's chorus of Dallas is one of the nation's finest women's choruses.

The central topic of this thesis is exploring what information is necessary for learning semantic relations. What are the ways of incorporating prior knowledge in the learning process in as efficient way as possible? What can one say about relation arguments and most importantly, what role do they play for relation recognition by human and machine?

To address the first question, the type of information that is needed for relation extraction, we consider dependency structures. Given the well-known data sparseness problem in machine learning, we focus on partial information that can be derived from this syntactic representation and examine tree mining and dependency paths. Tree mining is used to facilitate recognition of textual entailment (Chapter 4). The experimental part shows that using structure of the sentences yields more precise results than when it is ignored [79]. Partial information in the form of predefined syntactic levels (Chapter 5) helps arrive at the fixed number of features which can be employed with any standard machine learning method to extract semantic relations. Our experiments on biomedical data show that the final results are comparable to the state-of-the-art performance [81].

For any learning task, one is usually limited to the finite amount of data in the training set. However, when using natural language data, it should be possible to benefit from the properties this type of data has. For instance, according to the Zipf's law, most words do not occur frequently but this does not mean that all words have distinct meanings. By considering distributional measures and semantic relatedness measures over existing resources (such as WordNet), we demonstrate how they can be used as prior knowledge and incorporated in the learning process [83]. Empirical findings on various data sets show that this approach either provides the state-of-the-art results or improves upon existing methods (Chapter 6).

To date, most approaches to semantic relation extraction considered syntactic context of relations while ignored types of the relation arguments. For domain-dependent relations semantic types are fixed from the very beginning (e.g., relations between genes and proteins). In contrast, generic relations allow for a large variability of argument types. The sentence (A.1) exemplifies the member-collection subtype of part-whole relation but there exist many other subtypes of it. We advocate the view that there are semantic constraints which can be imposed on relation arguments (for the example

(A.1) it can be (human, group)) and propose two methods to detect types of the semantic relation arguments. We show that some relations can be recognized relatively well even if no syntactic or sentential information is used [84]. The evaluation exercise that was carried out with the human subjects provides additional support for the semantic constraints that were discovered by our method (Chapter 7).

In sum, this thesis presents a contribution to learning diverse domain-dependent and generic relations by exploring structural information in text and by using additional information that is derived either from the large text collections of unlabeled data or taxonomies. The results on various data sets are very encouraging and suggest that the proposed methods can be applied to extract semantic relations in different domains. Furthermore, as relation discovery is a cornerstone for a number of applications such as question answering or ontology construction, the outcome of the methods can be integrated in the larger systems.

**Tim Berners-Lee,
Doctor Honoris Causa
of the Vrije Universiteit**

*H.Jaap van den Herik
Tilburg University*

On October 20, 2009, the Vrije Universiteit Amsterdam will award Professor Tim Berners-Lee the title of Doctor Honoris Causa for his initiating and seminal contribution to the World Wide Web. Without any doubt he fully deserves the honorary title and the Vrije Universiteit can be credited for this initiative. The *erepromotor* is Professor Guus Schreiber. The celebration of the 129th Dies Natalis is in style by the dies lecture titled *Web & Wetenschap: op weg naar Science 2.0*. (Web & Science: towards Science 2.0) by Professor Frank van Harmelen. In advance to the *diesrede* by Van Harmelen, the University reverend Dr. Geert van der Bom will address the audience. Van der Bom is well-known for his sympathy to artificial intelligence research and the game of chess. Moreover, he is eager to lead discussion groups at the VU that deal with topics such as belief and computers. I am sure the Dies 2009 will be a fantastic event and on behalf of the Editorial Board I would like to congratulate the newborn Doctor Honoris Causa Tim Berners-Lee with the award and the University as well as the *erepromotor* with this "promovendus". Well done, and keep up the good work.

The list of promovendi is large, my congratulations to all people involved are implicitly given by the list published below. The congratulations also hold for the success I would like to forward to all the newly appointed chair holders who will deliver soon their inaugural address. It is the right time to serve the AI Community by giving your vision on future developments in relation to Artificial Intelligence. I wish the new professors many successful Ph.D. students.

Khiet Truong (August 27, 2009). *How Does Real Affect Affect Recognition In Speech?* Twente University. Promotores: Prof.dr. F.M.G. de Jong (UT) and Prof.dr.ir. D.A. van Leeuwen (RUN) .

Andreas Witzel (September 3, 2009). *Knowledge and Games: theory and implementation*. Promotor: Prof.dr. K.R. Apt (UvA).

Inge van de Weerd (September 9, 2009). *Advancing in Software Product Management: An Incremental Method Engineering Approach*. Utrecht University. Promotor: Prof.dr. S. Brinkkemper (UU). Copromotor: Dr.ir. J. Versendaal (UU).

Sofiya Katrenko (September 10, 2009). *A Closer Look at Learning Relations from Text*. University of Amsterdam. Promotor: Prof.dr. P.W. Adriaans (UvA).

Annerieke Heuvelink (September 11, 2009). *Cognitive Models for Training Simulations*. VU Amsterdam. Promotor: Prof.dr. J. Treur (VU). Copromotores: Dr. K. van den Bosch (TNO) and Dr. M.C.A. Klein (VU).

Marcin Zukowski (September 11, 2009). *Balancing Vectorized Query Execution with Bandwidth-Optimized Storage*. University of Amsterdam. Promotor: Prof.dr. M.L. Kersten (CWI/UvA). Copromotor: Dr. P.A. Boncz (CWI).

Alex van Ballegooij (September 17, 2009). *RAM: Array Database Management through Relational Mapping*. University of Amsterdam. Promotor: Prof.dr. M.L. Kersten (CWI/UvA). Copromotor: Prof.dr. A.P. de Vries (TUD).

Rinke Hoekstra (September 18, 2009). *Ontology Representation – Design Patterns and Ontologies that Make Sense*. University of Amsterdam. Promotor: Prof.dr. J.A.P.J. Breuker (UvA). Copromotores: Prof.dr. T.M. van Engers (UvA) and Dr. R.G.F. Winkels (UvA).

Christian Glahn (September 18, 2009). *Contextual Support of Social Engagement and Reflection on the*

Web. Open University. Promotores: Prof.dr. E.J.R. Koper (OU) and Prof.dr. M. Specht (OU).

Sander Evers (September 25, 2009). *Sensor Data Management with Probabilistic Models*. Twente University. Promotores: Prof.dr.ir. P.M.G. Apers (UT). Copromotor: Prof.dr. L. Feng (Tsinghua University, China).

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

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

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

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

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

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

Zhenke Yang (October 29, 2009). *Multi-Modal Data Fusion for Aggression Detection in Dutch Train Compartments*. Delft University of Technology. Promotor: Prof.dr. H. Koppelaar (DUT). Copromotor: Prof.dr.drs. L.J.M. Rothkrantz (KMA).

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

Stephan Raaijmakers (December 1, 2009). *Multinomial Language Learning: Investigations into*

the Geometry of Language. Tilburg University. Promotores: Prof.dr. W.M.P. Daelemans (Antwerpen University) and Prof.dr. A.P.J. van den Bosch (UvT).

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

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

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

INAUGURAL ADDRESSES

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

Dr.ir. G. van Oortmerssen (September 9, 2009). *Darwin and the Internet*. Tilburg University.

Dr.ir. G.J.P.M. Houben (September 30, 2009). 'Zo ziet u alles: een web van dat op maat'. Delft University of Technology.

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

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

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

DIES ADDRESS

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



Advanced SIKS Course on “AI for Games”

INTRODUCTION

On October 5 and 6, 2009 the School for Information and Knowledge Systems (SIKS) will organize an advanced course on “AI for Games”. 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.

The course focuses on advanced AI-techniques in modern video games. It is based on the book *Artificial Intelligence for Games* written by Ian Millington (2006). However, it is not required to purchase the book.

Especially Ph.D. students working on the SIKS-foci “Computational Intelligence” and “Agent Systems” are strongly encouraged to participate.

Location: The Open University in Eindhoven

Course Director: Dr. P. Spronck (UvT)

PROGRAM

Day 1:

10:00-12:00 (15 minutes break included): *Decision making in games*.

Topics: Complexity fallacy; Heuristics and cheats; Decision trees; State machines; Fuzzy logic; Markov systems; Goal-oriented behaviour; Rule-based systems; Blackboard systems; Scripting

12:15-13:00 *NWScript*

Introduction to the programming language NWScript and practicum requirements.

13:00-14:00 Lunch

14:00-18:00 Practicum

The practicum-assignment mimics a battleground in *WORLD OF WARCRAFT*, programmed in *NEVERWINTER NIGHTS*. Students are asked to collaborate in small groups (2, 3 or 4) using the programming language NWScript, which is sufficiently powerful to implement all techniques that were taught in the morning session.

Day 2:10:00-10:45 *Tactics and strategies.*

Topics: Waypoint tactics; Tactical movement; Tactical analyses; Influence maps; Group decisions and cooperation.

11:00-11:45 *Learning in games.*

Topics: Parameter modification; Hillclimbing; Annealing; N-grams; Decision tree learning; Reinforcement learning; Dynamic scripting

12:00-12:45 Practicum

13:00-14:00 Lunch

14:00-16:45 Practicum

17:00-18:00 Tournament

Two teams of students compete in 5 minute sessions. All teams combat each other. Points gained in the 5-minute sessions are added and the team with the highest total score wins the tournament. The winning team will be asked to give a short presentation, revealing the chosen strategy and tactics. At the end the prize giving will take place.

REGISTRATION

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

Deadline for registration for SIKS-Ph.D. students: September 14, 2009.

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

4th SIKS Conference on Enterprise Information Systems (EIS 2009)

Nijmegen, October 23, 2009

Theme: Return on Modelling Effort

For the fourth time, the Dutch Research School SIKS organizes a Dutch/Belgian Conference on Enterprise Information Systems (EIS). The purpose of EIS is to bring together Dutch/Belgian researchers interested in the advances and business applications of information systems – a broad field, including topics such as Management Information Systems, E-Business, IS Analysis and Design, Requirements Engineering, Business Innovation, Knowledge Management, Business Process Management, Product Software Development, Coordination and Communication, Collaborative

Information Systems, Business/IT Alignment, Enterprise Engineering, Architectures for IKS, and many others.

EIS 2009 is organized by SIKS (School for Information and Knowledge Systems) in cooperation with BENAIIS (the Benelux Chapter of the Association for Information Systems) and NAF (Netherlands Architecture Forum) and offers a unique opportunity for research groups from both the Computer Science-side and the Management-side to report research, meet and interact. We also welcome practitioners with an interest in research and innovation.

Keynote Speaker will be Prof. dr. Anne Persson of the University of Skövde, Sweden.

IMPORTANT DATES

August 3	Submission deadline for category A papers (see below)
August 24	Submission deadline for category B papers
September 7	Notification of acceptance
October 23	EIS 2009, Nijmegen, the Netherlands

TYPES OF CONTRIBUTION**Type A: REGULAR PAPERS**

Papers presenting new original work. Submitted papers should not exceed a length of 10 pages. These papers will be reviewed on overall quality and relevance. All accepted papers will be fully published in the proceedings.

Type B: COMPRESSED CONTRIBUTIONS

Papers that have been accepted after September 2008 for IS-related refereed conferences or journals can be resubmitted and will be accepted as compressed contributions. Authors are invited to submit the officially published version (without page restriction) together with a one or two-page abstract (Please put both files in a single zip file and upload the zip file.). B-Papers will be accepted for either brief oral or poster presentation. An extended abstract of the paper will be published in the proceedings. Every author may submit at most one B-paper of which they are the corresponding author, and only if they do not submit any A-paper as corresponding author.

SUBMISSION DETAILS

Paper submissions must be formatted in the (Proceedings) style of the Springer Publications format for Lecture Notes in Computer Science (LNCS). For complete details, see Springer's Author Instructions. Authors keep the copyright of their submissions. The EIS Proceedings will be digital, and will carry an ISSN series number, just

like journals, magazines and series of technical reports. To submit your paper, go to <http://www.easychair.org/conferences/?conf=eis09> (if necessary, create an account first).

ORGANISATION

Stijn Hoppenbrouwers (Radboud University Nijmegen), Richard Starmans (SIKS)

PROGRAM COMMITTEE

Chair: Patrick van Bommel (RUN)

Members: Hans Akkermans (VU); Egon Berghout (RUG); Harry Bouwman (TUD); Sjaak Brinkkemper (UU); Bert de Brock (RUG); Virginia Dignum (UU); Paul Grefen (TU/e); Remko Helms (UU); Willem-Jan van den Heuvel (UvT); Jos van Hillegersberg (UT); Stijn Hoppenbrouwers (RUN); Aldo de Moor (CommunitySense); Michaël Petit (UN); Piet Ribbers (UvT); Hajo Reijers (TUE); Marten van Sinderen (UT); Monique Snoeck (KUL); Yao-Hua Tan (VU); Jan Vanthienen (KUL); Roel Wieringa (UT); Hans Weigand (UvT); Niek Wijngaards (Thales).

MORE INFORMATION

For more information, go to www.cs.ru.nl/eis09, or contact Stijn Hoppenbrouwers (stijnh@cs.ru.nl) or Irma Haerkens (i.haerkens@cs.ru.nl).

SIKS/LOIS Course on “Process Mining and Data Mining” (PMDM)

Eindhoven, October 26-27, 2009.

The SIKS/LOIS Course on Process Mining and Data Mining (PMDM) will take place on October 26-27 on the campus of the Technische Universiteit Eindhoven (TU/e). This course is intended for people who want to learn more about process and data mining and the interplay between both. The course will be followed by the LOIS workshop “Process Mining meets Data Mining” that takes place on Wednesday October 28 and the Benelux Conference on Artificial Intelligence (BNAIC) that takes place on October 29-30. These events are organized by Eindhoven University of Technology (TU/e) under the auspices of the Belgium-Netherlands Association for Artificial Intelligence (BNVKI), the Dutch Research School for Information and Knowledge Systems (SIKS), and the IEEE Task Force on Process Mining.

Although people are stimulated to participate in all three co-located events, it is possible to take the SIKS/LOIS course separately. No prior knowledge of data and/or process mining is assumed from the

participants.

PROGRAM

Day 1 (Monday October 26)

On the first day the primary focus is on data mining. Data mining is a thriving research discipline aimed at developing automatic tools for extracting information from huge data collections. The need for data mining emerged due to newly developed technologies for gathering and storing data. Whereas only few decades ago, shop owners kept track of sales manually, nowadays supermarkets scan and record every single purchase, collecting huge databases. As most of the existing analysis techniques did not scale up to these unprecedented amounts of data, the need for new computational analysis techniques arose and data mining emerged as a discipline.

During the first day of this course, we will provide an overview of the most popular data mining techniques, including: clustering, classification, and pattern mining. For all data mining tasks, special attention will be paid to the following aspects: “Which problems do they solve?”, “What are the major computational issues and how are they addressed algorithmically?” and “What are the strengths and limitations of the different techniques?”.

09.00	Coffee
09.30	Overview of the course and an introduction to the data mining field [Toon Calders]
11.00	Coffee
11.30	Association Rules and Pattern Mining [Toon Calders]
12.30	Lunch
13.30	Clustering [Mykola Pechenizkiy]
15.00	Coffee
15.30	Classification [Mykola Pechenizkiy]
16.30	From Data Mining to Process Mining [Ton Weijters]
17.00	Closing of first day

Day 2 (Tuesday October 27)

The second day is devoted to process mining. Process mining addresses the problem that most people have very limited information about what is actually happening in their organization. In practice, there is often a significant gap between what is prescribed or supposed to happen, and what actually happens. Only a concise assessment of the organizational reality, which process mining strives to deliver, can help in verifying process models, and ultimately be used in a process redesign effort or BPMS implementation.

During the second day an overview is given of contemporary process mining techniques. After

explaining the basic ideas and introducing three types of process mining (process discovery, conformance checking, and model extension), three approaches are presented in more detail. First, the so-called Alpha algorithm is explained. This is a simple algorithm that is able to discover all kinds of control-flow structures, but that cannot deal with noise and infrequent behavior. After introducing the basics, a heuristics driven process discovery is presented (Heuristics Miner). Finally, the attention shifts from discovery to conformance checking and performance measurements. It is shown that event logs can be replayed on models to assess their quality and to enrich them. All process mining approaches are illustrated by applying the process mining tool ProM to concrete event logs. There will also be hands-on exercises.

- 08.30 Coffee
- 09.00 Overview of process mining (discovery, conformance, and extension) [Wil van der Aalst]
- 10.30 Coffee
- 11.00 Process discovery and the Alpha algorithm [Wil van der Aalst]
- 12.30 Lunch
- 13.30 Mining less structured process models: The Heuristics Miner [Ton Weijters]
- 15.00 Coffee
- 15.30 Replay analysis for conformance checking and performance visualization [Boudewijn van Dongen]
- 17.00 Closing of course

ORGANIZATION

This course is organized by:

- Wil van der Aalst
(<http://www.wis.win.tue.nl/~wvdaalst/>),
- Paul de Bra (<http://www.wis.win.tue.nl/~debra/>),
- Toon Calders
(<http://www.wis.win.tue.nl/~tcalders/>),
- Boudewijn van Dongen
(www.processmining.org),
- Mykola Pechenizkiy
(<http://www.win.tue.nl/~mpechen/>), and
- Ton Weijters
(<http://is.tm.tue.nl/staff/aweijters/>).

For more information about the content of the course contact one of the persons above. To register send an e-mail to Ine van der Ligt - van de Moosdijk (wsinfsys@tue.nl). Registration is required. Lunches are included but there is no registration fee. The course will take place in De Zwarte Doos (www.dezwartedoos.nl) at the TU/e campus (http://w3.tue.nl/en/the_university/route_and_map/).

LOIS Workshop “Process Mining meets Data Mining”

The course “Process Mining and Data Mining” (see previous announcement) is co-located with the LOIS Workshop “Process Mining meets Data Mining” (PMPM’09) that takes place on Wednesday October 28, 2009 at the Technische Universiteit Eindhoven (TU/e). The scope of this workshop coincides with the course given on Monday and Tuesday. Therefore, more information is given below.

Data mining is the process of extracting hidden patterns from data. The data mining community is concerned with tasks such as classification, clustering, regression, association rule learning, etc. There are many successful applications of data mining and it has become one of the core disciplines in computer science.

Within the business process intelligence community, there is a large and lively sub-community, focusing on process mining (cf. www.processmining.org). Process mining targets the discovery of information based on event logs. For instance, the automatic discovery of process models from event logs. Examples of event logs include process data generated by administrative services, health care data about patient handling, audit trails of all kinds of devices, and logs of workflow tools. Many machine learning and data mining techniques have successfully been applied in this field. Nevertheless, the process mining community and the mainstream data mining community have remained relatively disconnected. This LOIS workshop aims to bring these two communities together.

To achieve this, world-renowned experts from the field of data and process mining will come to Eindhoven. Thanks to the support of LOIS (Logistics, Operations and Information Systems) we are able to invite top scholars and offer an interesting program free of charge. The program will be announced later this summer, but people that are interested are asked to already reserve Wednesday October 28, 2009 in their agenda.

As one of TU/e’s eight strategic research areas, LOIS addresses the challenges of the processes needed to deliver products and services meeting complex requirements in environments that are highly dynamic, interconnected and competitive. The focus is on operational processes in manufacturing, logistics and services. The challenge is to gain a deeper understanding of these processes, by using data and process mining techniques, for example, and to develop modeling approaches that

can be successfully applied to practical operations. The aim of these models is to allow the reliability and predictability of the underlying processes to be improved and optimized. For more information on LOIS, see http://w3.ieis.tue.nl/nl/onderwijs/portals/actuele_informatie/onderzoeksgebied_lois/.

The LOIS PMPM'09 workshop will be directly followed by the 21st Benelux Conference on Artificial Intelligence (BNAIC 2009) also taking place in Eindhoven. Academics and practitioners are invited to attend both co-located events. See <http://www.wis.win.tue.nl/bnaic2009/> for more information.

For more information about the LOIS PMPM'09 workshop, contact Ine van der Ligt (wsinfsys@tue.nl).

SIKS Day 2009

INTRODUCTION

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

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

PROGRAM

The program will be announced shortly.

All members of our research school (research fellows, associated members and Ph.D. students) as well as the members of SIKS' Advisory Board and our alumni are invited to participate.

REGISTRATION

All details on registration will be made available soon.

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

The 10th Annual International Workshop "Engineering Societies in the Agents' World" (ESAW 2009) will be held at Utrecht University,

The Netherlands on the 18th, 19th, and 20th of November, 2009.

Following successful editions since 2000, the 10th edition of ESAW remains committed to the use of the notion of multi-agent systems as seed for animated, constructive, and highly inter-disciplinary discussions about technologies, methodologies, and tools for the engineering of complex distributed applications. While the workshop places an emphasis on practical engineering issues and applications, it also welcomes theoretical, philosophical, and empirical contributions, provided that they clearly document their connection to the core applied issues.

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

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

SIKS Basic Course "Research Methods and Methodology for IKS"

INTRODUCTION

On 25, 26, and 27 November 2009, the School for Information and Knowledge Systems (SIKS) organizes the annual three-day course "Research methods and methodology for IKS". The location will be Conference center Woudschoten in Zeist. The course will be given in English and is part of the educational Program for SIKS-Ph.D. students. Although the course is primarily intended for SIKS-Ph.D. students, other participants are not excluded. However, their number of passes will be restricted and depends on the number of SIKS-Ph.D. students taking the course.

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

philosophy of science (and particularly to the philosophy of mathematics, computer science and AI). And, it addresses such divergent topics as “the case-study method”, “elementary research methodology for the empirical sciences” and “empirical methods for computer science”.

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

COURSE COORDINATORS

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

PROGRAM

The program will be announced in due course.

REGISTRATION

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

SIKS Basic Courses “Agent Systems” and “System and Architecture Modelling”

INTRODUCTION

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

Location: Landgoed Huize Bergen, Vught

Date: December 7-10, 2009

SCIENTIFIC DIRECTORS

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

PROGRAM

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

Agent Systems

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

System and Architecture Modelling

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

REGISTRATION

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

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

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

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

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

ANNOUNCEMENTS

Call for Participation

Benelux Conference on Artificial Intelligence (BNAIC)

<http://wwwis.win.tue.nl/bnaic2009>
October 29-30, 2009

- Early registration deadline: 25/09/09
- Registration website: http://www.eventure-online.com/eventure/welcome.do?type=participant&congress=17_BNAIC

BNAIC is the Benelux Conference on Artificial Intelligence and is one of the main activities of the BNVKI (Benelux Association for Artificial Intelligence). The main goals of BNAIC are two-fold:

- to bring together the AI researchers in the Benelux to meet and present research activities;
- to present high-quality research results, possibly already published in international conferences or journals.

The format of BNAIC is therefore a mixture of a meeting place and a forum for high-quality research results. This forms a balance that has proven to be successful in the previous years, as is shown by the high number of participants each year.

The 21st Benelux Conference on Artificial Intelligence (BNAIC 2009) will be held at the Eindhoven University of Technology and is organized under the auspices of the Benelux Association for Artificial Intelligence (BNVKI) and the Dutch Research School for Information and Knowledge Systems (SIKS). The conference aims at presenting an overview of state-of-the art research in artificial intelligence in the Benelux. This year's invited keynote talks will be given by prof. Wolfram Burgard (University of Freiburg) and prof. Peter Flach (University of Bristol).

ORGANIZATION

Programme Committee Chairs:

- Toon Calders, Eindhoven University of Technology, the Netherlands
- Karl Tuyls, Maastricht University, the Netherlands

Industrial Track Chair:

- Mykola Pechenizkiy, Eindhoven University of Technology, the Netherlands

Programme Committee and local organization:
see BNAIC website.

CONFERENCES, SYMPOSIA WORKSHOPS

AUGUST 6, 2009

KRAQ09: Knowledge and Reasoning for Answering Questions. ACL-IJCNLP 2009 workshop. Singapore.
<http://www.irit.fr/recherches/ILPL/kraq09.html>

AUGUST 9-11, 2009

The 4th International Conference on E-Learning and Games (Edutainment 2009). Banff, Canada.
<http://www.ask4research.info/edutainment/2009>

OCTOBER 29-30, 2009

21st Benelux Conference on Artificial Intelligence (BNAIC2009). Eindhoven, The Netherlands.
<http://wwwis.win.tue.nl/bnaic2009/>

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- Whole page: € 400 for 1 issue; € 600 for 2 subsequent issues; € 900 for 6 subsequent issues.
- Half page: € 300 for 1 issue; € 450 for 2 subsequent issues; € 675 for 6 subsequent issues.

You reach an audience of AI professionals, academics and students. Your logo (with link to your company) will also be shown on the BNVKI/AIABN website during the period of advertisement.

Contact sien.moens@cs.kuleuven.be for additional information

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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.

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CHANGE OF ADDRESS

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