

Fifty Years of AI

Macro Operators

Perceptual Cognition
Workshop

Fifty Years of AI

Editor-in-Chief

This year is recognized by many researchers in Artificial Intelligence as the 50th birthday of their research domain. The acknowledged milestone marking the birth of AI was the famous Dartmouth Conference, proposed by John McCarthy, Marvin Minsky, Nathaniel Rochester, and Claude Shannon, and organised by McCarthy, who coined the term “Artificial Intelligence” for this purpose. Of course, central ideas in AI date back from far earlier. Even in the Greek mythology mention was made of intelligent robots. However, in some way all ideas on artificial intelligence came together in the proposal for the Dartmouth conference, as stated on August 31, 1955, in [1]. We quote:

“We propose that a 2 month, 10 man study of artificial intelligence be carried out during the summer of 1956 at Dartmouth College in Hanover, New Hampshire. The study is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it. An attempt will be made to find how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves. We think that a significant advance can be made in one or more of these problems if a carefully selected group of scientists work on it together for a summer.”

The authors then mention seven aspects of the artificial intelligence problem,: (1) Automatic Computers; (2) How Can a Computer be Programmed to Use a Language; (3) Neuron Nets; (4) Theory of the Size of a Calculation; (5) Self-Improvement; (6) Abstractions; and (7) Randomness and Creativity. Going about this list in a glance it is clear that all seven fields have seen considerable progress during the last fifty years. For people interested in the history of AI, some interesting links have been assembled below. Many more can easily be found.

John McCarthy received the Turing Award for his accomplishments in 1971.



Of course, such a birthday will not go without festivities. The main memorial was in Dartmouth again, the AI@50 conference (see <http://www.dartmouth.edu/%7Eai50/program.html>), including key note speakers McCarthy and Minsky. It had the challenging title: *AI, the Next Fifty Years*. In Germany, a symposium on 50 years of AI was recently organized at the Universität Bremen (see <http://www.ki2006.fb3.uni-bremen.de/50years.htm>), with Marvin Minsky as keynote speaker. Within our own community the AI lab of the Vrije Universiteit Brussels will organize a symposium on November 23, 2006 in Brussels (see the announcement at page 90 of this issue). A must for anyone interested in the history of AI.

[1] J. McCarthy, M.L. Minsky, N. Rochester, and C.E. Shannon (1955). A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence. <http://www-formal.stanford.edu/jmc/history/dartmouth/dartmouth.html>.

Bruce Buchanan’s Brief History of AI: <http://www.aaai.org/aitopics/bbhist.html>

Wikipedia’s History of AI: http://en.wikipedia.org/wiki/History_of_artificial_intelligence

ThinkQuest’s History of AI: <http://library.thinkquest.org/2705/history.html>

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The photographs in this issue are by courtesy of Guido de Croon (p. 83), Dreas van Donselaar (p.84) and Koen Deschacht (p. 86).

Front cover: John McCarthy, playing Chess via the IBM 7090, in 1967 (left), and at the Association of Symbolic Logic, Pittsburg, in 2004 (right).

The deadline for the next issue is: **September 29, 2006**.

Appeal for new BNVKI Board members

Several members of the Board of the BNVKI will step down at the next General Assembly, to be held during the BNAIC 2006, October 3-6, 2006 in Namur. Therefore, the Board of the BNVKI invites members of the BNVKI to make themselves available for becoming board member of the BNVKI. In case of several applicants of equal capability, preference will be for female applicants. If interested, please contact the chair of the Board, Prof.dr.ir. J.A. La Poutré (see the back cover of this issue for contact information).

BNVKI-Board News

Han La Poutré

Now is the time to pay attention to our binational gathering: the BNAIC, taking place in Namur, Belgium. This year's BNAIC will be special in various senses...

An important BNVKI event will be celebrated during this BNAIC: the 25th anniversary of the BNVKI! This is an important milestone and a reason for several activities during the BNAIC. With respect to what exactly will happen during the BNAIC: we just don't tell that right now. Just come and see and participate in the celebration of the 25 year jubilee of the BNVKI. Also, the upcoming BNVKI Newsletter will be dedicated to the jubilee, with many contributions about the history, present and future of the BNVKI. We like to invite you to send in contributions for this special edition.

As usual, the BNAIC will contain many paper presentations: this year about 95 papers that will be presented as oral presentations or posters. But also, this year for the first time, a special session and a forum will take place, that will deal with the connection between research and industry. This promises to be an interesting new component of the BNAIC, where both people working in academia as well as industry can hear about the newest challenges and developments. Don't expect any product presentations or sales shows: you will hear about AI research in industry, the (special) problems industry is dealing with, and what this means for AI research in terms of new research problems. So, expect a new type of contributions to the BNAIC, which will be inspiring to AI researchers.

Finally, since the BNAIC occurs in Namur, participants could stay the weekend following the BNAIC and enjoy the Ardennes. Many possibilities exist to do this, with day tours ranging from very relaxed to highly active.

The Board is looking forward to seeing you at the BNAIC in Namur and invites you to join in the celebration of the 25 years jubilee!

MACRO OPERATORS

*Henk Visser
Haarlem*

(Comp meets Math in the cloakroom of the National Theatre after a performance of Nathan the Wise and tackles him)

COMP. Hello Math, good to see you here! Better than in the Institute? Although I have good memories of our discussions about intuitive insights, perspicuous representations, and the like, I have long been going about with afterthoughts, and there is still one thing that intrigues me. We had many conversations but I don't remember that you ever mentioned macro operators. Yet I think that they are important enough for bringing them up in a discussion of problem-solving procedures in mathematics.

MATH. What a coincidence! Lessing already drew attention to macro operators when he discussed the use of verbs, and Jacob Israel de Haan, who knew this, once gave an example of a man visiting his doctor with a complaint about carrying out a painful, but seemingly unnecessary series of actions such as moving his right arm forward, moving his left arm backward and so on, whereas he could have described the situation as simply putting on his jacket. Yes, macro operators are important in problem solving, and I think that I must pay attention to them. Shall we continue the conversation in the theatre restaurant?

COMP. With pleasure.

(They go to the restaurant, take off their coats, and order a drink and a pastry)

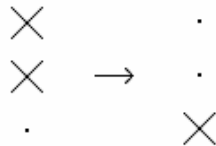
COMP. Do you know the paper by Iba about macro operators in peg solitaire? He presented it at the IJCAI conference of 1985.

MATH. I am afraid I have never seen it. My association with macro operators is the eight-puzzle problem in which the end state can be reached by a certain rotation. *(He draws the following figure on a napkin):*

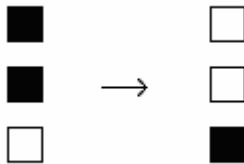
| | | |
|---|---|---|
| 5 | 6 | 7 |
| 4 | | 8 |
| 3 | 2 | 1 |

COMP. I know this example. It was given by my teacher in his course on the philosophy of AI. He doubted if a program based on SOAR would be able to generate the corresponding macro operator. Moreover he emphasized that human beings can describe this solution and communicate it to others in ordinary language,

because of which he called it a common-sense solution. Notice that it takes thirty elementary moves! He also drew the attention to the paper of Iba, but he was also skeptical about Iba's claim about what his program had achieved. Anyhow Iba distinguished a small number of macros which I memorized, so that I could demonstrate my skill of solving the classical peg problem at birthday parties ... It goes as follows. First of all we have the elementary moves, to begin with



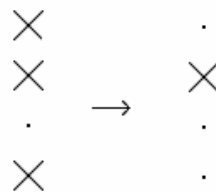
MATH. I see. It is not necessary to give the other ones, because they are reached by simple transformations. Is it useful to see these elementary moves as the creation of a negative image?



COMP. I don't know, but it is possible that a Boolean notation is interesting from a mathematical point of view:

$$110 \rightarrow 001$$

Moreover, what do you do with the following macro operator?



MATH. It amounts to a rotation over 180° and a negative image. You would describe it as

$$1101 \rightarrow 0100$$

But how did you remember this operation?

COMP. As 'dodd', after John Dodd, a great English bow maker. As soon as I distinguish this configuration, I know that I can eliminate the end pieces.

MATH. Interesting. My first violin teacher played with a Dodd!

COMP. Lucky man! But now for the next macro:



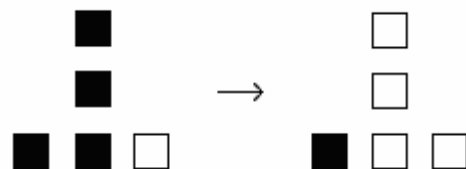
MATH. I see. It replaces three elementary moves. It can also be seen as a reflection in the central axis and a negative image, two operations for one macro. But your one-dimensional notation does not suffice any more.

COMP. Shall we from now on use a two-dimensional representation? Something like:

$$\begin{array}{ccc} x & 1 & x \\ x & 1 & x \\ 1 & 1 & 0 \end{array} \rightarrow \begin{array}{ccc} x & 0 & x \\ x & 0 & x \\ 1 & 0 & 0 \end{array}$$

The variable x can take any value, either zero or one. How would you describe this complex operation in ordinary language?

MATH. As soon as three pieces on a row are flanked at one end by two different elements, these three pieces can be deleted.



COMP. That is clear. But how would you describe the following very useful macro with which six pieces are taken away?

$$\begin{array}{ccc} 1 & 1 & x \\ 1 & 1 & 0 \\ 1 & 1 & 1 \\ x & x & 1 \end{array} \rightarrow \begin{array}{ccc} 0 & 0 & x \\ 0 & 0 & 0 \\ 0 & 0 & 1 \\ x & x & 1 \end{array}$$

MATH. Is this the only way of deleting a configuration of two by three pieces?

COMP. No, it is not. But I have no complete picture of the possibilities. I propose that we find out at home. Moreover it is already late. But I have a question for you. How did you know what

Lessing said about verbs? Did you read his Hamburg Dramaturgy?

MATH. I once had a look into that work, but I have read about Lessing's remarks in the third volume of Mauthner's *Kritik der Sprache*. I will look it up. Shall we meet each other tomorrow at the Brouwer Institute?

COMP. Agreed!

(They pay the bill and go their different ways)

(Next morning in Comp's room)

MATH. What did you find, Comp? And how?

COMP. When I came home yesterday night I tried to solve your problem, so I started with the following position:

$$\begin{array}{ccc} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \\ x & x & 0 \end{array}$$

and I discovered that it can be reduced to a position in which a rectangle of two by three pieces has been eliminated:

$$\begin{array}{ccc} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \\ x & x & 0 \end{array} \rightarrow \begin{array}{ccc} 0 & 0 & 1 \\ 0 & 0 & 1 \\ 0 & 0 & 1 \\ x & x & 0 \end{array}$$

also, that the piece above to the right had not been used:

$$\begin{array}{ccc} 1 & 1 & x \\ 1 & 1 & 1 \\ 1 & 1 & 1 \\ x & x & 0 \end{array} \rightarrow \begin{array}{ccc} 0 & 0 & x \\ 0 & 0 & 1 \\ 0 & 0 & 1 \\ x & x & 0 \end{array}$$

In a similar way I found another macro:

$$\begin{array}{ccc} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 0 \\ x & x & x \end{array} \rightarrow \begin{array}{ccc} 0 & 0 & 1 \\ 0 & 0 & 1 \\ 0 & 0 & 0 \\ x & x & x \end{array}$$

It is in fact a combination of the two following macros:

$$\begin{array}{ccc} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 0 \\ x & x & 1 \end{array} \rightarrow \begin{array}{ccc} 0 & 0 & 1 \\ 0 & 0 & 1 \\ 0 & 0 & 0 \\ x & x & 1 \end{array}$$

$$\begin{array}{ccc} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 0 \\ x & x & 0 \end{array} \rightarrow \begin{array}{ccc} 0 & 0 & 1 \\ 0 & 0 & 1 \\ 0 & 0 & 0 \\ x & x & 0 \end{array}$$

But then I did not want to go through with this, and it was also too late for making the computer do it, so this is all that I found.

MATH. You are right that it is not very interesting to proceed this way, but don't you think that your results can be generalized?

COMP: What do you mean?

MATH. Well, it might be that we can bring all possibilities for the third column under one formula. I have the intuitive feeling that a rectangle of two by three can always be deleted as soon as it is accompanied by a four-place column containing the configuration

odd

What do you think?

COMP. That would be odd ...

MATH. I have a proposal. You are going to use the computer in order to find out whether I am right or not, and I take pen and paper to do so.

COMP. OK. Here is a sheet of paper. Good luck!

(After less than half an hour Math stops writing and sighs)

MATH. Yes! I was right. How far did you come?

COMP. I am still working at it ...

MATH. Do we now have enough macro operators to solve the traditional solitaire task?

COMP. We can try it out, look *(he has already set ready a 'real' game of solitaire)*:

```

      1 1 1
      1 1 1
    1 1 1 1 1 1 1
    1 1 1 O 1 1 1
    1 1 1 1 1 1 1
      1 1 1
      1 1 1
  
```

MATH. It seems that there is as yet no useful possibility for an odd macro! Am I right?

COMP. I always start with taking three pieces away:

```

      1 1 1
      1 1 1
    1 1 1 1 1 1 1
    1 1 1 O 1 1 1
    1 1 1 1 1 1 1
      1 1 1
      1 1 1
  
```

The result is clear:

```

      1 1 1
      O 1 1
    1 1 O 1 1 1 1
    1 1 O O 1 1 1
    1 1 1 1 1 1 1
      1 1 1
      1 1 1
  
```

MATH. Now it is easy, or shall I say 'odd'?

```

      1 1 1
      O 1 1
    1 1 O 1 1 1 1
    1 1 O O 1 1 1
    1 1 1 1 1 1 1
      1 1 1
      1 1 1
  
```

I can take six away:

```

      1 1 1
      O 1 1
    O O O 1 1 1 1
    O O O O 1 1 1
    O O 1 1 1 1 1
      1 1 1
      1 1 1
  
```

MATH. This is promising, for there is another odd macro:

```

      1 1 1
      O 1 1
    O O O 1 1 1 1
    O O O O 1 1 1
    O O 1 1 1 1 1
      1 1 1
      1 1 1
  
```

Another six away:

```

      1 1 1
      O 1 1
    O O O 1 1 1 1
    O O O O 1 1 1
    O O 1 1 1 1 1
      O O O
      O O O
  
```

COMP. Go on!

MATH. Odd again:

```

      1 1 1
      O 1 1
    O O O 1 1 1 1
    O O O O 1 1 1
    O O 1 1 1 1 1
      O O O
      O O O
  
```

It becomes monotonous:

```

      1 1 1
      O 1 1
    O O O 1 1 O O
    O O O O 1 O O
    O O 1 1 1 O O
      O O O
      O O O
  
```

COMP. And now?

MATH. I take three away, as you did in the beginning:

```

  1 1 1
    0 1 1
0 0 0 1 1 0 0
0 0 0 0 1 0 0
0 0 1 1 1 0 0
    0 0 0
      0 0 0

```

and I am almost ready:

```

  1 1 1
    0 1 1
0 0 0 1 1 0 0
0 0 0 0 1 0 0
0 0 0 0 0 0 0
    0 0 0
      0 0 0

```

COMP. So far, so good, but I can tell you that the two remaining possibilities for taking three away are not feasible.

MATH. I see that too. Therefore I will continue with elementary moves, and see if there is still a solution.

COMP. How far can you look ahead?

MATH. Six moves must be possible. Let me see ...
(*Math pores over the board*) Yes!

```

  1 1 1
    0 1 1
0 0 0 0 0 1 0
0 0 0 0 1 0 0
0 0 0 0 0 0 0
    0 0 0
      0 0 0

```

COMP. Aha! Shall I ...

MATH. Let me do it, I have come to like it!

```

  1 1 0
    0 1 0
0 0 0 0 1 1 0
0 0 0 0 1 0 0
0 0 0 0 0 0 0
    0 0 0
      0 0 0

```

Do you also see how it is finished?

```

    0 0 1
    0 1 0
0 0 0 0 1 1 0
0 0 0 0 1 0 0
0 0 0 0 0 0 0
    0 0 0
      0 0 0

```

COMP. Good old Dodd again!

MATH. I see it differently, but it is up to you!

COMP.

```

    0 0 0
    0 1 0
0 0 0 0 1 1 0
0 0 0 0 0 0 0
0 0 0 0 0 0 0
    0 0 0
      0 0 0

```

MATH. At last we have the tiny macro we began with yesterday night:

```

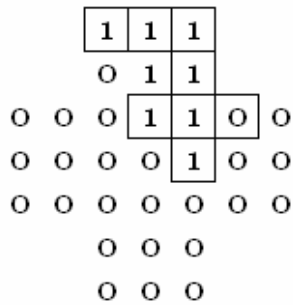
    0 0 0
    0 0 0
0 0 0 0 0 0 0
0 0 0 1 0 0 0
0 0 0 0 0 0 0
    0 0 0
      0 0 0

```

COMP. Fine!

MATH. An interesting aspect of macros is that they may make a particular solution perspicuous. This was the case with the eight-puzzle problem which I mentioned yesterday. However our solution of the solitaire problem fails in this respect. I had to insert an elementary move after the second application of the elimination of three in a row.

COMP. Iba had a macro for that situation. He called it 'Remove-L':



MATH. That was clearly ad hoc, and I understand why your teacher had misgivings about Iba's achievements. And why was Iba satisfied with this solution? A mathematician would have looked for a truly perspicuous solution, and if he could not find one, then he would have told so.

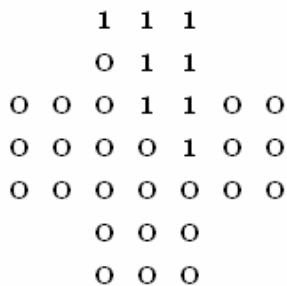
COMP. It is possible that Iba tried to find out whether there is a solution with a minimum of different macros. If that is indeed the case, he has probably got the result that his 'Remove-L' macro was always needed at the end of the game.

MATH. The description 'Remove-L' does not mention the precondition of the operator. I see no simple remedy for this, so I remain critical about such a macro, not to mention that it is used only once.

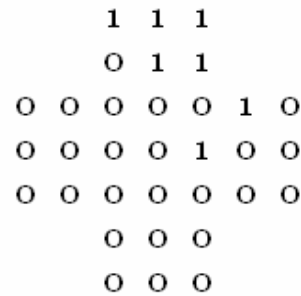
COMP. Does this mean that the whole project has failed?

MATH. Not at all. I noticed that so far all macros can be described as operations with which only pieces are taken away and none are added. This looks plausible, but it has led to an obscure macro, the 'Remove-L'. Moreover the corresponding solution could not do without an elementary move, although only at the end.

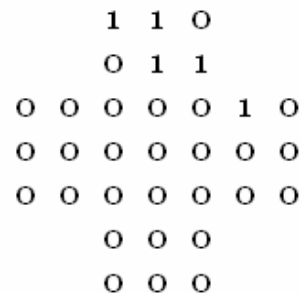
COMP. When you looked six moves ahead, you imagined only elementary moves one after another, whereas I noticed a dodd situation after your first move (*Comp reconstructs the state which preceded it*):



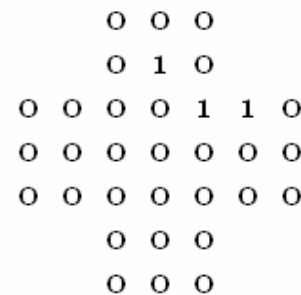
It is possible to regard the elementary move as a preparatory move for a dodd situation:



(*Comp applies the dodd macro*)



MATH. Then I would jump over two pieces, as if we were playing draughts:



The fact that I could look ahead can perhaps be explained by my experience with draughts. I did not tell you, because I would not lead you away from your macros.

COMP. There is indeed a difference between human players and computers. You could bring the game to a good end in your way. On the other hand a suitable computer program would not have problems with checking the precondition of the Remove-L macro and then applying it.

MATH. Would the draughts approach not lead to significant macros? To begin with:

$$\begin{array}{ccc} 1 & 1 & 0 \\ & & 1 \\ & & 0 \end{array} \rightarrow \begin{array}{ccc} 0 & 0 & 0 \\ & & 0 \\ & & 1 \end{array}$$

COMP. Why not? Look:

$$\begin{array}{ccc} 1 & 1 & 0 \\ 1 & 1 & 1 \\ 1 & 1 & 0 \\ 1 & 1 & 0 \\ & & 0 \end{array} \rightarrow \begin{array}{ccc} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \\ 1 & 1 & 0 \\ & & 1 \end{array}$$

MATH. What do you think of this:

$$\begin{array}{ccc} 1 & 1 & 0 \\ 1 & x & 1 \\ 0 & 1 & 0 \end{array} \rightarrow \begin{array}{ccc} 1 & 0 & 0 \\ 0 & x & 0 \\ 0 & 0 & 0 \end{array}$$

COMP. I see in which direction you want to go. Iba's macros are perhaps significant for a particular solitaire problem, but it is not clear whether they are interesting from a mathematical point of view.

MATH. Macros can indeed be judged from different points of view, mathematical, computational, and also psychological. When we restrict ourselves to mathematics, we would expect that macros have certain mathematical properties, depending on the task which they are supposed to perform. Macros in solitaire games can be judged by the criterion how far they contribute to solutions of solitaire puzzles. I would define such a puzzle as the problem of transforming a finite subset of the two-dimensional raster with exactly one empty place, into itself with exactly one occupied space, with the usual transformation rule. Classical solitaire can be defined as a solitaire puzzle with the property that the goal state is the negative of the initial state. But then we can also omit the condition that the initial state has only one empty space. This would provide more solvable solitaire problems.

COMP. Can you give an example?

MATH: A very simple one is the following problem:

$$\begin{array}{ccc} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 0 & 1 & 0 \end{array} \rightarrow \begin{array}{ccc} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 1 & 0 & 1 \end{array}$$

COMP. This produces another macro! And apparently the description you gave of the elementary move as the forming of a negative image was not at all ridiculous. Another question: do you think that initial states in the form of a square or rectangle are interesting?

MATH. We can start with the situation of a moment ago. The third row can be reached by your famous dodd macro, so let us add one column and apply it:

$$\begin{array}{cccc} 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \\ 1 & 0 & 1 & 1 \end{array} \rightarrow \begin{array}{cccc} 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \\ 0 & 0 & 1 & 0 \end{array}$$

It follows that the whole operation comes down to a solution of a classical solitaire puzzle.

$$\begin{array}{cccc} 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \\ 1 & 0 & 1 & 1 \end{array} \rightarrow \begin{array}{cccc} 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \\ 0 & 0 & 1 & 0 \end{array} \rightarrow \begin{array}{cccc} 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 \end{array} \rightarrow \begin{array}{cccc} 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 \end{array}$$

COMP. Interesting! You started with two macros and combined them in such a way that a solvable solitaire puzzle came about.

MATH. We can even go further by adding two rows to the second last state, and then applying a odd macro:

$$\begin{array}{cccc} 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 \\ 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \end{array} \rightarrow \begin{array}{cccc} 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 1 & 1 & 0 & 1 \\ 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \end{array} \rightarrow \begin{array}{cccc} 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 1 & 1 & 0 & 1 \\ 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \end{array}$$

COMP. It is a pity that the total result is not a classical solitaire puzzle:

$$\begin{array}{cccc} 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \\ 1 & 0 & 1 & 1 \\ 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \end{array} \rightarrow \begin{array}{cccc} 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{array}$$

But the procedure opens perspectives. Instead of making an attempt to solve a particular problem with the risk that there is no solution at all, solvable problems are constructed from solved problems. It reminds me of a similar approach which my teacher in the philosophy of AI chose for finding solvable rectangular boards for the problem of the knight, which is how to reach every cell in a tour of the knight around the board.

MATH. I know. This problem also has a classical form in the requirement that the knight should be brought back to his initial position, in a so-called closed tour. But already the board of 4 by 3 is not classical, although one of its solutions can be used to solve the problem for a board of 8 by 3. A similar success can be reached by our last solution. Do you see it?

COMP. Of course. I will add a rectangle of 4 by 5 and repeat the last solution:

```

1 1 1 1 1 1 1 1      0 0 0 0 1 1 1 1
1 1 1 1 1 1 1 1      0 0 0 0 1 1 1 1
1 0 1 1 1 1 1 1  →  0 0 1 0 1 1 1 1
1 1 1 1 1 1 1 1      0 0 0 0 1 1 1 1
1 1 1 1 1 1 1 1      0 0 0 0 1 1 1 1

```

I apply the dodd macro to the result and then it is obvious what to do:

```

0 0 0 0 1 1 1 1      0 0 0 0 0 0 0 0
0 0 0 0 1 1 1 1      0 0 0 0 0 0 0 0
0 0 0 0 1 0 1 1  →  0 0 0 0 0 0 1 0
0 0 0 0 1 1 1 1      0 0 0 0 0 0 0 0
0 0 0 0 1 1 1 1      0 0 0 0 0 0 0 0

```

MATH. Now we know that this is a solvable problem we can try to solve it with other macros such as dodd and odd.

COMP. (*After some scribbling*) No problem. Only at the end I had to look for suitable elementary moves.

MATH. I think that a computer program should also start with such macros, but must solve the endgame without them. However, how does it decide that the endgame has arrived?

COMP. When the macros do not work anymore. The last problem seems a good example for trying this out. When I solved it in my way, the endgame arose when there were only five pieces left.¹ How would this be with the computer?

MATH. I would suggest that you try to answer this question, whereas I am going to think about the use of macros in theorem proving.

COMP: Good idea! Just one question: did you find the reference to Lessing?

¹ This was Comp's endgame:

```

0 0 1 0
0 1 1 0
0 1 1 0

```

MATH. First of all I looked into the doctoral thesis of Jacob Israel de Haan. His quotations from Lessing were taken from Mauthner, so I consulted the third volume of Mauthner's *Beiträge zu einer Kritik der Sprache*. It appeared that Lessing formulated his definition of an action in his essays on the fable, and he gave a philosophical comment in the sixteenth chapter of *Laocoon*. I wrote the definition out,² and will now try to give a translation:

I call an action a succession of changes which together constitute a whole. This unity of the whole rests on the conformity of all parts to a final goal.

COMP. Nice quotation! Perhaps we can use it for a definition of a macro operator. I will think about it.

MATH. So will I. See you later. (*He leaves Comp's room*)

Perceptual Cognition Workshop

*Guido de Croon and Eric Postma
MICC-IKAT, Universiteit Maastricht*

On April 20th, 2006 MICC-IKAT organized the perceptual cognition workshop at Maastricht University. The workshop was funded by the NWO Cognition programme (advanced studies initiative) and featured active vision as the central theme. Active-vision models perform actions to influence their subsequent observations, rather than passively receiving and processing observations, as is common in more traditional models of vision. Reputed researchers from Europe and the US presented their research on active vision. In the following, we review their presentations in two parts. The first part contains the three presentations on natural active vision, the second part those on the construction of active-vision models.

NATURAL ACTIVE VISION

The main goal of active-vision models is to better understand how natural systems perceive their environment. Three presentations during the workshop addressed this issue.

² Eine Handlung nenne ich eine Folge von Veränderungen, die zusammen ein Ganzes ausmachen. Diese Einheit des Ganzes beruht auf der Übereinstimmung aller Teile zu einem Endzweck.

AN EMBODIED MODEL OF EYE-MOVEMENTS

Dana Ballard (Rochester University)

Human eye-movements depend to a great extent on the type of task being performed. The task-dependency of eye-movements was first recognized by Yarbus (Yarbus, 1967). Recently, it became clear that the timing of eye-movements is also tightly linked to the demands of a task (see, e.g., Hayhoe, 2003). For example, when making peanut butter sandwiches, a subject will fixate on the peanut butter jar, just before grabbing it. Then a fixation on the knife may follow just before moving the knife to the peanut butter jar, etc.

Professor Ballard presented joint research with Nathan Sprague, in which they constructed an active-vision model of human obstacle avoidance and litter collection in a virtual world. The model, named WALTER, has several micro-behaviours: collision avoidance, sidewalk navigation, and litter collection. The appropriate executions of these micro-behaviours are learned with reinforcement learning by estimating the expected reward of performing micro-behaviours in certain world states. For example, if WALTER faces an obstacle right in front of him, the actions “going to the left” or “going to the right” will have a high reward. Since the micro-behaviours share the same action space (walking direction) the action selection is performed by summing the reward values of all actions over the three micro-behaviours. The main difficulty of the task derives from the fact that WALTER is uncertain as to the world’s state. The only manner to obtain a certain estimate of an object’s position in the world is to move the eyes to fixate it. If WALTER is not fixating a certain object, the uncertainty on its position increases. The allocation problem of the model’s fixation is solved with the help of rewards for the different micro-behaviours, obtained by reinforcement learning. These rewards allow WALTER to calculate the expected cost of the increasing uncertainty on a part of the world’s state.

An advantage of Sprague and Ballard’s approach is that it is possible to let humans perform the same task as WALTER, in the same environment. This facilitates the verification of the eye-movement model. In one of the studies (Sprague and Ballard, submitted), the eye-movements of human subjects were compared with two models. The first model is a bottom-up model of visual attention, which determines fixation points by evaluating the visual saliency of parts of the visual scene (based on Itti and Koch, 2001). For example, an object in the visual scene that contrasts highly with its surroundings is more likely to be fixated than a patch of grass. The second model is WALTER, the model discussed above. The comparison shows that

the first model does not predict more than half of the fixations made by human subjects. In contrast, WALTER predicts rather well the locations of the fixations made by human subject. The main difference with human subjects is that the latter tend to fixate the side of the sidewalk less. Suggested reasons for this are that human subjects do not need to fixate the sidewalk, since it does not contain curves, or that human subjects gather information about the sidewalk while fixating an object that is on the sidewalk.

DEVELOPMENT OF VISUAL FEATURES

Dario Floreano (EPFL, Lausanne)

The presentation of professor Floreano focussed on the co-development of active-vision behaviour and feature selection. The methodology adopted is that of evolutionary robotics (Nolfi and Floreano, 2000). In evolutionary robotics, the parameters of the active-vision model are optimised with an evolutionary algorithm. One of the advantages of this methodology is that it allows the self-organisation of both active-vision behaviour and feature selection. The evolutionary methodology has shown that complex visual tasks, such as position and size-invariant shape recognition and navigation in the environment, can be solved with rather simple neural architectures. In the presentation, Floreano addressed two sets of experiments: shape discrimination and robot navigation.

The active-vision models that were evolved for shape discrimination developed sensitivity to a number of oriented, retinotopic, visual features – oriented edges, corners, height – and a behavioral repertoire to locate, bring, and keep these features in sensitive regions of the vision system, resembling strategies observed in simple insects. For example, evolved active-vision models mimicked behaviour typical of free-flying *Drosophila* flies in discriminating different shapes (Floreano *et al.*, 2004). *Drosophila* flies have been shown to move in such a way as to bring a relevant shape over the receptive fields of neurons sensitive to the retinotopic height of a horizontal edge (Dill *et al.*, 1993). In (Marocco and Floreano, 2002), an active-vision model was evolved to discriminate between squares and triangles. The active-vision model had nine receptive fields. The possible actions of the model were to change the position of the receptive fields, zoom in and out on the image, and to change the ‘mode’ of each receptive field between averaging the light intensity of the corresponding image area and representing the center pixel of the

corresponding image area. After evolution, the active-vision models all followed a similar action strategy. First, they located the shape in the image. After fixating the shape, the retina slid back and forth over one of its vertical edges. If the edge was straight, it set its response to square, otherwise to triangle.

In a second set of experiments the active-vision model developed its receptive fields by means of unsupervised Hebbian learning. These experiments show that the so-formed receptive fields are significantly affected by the behaviour of the system and differ from those predicted by most computational models of visual cortex. Robots were evolved in simulation for a task of driving around in an environment. There were two types of robots: one type of robot could evolve the manner in which it drove around in the environment during the development of its visual features, while the second type of robot had a fixed behaviour during the development of its visual features. The first type of robot outperformed the second type of robot on the driving task. The visual features of the two types of robots differed considerably.

GIBSON REVISITED

Wim van der Grind (Universiteit Utrecht)

In the third presentation on active vision professor van der Grind presented a concise overview of the Gibsonian view of active vision. Over half a century ago, J.J. Gibson developed an ecological theory of perception that emphasised the importance of the active observer in a natural environment. In particular, the extraction of invariant visual properties, i.e., properties remaining unaffected by movements of the observer and environmental changes, play a central role in the ecological theory of perception. Gibson's views are often contrasted to those of David Marr who developed a computational theory of vision that is firmly rooted in traditional artificial intelligence. Although Marr's views and ideas are still affecting current work in computer vision, they have not led to a successful realisation of artificial vision systems. Gibson's views may provide a viable alternative to Marr's theory as it takes the interaction with the environment seriously. Unfortunately, Gibson refrained from being very specific about the underlying mechanisms of active vision, whereas Marr's computational theory was highly specific on implementation issues. Professor van der Grind argued convincingly that the mathematical operationalisation of Gibson's theories, developed over the last decades by his colleague Jan Koenderink, do provide concrete specifications for implementation of a visual front-end.

The main goal of Koenderink's front-end is the extraction of invariant visual properties. One of the results is a set of ideal receptive field profiles that facilitate invariant perception. Interestingly, the receptive fields found through Hebbian learning in Floreano's work resemble the mathematically derived receptive fields in Koenderink's formal framework.

In a way, van der Grind's exposition represented a "view from the past" but it still turned out to be highly relevant for present-day research in the so-called "new AI" and active perception.

CONSTRUCTING ACTIVE-VISION MODELS

A second main goal of active vision models is to improve computer vision that has mainly focused on passive-vision models. Three presentations addressed this issue.

SOLUTIONS TO THE PERCEPTION-ACTION CYCLE IN COMPUTER VISION

Joachim Denzler (Universität Jena)

The perception-action cycle becomes of increasing interest in computer vision and cognition to tackle difficult and ill-posed problems. In his presentation, professor Denzler presented recent developments in the area of optimal sensor-data acquisition in, for instance, viewpoint planning. Denzler used information theory to deal with a viewpoint-planning task (see Denzler, 2002). In this task, an active-vision model has to classify three-dimensional objects. The objects are placed on a turn-table, which is controlled by the active-vision model. In this manner, the active-vision model can determine the viewpoint from which the object is observed. The information-theoretic approach to viewpoint planning employs a framework based on Shannon's information theory and selects the viewpoints that maximise the mutual information between the observations (views of the 3-D object under consideration) and the object classes. The information-theoretic approach, introduced in (Denzler, 2000), takes the a priori probabilities of the various classes into account when calculating the mutual information. Therefore, a sequential decision process can be realised by using the a posteriori probabilities at the current time step as the a priori probabilities at the next time step in the viewpoint-planning process. It has been proven that under certain conditions this decision process converges to a good solution that maximises the information gained about the object class.

The information-theoretic approach can be applied to any active-perception task. For example, besides classification, it has also been

applied to optimal focal length selection in 3-D object tracking. Since the position of the tracked object is dynamic, the approach incorporates a Kalman filter to estimate future states and the corresponding uncertainty. The difference of this approach with other approaches to object tracking is that the selected focal length does not only depend on the state estimate, but also on the uncertainty of this estimate and on the reliability of the sensors. The approach was used in tracking an aibo-robot and shown to perform adequately.

RAPID OBJECT RECOGNITION FROM DISCRIMINATIVE REGIONS OF INTEREST

Lucas Paletta (Joanneum Research)

In his presentation, dr. Paletta focused on object recognition from local information. The use of local information carries a potential for robust object recognition, e.g., in case of partial occlusion, scale variation, noise, and background clutter. In (Paletta *et al.*, 2005), discriminative local patterns are identified with the help of a posterior entropy measure. Then, object models are derived from selected local patterns that have a low posterior entropy, i.e., that carry information on the object class. In the recognition phase, a trained decision tree estimates the posterior entropy of multiple local patterns in an image. The patterns with low entropy are selected and compared with the patterns stored in the object models. The class is determined with majority voting among the selected local patterns.

The approach is illustrated with an application in which a tourist makes pictures of buildings from different viewpoints using a PDA. Using the acquired pictures as input, the recognition algorithm successfully identified different buildings in the city. The experimental results show that the adopted approach is both fast and robust.

BEHAVIOURAL AND PROBABILISTIC ACTIVE VISION

Guido de Croon (Universiteit Maastricht)

In this presentation, two main approaches to active vision were compared.

The first approach is referred to as the “probabilistic” approach, since it relies on the solution of active-vision problems by formalising them with the help of a probabilistic framework. These active-vision problems always concern state estimation, i.e., there is a part of the world state that is unknown to the active-vision model on which the model should gain more certainty. Object classification is an example of a state-estimation problem. Before observing an object, all object classes can be equally probable. The active vision has to determine actions and interpret observations in order to better estimate the object’s class.

Examples of probabilistic active-vision models are (Denzler, 2002; Paletta, 1998; Arbel and Ferrie, 2001), of which one model is the information-theoretic model presented by Prof. Denzler in his presentation.

The second approach is referred to as the “behavioural” approach, since it relies on the solution of active-vision problems by searching for behaviours with a high performance. This approach can be used for problems of state estimation, e.g., (Marocco and Floreano, 2002; de Croon *et al.*, 2006). However, it can also be applied to other problems, such as controlling a small car on a racing circuit (v.d. Blij, 2005), or evolving the morphology of an artificial agent so that it can move forwards (Sims, 1994). Some of the research performed in the area of evolutionary robotics, such as the research presented by prof. Floreano, is an example of this approach to active vision.

The probabilistic approach to active vision has the advantage compared to the behavioural approach that it is based on a formal framework. This permits a thorough understanding of the behaviour and functioning of active-vision models. However, the behavioural approach can also have an advantage with respect to the probabilistic framework. In particular, the evolutionary approach is less restricted in its possible applications, offering a solution strategy to problems that are hard to formalise.

In the presentation, an experimental comparison of multiple active-vision models was presented on a viewpoint-planning task in which an active-vision model has to classify different 3-D objects. There are four main conclusions to be drawn from the experiments: (1) Active-vision models outperformed passive-vision models. (2) All active-vision models outperformed a random action-selection method, even though this method catches up with the models if the number of objects increases. (3) The differences between the different methods seem to be rather small, although some methods structurally outperform others. For example, the information-theoretic model structurally outperforms the active-vision model used in (Arbel and Ferrie, 2001). (4) The only active-vision model inspired on the behavioural approach performed better than or equally well to the other models, indicating that the absence of a formal framework for action selection does not have to be a handicap. Future work should address other tasks and more active-vision models from the behavioural approach.

EVALUATION

The workshop closed with a plenary discussion of the outstanding questions in active perception. Although there was some disagreement among the participants about the methodologies to apply in the study of vision (e.g., mathematical formalisations versus evolutionary robotics) all agreed that perception and action are intimately related and should be the starting point for future studies of active perception. The organizers of the workshop are preparing a publication on the current-state of affairs in the modelling of active perception and on promising future directions for studying perception in active observers.

T. Arbel and F.P. Ferrie (2001). Entropy-based gaze planning. *Image and Vision Computing* 19(11):779–786.

J. van der Blij (2005). *Omnidirectional Active Vision in Evolutionary Car Driving*. M.Sc. Thesis, 2005.

G. de Croon, E.O. Postma, and H.J. van den Herik (2006). A situated model for sensory-motor coordination in gaze control. *Pattern Recognition Letters* 27:1181–1190.

J. Denzler and C.M. Brown (2000). *Optimal selection of camera parameters for state estimation of static systems: an information theoretic approach*. Technical Report, Computer Science Department, University of Rochester.

J. Denzler and C.M. Brown (2002). Information theoretic sensor data selection for active object recognition and state estimation. *IEEE Transactions on Pattern Analysis and Machine Intelligence* 24:145–157.

M. Dill, R. Wolf, and M. Heisenberg (1993). Visual pattern recognition in drosophila involves retinotopic matching. *Nature* 355:751–753.

D. Floreano, T. Kato, D. Marocco, and E. Sauser (2004). Coevolution of active vision and feature selection. *Biol. Cybern.* 90:218–228.

M. Hayhoe et al. (2003). Visual memory and motor planning in a natural task. *Journal of Vision* 3:49–63.

L. Itti and C. Koch (2001). Computational modeling of visual attention. *Nat. Rev. Neurosci.* 2:194–203.

D. Marocco and D. Floreano (2002). Active vision and feature selection in evolutionary behavioral systems. Hallam J, Floreano D, Hayes G, Meyer J (eds) *From animals to animats 7: proceedings of the seventh international conference on simulation of adaptive behavior*. MIT Press-Bradford Books, Cambridge, MA, pp 247–255.

S. Nolfi and D. Floreano (2001). *Evolutionary Robotics, The Biology, Intelligence, and Technology of Self-Organizing Machines*. MIT Press / Bradford Books.

L. Paletta, G. Fritz, and C. Seifert (2005). Q-Learning of Sequential Attention for Visual Object Recognition from Informative Local Descriptors. *Proceedings of the 22nd International Conference on Machine Learning*. Bonn, Germany.

L. Paletta, M. Prantl, and A. Pinz (1998). Reinforcement learning for autonomous three-dimensional object recognition. *Proc. 6th Symposium on Intelligent Robotics Systems*. Edinburgh, UK.

K. Sims (1994). Evolving 3D morphology and behavior by competition. *Artificial Life IV Proceedings*, ed. by Brooks & Maes. MIT Press, pp. 28-39.

N. Sprague and D.H. Ballard (2005). Modeling embodied visual behaviors. In *ACM Transactions on Applied Perception* (submitted).

A. Yarbus (1967). *Eye Movements and Vision*. Plenum Press.



From left to right: Mototaka Suzuki, Dario Floreano, Guido de Croon, Eric Postma, Jaap van den Herik, Dana Ballard, Joachim Denzler, Wim van de Grind

EU Spam Symposium 2006 Bringing spammers and antispammers together

Dreas van Donselaar
Director & co-founder
SpamExperts B.V., Maastricht

The first EU Spam Symposium (www.spamsymposium.eu), held at the University of Maastricht (the Netherlands) on June 15, 2006, invited antispam experts from around the world, including France, Norway, the Netherlands, Switzerland, the US and Australia.

The symposium was organized by the Dutch antispam company SpamExperts (www.spamexperts.com) in cooperation with Maastricht University and several other parties. Being supported by CEPIS (The Council of European Professional Informatic Societies) made it a true

European event that will reoccur yearly in a similar setting, thereby forming the central European forum to discuss spam-related topics.

The diverse group of speakers discussed about the legal, technological, governmental and psychological sides of the worldwide spam problem. Unique was an ex-spammer explaining about the spammer side of the story. John Graham-Cumming, author of the well-known Popfile software, discussed about the different tricks spammers use to bypass spamfilters. He demonstrated how many tricks are invisible to the eye but have major impact on the spamfilter trying to judge it. Ann Elisabeth, also known as the SpamHuntress, explained in what ways she tracks down spammers and provided a glimpse of the lifestyle of spammers and how to recognise them.

Spammer-X explained the whole network structure that is usually behind the different spam runs and how spammers easily make over US\$ 10.000 weekly in profit. Most interesting was that the largest part of the income earned from sending spam goes to the shops selling products and not to the spammers promoting those products. Another part of the profit goes to technology facilitators and the smallest amount to people selling email addresses.

All speakers in the end agreed that the only way to stop spam, is to stop buying from spam. A large group of people is still buying from the spam emails they receive, providing the income for the people behind the spam and allowing them to keep sending millions and millions of spam messages every day.

The full video archive is available for free online at www.spamsymposium.eu.



From left to right: Prof. van den Herik, behind him Ann Elisabeth, John Graham-Cumming, Spammer-X, Jose Maria Gomez Hidalgo, Danyel Molenaar, Matthew Prince.

ACM SIGIR 2006 Conference

Jan De Beer

Katholieke Universiteit Leuven – ICRI

The 29th edition of the annual ACM SIGIR international conference on research and development on information retrieval (IR) may be considered, to general expectation and opinion, a true success. With a solid qualitative and organizational reputation, and an ever increasing number of participants (about 700 this year) originating from renowned academic and industrial research institutes worldwide, SIGIR continues to be the authoritative, international conference within its research domain. Its objective remains the support and amplification of a major international forum for the presentation of new research results and the demonstration of new systems and techniques in the broad field of information retrieval (systems and techniques for the efficient and effective management, retrieval, exploitation, extraction, presentation, ... of mostly unstructured information sources). SIGIR is held in cooperation with the related fora SIGCHI and SIGWEB.

This year the scenic and nicely sustained University of Washington campus provided the stage for the conference, which lasted August 6-11. The campus is located just outside the busy, yet relatively small center of Seattle (Washington, USA). The cosy, typical northwest marine city houses facilities of Boeing and Microsoft. Together with Google they constitute the conference's diamond sponsors. Despite the long voyage, a dozen participants from Belgium and the Netherlands found their way to Seattle. During the ACM business meeting, highlights were cast upon the Netherlands, as it presented itself as next year's conference host. It was announced that SIGIR 2007 will be held in Amsterdam, July 23-27. The general conference chairship will thus be passed on from Efthimis N. Efthimiadis (Washington University) to Wessel Kraaij (TNO Information and Communication Technology) and Arjen de Vries (Center for Mathematics and Informatics).

Innovative research, developments, ideas and reflections were addressed every morning and afternoon in the form of doctoral proposals, tutorials, simultaneous paper sessions, a poster and demonstration session, workshops and invited speakers (Radha Radhakrishnan from Boeing, prof. Jon Kleinberg from Cornell University, and the honoured prof. C.J. van

Rijsbergen from Glasgow University). In the evenings, one could engage in a social event.

The Doctoral Consortium provides doctoral students with a unique opportunity to discuss their proposed Ph.D. research with experienced IR researchers and other doctoral students. The proposal of Xiaoyong Liu (UMASS; University of Massachusetts Amherst) titled "Cluster-Based Retrieval From A Language Modeling Perspective" was rewarded by the jury.

The conference's main activity remains the presentation of the papers, which are published together with the poster papers in the annual Proceedings. Although the selection was fierce, 74 papers (as well as 52 poster papers) were accepted for publication. For practical matters, the papers were grouped in themes each comprising three to four half-hour presentations, including time for questions and remarks, which were generally quite interesting and/or elucidating. As themes were held simultaneously in blocks of three, attendants had to make a selection in the wide variety of topics. This surely was not always convenient, also causing 'audience traffic' during themes.

Apart from traditional themes including formal models, evaluation techniques, classification and machine learning, question-answering, etc., current aspects and popular topics were given much attention, including user and context modelling, distributed, high-precision, and web (graph)-based retrieval models. The best (student) paper award was rightly attributed to Ben Carterette (UMASS, under the supervision of prof. J. Allen and prof. R.K. Sitaraman). The paper, titled "Minimal Test Collections for Retrieval Evaluation" describes a sound stochastic framework for an optimal (in the number of selected test documents) and therefore more efficient evaluation of retrieval systems, vastly saving on user evaluation time and efforts. They continued by implementing their framework for the commonly used MAP (mean average precision) metric, and were able to present some preliminary experimentation results for the popular TREC corpus.

The conference's social events comprised a welcoming reception at the Boeing Future of Flight Aviation Center (including an exquisite banquet with a marked presence of fresh salmon), a reception sponsored by Google, casting light on the posters, demonstrations, and various salmon fineries, and a by Microsoft sponsored excursion to the Indian Tillicum Village on Blake Island (featuring Indian-style broiled salmon on the menu). The restful boat trip back in the womb of a nightly

sky enlightened solely by Seattle's brilliant skyline, most likely produced some picturesque postcards. Somewhat tired but satisfied all turned home, waving salutes for next year's meeting in Amsterdam.

ABOUT THE AUTHOR

Jan De Beer (jan.debeer@law.kuleuven.be) is a scientific researcher at the center of Legal Informatics & Information Retrieval at the Katholieke Universiteit Leuven, Belgium. He attended the conference and presented a poster picturing a novel evaluation metric.

FURTHER INFORMATION

www.sigir2006.org and www.sigir2007.org

COLING-ACL 2006

Koen Deschacht

*Katholieke Universiteit Leuven –
Interdisciplinary Centre for Law and ICT*

Traditionally, the COLING (of the International Committee on Computational Linguistics) and the ACL (of the Association for Computational Linguistics) conferences are held for people from different research communities which perform research using quite different paradigms. But sometimes these conferences come together, and what comes out of this marriage can be quite unique.

The COLING-ACL conference was organized in Sydney from the 17th to the 21th of July. Held in the beautiful Sydney harbor convention center, it was not only well located to please our minds, but also to please our eyes and, thanks to the many Asian restaurants, to please our stomachs.

The conference was preceded and followed by 16 workshops and 4 tutorials on a large variety of subjects. The technical program of the main conference took 4 days, interrupted by an excursion on Wednesday. During these four days, 148 papers were presented, supplemented with 127 posters. Moreover, several times during the conference demonstrations could be attended. To make this a bit digestible, papers were presented in four parallel sessions.

The conference took off on Sunday with a drink or two, but the official start was on Monday morning. After the welcome, the fully packed program started, and was concluded that day by the ACL 2006 lifetime achievement award. This was presented to prof. Eva Hajičová of the Prague Institute of Formal and Applied

Linguistics, hereby again confirming the prestigious position of the Prague Linguistic Circle. Afterwards Hajičová gave a talk about the more persistent problems she had encountered in her research. She also showed how the founder of this very school, Roman Jakobson, is still a large influence in her work until today. In the evening we were treated with two poster session and some more drinks.

On Tuesday morning, the first invited speaker, prof. Daniel Marcu of the University of Southern California, gave a very interesting talk titled "Argmax Search in Natural Language Processing". In his paper he argued convincingly that almost all problems in NLP can be viewed in one way or another as searching the best solution in some space of possible solutions and that one should never forget the difficulties related to developing search algorithms.

Wednesday the scientific activities were interrupted for a visit to Taronga Park Zoo and Manly Beach. The weather was very unlike Australia's, but at least the rain was that kind to create a beautiful rainbow above the famous opera house, while our boat was passing by in the bay. With that many scientists together, talks about NLP of course continued while watching koala's in the zoo and surfers on Manly beach. But the day off gave us some new energy for a lot more papers on Thursday and Friday.



The Opera.

Very interesting in this conference was the large share of Asian participants. This was also reflected in the plenary discussion "Challenges in NLP" on Thursday. For me the discussion didn't really have the same value as talking in person to some of the people working on Asian languages, but it was interesting to discover the problems of NLP applications on non-western languages. It shows once again that it is important, when developing algorithms, to keep in mind other languages than English (and Dutch). I must admit though that I have already forgotten most of the problems related to parsing Japanese sentences, together with the

Chinese words I was taught by a generous colleague.

The second invited speaker, prof. Sally McConnell-Ginet, of Cornell University, had the hard task to start the meeting on Friday morning, after the animated conference dinner Thursday evening. She talked about the relation between gender, sexuality and language.

The last day, Friday, was concluded by the best paper award, which went to Marco Pennacchiotti and Patrick Pantel for their paper "Semantic Taxonomy Induction from Heterogeneous Evidence". I hadn't had the chance to see their presentation, but most of the people who had supported this choice. This was the end of the conference and the time for many people to go home.

But of course, some people's scientific hunger is never satisfied, and for them there were some more workshops on Saturday and Sunday. I participated in the workshop on ontology learning and population. For me this was an excellent opportunity to talk to some other Ph.D. students who are working in this field. The panel discussion afterwards focused on the use of ontologies in the medical domain, which seemed to have a large interest (and, as some people remarked, the money) to start using ontologies in real-world applications. Another topic was the creation of a common test bank on which algorithms for ontology learning could be evaluated. Unfortunately, there didn't seem to be enough interest to get this started in the near future.

ACL AND COLING IN THE FUTURE

The next ACL conference will be held in Prague, June 24-29, 2007 (for more information, see <http://www.acl2007.org>). The next COLING conference will be held in Manchester, August 13-23, 2008.

Communication by Theses

*Jaap van den Herik
MICC-IKAT, Maastricht*

The summer break is an excellent opportunity for reading theses, assessing them and commenting upon the contents. So, it is expected that after the summer holidays many Ph.D. students will receive comments from their supervisors, or approval from their committees. This implies that in the October issue we will see that many announcements occur for December 2006 and

early 2007. Indeed, there is a continuous stream of theses, which is increasing too. This is also communicated to be the case by other research schools. Moreover, the topics are mostly interdisciplinary, in particular when ICT and AI are involved. This time, in the list of announcements, the topics range from law via economics to bio-informatics (or even better: bio-mathematics).

The dissemination of research findings has a logical consequence on the dissemination of talented persons all over the world. In the last issue I mentioned a few professors who had found their way abroad. As a consequence of my call for more names and by pure incidence I came across two more names for which I will set aside some space to introduce them to our community.

First, Leon van der Torre has recently been appointed as full professor at the new professorial chair in Luxemburg. Some time ago we had the announcement that Luxemburg was starting an own university with a computer-science branch, with emphasis on Artificial Intelligence. They have managed to attract Leon van der Torre and the BNVKI believes that this is an excellent choice. We congratulate Leon with the appointment and we hope on a continuation of previous collaboration.

There is a variety of plans possible, ranging from renaming the BNVKI to BNLVKI and organizing a Luxe BNAIC in Luxemburg (or a BNAIC de luxe) to starting BNVKI projects in a truly European context. Leon has promised to provide us with an informative contribution on his activities in Luxemburg. We look forward to meeting him in Namur during the BNAIC 2006.

Second, we had recently the privilege to meet Dr. Max Welling in Maastricht. He is associate professor at the School of Information & Computer Science, University of California Irvine, USA. He did his Ph.D. some eight years ago with Professor Gerard 't Hooft (theoretical physics) and has shifted his research to machine learning. After his appointments as a postdoctoral fellow at the Vision Lab in Caltech, the Gatsby Institute in London, and the Department of Computer Science in Toronto, he was given the opportunity to start a research group in Irvine. His research focuses on Mixture Models, Bayesian Random Fields, and other statistical machine-learning approaches. During his summer break, he visits Dutch universities to keep contact with the research in his homeland. This summer he visited (amongst others) our institute to present his recent work on Bayesian Random Fields. His inspiring talk gave rise to many ideas and discussions. We hope to see and hear more of Dr. Welling in the near future.

Henk-Jan Lebbink (September 18, 2006). *Dialogue and Decision Games for Information Exchanging Agents*. University of Utrecht. Promotores: Prof.dr. J.-J. Ch. Meyer (UU), Prof.dr. C.L.M. Witteman (RUN).

L. Cheung (September 18, 2006). *Reconciling Nonderterministic and Probabilistic Choices*. Radboud Universiteit. Promotor: Prof.dr. F.W. Vaandrager (RUN).

Merlijn Sevenster (October 4, 2006). *Branches of Imperfect Information: Logic, Games, and Computation*. Universiteit van Amsterdam. Promotores: Prof.dr. J.F.A.K. van Benthem (UvA). Lector: dr. P. van Emde Boas (UvA).

Johan Hoorn (October 9, 2006). *Software Requirements: Update, Upgrade, Redesign – towards a Theory of Requirements Change*. Vrije Universiteit. Promotores: Prof.dr. G.C. van der Veer (VU), Prof.dr. J.C. van Vliet (VU).

Rainer Malik (October 11, 2006). *CONAN: Text Mining in the Biomedical Domain*. Universiteit Utrecht. Promotor: Prof.dr. A.P.J.M. Siebes (UU).

Stacey Nagata (October 12, 2006). *User Assistance for Multitasking with Interruptions on a Mobile Device*. Universiteit Utrecht. Promotores: Prof.dr. J. van den Berg (UU), Prof.dr. M. Neerincx (TUD). Co-promotor: dr. H. van Oostendorp (UU).

M.H.J. de Bruijne (October 18, 2006). *Survival Prediction using Repeated Follow-up Measurements*. Universiteit Leiden. Promotor: Prof. dr. J.C. van Houwelingen (Universiteit Leiden).

Carsten Riggelsen (October 23, 2006). *Approximation Methods for Efficient Learning of Bayesian Networks*. Universiteit Utrecht. Promotor: Prof.dr. A.P.J.M. Siebes (UU). Co-promotor: dr. A.J. Feelders (UU).

Valentin Zhizhkun (November 28, 2006). *Graph Transformation for Natural Language Processing*. Universiteit van Amsterdam. Promotor: Prof.dr. M. de Rijke (UvA).

Niek Althuisen (December 15, 2006). *Analogical Reasoning as a Decision Support Principle for Weakly-Structured Marketing Problems*. Erasmus Universiteit Rotterdam. Promotor: Prof.dr. B. Wierenga (EUR).

Ruben Sietsma (January 10, 2007). *Gegevensverwerking in het Kader van de Opsporing. Toepassing van datamining ten behoeve van de opsporingstaak: afweging tussen het opsporingsbelang en het recht op privacy*. Universiteit Leiden. Promotor: Prof.mr. H. Franken (Universiteit Leiden). Referent: Prof.mr. Y. Buruma (RUN).



First Dutch/Belgian Day on Enterprise Information Systems (EIS 2006)

On September, 8, 2006 SIKS organizes the First Dutch/Belgian day on Enterprise Information Systems in conference center Hoog-Brabant in Utrecht. The purpose of EIS 2006 is to bring together Dutch/Belgian junior and senior 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 and many others.

EIS 2006 is organized by the Dutch Research School SIKS as a unique opportunity for research groups from both the Computer Science-side and the Management-side to meet and interact. EIS 2006 is intended to be the first in a yearly EIS-tradition as a way of reinforcing the Information Systems field – in terms of both scientific ambition and industrial relevance.

This first year, the theme of EIS is “Information Systems – defining the field”. In the morning session, Roel Wieringa (UT, Scientific Director of SIKS) will introduce this theme and present his view on Information Systems as a scientific discipline and its research methods. After reactions from Monique Snoeck (KU Leuven), Jaap Gordijn (VU) and Hans Akkermans (VU, Chairman Board of Governors SIKS), there will be a plenary discussion on this topic. In the afternoon session, a

tour d’horizon of state-of-the-art EIS research is provided by presentations of Herman Balsters (RUG), Erik Beulen (UvT/Atos Origin), Slinger Jansen (UU), Ana Karla Alves De Medeiros (TUE), Aldo de Moor (VUB) and Rene Wagenaar (TUD).

The day is chaired by Hans Weigand (UvT) and is open for all SIKS-researchers, but also for EIS practitioners or interested researchers from other fields.

PROVISIONARY PROGRAM

- 09.30-10.10 coffee
- 10.10-10.25 welcome by Hans Weigand (UvT)
- 10.25-11.00 Roel Wieringa (UT): Information Systems: defining the field
- 11.00-11.20 Monique Snoeck (KUL): reaction
- 11.20-11.40 Jaap Gordijn, Hans Akkermans (VU): reaction
- 11.40-12.10 plenary discussion
- 12.10-13.00 lunch
- 13.00-13.30 Erik Beulen (UvT): Managing IT outsourcing
- 13.30-14.00 Herman Balsters (RUG): Semantics of IS outsourcing
- 14.00-14.15 break
- 14.15-14.45 Slinger Jansen (UU): Software release and delivery
- 14.45-15.15 Ana Karla Alves De Medeiros (TUE): Genetic workflow mining
- 15.15-15.30 break
- 15.30-16.00 Aldo de Moor (VUB): Inter-organizational ontology engineering
- 16.00-16.30 Rene Wagenaar (TUD): (to be announced)
- 16.30-17.00 drink

REGISTRATION

All members of our research school (research fellows, associated members and Ph.D. students) are invited to join EIS 2006. Participation (lunch included) is free, but an early registration is required. Participants are kindly requested to fill in the registration form on the SIKS-site.

Basic Courses: “Information and Organisation” and “Architectures for IKS”

INTRODUCTION

From September 25 till September 29, 2006, the School for Information and Knowledge Systems (SIKS) organizes two basic courses: “Information and Organisation” and “Architectures for IKS”. The location will be Landgoed Huize Bergen in Vught. Both courses will be given in English and are part of the

obligatory Basic Course Program for SIKS-Ph.D. students. Although these courses are primarily intended for SIKS-Ph.D. students, other participants are not excluded. However, their number of passes will be restricted and depends on the number of SIKS-Ph.D. students taking the course.

SCIENTIFIC DIRECTORS

- dr. H. Weigand (UvT), prof.dr.ir. P. Grefen (TUE) "*Information and Organisation*"
- prof.dr. E. Proper (RUN) "*Architectures for IKS*"

PROGRAM

The provisional program will be made available soon.

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: September 1, 2006

After that date, applications to participate will be honoured in a first-come first-serve manner. For registration you are kindly requested to fill in the registration form.

SIKS Basic Course "Research Methods and Methodology for IKS"

INTRODUCTION

On 20, 21, and 22 November 2006, the School for Information and Knowledge Systems (SIKS) organizes the annual three-day course "Research Methods and Methodology for IKS". The location will be Hotel Het Bosgoed in Lunteren. 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 three 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 characterisation of their own research project/proposal, by answering a set of questions, formulated by the course directors, and based on the aforementioned literature. This small contribution is to be submitted two weeks in advance. Please send a pdf-file to office@siks.nl. More details on the procedure will be provided in due course. 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.

PROGRAM

Is not available yet, but will be published in the next edition of this Newsletter.

COURSE COORDINATORS

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

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 at the SIKS-site.

Deadline for registration for SIKS-Ph.D. students: October 24, 2006

ANNOUNCEMENTS

Agenda General Assembly BNVKI October 6, 2006

0. Opening
1. Minutes general assembly meeting of October 18, 2005
2. Announcements
3. Financial Report 2006

4. Auditing committee 2005
5. Progress report 2005 and plans for 2006
6. 25 years BNVKI
7. BNAIC 2007
8. Board members (and elections)
9. End of meeting

**50 Years of AI
Symposium, AI-lab, VUB, Brussels
November 23, 2006**

50 Years ago (during the Dartmouth conference in 1956) Artificial Intelligence as a scientific discipline was born. In honour of the “birthday” of this young research domain the symposium investigates AI research, both what has been achieved in the past and what can be expected in the future. With this symposium the AI-lab wants to stir up the historical consciousness. As with so many research domains within the exact sciences, one can remark that many ground-breaking realisations get lost amidst the constant stream of new developments. Though this rapid evolution is inherent to the young research field and is in itself of crucial importance for its survival, one should contemplate for a moment at its short history.

The symposium will emphasise the historic realisations in the hope that this introspection can determine or at least steer the future of the research domain. During the festivities the focus will be on research activities and applications developed in Flandres. The symposium will chronologically go by the milestones of the history of the domain as a whole and of the contributions by the Laboratory for Artificial Intelligence of the Vrije Universiteit Brussel. Finally, there will be an outlook on the future of AI.

The most important Flemish AI researchers already have vowed their cooperation and this symposium promises to become a real party. Therefore a location was chosen that will give this event quite some flair. If you are interested in Artificial Intelligence this symposium should be on your agenda. For more information, please consult <http://arti.vub.ac.be/50jaarAI/>. In this way you are assured to get a representative view in only one day of 50 years of AI.

**International Workshop on
Current Challenges in Kernel Methods
(CCKM06)
Belgium, Brussels, November 27-28, 2006**

*Prof. Bernard Manderick
Dr. Tijl De Bie*

FORMAT

The workshop will consist of two days of invited talks by internationally renown researchers. Additionally, an interactive student poster session will be organized.

CONFIRMED INVITED SPEAKERS

- Andreas Christmann (Free University of Brussels)
- Nello Cristianini (University of Bristol)
- Kristiaan Pelckmans (Katholieke Universiteit Leuven)
- Alain Rakotomamonjy (INSA de Rouen)
- Sandor Szedmak (University of Southampton)
- Jean-Philippe Vert (Ecole de Mines de Paris)

IMPORTANT DATES

- Conference accommodation reserved until: Sunday October 15.
- Poster abstract submission deadline: Friday October 27.
- Early registration deadline: Friday October 27.
- Late registration deadline: Friday November 17.
- Workshop: Monday November 27 - Tuesday November 28.

DESCRIPTION

In the past decade, the kernel-methods domain has expanded from a single algorithm for classification to a full-grown toolbox of techniques that are currently being applied in a variety of domains. This workshop aims at highlighting the current trends and topics of interest, and at putting these in a synthesized historical perspective, with attention for both theoretical and application challenges. Specific topics range from learning theory, over algorithmic/optimization issues in new kernel methods to practical successes and bottlenecks.

Intended audience: researchers interested or working in kernel methods, or application domains that are likely to benefit from the advances in kernel methods. Participants may come from artificial intelligence, machine learning, statistics, bioinformatics, data mining, web mining, ... with a special interest in the study and application of kernel methods.

Level and scope: the lectures in the workshop are intended to be accessible to a broad audience, including anyone with a broad background in computer science, statistics, mathematics, physics, electrical engineering, or related domain. As a guideline, half of each lecture will be tutorial style, while the other half will cover recent developments.

The workshop is sponsored by the WOG machine learning for data mining and applications, such that attendance will be free except for the catering expenses. However, for practical reasons, registration is mandatory (see workshop website for registration details).

Please check the workshop website for more details: www.machine-learning.be/cckm06.

CONFERENCES, SYMPOSIA WORKSHOPS

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

SEPTEMBER 3-6, 2006

The 3rd IFIP International Conference on Ubiquitous Intelligence and Computing (UIC-06), Wuhan and Three Gorges, China.
<http://www.uic-conference.org/2006/>

SEPTEMBER 4-8, 2006

UC 2006, 5th International Conference on Unconventional Computation, University of York, UK.
<http://www.cs.york.ac.uk/nature/uc06/>

SEPTEMBER 10-14, 2006

International Conference on Artificial Neural Networks (ICANN 06), Holiday Inn Hotel, Athens, Greece.
<http://www.icann2006.org>

SEPTEMBER 13-15, 2006

10th European Conference on Logics in Artificial Intelligence (JELIA'06). Liverpool, UK.
<http://www.csc.liv.ac.uk/~jelia>

SEPTEMBER 13-15, 2006

Second International Conference on High Performance Computing and Communications (HPCC-06), Munich, Germany.
<http://hpcc06.lrr.in.tum.de/>

SEPTEMBER 18-22, 2006

13th ISPE, International Conference on Concurrent Engineering: Research and Applications, Antibes, French Riviera.
<http://www.ce2006.org>

SEPTEMBER 19-21, 2006

2nd Annual North American Game-On Conference (GameOn'NA 2006). Naval Postgraduate School, Monterey, USA.

<http://biomath.ugent.be/~eurosis/conf/gameon-na/gameon-na2006/index.html>

SEPTEMBER 20-22, 2006

The 5th International Conference on Entertainment Computing (ICEC'2006). Cambridge, UK.
<http://www.icec2006.org/>

SEPTEMBER 28-29, 2006

The 7th IEEE/ACM International Conference on Grid Computing (GRID 2006), Barcelona, Spain.
<http://www.grid2006.org/>

SEPTEMBER 28-30, 2006

IFSAM VIIIth World Congress 2006, Berlin, Germany. <http://www.ctw-congress.de/ifsam/submissions.html>

OCTOBER 5-6, 2006

The 18th Belgian-Dutch Conference on Artificial Intelligence (BNAIC 2006), Namur, Belgium.
<http://www.bnaic2006.be>

OCTOBER 23-25, 2006

ESM2006, The 2006 European Simulation and Modelling Conference, Toulouse, France.
<http://biomath.ugent.be/~eurosis/conf/esm/esm2006/>

OCTOBER 25-27, 2006

First European conference on Smart Sensing and Context (EuroSSC 2006). Enschede, The Netherlands.
<http://www.EuroSSC.org>

NOVEMBER 7-10, 2006

5th International Symposium on Formal Methods for Objects and Components FMCO 2006. CWI, Amsterdam, The Netherlands.
<http://fmco.liacs.nl/fmco06.html>

NOVEMBER 29 - DECEMBER 1, 2006

GAME-ON 2006, Technical University of Braunschweig, Braunschweig, Germany.
<http://www.ibr.cs.tu-bs.de/news/ibr/game-on-2006/index.html>

NOVEMBER 30 - DECEMBER 1, 2006

6th International Conference on Practical Aspects of Knowledge Management, University of Vienna, Austria.
www.dke.univie.ac.at/pakm2006

DECEMBER 4-6, 2006

Second IEEE International Conference on e-Science. Amsterdam, The Netherlands.
<http://www.escience-meeting.org/eScience2006>

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COPY

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