

Two Myths about AI

Over the summer I've been writing, or more often trying to write, a general-audience AI book. On reflection, much of the content of this book – AI, A beginners guide – has turned out to be involved with the debunking of two pernicious myths about AI. The first myth is that AI has failed. The second myth is that when it succeeds humanity will (at best) be ruled by new super-intelligent artefacts.

I don't really need to say anything in AISBQ about the falsehood of the second myth. It is something that seems to crop up far too regularly and needs no more said for the present.

However, it is worth looking at the second myth a little more closely.

AI has a long track record of successes. I hesitate to list them because AISB members in particular might be bored by such a list. For example back in 1997 when Deep Blue beat Gary Kasparov I was still writing editorials for this journal and took the line that we had all known for some years that this victory was only a matter of time. Then again, just because chess-playing was no longer considered cutting-edge AI didn't mean that AI failed in 1997. A chess-playing program defeated the world champion in a fair and observed match. What sort of failure is that? It's the sort of 'failure' that all other branches of technology would welcome, that's what it is.

Less newsworthy AI successes are all around us. If you apply for a loan, mortgage, or credit card the decision as to whether or not you are credit-worthy will be taken by a knowledge-based system. If you lose the credit card, then abnormal spending patterns on your account may well be detected by a neural net. Knowledge-based systems aren't even billed as AI any more. Giving advice, testing credit-worthiness, or detecting a change in patterns are simply seen as more things that computers can do nowadays. AI

research from a couple of decades ago has been seamlessly integrated into modern technology. Which is just as things should be.

Why then does the myth that AI has failed persist? Probably it is the result of a number of factors. Perhaps the most important is the bad habit displayed by early AI pundits of setting impossible goals for the area. The so-called Turing test is the first and most famous of these. In fairness to Turing, that was back in 1950 and things have become a lot clearer since then. However the tendency to rather over-state things runs through the history of AI like the name Brighton through a stick of rock. There was the "General Problem Solver", "Expert Systems", and even today we have "Artificial Life".

In the perception of the general public, AI has often promised slightly more than is realistic. Along the way many top AI researchers allowed funding bodies to believe that they would get rather more for their money and rather more quickly than was actually the case.

This internal mis-representation is aggravated by a tendency (both inside and outside AI research) to take a terribly anthropocentric view of things. I call this the "really" problem. Students say things like: "Deep Blue doesn't *really* play chess because..." and then go on to list one or more ways in which their chess playing differs from that of a program. "Well", I say, "it didn't win the match by making toast. Does a calculator *really* calculate?" The answers to that question reveal more about students than about AI and will therefore be passed over in silence.

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Blay Whitby
Editor

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<http://www.aisb.org.uk/>

Special Report -Warchalking

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Are you using or do you regularly use a wireless network? If so, read on - there's something you need to hear about. Actually it's a fascinating story even if wireless technology has no immediate appeal for you. Just as the American hobos had their own private system of signs, so a small but significant group have started to mark the presence of usable wireless networks.

There's a noticeable amount of overspill from any wireless network. If the reception is good all over your house or office block then it will be just as good across the street. So what? Well someone with the appropriate software can easily freeloader on your bandwidth. There are people out there doing this routinely. In London this summer Matt Jones came up with the idea of making special chalk marks to indicate the presence of wireless hotspots. It's an idea that has spread like wildfire.




There's a full set of symbols indicating open and closed nodes and available bandwidth. (See diagram left). These symbols have already been given (some) legitimacy by the state of Utah deciding to use them on about 250 of its office buildings. This allows passing state employees (for example police officers) more easily to find high-bandwidth Internet connections.

Of course there is a dark side to all this. The very name warchalking is a derivative of wardialling - the old hacker technique of setting up the computer to make repeated calls until answered by another modem which offered the possibility of a hack. The appearance of these symbols outside your office might well be the declaration of open season on your network. It's too soon to say whether legitimate uses will outpace illegitimate ones.

I shouldn't really need to add that if your network lacks encryption then it could be used for all manner of nefarious purposes. If there is an investigation then it will lead to you and not to the person who parked outside one night and used your Internet connection. Another possibility is the 'drive-by spamming'. I don't know if this has happened yet but the warning signs (almost literally) are there. On most home wireless networks it's simply a matter of setting

security to on. Office systems should be run by people who know and understand security. (Though I know this is not always the case.)

On the other hand, if you want to try it yourself or find out more, then Jones' original site is at www.warchalking.org. A Google search will show that, over the summer, the idea has already spread to many countries. It's certainly a trend to watch.

let's warchalk..!	
KEY	SYMBOL
OPEN NODE	ssid  bandwidth
CLOSED NODE	ssid 
WEP NODE	ssid access contact  bandwidth
blackbeltjones.com/warchalking	

Blay Whitby
University of Sussex

Publications dates for the next issue of AISBQ:

*All submissions for the Winter issue of AISBQ must be made no later than **15 November 2002**.*

Publication of the AISBQ will be in March, June, September and December, with copies of the AISBJ being sent out with the June and December issues.

AISB News

Chair's Message

AISB continues its period of consolidation, so there is relatively little for me to report here, other than that the process does indeed continue. Therefore, I will allow myself the luxury of a little rumination.

This July, I was compelled to register for the main conference of ECAI'02, by the fact that I was co-chairing a workshop attached to it. The conference, the organisers reported, attracted around 500 people, though as always it was difficult for them to give a completely definite figure until after the event. My impression, though, (admittedly filtered through the symptoms of a nasty bacterial infection) was that ECAI'02 was indeed well-subscribed during the workshop sessions, but that many delegates departed immediately thereafter, leaving a cohort that I'd guess from the plenary sessions was not all that much larger than a large AISB Convention.

One might draw the conclusion that ECAI is suffering from the same general decline in attendance as IJCAI, and suggest that the reason is the very wide range of more specialist conferences and workshops which now surrounds us.

That raises the question of why the AISB conventions of recent years have been, in historical terms, so successful. I would suggest that the reason is our decision, back in 1999 to drop the "general conference" format and to focus instead on related but specialist symposia. Given the obvious success of the workshop sessions at ECAI, I wonder if it's about time for ECAI to begin thinking along the same lines?

Of course, the arrival of more specialisation brings with it the danger of fragmentation, and for that reason, among others, AISB introduced its new Journal, in 2001, the interdisciplinary journal of artificial intelligence and the simulation of behaviour. I would take this opportunity to remind members that, firstly, a journal is nothing without submissions and that, secondly, AISBJ is an RAE-worthy publication medium.

Perhaps more importantly, it has so far managed a very quick turnover, so it is an effective way of getting your results in the public domain in good time.

*Geraint Wiggins
Chair of AISB
City University
London*

*If you want to write to the editor, or send an open letter for publication, please write to: The Editor, AISBQ, School of Cognitive and Computing Sciences, University of Sussex, Brighton, East Sussex BN1 9QH
Or email editor@aisb.org.uk*

Editorial continued from front page...

There is a serious point behind all this. AI has repeatedly delivered useful working bits of technology yet is seen as some sort of failure because it has (both deliberately and accidentally) allowed mistaken perceptions to develop. My personal view is that there is more to intelligence than human intelligence. There are better yardsticks than human intelligence with which to measure artificial intelligence too. That doesn't mean that cognitive modelling is pointless or that AI has nothing to tell us about human psychology. We just have to stop seeing human intelligence as the only sort there can be (apart from a few chimps and dolphins).

As always, if you disagree I'd welcome a quick email. If you agree I'd like to hear about it too. Perhaps we should consider some sort of public celebration of AI successes. There no reason to allow false myths to persist.

*Blay Whitby
Editor*

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AISB News

Some reflections of a retiring Treasurer

As my term as Treasurer for AISB has now come to an end, I thought I'd look back over the financial figures since I took over, effectively in the summer of 1997. A summary of these figures is given in the Table below.

A few graphs based on these figures show the main trends. The most important, from a financial perspective for AISB, is the difference between annual income and expenditure. When I took over in 1997, AISB was running at loss of nearly £10,000 p.a., an increase from a loss of around £1,000 the previous year, see the chart of Income and Expenditure.

Year	AISB Annual Accounts from 1996 to 2001					
	1996	1997	1998	1999	2000	2001
Income and Expenditure Account						
Turnover					30,739	26,996
Direct Costs					13,814	7,730 -
Excess of I over E before overheads	23,066	16,968	23,661	20,436	16,925	19,266
Administrative Expenses	24,162	26,828	21,837	13,548	14,885	12,251 -
Excess of I over E after overheads	- 1,096 -	9,860	1,824	6,888	2,040	7,015
Taxation	164	120	207	144	38	30 -
Excess of I over E after taxation	- 1,260 -	9,980	1,617	6,744	2,002	6,985
Retained Profit brought forward					-	2,002 +
Retained Profit carried forward					2,002	8,987

The balance at the beginning of the year was around £14,000, so we only had one year's funds to reverse the trend towards larger losses

Balance Sheet						
Debtors	4,260	-	-	6,949	6,026	10
Cash at bank and in hand	12,658	22,393	60,381	28,768	21,759	27,296 +
Current Assets	16,918	22,393	60,381	35,717	27,785	27,306
Creditors	2,457	17,562	53,232	21,824	11,890	4,426 -
Net Current Assets	14,461	4,831	7,149	13,893	15,895	22,880
Fixed assets	1,051	701	-	-		+
Total assets less current liabilities	15,512	5,532	7,149	13,893	15,895	22,880
<i>Reserves:</i>						
Other Reserves					13,893	13,893
Income and Expenditure account					2,002	8,987 +
Total reserves					15,895	22,880

What was to be done? The first thing to be done was to protect the personal funds of the members of the committee. If AISB had been declared bankrupt, then each of the AISB officers would have been severally and individually liable for any outstanding debts. This was a real possibility since the bills from the University of Sussex, who own the CASA office which do the administration for AISB, were being received about a year after the actual expenditure had been incurred. For instance, by the end of 1997 we had around £17,000 due to our creditors. (Luckily there was also a balancing amount of cash in the bank to cover this, so we were not technically bankrupt. But cash in the bank is deceptive; it looked on paper as though AISB was still flush - a great temptation to undertake yet more expenditure to increase income.) The chairperson at the time, Ann Blandford, and I individually persuaded our Departments at Middlesex and Manchester Universities, respectively, to stand as guarantors of any debt that might arise out of bankruptcy for a period of 5 years. We then set about changing the legal status of the Society to be a Company Limited by Guarantee. This means that the Officers of the Company are each individually liable for just a limited amount of their own money; in our case this is set at just £1 each. So since April 1999 AISB has been

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a Company, filing returns with Companies' House.

The 1996 loss had already instigated attempts to increase the income from membership. AISB's annual income nevertheless declined from £23,000 to £19,000 in 1997. Fluctuations in income in AISB are caused mostly by changes in the income from the annual Conferences and Workshops, or, as they are now called, Conventions. Convention income is largely in the hands of the Convention organisers and depends on the attractiveness of the location, the workshop topics chosen and on how much effort the organisers are able to devote to the Convention. 1996 had been a particularly good year, with an income of around £7,000; 1997 was a particularly poor year, bringing in only around £3,000 of which £1,000 did not materialize until the following year. (I can say this as I was the principal Organiser that year!) Even the income from membership, by far the largest single source of income for AISB, had fallen, despite the committee's efforts to increase the attractiveness of AISB to its members. An overview of income by sources shows this clearly

Income							
Convention this year: income	8,436				19,740	13,858	
Convention this year:expenses	1,385				13,814	7,730	-
Convention this year	7,051	1,907	5,186	7,226	5,926	6,128	
Convention previous years	674		1,118	626	15	513	
Membership fees	12,582	11,184	14,680	11,950	10,552	11,121	
USA Membership		1,825	68				
Inserts	240	816	1,146	470	110	1,200	
Gross interest	542	449	446	164	322	304	
Sundry income	592	787	1,017				+
Income	21,681	16,968	23,661	20,436	16,925	19,266	
Expenditure							
Office costs	13,195	19,302	13,788	8,476	8,033	5,373	
Postage costs	350	350	737	558	555	495	
Computer costs					636	111	
Newsletter	5,042	4,738	3,839	2,937	3,112	3,128	
Committee expenses	441	667	615	474	489	780	
Travel awards	2,985	1,080	1,100	-	200	300	
Sundry expenses	86		1,046	- 86	15	330	
ECCAI fee					767	524	

In such a critical situation, where any new initiative requires funds, the simplest thing to do is to curtail expenditure. This is what the committee decided to do for the following year, 1998. By far the largest single expenditure is our office cost, that is the moneys that are paid to the University of Sussex to support the staff at CASA who doing everything for us, such as maintaining the membership data base, collecting the membership dues, producing the AISBQ and the weekly electronic bulletin. In 1997 these costs had risen to over £19,000, from around £13,000 the previous year, mostly as a result of the increased time that CASA staff were asked to put into AISB to make the Society more attractive to its members. However, this was more than our total income, let alone our known income from membership fees. We managed to negotiate with CASA that we would use less of their management time, so that AISB office expenditure halved over the next two years. Since then we have negotiated with CASA to be charged on an activity basis, enabling them to direct their effort to those activities which we value and further reduce the cost to ourselves.

Expenditure						
Office costs	13,195	19,302	13,788	8,476	8,033	5,373
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AISB News

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In 1998 income was only just ahead of expenditure and a further reduction in expenditure was forced upon us. This entailed cutting back the number of issues of the AISB Quarterly from three to two, clearly an undesirable course of action that has since been reversed. One of the anomalies at the time was that our income appeared to be much lower than it should have been for the number of registered members. CASA was asked, again, to ensure that the membership database was in order. It turned out that the number of fee-paying members was nearer 400, rather than the registered membership of around 600. Many previous members had stopped paying but were still registered and so still receiving the AISB Quarterly. (Collecting past unpaid dues benefited the Society to the tune of about £2,000 in 1998.) Clearing up the database meant a reduction in the number of copies of AISBQ that had to be printed and sent. Even now, a few registered members are still paying, by bankers standing order, a £9 annual subscription, which was what it was way back in the 1970s. These members no longer receive the AISBQ, further reducing costs.

The present AISB committee, concerned about the failure of AISBQ to actually be a quarterly, decided that the two functions served by the then AISBQ, that of a newsletter and that of an academic journal, should be split. So from this year a cheaper AISBQ covers just the newsletter items and so can be published quarterly. The AISB Journal, a new venture, appears twice yearly. Its costs are kept down through the work of the issue editor ensuring camera-ready copy.

Another possible course of action when expenditure exceeds income is to increase income. Our major source of income is from membership dues. These had remained fixed at £25 p.a. for full membership for about 10 years, so it was time to increase them, at least in line with inflation. However, there was an obstacle. Any increase to compensate for inflation over a ten year period would be a major step. As most members paid by banker's standing order, they would have to request their banks to change the amount of the order. People who pay by standing order do so because they want to avoid the hassle of doing something every year; changing would be the last thing they wanted to do, as witness the many members who still pay out-of-date dues! Moreover, as we wanted to increase costs to cover inflation on a regular basis, rather than wait for another 10 years, we needed to avoid causing this hassle. So, once we were a Company, we could and did ask for the right to collect membership fees by Direct Debit. You will have been asked to pay by Direct Debit; please do so as it saves AISB administration costs and yourselves the yearly hassle.

The other major source of AISB income is the volatile income from the annual Conventions and the joint meeting with our European colleagues, ECCAI. The previous ECCAI conference had been of great financial benefit to AISB. Unfortunately, ECCAI'98 was not, bringing in no more than an AISB Convention in an average year. Fortunately the Convention in 1999 was a great success and the conventions since then have been living up to this reputation.

The overall result of these efforts on the part of the AISB committee, CASA and Blay Whitby, as editor of AISBQ, has been that income has exceeded expenditure for every year since 1998. Consequently we have been able to reduce our payments due to creditors to a minimal amount and to amass a real positive balance which we have on long term deposit at our bank, The Clydesdale. This balance now amounts to over a year's expenditure, which is just about adequate as a protection against a couple of loss making Conventions. So we are now in a position to undertake new initiatives that are attractive to the membership; and this is what our Chairman Geraint Wiggins, has instigated over the past two years. It would be nice to be able to have a balance from the interest of which we could pay the entire annual expenditure as is the case with some of the older learned societies such as the LMS. But Maths has been at this game longer than AI!

David Brée
Retiring Treasurer for AISB

Letter to the Editor

Dear Editor

Your editorial in the last issue of AISBQ chimed in quite nicely with my letter about the ICMAUS theory in the same issue. The theory was developed to try to overcome the fragmentation in AI (and computing and cognitive science) and I think it is looking quite good in that respect.

You may like to know that I will be giving a half-day tutorial about the ICMAUS theory and its applications on the 10th of December at the ES2002 conference in Cambridge. I have appended a notice about the tutorial to this message. You or any of your colleagues or research students would be very welcome.

*Best wishes
Gerry Wolff*

UNIFYING AI: A TUTORIAL ON THE ICMAUS THEORY AND ITS APPLICATIONS

To be given at the ES2002 conference in Cambridge, 10th December 2002.

This tutorial will present a framework of ideas, under development since 1987, that provides a unified view of several AI-related topics including natural language processing, probabilistic reasoning, fuzzy pattern recognition, representation and use of ontologies, planning and problem solving, unsupervised learning, and aspects of mathematics and logic. This theory, which was the subject of an invited talk at the ECAI2002 conference in Lyon in July, is called 'information compression by multiple alignment, unification and search' (ICMAUS). It is realised in the form of computer models that provide examples for the tutorial. The background to the ideas will be described together with the elements of the ICMAUS framework and its range of applications. Further information about the theory and its applications may be found at www.cognitionresearch.org.uk/sp.htm.

Information about the ES2002 conference and registration may be found at <http://www.bcs-sges.org/es2002/>. Click on the

'Tutorials' link for further information about tutorials.

If there is any particular aspect of the theory that interests you, or any particular area of application, please let me know. I will try to adapt the tutorial to accommodate interests of that kind.

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From the Archives

The verifying compiler

...A project now in its early stages in the Department of Computer Science entails building what we call a verifying compiler. Such a compiler would accept a program...including comments to describe the important relations among program variables at several points in the program. The compiler would build appropriate internal representations of the structure of the program, including the comments, construct the implicit theorems needed to prove the correctness of the program, and make some attempt to prove them. It appears that most of the theorems will be trivial, or can be broken down into many parts, most of them we plan to use simplification and decision procedures for common special cases, in the interest of speed. If our procedures are not capable of proving a certain theorem, they will attempt to find a counter-example, and to construct from it a set of values of program variables for which the corresponding part of the program will not work. Failing to find a counter-example, the compiler will turn to the programmer for help in proving the theorem...

*(From an article in Computer Science
Research Review, Carnegie-Mellon
University, 1967).
R W Floyd*

Taken from AISB Issue 6 July 1968

Thanks to Rudi Lutz for selection of archive material.

Reviews

A Mind so Rare: The Evolution of Human Consciousness

Author: Merlin Donald

Publisher: W. W. Norton & Company

ISBN number: 0-393-04950-7

This is one of those books that appears to stand the world on its head but once you get used to the view makes you wonder if you were right way up to start with. Donald has already proved himself one of the great integrators in cognitive science with his previous book *The Origins of the Modern Mind* (Donald 1991). This attempted to give an evolutionary account of the human symbolic mind. This proposed a bold synthesis of paleoanthropological, neuroscientific and linguistic evidence. While much of the rest of the cognitive science community has become fascinated with modular minds and AI researchers in particular now laugh at the very mention of a General Purpose Problem Solver, Donald has stuck resolutely to his belief that an account of a more general purpose 'extended mind' needs to be given. The flavour of extended mind that Donald favours is an idiosyncratic one. Over evolutionary time our minds have passed through a variety of prior stages, episodic, mimetic and theoretic. Modern human beings have what can be thought of as a mind which constructs itself. This new book is concerned with how that process of self-construction takes place; how grasping this fundamentally shifts our view of what cognitive science should be about; and the role of consciousness within this.

Donald's argument rests on three claims. The first is that cognitive science is guilty of taking a limited database of examples when trying to appraise the end-product of this evolutionary and cultural development. The second that consciousness needs to be reintegrated into our understanding of mind in a causal role such that it is the main instigator and governor of new skill development. The third and final claim is that if we want to understand how this self-construction program gets underway we need to turn our attention beyond the skin and look at how culture is able to grab a hold of our innate developmental architecture and insert not just new categories and content, but new mechanisms and learning devices.

Expanding the Database

A central argument of the book is that cognitive science in general (and experimental psychology in particular) has tended throughout the twentieth century to create a diminished idea of human capabilities. This is not actually a particularly original complaint, but Donald's idea of the main source of this problem is an interesting one. That the central experimental paradigm that cognitive psychology sets up in its laboratory is limited in one crucial dimension: time. Donald argues that the main database of experimental psychology, short-term memory, visual imagery, perceptual illusions and allocation of attention are by methodological necessity crammed into a time window of fifteen seconds or less. The problem arrives when this is construed as a complete database of human capabilities. Donald argues that we need a much augmented database and these new additions are drawn from broad sources: the fictional (though he argues realistic) psyches of the characters of 19th Century novels, the incredible quotidian feats of memory and attention we perform when having an argument, and neurological examples of when some of these capabilities breakdown. Let's look at one of his examples.

Two of the most important findings of experimental psychology are Geoffrey Miller's law of the magic number plus or minus seven, and unexpectedly tiny temporal minima of memory. This second 'fact' refers to our abilities to only hold a clear sensory image in short term memory for a few seconds at most before it fades or becomes something else.

Donald thinks these apparent limitations 'shocking' to our everyday sense of human capabilities, but argues that they only show up in the extreme conditions of the laboratory. Cognition when taken in a more naturalistic setting in fact violates both 'laws', and to challenge what we thought we knew from the experimental work he raises a few paradigmatic examples of where normal human cognition seems to expressly violate these intuitions. One of these is an analysis of a post-film conversation. Donald contents that in order to keep track of an argument between a few friends and several new acquaintances after a controversial film, a

Reviews

huge amount of particular details need to be kept track of by the conversation participants, and not just details of the film itself, but the contrasting views of the various interlocutors, how knowledgeable they are, what examples they have presented today to back up their views, but also the contradictory point they may have raised last week. In short, to have such an argument at all 'the stuff of everyday life' we need not only to perceptually track far more than seven distinct things but moreover do so over a time frame of minutes and hours, not seconds. Donald argues these examples show that we need to turn much more attention to what he calls Intermediate-term awareness; and it is here that consciousness shows up.

What Consciousness did for us

Donald is unhappy with many of the current accounts of consciousness, particularly with the claim that consciousness is too difficult to understand. He comments "I think that Mysterianists should emulate their predecessors, the ancient Greek and Roman Mystery cults, by pooling their considerable financial resources, building a temple in a beautiful place and holding secret rituals on a summer solstice."

The big axe Donald has to grind is not so much that experimental psychology's research program had to edit out so many important features of human cognition, indeed he sees this as being in some sense a short term necessary evil - but rather, that the limited database of human experience thereby suggested has caused many widely read recent accounts of consciousness (particularly Dennett's *Consciousness Explained*) to construe the idea of consciousness itself as being of limited value. Consciousness, he argues needs to be re-imbued with a central role in our thinking about minds for it is through the attention allocation mechanisms of consciousness that we construct ourselves and our worlds.

In particular it is only with a good understanding of consciousness that we can gain an insight as to how it is we learn complex skills, such as language.

Because of his dissatisfaction with massive modularity theories with their implications

that there is nothing new under the sun, one of Donald's major concerns is the notion of skill assembly; and it is here perhaps that we might find the aspect of his book which will be of most interest to AI researchers. Donald draws our attention to a paradox about the nature of attention, learning and consciousness, by reviewing some of the literature on unconscious learning. He finds that in all but the simplest instances; experimental psychologists report that when attention is not focused on the target of learning very little learning seems to occur. This contrasts strongly with ideas of consciousness as being a second-order or epiphenomena, arriving late only after all the interesting business of building the world is done automatically at lower perceptual processing levels. Consciousness, Donald thinks, should be understood as intimately involved in managing the resources of attention which allow higher cognitive functions to be acquired in the first place.

Epigenetic Robotics

Donald finds our ability to assemble novel skills such as driving cars to be very demonstrative of these types of powers. He draws our attention to how in the first instance trying to keep basic control of the vehicle - managing the gears etc - while at the same time paying attention to safe road use, takes all of our attentive resources and fully involves consciousness. Consciousness recedes as these processes become automatic and perfected and fade into unconscious regulation. It is for this reason that Donald calls the functioning of self-regulating consciousness the governor of mental life. While we need to grasp this in order to understand our unique human capabilities better it is ultimately he argues the process of enculturation that makes our mental firmament open-ended. Donald thinks therefore the place we need to look for the assembly of these skill construction systems is in culture and in the microstructure of how this interleaves with our native cognitive architecture through processes like the development of joint attention and the higher learning bases these establish. Perhaps, Donald's ideas could then be an inspiration to the burgeoning group of researchers interested in Epigenetic Robotics; a field which exactly overlaps these interests.

Reviews

This book has a great deal to offer the AI community because it pulls together a huge amount of research on how minds might self-assemble, but perhaps more importantly it is the best attempt so far to pull together user requirements documentation for the self-constructing mind: an invitation to engineers everywhere.

Robert Clowes, School of Cognitive and Computing Sciences, University of Sussex

Knowledge-Based Vision-Guided Robots

Nick Barnes & Zhi-Qiang Liu
Physica-Verlag www.springer.de, 2002
ISBN 3790814946

This book describes a vision system developed for a mobile robot. The robot is able to navigate around an object, maintaining it in view of a sideways pointing camera. The circumnavigation is achieved purely by visual means, without having any prior stored map of the environment in which it operates. A model-based system of canonical views is used as an internal representation of the object and the robot compares what it sees against the model, using odometric data in order to anticipate the likely change in perceived distance and orientation of the object. Combining information about the robot's physical motion and embodiment together with vision data helps to reduce the amount of visual processing needed.

This seems like a good system making use of high level vision techniques, but there are some big limitations which are pointed out in the book. Firstly there is no proposed method by which the canonical object model could be acquired autonomously. At best they suggest that the model could be calculated from a 3D CAD model, but this again assumes the active intervention of a human expert. Also, light source direction and surface albedo are explicitly put into the object model by the human programmer.

This means that if the light source position were changed, or if multiple light sources were introduced, the system would be likely to fail.

Nevertheless, what interested me most about this book was the representation of objects as canonical models. This type of representation is very similar in principle to that used in semantic networks, which are typically used to represent relations between linguistic rather than visual entities. A canonical model could also be equivalently represented within a Kohonen-style topological map.

The information available on the web about this particular project is pretty sparse, consisting only of this page <http://www.cs.mu.oz.au/~nmb/main.html> which shows a short video of the robot navigating around an obstacle. On the face of it this isn't terribly impressive, reminding me of the distinctly pedestrian pace of the SRI Shakey robot from the 1960s. Rather than moving in a continuous fashion there appear to be distinct alternating "move" and "observe" phases each taking some seconds to complete. The robot's apparently sluggish progress isn't necessarily a big criticism though, since this could be resolved simply by using a more powerful computing.

Bob Mottram
North Yorkshire

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1. Publish something obvious but faulty. Every new research development must improve on some previous one. If your work can become the default straw man then you are guaranteed a succession of invaluable citations. The only difficulty is publishing a faulty idea in the first place. Seek out a lightly refereed journal or conference – or use your own journal (see the last issue of Hacker's Guide). Compensate for this outlet's inevitably low visibility with clamorous follow-up publicity.
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