

Three-Dimensional Reconstruction of Neurons with Neuromantic

Despite the tendency of traditional artificial neural networks to simplify the role of dendritic and axonal morphology to simple connections between neurons, in reality neurites have an important role to play in determining neuronal behaviour. For example, the diameter significantly affects the oscillatory behaviour of a neurite. Similarly, signals take time to travel down the length of dendrites, adding a spatiotemporal characteristic into neuronal operation.

There are two main motivations for the creation of models of neuronal morphology. Primarily, such models are required in order to investigate the role that the morphology of a neuron plays in determining function by allowing validation of computational simulations with the results of in vitro electrophysiological experiments. Additionally, it is thought that aberrant neuronal morphology may play a role in brain diseases such as epilepsy [1], and thus being able to meaningfully characterise abnormalities may yield novel insight into such conditions.

The standard way to model neuronal morphology is to represent the dendritic tree as a series of connected cylinders of varying radius and length. The tree is thus stored as a series of points, where each point is associated with a 3D position and radius, as well as having a corresponding 'parent point'. From such a model, the behaviour of the neuron may be estimated using a compartmental simulator such as NEURON [2] or GENESIS [3]. Also, it is possible to calculate a variety of useful statistics from such models to either classify them or differentiate between a control and experimental group.

The raw data required for a reconstruction is a stack comprised of a series of images taken of the tissue sample at varying distances away from the microscope lens. In each image a different planar section of the sample is in focus, and thus the image stack as a whole forms a pseudo-3D representation of the neuron. (continued on p. 2)

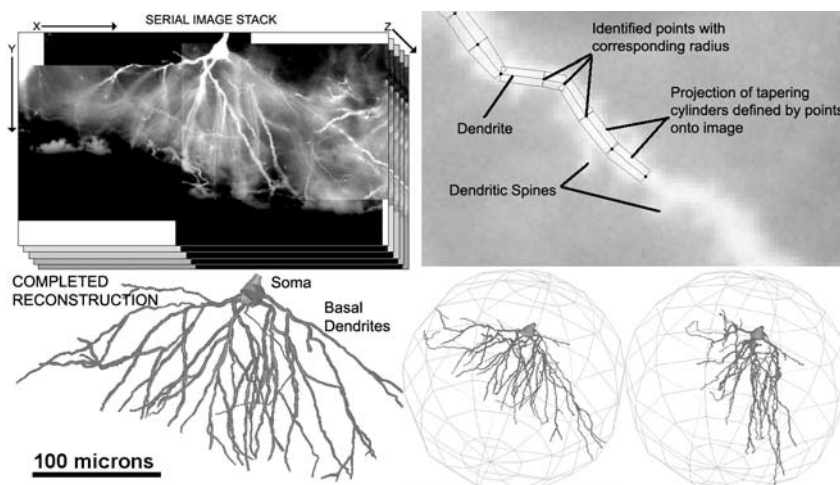


Figure 1. The basic process of neuronal reconstruction: from the original image stack (with resolution 2862 by 1649 and 86 images) in the top left panel, points are marked out sequentially down the dendrites (top right panel). This process culminates in a full 3D model of the basal tree converted to metric coordinates (bottom panels).

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Three-Dimensional Simulation of Neurons

The **AISB Quarterly** is published by the Society for the Study of Artificial Intelligence and Simulation of Behaviour.

ISSN 0268-4179

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Editor

Colin G. Johnson.
Computing Laboratory,
University of Kent at
Canterbury.
aisbq@aisb.org.uk
<http://www.aisb.org.uk/aisbq/index.shtml>

Advertising and Administration

Therie Hendrey-Seabrook
aisbq@aisb.org.uk
School of Science and
Technology
University of Sussex
Falmer, Brighton
UK, BN1 9QH
Tel: (01273) 678448
Fax: (01273) 671320

AISB PATRON

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Typically, neuronal reconstruction starts at the soma and sequentially marks out points down the dendritic tree and their corresponding radii, either manually or automatically. The most manual form of reconstruction requires the user to explicitly identifying points along each dendrite, whereas more advanced methods can take distant points on a dendrite and automatically trace between them. The image slice for which a given short section of dendrite is most in focus yields the corresponding Z-coordinate. Hence, the reconstruction is discretised in the Z axis.

Neuromantic, a freeware tool that is currently under development at the University of Reading, is designed to facilitate the reconstruction of neurons across a variety of microscopy techniques. Figure 1 illustrates the basic process of reconstruction using an image stack of the basal tree of a pyramidal neuron [4]. Recent experiments with Neuromantic show that it is more time efficient for semi-manual reconstruction than other comparable applications such as Neurolucida and Neuron_Morpho. Work is currently ongoing to complete the semi-automatic tracing capabilities of the program, which employs a 3D extension of the algorithm used by NeuronJ [5]: steerable gaussian filters [6] are employed to identify neurites and a modification of Dijkstra's algorithm is used to calculate optimal cost routing in real-time.

The laborious task of reconstructing neurons has resulted in a significant bottleneck in computational neurobiology, as it is generally difficult to obtain the sample size necessary for large-scale statistical comparisons. It is hoped that by providing a freeware tool that significantly reduces the user effort required, further research into this interesting area can be stimulated.

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Darren Myatt and Slawomir Nasuto

School of Systems Engineering
The University of Reading
Email: d.r.myatt@reading.ac.uk
<http://www.rdg.ac.uk/neuromantic>



Decentralised Control of Complex Systems

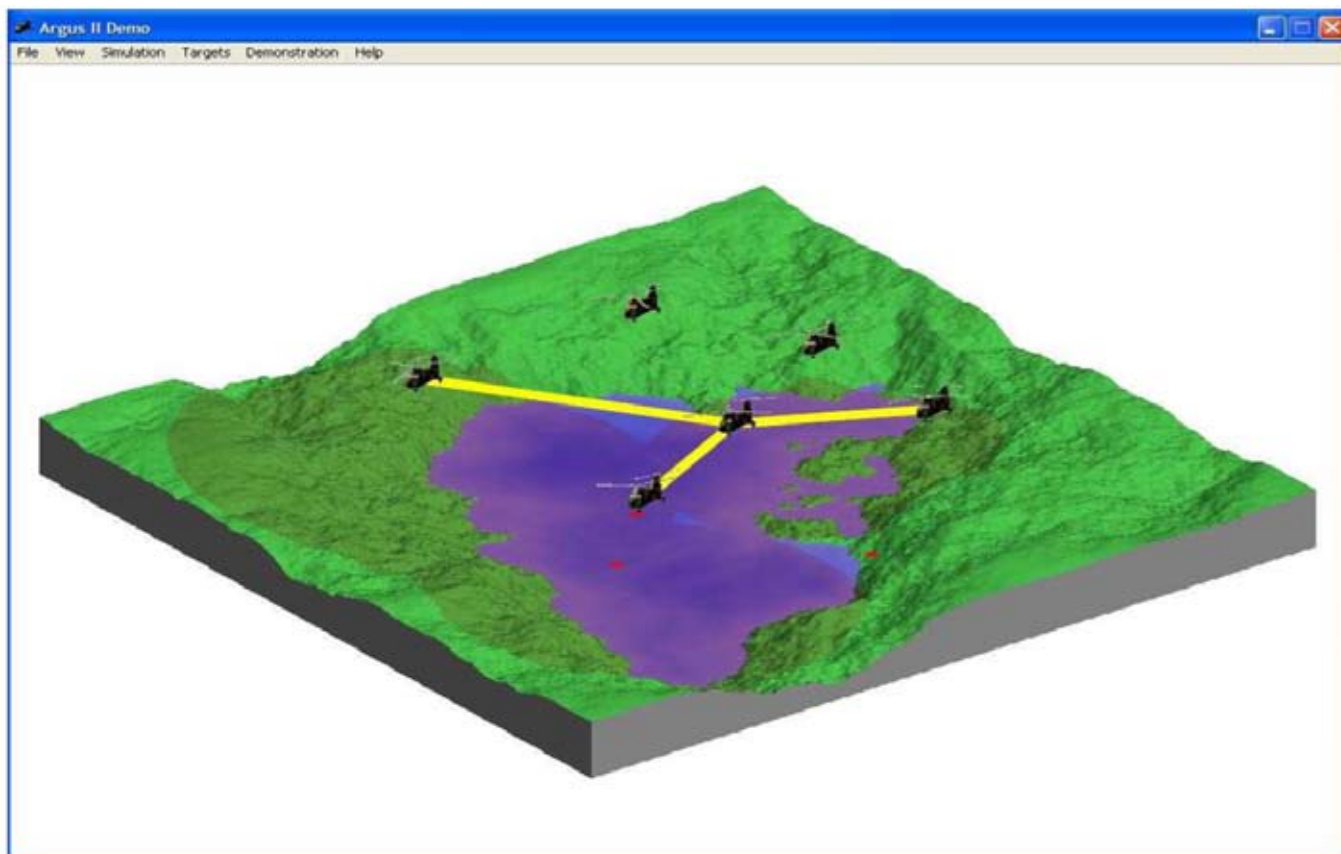
Many modern computing systems have to operate in environments that are highly interconnected, highly unpredictable, in a constant state of flux, have no centralized point of control, and have constituent components owned by a variety of stakeholders that each have their own aims and objectives. Relevant exemplars include the Web, Grid Computing, Peer-to-Peer systems, Sensor Networks, Pervasive Computing and many eCommerce applications. Now, I believe that all of these systems can be viewed as operating under the same conceptual model: (i) entities offer a variety of services in some form of institutional setting; (ii) other entities connect to these services (covering issues such as service discovery, service composition and service procurement); and (iii) entities enact services, subject to service agreements, in a flexible and context sensitive manner. Moreover, I believe agent-based computing is an appropriate computational model for conceptualizing, designing and implementing such systems (Jennings, 2000; Jennings

2001). In particular, autonomous agents are a natural way of viewing flexible service providers and consumers and the interactions between these autonomous components are naturally modeled as some form of economic trading process that, if successful, results in a service contract (or service level agreement) between the agents involved.

With the team here at Southampton, we have focused, in particular, on the design of the agents and their interactions. Specifically, we have concentrated both on the fundamental science involved in constructing such computational service economies and in how these techniques can be applied in a variety of real-world applications. In the former case, we have made advances in the areas of game theory (Gerding et al., 2007), auctions (Dash et al., 2007, David et al., 2007; Rogers et al., 2007a; Vetsikas et al., 2007), coalition formation (Dang and Jennings, 2006; Dang et al., 2006; Rahwan and Jennings,

2007), automated negotiation (Fatima et al., 2004; Fatima et al., 2006), coordination (Rogers et al., 2007b) and computational mechanism design (Dash et al., 2003). In the latter case, we have built applications using these techniques in areas such as: virtual organizations (Norman et al., 2004), sensor networks (Padhy et al., 2006; Rogers et al., 2005; Rogers et al., 2006) and personalized recommendations (Wei et al., 2005; Payne et al., 2006).

In what follows, however, I will focus on just one of these applications to provide more details of the fundamental methodology of this work. Specifically, I will focus on multi-sensor networks (MSN) that are being deployed in a wide variety of application areas ranging from military sensing to environmental monitoring and traffic control. Such networks consist of a number of sensors connected via a communication network.



Decentralised control of complex systems

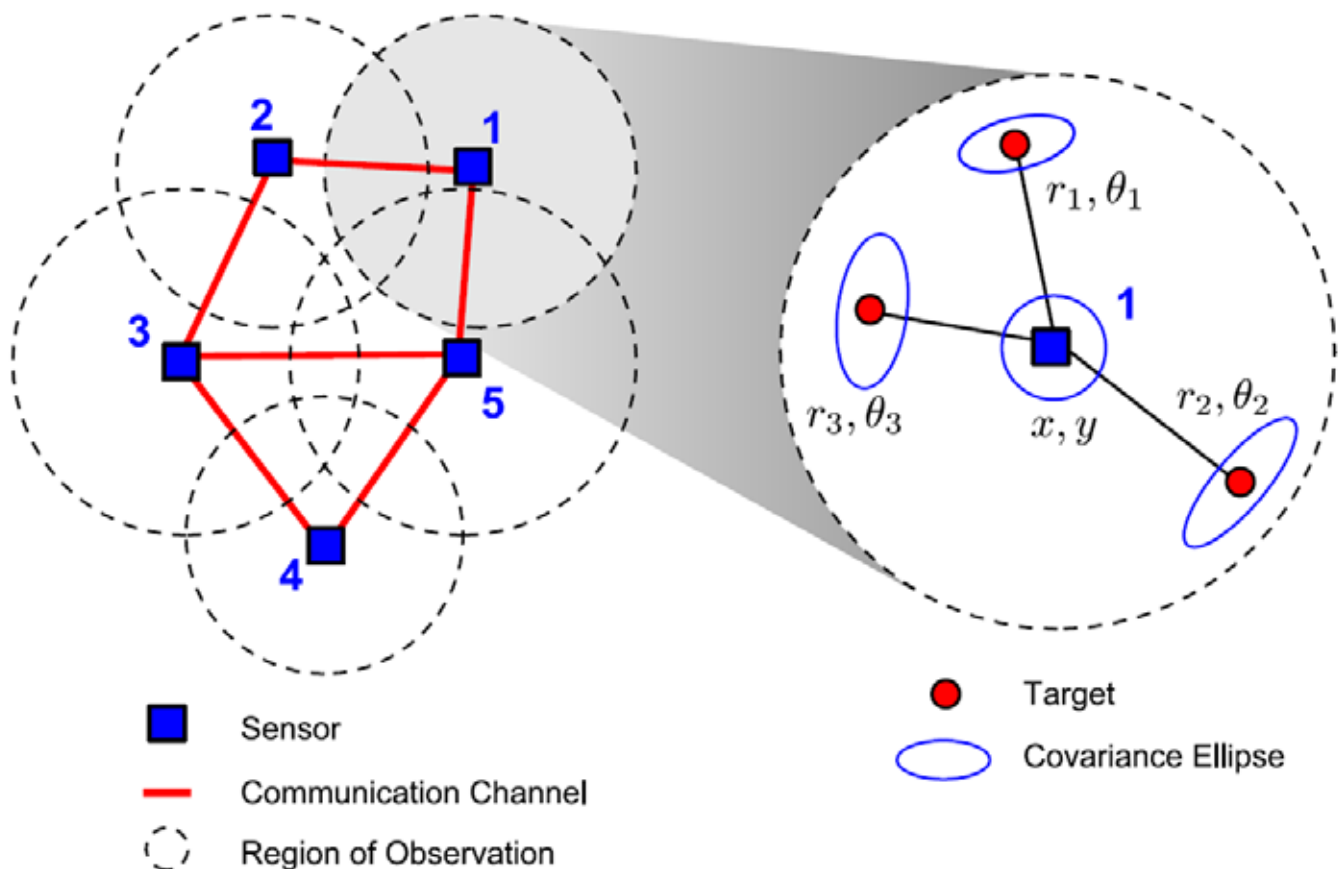
Each sensor is able to sense their local environment, but can also make use of data transmitted from neighbouring sensors in order to improve the accuracy of their own measurements (e.g. by combining their own noisy observation, with the observations from a number of other sensors, in order to reduce the final uncertainty).

To date, research in sensor networks has mainly concentrated on using cooperation among distributed sensors. At its core, this approach involves determining the exchanges of observed data between the sensors that results in the maximum gain in information across the whole sensor network. However, this approach overlooks the fact that in some applications each sensor may be individually-owned by dif-

ferent stakeholders. In such cases, the sensors are operating in a competitive rather than cooperative environment, and thus, they may attempt to optimize their own gain from the network, at a cost to the performance of the entire system. To address this challenge we have explored the application of computational mechanism design and auctions within information fusion scenarios.

In this work, we consider a real world aerial surveillance scenario such as that posed in disaster relief contexts, where multiple emergency response agencies, with aerial vehicles of different capabilities, must interact in order to locate casualties. The sensor network is formed from sensors that are mounted onboard these aerial

vehicles (see figure 1). Each sensor is provided with an imprecise estimate of its own location by the navigation system of the aerial vehicles to which it is mounted, and it is tasked with detecting and tracking multiple targets within a region of observation immediately surrounding itself (see figure 2). Within its region of observation, the sensor is able to estimate the position of each target by making noisy or imprecise measurements of the range and bearing of the target from itself. However, in order to better resolve the uncertainty in these position estimates, the sensors must acquire target observations from neighbouring sensors and then fuse these observations with their own.



Decentralised control of complex systems

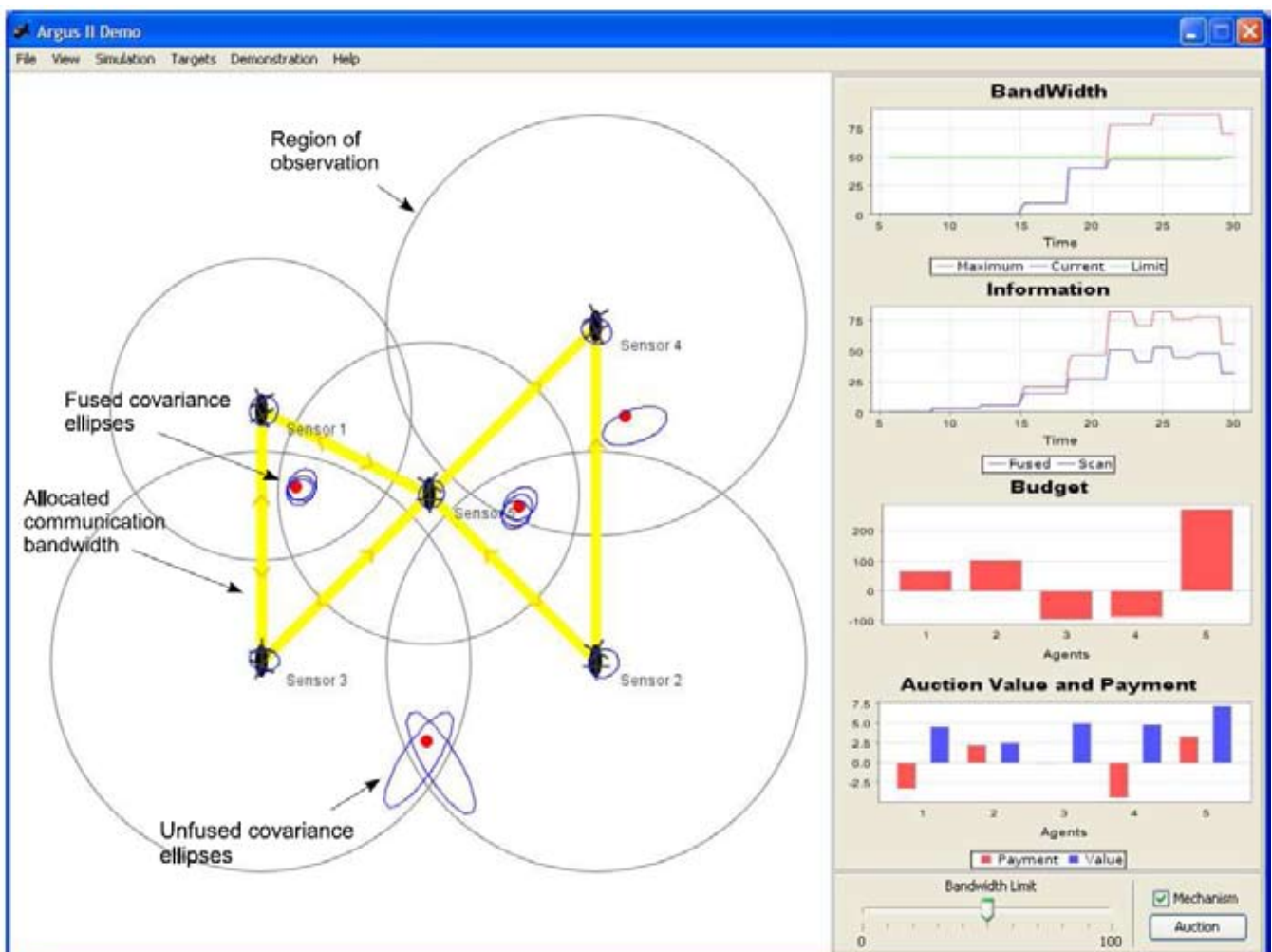
The sensors are connected together via a communication network that has a limited bandwidth, and thus, there must be some coordination to determine which data should be sent to which sensors in order to make best use of this limited global resource. However, since each sensor is owned by a different stakeholder, it is thus selfishly seeking to maximize the accuracy of its own target position estimates. As a result, each sensor has a positive disinclination to share its observations since in doing so, it will occupy valuable bandwidth which may be used to receive observations from other agents. Thus, we use techniques from mechanism design to engineer a protocol that incentivises the sharing of observations, whilst also ensuring that the global resource of communication bandwidth is used effectively.

However, in order to apply the tools of mechanism design we require a metric

that allows us to assign a value to the observations provided by each sensor. In our work, we have derived a metric based on the Fisher information of these observations. This measure is related to the precision of the observations, and thus sensors that make range and bearing measurements with greater precision, generate observations with greater information content, and hence greater value. This metric is particularly attractive as when independent observations are fused, the information content of the fused observation, is simply equal to the sum of the two individual observations.

Adopting this measure allows us to develop a protocol, whereby an independent auctioneer allocates the communication bandwidth based on the valuations of observations supplied by the individual sensors. Thus far, we have focused our research onto a class of direct mechanisms that

are said to be strategy-proof or incentive compatible (Dash et al., 2005). That is, the sensors have a dominant strategy to truthfully reveal the information content of their observations to the auctioneer (they thus have no incentive to engage in complex strategic behaviour). Such an outcome is achieved through the payments that the sensors must make (or collect) for receiving (or transmitting) observations. These payments are calculated by the auctioneer in order to align the individual goals of the sensors with the overall system-wide goals of the system designer. By incentivising truthful reporting of the information content of observations from the sensors, the auctioneer is then able to ensure that the bandwidth is allocated efficiently (i.e. to maximize the information gain of the entire network).



Decentralised control of complex systems

To demonstrate the application of this mechanism, the information fusion scenario, the auction mechanism, and the individual sensors have been implemented within a fully asynchronous Java simulation environment (see figure 3 and visit <http://www.ecs.soton.ac.uk/~acr/demonstrator/>). The main view shows the measurements and communication of the individual sensors that make up the sensor network. The graphs to the right record metrics of the entire system such as the total information gain of the network, the utilization of the available bandwidth, and the outputs of the auction process.

In this work, we have demonstrated an effective and efficient control mechanism for sensor networks, in which the constituent sensors are owned by different stakeholders that have their own goals and objectives. Our system has a principled valuation metric based on the Fisher information of a sensor's observations and uses computational mechanism design to engineer a sensor network with a particular desirable system-wide property (in this case, the efficient use of limited bandwidth capacity), despite the selfish goals and actions of the individual sensors. Whilst this research is ongoing, and is currently focusing on how the role of the auctioneer may be distributed amongst the sensors within the network, it is clear that computational mechanism design offers an invaluable and powerful set of tools and techniques to address the challenges posed by these scenarios.

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Nicholas Jennings
University of Southampton
nrj@soton.ac.uk



Planning and Doing Things

I was interested in computers by the age of 15 and gave talks on them at school. I attended evening classes a couple of years later while still at school travelling on the bus for an hour in the evening to a college in Leeds to learn programming (in COBOL!). Computers at that time filled a room, you submitted your exercises on punched card and got the results the following day. I built my first AI planner over 35 years ago. I'd already been on an early AI course at Lancaster University where the language of choice for teaching a range of topics was POP-2 and wanted to do a Summer project to create a problem solver. With support from Donald Michie and his team at Edinburgh I tried to create a Graph Traverser along the lines they were working on. Boy, am I glad I got involved with computers, AI, and planning technology!

Planning is a key area for creating intelligent behaviour and a long term aim of the AI community. I have been doing my bit to advance the concepts, technology and applications we have in his area. And, in doing so, I have been able to bring in a number of my other interests in search and rescue teams (from a childhood TV programme - Supercar), space travel and future habitats. This has involved collaboration with scientists, systems developers and creative people worldwide. I love collaborative projects and the joint demonstrations of the results.

I joined Donald Michie's Department of Machine Intelligence in Edinburgh in the early 1970s during which time my AI planners Interplan and Nonlin were created. I shared a flat with my fellow PhD student Dave Warren, who worked on the early Prolog compilers, using remarkably similar technology to that I was interested in for planning. I shared an office with Aaron Sloman who was visiting and thinking deep thoughts about the philosophical aspects of AI. Earl Sacerdoti, who did work on multi-level plan representation and hierarchical planning was a visitor and we worked together on concepts for flexible hierarchical, partial ordered task network planners with

internal goal structure recorded. Edinburgh is a fantastic environment with many visitors and collaborators. Nonlin was created to be used on real applications with the UK electricity generation utility for turbine overhaul procedure project planning. It was also used to drive the Freddy II robot in a project led by Robin Popplestone. Its core algorithms are still at the heart of most Hierarchical Task Network (HTN) and partial-ordered (POP) planners.

I had a period in the second half of the 1970s working on IBM and ICL mainframes leading a team which developed commercial data base software for engineering applications, and the team supported that for business critical applications. Just afterwards I headed up Edinburgh University's microcomputer support and office systems team, when these systems were novel and distributed computing was just starting to take off. Most computing before that was on large centralised mainframe systems. This work on software engineering and being involved in systems and user help desk support was something that has stayed with me through my career.

Edinburgh University used some of the funds generated by its commercial activities, in which I was engaged, to give a number of academic entrepreneurs a fellowship to allow them to explore collaborations with industry and with international organisations. The three of us that got these fellowships explored AI (me), Computer Science (Malcolm Atkinson, now Director of the National e-Science Centre) and Electronic Engineering (Peter Denyer, who formed Vision Group, a company successfully floated on the Stock Exchange). I joined Jim Howe (Head of the School of AI at Edinburgh) as he was creating the Artificial Intelligence Applications Institute (AIAI) and we obtained commercial and other funding to start this organisation. I took over as its Director after the first year of operations. AIAI has been a pioneer in using AI technology for a wide range of applications. It has concentrated on knowledge systems, planning systems, and adaptive systems. Its been involved in

some pioneering and deployed influential systems in everyday use—for yellow pages layout, spacecraft assembly, integration and test, industrial plant diagnosis, logistics support and so on.

My own Planning and Activity Management Group within AIAI is exploring representations and reasoning mechanisms for inter-agent activity support. The agents may be people or computer systems working in a coordinated fashion. The group explores and develops generic approaches by engaging in specific applied studies. Applications include crisis action planning, command and control, space systems, manufacturing, logistics, construction, procedural assistance, help desks, emergency response, etc. Our long term aim is the creation and use of task-centric virtual organisations involving people, government, and non-governmental organisations, automated systems, grid and web services working alongside intelligent robotic, vehicle, building and environmental systems to respond to very dynamic events on scales from local to global.

Over the last decade, I have concentrated on applying planning and collaboration technology to emergency response tasks, and a number of my projects contribute to this. In the UK, the Advanced Knowledge Technologies (AKT) project with 5 university groups and a number of industrial and government has pushed the research agenda for the semantic web and knowledge systems on the web and we are applying these in a challenging accident scenario situated in central London. In the US, we have had DARPA (Defense Advanced Research Projects Agency) support for our work since the late 1980's and this has been directed towards multi-national coalition operations for peace-keeping, collaborative operations for disaster relief, search and rescue coordination, etc. in projects such as CoAX, CoSAR-TS, and Co-OPR. In Europe, we are engaged in projects such as OpenKnowledge which has emergency response interests in dealing with the aftermath of floods in Italy.

Planning and Doing Things

The FireGrid project, in the UK, involves a large team from academia, industry and government agencies who are exploring concepts for emergency response with advance simulation in intelligent buildings.

Our aim is to create helpful agents and collaboration between organisations and people which can use knowledge of other agents, tasks, procedures, services and the environment so as create a "helpful environment" which improves safety and the lives of everyone.

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See Austin Tate being interviewed about the use of artificial intelligence techniques and their use in emergency response centres in March 2007 at <http://www.ukfuturetv.com>

Austin Tate

AIAI, University of Edinburgh
a.tate@ed.ac.uk



Books for Review

The AISB has a number of books for review in future issues of the *Quarterly*. If you would be interested in writing a review of one of the books below, please contact the Editor. Only AISB members will be sent books for review. If you subsequently decide that you cannot review the book, either because of time constraints or because you don't think it is (or you are) suitable after reading the guidelines, then you must let the Editor know. Please see more details on the web at <http://www.aisb.org.uk/aisbq/qbooks.shtml>

Introduction to Machine Learning, Ethem Alpaydin, pp. 416.

Visions of Mind, ed. Darryl N. Davis, Idea Group Press, 2004.

Thinking About Android Epistemology, ed. Kenneth Ford et al., MIT Press 2006

Computer Models of Musical Creativity, David Cope, MIT Press, 2006.

Wired For Speech: How Voice Activates and Advances the Human-Computer relationship, Clifford Nass and Scott Brave, pp296

My Mother was a Computer: Digital Subjects and Literary texts, N. Katherine Hayles, pp 290

Musical Creativity: Multidisciplinary Research in Theory and Practice, eds. Irene Deliege and Geraint Wiggins

Unifying Computing and Cognition
Gerry Wolff pp454

From Molecule to Metaphor: A neural theory of language Jerome Feldman, pp 357

Putting Linguistics into Speech Recognition Manny Rayner et al., University of Chicago Press, pp 305.

Conference Report: Cooperative Information Agents

The Tenth International Workshop on Cooperative Information Agents (CIA 2006) was held in The University of Edinburgh eScience Institute, Edinburgh, Scotland, on September 11-13. Citing from the workshop website: "An intelligent information agent is a computational software entity that is capable of accessing one or multiple, potentially heterogeneous and distributed information sources, proactively acquiring, mediating, and maintaining relevant information or services on behalf of its human users, or other agents, preferably just in time and anywhere." The goal of the workshop was to provide a forum for researchers and managers to discuss agent-based cooperative information systems, as well as this field's applications to the internet and the World Wide Web. Numerous interesting projects were presented in the workshop; three of them will be sketched here.

One work (which won The Best Paper Award) with the name "Learning to Negotiate Optimally in Non-stationary Environments" was presented by Vidya Narayanan (joint work with Nicholas R. Jennings) [2]. Since multiagent interactions can be modeled as stochastic games, learning this type of games in the face of partial information has become a major trend in the past decade. The goal of the learning process is a controversial issue, but most works attempt to achieve Nash Equilibrium, using reinforcement learning techniques. Narayanan mentioned that almost all previous work on multiagent learning has assumed that the underlying environment is stationary (and even when this is not the case, there are still strict assumptions). Narayanan and Jennings, in contrast, have considered learning as a tool for negotiation; in this setting, assuming a stationary environment is unrealistic. Narayanan discussed a model for negotiation based on non-stationary Markov Chains, and introduced a Bayesian learning algorithm. The algorithm does not assume knowledge of the opponent's strategy profile, and further, allows for changes in the opponent's profile over time. Narayanan and Jennings have shown that their algorithm converges (in the limit) to an optimal strategy. Narayanan also presented some empirical

results which imply that the algorithm often converges rapidly. In general, this work seems to be an important contribution to the field of multiagent negotiation, and may have various applications, not only for information agents, but also for e-commerce agents, personal assistant agents, or indeed for any agent situated in a competitive environment.

Another prominent work (nominated for best paper), entitled "A Fuzzy Approach to Reasoning with Trust, Distrust and Insufficient Trust", was presented by Nathan Griffiths [1]. Griffiths proposed using fuzzy logic to deal with the inherent uncertainty encountered when reasoning about agents' trustworthiness. Existing approaches in the field of reputation systems have considered fuzzy logic, but have used trust as a means of establishing reputation. Griffiths, on the other hand, decoupled the concepts of trust and reputation (the former is an individual assessment while the latter is a social notion), and focused on helping agents interact on the basis of their own degree of trust. Griffiths discussed the three classic concepts of trust, distrust and untrust (where untrust occurs when an agent is positively trusted, but not sufficiently for cooperation), and added a new notion of undistrust - negative trust - which is insufficient for making crisp decisions in the interaction process. Essentially, Griffiths defined fuzzy terms for the abovementioned concepts, which, together with fuzzy inference rules, specify agents' decisions in his framework. Griffiths presented experimental data, which validates his approach: when agents use all the fuzzy concepts to make decisions, the results are superior to selection mechanisms in which agents do not make use of the concept of distrust, and far superior when more restrictions are imposed.

Another interesting topic was presented by Frank van Harmelen [3]. van Harmelen gave a bird's eye view of the state of semantic web research. He gave two interpretations of the goals of the semantic web: as the web of data (integration of data sources over the web), and an enrichment of the current web. van Harmelen

also discussed four objections which are often raised against the semantic web. Most importantly, van Harmelen listed the four main questions in semantic web research:

1. "Where does the meta-data come from?" In short, from natural language processing, machine learning and social communities.

2. "Where do the ontologies come from?" Several problems in the area of ontology-learning remain difficult.

3. "What to do with many ontologies?" Ontology mapping remains a very difficult problem; some even consider it the main weakness of the semantic web approach.

4. "Where's the web in the semantic web?" The most successful applications of the semantic web are currently in company intranets. However, in recent years the focus of semantic web research is returning to the web itself.

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Ariel D. Procaccia

Hebrew University of Jerusalem
arielpro@gmail.com

AISB Annual Convention 2008



Communication, Interaction and Social Intelligence

The AISB 2008 convention will be in the University of Aberdeen from April 1-4, organised by Frank Guerin and Wamberto Vasconcelos. The theme for the 2008 convention is "Communication, Interaction and Social Intelligence". This is a return to the same broad area as the highly successful AISB 2005 convention on "Social Intelligence and Interaction in Animals, Robots and Agents". The 2008 convention aims to bring together three areas of research: Firstly, agent-agent communication and interaction, for example the engineering of agent societies and electronic institutions; Secondly, human-computer communication and interaction, for example embodied agents, natural language, and data interpretation and visualisation; Thirdly, supporting human-human communication and interaction, for example supporting human teamwork, and social networks. In addition to providing a home for state-of-the-art research in

specialist areas, the convention will also provide a fertile ground for new collaborations to be forged between complementary areas. Symposium proposals are currently being solicited. This will continue until 1st September 2007. Shortly after this the accepted symposia will be announced. Please see the web site for more details.

Aberdeen University is one of the ancient Universities of Scotland, dating back to the fifteenth century. The convention will be hosted in the picturesque King's College campus, which forms the heart of Old Aberdeen. Accommodation for convention delegates will be provided on campus. Aberdeen is very well connected by air, rail and road. The Airport has regular flights from Amsterdam, Paris, Copenhagen, Dublin, London and many other UK airports. Nestling on the coast between the rivers Dee and Don, Aberdeen City is very compact with most places accessible by foot. The city has a population

of 216,000 and has a range of excellent restaurants and lively nightlife and music scenes. Aberdeen is also an excellent base for tourism, whether it be exploring the Deeside Woodlands and Cairngorm Mountains or following the whiskey and castle trails. Other popular attractions include golf courses, horse riding, windsurfing, and skiing.

Convention web site:
<http://www.aisb.org.uk/convention/aisb08/>

Frank Guerin,
Wamberto Vasconcelos
University of Aberdeen
aisb08@aisb.org.uk



Call for 2009 Convention Proposals

The AISB would like to invite proposals to host the 2009 Convention.

THE AISB CONVENTION

The AISB Convention is the major annual UK Artificial Intelligence and Cognitive Science Event. In the past the convention has been hosted by a number of prestigious institutions including the Universities of Abdeen (2008), Newcastle (2007), Bristol (2006), Hertfordshire (2005), Leeds (2004), Aberystwyth (2003), Imperial (2002), York (2001), Birmingham (2000), Edinburgh (1999). It aims to function as a venue for the presentation of recent and emerging work in the fields of Artificial Intelligence and Cognitive Science and as a productive environment for networking and the formation of collaborations. The convention exists as a series of themed symposia and workshops together with some additional plenary talks. Previous themes have included: Communication, Interaction and Social Intelligence (2008), Artificial and Ambient Behaviour (2007), Adaptation in Artificial and Biological Systems (2006), Social Intelligence and Interaction in Animals, Robots and Agents (2005), Motion, Emotion and Cognition (2004), Cognition in Machines and Animals (2003), Logic, Language and Learning (2002), Agents and Cognition (2001), Artificial Intelligence and Society (2000), Creativity (1999).

The convention will have a convention organiser who has overall responsibility for the convention program, local arrangements, and financial management. Program detail is mostly delegated to individual symposium organisers but the convention organiser is responsible for arranging plenary talks.

Each convention has a broad theme suggested by the convention organiser within which the plenary talks and the majority of the symposia should fit. This gives organiser the opportunity to promote their research area.

A full description of the role of the convention organiser is available on request from the AISB secretary (secretary@aisb.org.uk) and also from the AISB Web Site

MAKING A PROPOSAL

Proposals should be made by emailing in plain text to Louise Dennis at secretary@aisb.org.uk, enclosing the following information. (Prior informal email enquiries from possible proposers are welcomed):

Theme. The convention should have a theme that should try to encompass a wide range of work in both Artificial Intelligence and the Simulation of Behaviour. A brief justification of your chosen theme indicating why you believe it to be timely should also be included. Our aim that over a period of years the Convention should represent the broad spread of UK research in Artificial Intelligence and Cognitive Science although this does not preclude the possibility that the Convention may have similar themes in two successive years. The committee will judge proposals in this context and may make suggestions for adapting a proposed theme to fit in with this aim.

Name and Affiliation of the Convention Organiser - including both postal and email addresses and telephone numbers.

Case for Support. Not more than 1000 words, arguing your case for hosting the Convention. You may put observations about your own background and suitability in the Additional Comments section below. This case for support should include suggestions of individuals you intend to approach as plenary speakers and symposia organisers.

Convention Location, Time And Length. Typically an AISB convention runs for 3-4 days in March/April. If you are proposing to host a convention of unusual length or at an unusual time then you should also include a justification of this change. The location should be in the UK.

Additional Comments. No more than 500 words on, for example, the relevance of your background to the convention, and of the benefits of your proposed location.

Bibliography. Any literature references cited above.

Proposals will be selected by the Committee of the AISB. Unless there are very special circumstances, please do not expect us to consider web pages or other documents referenced by the proposal.

TIMETABLE

Convention proposal submission deadline:
1st July 2007

Notification of Acceptance: 5th August 2007

Suggested deadline for Call for Symposia

Proposals: 31st July 2008

AISB COMMITTEE MEMBERS

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John Barnden
University of Birmingham
chair@aisb.org.uk

Vice Chair

Dimitar Kazakov,
University of York
vicechair@aisb.org.uk

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louise.dennis@aisb.org.uk

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Awards
Kris de Meyer
King's College London
treasurer@aisb.org.uk
travel@aisb.org.uk

Membership

Steve Croker
University of Derby
membership@aisb.org.uk

Publications

Mark Bishop
Goldsmiths College London
publications@aisb.org.uk

Managing Editor

AISB Journal
Geraint Wiggins
Goldsmiths College London
aisbj@aisb.org.uk

Editor, AISB Quarterly

Colin Johnson
University of Kent
aisbq@aisb.org.uk

Public Understanding of AI

Tim Blackwell
Goldsmiths College London
t.blackwell@gold.ac.uk

Publicity

Nick Hawes
University of Birmingham
publicrelations@aisb.org.uk

Schools Liaison

Fiona McNeill
University of Edinburgh
f.j.mcneill@ed.ac.uk

AISB Convention 2007

Christian Kray
University of Newcastle-upon-Tyne
aisb07@aisb.org.uk

AISB Convention 2008

Frank Guerin
University of Aberdeen
aisb08@aisb.org.uk

Ordinary Member

Slawomir Nasuto
University of Reading
s.j.nasuto@reading.ac.uk



The Life of A. Hacker

by Fr. Aloysius Hacker

Cognitive Divinity
Programme
Institute of Applied
Epistemology

About the Society

The Society for the Study of Artificial Intelligence and Simulation of Behaviour (AISB) is the UK's largest and foremost Artificial Intelligence society. It is also one of the oldest-established such organisations in the world.

The Society has an international membership of hundreds drawn from academia and industry. Membership of AISB is open to anyone with interests in artificial intelligence and cognitive and computing sciences.

AISB membership includes the following benefits:

- Quarterly newsletter
- The AISB Journal
- Student travel grants to attend conferences
- Discounted rates at AISB events and conventions
- Discounted rates on various publications
- A weekly e-mail bulletin and web search engine for AI-related events and opportunities

You can join the AISB online via:

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

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Episode 4: Computational Theology

The UK I returned to, at the start of the Swinging Sixties, was very different from the one I had left. It was alive to new thinking, especially to the combination of "white hot" technological innovation with new forms of spirituality and the spending of large sums of money. My latest enterprise, CATHOLIC™ (Church of Aloysius Theobald Hacker for Ordinations, Liturgy, Inquisitions and Christenings), could hardly have come at a more opportune moment. The newly minted pop idols provided me with both a source of high profile acolytes and financial security. Thus freed from academic constraints, such as the need to publish and attract funding, I was able to give full rein both to advancing a new Computational Theology and to perfecting the practical products proceeding from my new percipience.

Despite the abstract ambitions of the ambassadors of a new religion, the flock require concrete realisations of their faith. Meeting this need resulted in my most successful technology transfer from the Cognitive Divinity Programme: the FETISH™ (Faith Expounded, Theology Interpreted and Spirituality Helped). The FETISH™ employed the latest Artificial Intelligence techniques to understand and answer all the user's religious questions via a speech processing unit. It delivered uplifting sermons, listened to prayers, inspired virtuous living and encouraged generous giving, especially to CATHOLIC™. From the latest fashion accessory of the novo riche, it became the must-have Christmas gift of 1964, and soon took pride of place in an alcove of every lounge in the land—it was, for a moment, more popular than John Lemon. The downside of this, otherwise

welcome, publicity was to draw the attention of an obscure but ancient, Italian organisation with a similar name to ours. To avoid expensive litigation, we were reluctantly forced to change our name to the Church of God the Programmer.

The central tenet of our new Church is that the Universe is a simulation, programmed by God, in which Jesus was his avatar. Members of the flock can communicate with God with PRAYER (Please Reboot After Yet more Editing and Revision); God can intervene in the simulation with MIRACLES (Mysterious Interventions in Reality, Altering Continuity by Little Edits in the Simulation). These revolutionary ideas have underpinned our new Computational Theology. We have even used to them to make advances in the sciences, such as cosmology. For instance, the apparent acceleration of the Universe's expansion can be explained without the need for exotic dark energy, but merely by God's coffee cup nudging the fast-forward button.

Want more say?

If you have lots of ideas about what we should have in the Quarterly, contact the Editor about becoming an *Editorial Board Member*.

Want to advertise?

The AISBQ reaches hundreds of Artificial Intelligence and Cognitive Science researchers in the UK, Europe, and beyond. Advertising and general information is available via:
<http://www.aisb.org.uk/aisbq/index.shtml>

Want to write something?

The link above gives access to full guidelines for the submission of reviews and technical articles. Books available for AISB members to review are also listed.

The deadline for the next issue is:

Friday 27th July 2007