

Title: Visions of Mind

Alternatives:

Perspectives on Architectures for Cognition and Affect
Architectures for Cognition and Affect
Architectures for Mind
Artificial Minds, Synthetic Emotion

Introduction

Spring 2000 saw the annual symposium of the premier UK Artificial Intelligence society (The Society for the Study of Artificial Intelligence and the Simulation of Behaviour <http://www.aisb.org.uk/>) held at the University of Birmingham. One of the principal workshops ran under the title "[HOW TO DESIGN A FUNCTIONING MIND](#)"

This was organised by Professor Aaron Sloman. A set of international speakers addressed the objectives of that workshop, namely:

1. Summary:

This two-day symposium will adopt a multi-disciplinary approach to the long term problem of designing a human-like mind, whether for the scientific purpose of understanding human minds or some engineering purpose.

The invited keynote speakers for the [main Convention](#) are Alan Bundy, Geoffrey Hinton, Marvin Minsky, and Aaron Sloman. Some of their talks will be relevant to this symposium. Marvin Minsky and Geoffrey Hinton will also attend this symposium.

2. Background to the symposium:

Much research in AI is fragmented: people work on language, or vision, or planning, or learning or mathematical reasoning, without necessarily asking how their models could be combined with others in a fully functioning mind; or they discuss multi-agent systems where the agents have only very simple collections of capabilities.

Much research in psychology is equally fragmented: investigating particular capabilities and how they are affected by environmental factors, or brain damage, or gender, or age, etc.; for instance linguistic or visual or problem solving or memory or motor control capabilities.

Moreover such research often produces interesting empirical results without leading to a theory that is deep or precise enough to be the basis for a design for a working system.

Some philosophers also think about these topics and attempt to analyse the concepts involved in talking about minds, or necessary or sufficient conditions for various kinds of mentality, but without doing so at a level that might guide an engineer attempting to design a mind: and some of them produce arguments claiming to show that the task is

impossible, but without formulating the arguments in a manner that could convince a computer engineer.

Ethologists study the minds of many kinds of animals and how they differ, but often without asking what sorts of architectural differences might underly the observed differences in behavioural capabilities, social structure, etc.

Biologists and paleontologists study the evolution of systems which include humans and other animals but generally find it much easier to investigate the development of physical form and physical capabilities than the mechanisms of mind.

3. The purpose of the symposium

The symposium is intended to bring together people interested in building bridges between various kinds of partial studies, with the long term goal of understanding, at least in principle, how to build a complete mind.

Researchers in any discipline are invited to submit posters which address these issues, whether in a speculative fashion or by reporting firm results which directly contribute to the long term task. Examples of topics might be proposed include: architectures to accommodate multiple aspects of human mental functioning, or analyses of requirements for such architectures, or a critique of existing architectures on the basis of their functional limitations or inconsistent empirical evidence, or discussions of how important aspects of human minds might have evolved, or analysis of the problems of designing an adult mind vs designing an infant mind which develops into an adult mind, or comparisons between capabilities of different animals which provide evidence for architectural differences, or overviews of major results in neuroscience which have implications for the virtual machine architecture of a mind (e.g. evidence from brain-damaged patients indicating what sorts of separable functional modules exist).

Philosophical posters presenting familiar arguments to prove that the task is impossible are not particularly welcome whereas philosophical arguments which highlight some of the difficulties to be overcome are.

[Aaron Sloman, 2000, <http://www.cs.bham.ac.uk/~axs/aisb2000/>]

This proposed text has very similar objectives. It draws on those authors present at the workshop and other authors to provide an update on their perspectives for this collected text.

A follow-up collection of papers for publication as a reviewed and edited text was mooted. Due to time constraints, Professor Sloman was unable to pursue this. The associated document Authors.doc presents the original presentation titles. The proposed text has been discussed with Professor Sloman, and he is happy for me to follow up on his workshop with a collection of new papers that draw on the workshop content.

Objectives and Mission

The main objective of this collection is to present an overview of where the research area of artificial minds is at the start of the twenty first century. As such it will draw on current and prospective work from pivotal researchers in the area. It will include perspectives from philosophy, psychology, cognitive science and artificial intelligence. Rather than present a unified model of mind, it will invite a diverse collection that mirrors the academic discipline

itself. The objectives and mission of the proposed text are in effect a rephrasing of those associated with the original workshop.

The proposed text presents a multi-disciplinary approach to the long term problem of designing a human-like mind, whether for the scientific purpose of understanding human minds or some engineering purpose.

Much research in AI is fragmented: people work on language, or vision, or planning, or learning or mathematical reasoning, without necessarily asking how their models could be combined with others in a fully functioning mind; or they discuss multi-agent systems where the agents have only very simple collections of capabilities.

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This text brings together research from academics in Europe and the USA interested in building bridges between various kinds of partial studies, with the long term goal of understanding, at least in principle, how to build a complete mind.

Scholarly Value

This topic is important both to artificial intelligence and cognitive science, and also to the academic disciplines that they draw on and feed, for instance philosophy, computer science and psychology. The proposed collection follows in the tradition of

Computers and Thought, E.A. Feigenbaum & J. Feldman (Eds.)

ISBN 0-262-56092-5, 1963.

Mind Design, J. Haugeland (Ed.)

ISBN 0-262-08110-5, 1981.

Architectures for Intelligence, K. VanLehn (Eds.)

ISBN 0-8058-0405-6, 1988.

Android Epistemology, K.M. Ford, C. Glymour & P. J. Hayes
ISBN 0-262-06184-8, 1989.

The authors who have confirmed their interest in participating in the project include well known international figures such as Professors A. Sloman, J.A. Barnden, S. Franklin, P. Hayes and W. Clocksin.

This text could well become one of those heavily cited works that epitomises the research ethos associated with this discipline as viewed at the start of the twenty-first century.

Competition

The research area is covered in international conferences such as IJCAI, AAAI etc, but there is no easily available *current* collected works on this topic.

Tentative Content

A selection of papers from some leading figures in the area of cognition and artificial minds addressing the objectives and mission statement given above. The articles will present a diverse perspective on this important topic.

Expected content to include an introduction to the area from the editor, giving an historical perspective on this work, e.g. from Descartes' theories of mind to the current state of Artificial Intelligence and Cognitive Science. This introduction will include a short overview of the overall work included from the contributors. (10 pages maximum). I would expect contributions from the researchers contacted who have expressed an interest. Currently there are 15 contributors. At approximately 20 pages each, the text should be about 350 pages in length, including an index.

Prospective authors who have confirmed an interest in the project include:

Dr. Zippora Arzi-Gonczarowski, Typographics Ltd., Jerusalem, Israel.

Professor John A. Barnden, University of Birmingham, UK.

Dr. Joanna Bryson, University of Bath, UK

Professor William Clocksin, Oxford Brookes University, UK.

Dr Darryl Davis, University of Hull, UK.

Dr. Bruce Edmonds, Manchester Metropolitan University, UK.

Professor John Fox, Advanced Computation Laboratory, London, UK.

Professor Stan Franklin, Memphis University, USA

Dr. David Glasspool, Advanced Computation Laboratory, London, UK.

Dr. Pentti Haikonen, Nokia Research Center, Finland

Professor Pat Hayes, University of West Florida, USA.

Dr. Brian Logan, University of Nottingham, UK

Professor Doug Riecken, Rutgers University, USA

Professor Matthias Scheutz, University of Notre Dame, New York.

Professor Aaron Sloman, University of Birmingham, UK

The full list of people contacted and the title of their AISB'00 paper is given in the attached document (Authors.doc). More detail on the nature of each potential contributor can be given, but it will include philosophical perspectives, views from psychology, connectionist models of mind and different designed and implemented architectures.

Tentative Timetable

Initial Call for Full Papers	March 2003
Submission of Papers	June 2003.
Review of papers	June to September 2003.
Notification of Review results	September 2003.
Final Copy of Papers (to editor)	November/December 2003.
Collation of papers and other material	January 2004.
Final digital text to publisher	March 2004.

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Project Pages <http://www2.dcs.hull.ac.uk/NEAT/dnd/visions/mind.html>

Vita Brevis

Current Position Lecturer, Computer Science, University of Hull.

Research Interests

Agents Architectures, Methodologies and Artificial Life.

Cognition, Emotion and Motivation.

Data Mining and Knowledge Engineering in Medicine.

Machine Perception and Vision

Computer Art.

Other Research Activities

5 PhD Students, 3 MPhil Student,

Program Committee for International Conference on Neural Nets and Artificial Intelligence

Program Committee for International Conference on Agents in Business Automation

Publication Summary

14 Journal Papers, 31 International conferences, 4 Book Chapters, 14 Other

See attached document Publications.doc for full list

Academic Career

School of Computing, Staffordshire University, Senior Lecturer in Artificial Intelligence, October 1996 – June 1999

School Of Computer Science, University of Birmingham, Senior Research Fellow in Artificial Intelligence, Architectures for Intelligent Agents, February 1995 – September 1996

School Of Computer Science, University Of Birmingham, Research Fellow, Software Applied to Multi-Mode Medical Images, June 1994 – January 1995.

Multi-Media Lab, University of Manchester, Post-doctoral Research Associate, Development of AI/Vision techniques for multi-media databases, June 1991 – May 1994.

Wolfson Image Analysis Unit, Medical Biophysics & Orthodontics, University of Manchester, Research Associate, Blackboard (computer vision) systems, October 1988 – May 1991

Psychology Department, University Of St. Andrew's, Research Assistant, Human Visual Psychophysics. January 1988 – September 1988.

Qualifications

BSc, Biological Science, Major in Experimental Psychology, Dept. of Experimental Psychology, University of Sussex, June 1976

M.Sc., Knowledge Based Systems, Dept. of Computer Science, Heriot-Watt University, November 1987

Ph.D., Dept. of Medical Biophysics, School of Investigative and Diagnostic Medicine, Faculty of Medicine, University of Manchester, December 1991.