About AIAI

AIAI is a technology transfer organisation that promotes the application of Artificial Intelligence research for the benefit of commercial, industrial, and government clients. AIAI has considerable experience of working with small innovative companies, and with research groups in larger corporations.

AIAI specialises in Intelligent Systems - systems making use of the knowledge of experts, or systems that learn.

The application focus of AIAI includes the following:

- **Knowledge Management & Systems** - Knowledge Modelling, Ontologies, Development Methodologies, Intelligent Documents, Case-Bases and Organisational Memories

- **Planning & Activity Management -** Activity Planning, Intelligent Task Management, Intelligent Workflow, Process Standards & Modelling, Intelligent Agents and Cooperation

- **Adaptive Systems** - Case-Based Reasoning, Neural Networks

- **Intelligent Interfaces** - Multi-lingual, multi-modal, task support interfaces and Intelligent Process Panels

- **Bioinformatics** - Data Mining, Trend Analysis, Intelligent Tools, Ontologies

- **New Ventures** - Making new links to skills available in other parts of Informatics, the rest of the University and further afield

AIAI is part of the School of Informatics at the University of Edinburgh, UK. We offer a wide range of undergraduate and postgraduate degrees in Artificial Intelligence, Cognitive Science, Computational Linguistics, Computer Science and Software Engineering.

Artificial Intelligence Applications Institute

AIAI at the University of Edinburgh is part of the largest AI group in Europe. It is an internationally renowned centre of expertise in applying innovative Artificial Intelligence techniques to real-world problems. AIAI specialises in Intelligent Systems - systems making use of the knowledge of experts, or systems that learn. AIAI has considerable experience of working with a large variety of industrial and commercial clients and collaborators on a range of problems. AIAI can demonstrate a deep understanding of how AI techniques are selected and implemented, together with a practical experience in analysing clients' requirements and constructing systems to meet these requirements across a wide range of application areas.

Client and Collaborators include:

Amoco, Arup, Boeing, BRE, British Aerospace, British Telecom, CISE, Conoco, CRI Denmark, DARPA, DERA, Digital, Edify, Elf, ESEC, European Space Agency, Exxon, Ford, GCHQ, GEC Marconi, GlobalInfoTek, Hewlett Packard, Health & Safety Executive, Hitachi, IBM, ICL, ISX, Ilog, Kodak, Lloyd's Register, Lockheed Martin, Logica, Motorola, NCR, NIST, Nynas, Pindar, Petroleum Science & Technology Institute, QinetiQ, RAF, Rolls-Royce & Associates, Seiko, Sharp, Shell, Slam Games, Standard Life, Texaco, Toshiba Corporation, UBS, Unilever, US Air Force, US Army

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Four decades of world leading research and teaching
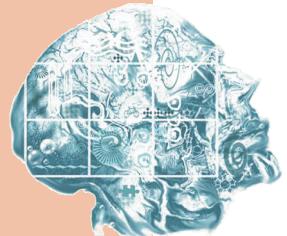
Two decades of innovative applications of Artificial Intelligence

Emergency Response
E.g. e-Response, FireGrid, I-Rescue

The e-Response project centres on 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.

AIAI has worked with UK and US Search and Rescue agencies, and on a number of collaborative projects in emergency response for natural disasters such as flood and earthquakes, as well as on accident scenarios in cities and the built environment via the FireGrid and I-Rescue projects.

Intelligent Systems
E.g. SPIRIT, Expert Provisioner

SPIRT is a knowledge based diagnostic system for oil well testing, which is used to determine how much oil exists in a reservoir, where it is and how it will flow to the well. This research incorporated pattern matching and uncertain reasoning technologies to select suitable sites. AIAI designed and developed the knowledge based component of the prototype software system.

Expert Provisioner is a knowledge-based provisioning system prototype, designed to support RAF Range Managers in the procurement of consumable supplies. The system removes much of the mundane work in order processing as well as potential for misinterpretation of information. This project helps to save £30 million per annum for the RAF and is now being deployed to the British Army and Navy.

Planning and Workflow
E.g. Optimum-AIV, I-X, O-Plan

A consortium consisting of Computer Resources International A/S, Matra Marconi Space, Progespace and AIAI was responsible for the development of the European Space Agency (ESA) knowledge based system for the planning and scheduling of activities for spacecraft assembly, integration and verification, called Optimum-AIV. AIAI's O-Plan was used as the basis for this work. State of the art knowledge based techniques were applied in the planning and scheduling process: preconditions and effects on the spacecraft configuration of individual activities can be stated and used for verification of the plan logic. Optimum-AIV is now being operationally applied to the preparation of ARIANE IV equipment bays.
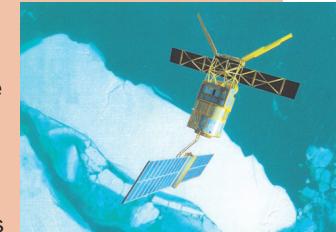
I-X, also developed at AIAI, is a systems integration architecture project funded by DARPA research initiatives. There is a need to coordinate people and systems to bring about more effective organisational behaviour; in the context of modern distributed, virtual organisations, when attempting any sort of collaborative synthesis task (such as design, planning or configuration), likely to require the capabilities of both human and computer agents, the need for such management becomes most evident.

Document Authoring
E.g. Formation, GhostWriter

Winner of an award for Innovative applications of AI, Formation, developed by Pindar with support from AIAI, is a knowledge-based document layout system, originally designed for large classified directories and catalogues, such as British Telecom Yellow Pages. It operates using the same kind of expert knowledge of principles and procedures that are employed by a human layout artist doing the same task. Formation can lay out a typical telephone directory at speeds in excess of 1500 pages per hour on a typical Pentium PC. This small reduction in wasted space brings large cost savings.

GhostWriter was a research project between British Aerospace Defence and Dassault Aviation, with assistance from AIAI. Its primary objective was to design, develop and demonstrate a proto-type authoring environment so as to illustrate the kinds of proactive support that are required by and that would benefit authors in the production of technical documents. The prototype has been used to demonstrate the interactive and semi-automatic production of a significant portion of a complex maintenance procedure for the Falcon 900 aircraft.

Bioinformatics
E.g. XSPAN, Proteomics Trend Analysis

The XSPAN project, a collaboration between Heriot-Watt University and Edinburgh University, aims to support cross-species access to tissue-based genomic information through the development of an internet based cross-species anatomy network, i.e. i.e. a cross-species anatomy ontology integration system. The network provides interoperability between anatomy databases of the key model embryos, which will, in turn, facilitate access to gene expression and other tissue-based data across species, and to other genomics and proteomics resources.

The proteomics trend analysis project concerned the use of cutting edge data mining and machine learning technique for the analysis of post-experimental 2-D Electrophoresis Gel data to automatically detect interesting trends. Publications around this work were awarded a best paper and best presentation award.
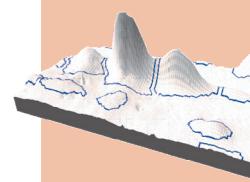
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