



Advanced Planning Technology

Support for planning, workflow and inter-agent collaboration

The University of Edinburgh's Artificial Intelligence Applications Institute (AIAI) is one of the world's leading applied research groups using advanced artificial intelligence methods for planning and activity management tasks.

The AIAI's Planning Group 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 develops generic approaches and software systems by engaging in specific applied projects of direct benefit to its clients in industry and international governmental agencies. Some of the most advanced activity support, planning, scheduling and workflow software is available to use as the basis for this work.

Putting AI Planning Technology into Productive Use

O-Plan and I-X

Command, planning and control agents to support non-combatant evacuation operations, US Army military operations in urban terrain, multinational coalition operations, disaster relief, search & rescue, etc.

Optimum-AIV

Planning system for assembly, integration and test of Ariane IV payloads for the European Space Agency.

EUMETSAT

Specification of the telecommand system for the European Meteorological Spacecraft Control Centre.

International Standards

Inputs to the development of standards for process specification, workflow, enterprise modelling, web services, etc.

Objectives

- To put AI planning and activity management technology to productive use
- To allow for a shared model of objectives, tasks, plans, options and current world state between human and automated agents
- To develop new generic methods for planning and activity management
- To participate in relevant standards activities

Technologies

- Shared Plan and Activity Representation
- Intelligent Process Management
- Knowledge-Based Planning
- Adaptive Systems Approaches to Planning (Genetic Algorithms and Neural Nets)
- Constraint Management Technology
- Knowledge-Based Workflow
- Intelligent Agent Technology
- Intelligent Activity and Process State Visualisation
- Modular, Distributed Systems Integration Architectures

Applications

- Military Operations such as Non-combatant Evacuation Operations (NEOs), Air Campaign Planning and Army Small Unit Operations
- Search & Rescue Coordination
- Emergency and Unusual Procedure Assistance (i-rescue.org)
- Coalition Operations
- Spacecraft Mission Planning
- Construction and Engineering Planning such as Assembly, Integration and Test
- Logistics
- Help Desks, Systems Management Aids and Advisory Assistants
- Management Tasks
- Personal Assistants

Software Systems

I-X (2000-present)

A portable cross-platform Java-based planning and collaboration support environment. Aid to multi-agent cooperative work and external services use.

O-Plan (1983-99)

An AI planning, execution and plan repair system with extensive representations for temporal, resource and other constraints, support for plan execution monitoring and plan repair "on-the-fly". Runs as a web service.

Nonlin (1974-82)

The original hierarchical task network, partial-order planner - used as the basis for many textbook descriptions of this type of technology.

Commercial Opportunity

The Artificial Intelligence Applications Institute are interested in discussing collaborative projects to utilise the planning, execution support and re-planning capabilities within our software systems and skill base.

Further Information

For further information on this technology transfer opportunity with the University of Edinburgh, please contact:

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The collage features several key elements:
1. A screenshot of the 'I-X Process Panel' showing a list of tasks with columns for Description, Annotations, Priority, and Action.
2. A 'Search and Rescue Command' window displaying a map of the North Atlantic with a search area.
3. A 'CoAKTing' interface showing a meeting agenda with items like '3: Present Meeting Items' and '4: Raise AOB'.
4. A satellite image of the Earth Resources Satellite-1 (ERS-1) in orbit.
5. A photograph of a Royal Navy rescue helicopter (H99) performing a hoist rescue at sea.

Image: Search and Rescue at Sea – Photo by Austin Tate

Image: ERS-1 – Photo used with permission of European Space Agency