

# American Association for Artificial Intelligence

---

## Synopsis of AI Trends emerging at 2004 AI Conference

*For those interested in the latest trends in cutting edge AI research and applications, the annual National Conference on AI (AAAI-04) is a treasure trove. This year, there are a number of emerging trends being presented at the conference, including AI for:*

### ▪ Counter-Terrorism / Crisis Management / Defense

For decades, the Department of Defense has been a major funding source for AI research. Since the tragedies of 9/11, there has been a new urgency to develop and field AI systems to aid the intelligence, defense, and emergency response communities. While much of this work remains cloaked in secrecy, this year's IAAI conference includes nine papers on topics such as "Identifying Terrorist Activity with AI Plan Recognition Technology" by researchers at SRI International and Palo Alto Research Center, describing DARPA-funded research; and "Coordination Managers for First Responders" from Honeywell Laboratories .

In addition, the Mobile Robots Competition will include a "Search and Rescue" event on a course simulating a fallen structure provided by the National Institute of Standards and Technology. The robots must navigate the terrain and rubble, find human victims, and direct human rescuers to the victims. In 2001, entrants in this event had barely returned home after the competition, when tragedy struck on 9/11. Several teams rushed to Ground Zero in New York City to assist with the search and recovery efforts.

The Intelligent Systems Demonstrations will also include several prototype systems in this domain, such as: Coalition Search and Rescue - Task Support, and Agent-Based Modeling with Social Networks for Terrorist Recruitment.

### ▪ Space Exploration

NASA has been much in the news of late. AAAI-04 Keynote speaker is Daniel J. Clancy, Chief, Computational Sciences Division, NASA Ames Research Center. Clancy will discuss the country's Vision for Space Exploration which focuses on the joint human-robotic exploration of the solar system starting with a return to the moon, and then the human exploration of Mars. In addition, the vision includes a continued array of robotic missions to Mars and other destinations. Clancy will survey how AI will play a key role in these efforts.

There are also two emerging Innovative Applications of AI (IAAI) papers from NASA-Ames, and an Intelligent Systems Demonstration on the Autonomous Science on the EO 1 Spacecraft .

### ▪ Robotics

Robotics is seen by some as the capstone of AI research and applications. Robotics brings together diverse threads of AI research such as vision, planning, sensor fusion, natural language, face recognition and more. AAAI's Thirteenth Annual Mobile Robot Competition and Exhibition will bring together teams from universities, colleges and research laboratories to

## American Association for Artificial Intelligence

---

compete and demonstrate state-of-the-art research in robotics and AI. This year there will be three events: (1) the Robot Challenge wherein the competing robots are supposed to register, volunteer, and give a talk at the conference, (2) Rescue Robot Competition which challenges robots in a simulated fallen structure to find human victims, and direct human rescuers to the victims, and (3) Open Interaction Task involving human-robot interaction in an unstructured environment. In addition, The Robot Exhibition will provide a venue to showcase current robotics and embodied-AI research that does not fit into the competition tasks.

Invited speaker Sebastian Thrun from Stanford University will describe the Groundhog robot system designed to map abandoned mines in his talk "Real Robots for the Real World." According to a 1991 survey "tens of thousands, perhaps even hundreds of thousands, of abandoned mines exist in the United States. Not even the U.S. Bureau of Mines knows the exact number, because federal recording of mining claims was not required until 1976." Thrun will present some recent innovations in robotic mapping and exploration of unknown and hazardous environments. The Groundhog system was a joint effort between leading mobile roboticists at two of the leading robotics research centers -- Stanford University and Carnegie Mellon University.

There are also several robot demonstrations in the Intelligent Systems Demonstrations portion of the conference program.

- **Web / Computer Science**

AI technology is an integral component of current and future trends in intelligent computing. There are nine different talks and papers on various aspects of this trend at the conference. Peter Norvig, Google Director of Search Quality, will talk about AI trends in Web search engines. Edward Feigenbaum of Stanford University, and a pioneer in the field of AI, will give an invited talk on themes that have long been central to AI work within a contemporary context -- such as discussing knowledge webs and new applications of knowledge-based systems. Alex (Sandy) Pentland, Director of Human Dynamics Research at the MIT Media Lab, will discuss trends in wearable machine perception to characterize, annotate, and influence fact-to-face interactions. Pentland asserts that such technology can augment peoples' memory, initiate productive interactions, and improve group decision making and distributed work force functioning. Tim Finin, of the University of Maryland, will discuss emerging trends in software agents. There are also several emerging Innovative Applications of AI papers in this domain.

- **Health Care / Elderly**

The world's population is rapidly aging, and some are predicting a coming 'crisis in caregiving.' Intelligent technologies have the potential to help avoid this crisis by providing people with ways to adapt to the physical and cognitive changes that can accompany aging. In her talk "Intelligent Technology for Adaptive Aging" Martha Pollack of the University of Michigan will describe the state-of-the-art in such technology, highlighting the important role of AI. Two related Innovative Applications of AI papers will be presented: "A Robotic Wayfinding System for the Visually Impaired," and "The Independent LifeStyle Assistant".

# American Association for Artificial Intelligence

---

- **Scientific Research**

Much scientific research is so data rich that traditional information management, extraction and analysis tools are ineffective. The latest AI techniques to assist with biomedical research, cross-disciplinary and large-scale experimentation and analysis will be presented in invited talks, and IAAI papers and a panel discussion.

- **Education**

Computer-assisted instruction (CAI) continues to be a frontier of computer science. Several IAAI papers will be presented on innovative CAI systems and their preliminary results when tested, including: “A Visual Modeling Environment for Middle-School Students” from Northwestern University, “Branching Storylines in Virtual Reality Environments for Leadership Development” from the University of Southern California’s Institute for Creative Technologies, and several simulation systems for training such as the “Synthetic Adversaries for Urban Combat Training” from Soar Technology Inc. and the University of Michigan.

- **Manufacturing / Business**

For more than two decades, manufacturing has been a very fruitful domain for AI applications. As recipients of this year’s Innovative Applications of AI award, several of the earliest big investors in AI technology describe recent deployed AI applications, including General Motors, Ford Motor Company and General Electric. Each have impressive returns on investment and are being widely used within their companies.