

The 2005 International Florida Artificial Intelligence Research Society Conference (FLAIRS-05): A Report

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■ The Eighteenth International Conference of the Florida Artificial Intelligence Research Society was held May 15–17, 2005, at the Hilton Clearwater Beach Resort in Clearwater Beach, Florida, located on 10 acres of powder-white beaches on the Gulf of Mexico. The general chairs were Larry Holder and Diane Cook of the University of Texas at Arlington. Ingrid Russell of the University of Hartford and Zdravko Markov of Central Connecticut State University served as program chairs. This article presents a report of the conference.

The Florida Artificial Intelligence Society¹ (FLAIRS) was founded in 1987 to promote and advance artificial intelligence research in the state of Florida and to foster the exchange of ideas and collaboration among the state's researchers in universities and industry, through an annual conference. Shortly thereafter the FLAIRS conference, a general AI conference, grew to become a major venue for AI researchers around the world to present their work. In this year's program, 56 percent of the presented papers included an interna-

tional author. The conference continues its cooperative status with the American Association for Artificial Intelligence.

The last few years have seen a significant increase in the number and quality of submissions to the FLAIRS conference, with submission numbers more than doubling over the last three years. This year's conference received 249 submissions, of which 131 were accepted as full papers and 32 were accepted as short papers for a poster session.

The program included a general session with many excellent papers spanning a broad range of AI research areas and covering traditional topics such as search, reasoning, and knowledge representation. There were 17 special tracks with several outstanding papers to supplement the program, bringing breadth to the general session and including some nontraditional AI topics, such as "AI in music and art" and "emotional intelligence." An integral part of the conference, the special tracks were coordinated by Todd Neller of Gettysburg College and are intended to give researchers working in similar areas the opportunity to meet and present work in those areas.

These focused sessions also offer forums for interaction among a broader community of AI researchers. The special tracks program included sessions and papers on AI education, AI for social networks, case-based reasoning, computational intelligence for advanced Web knowledge discovery, constraint solving and programming, evaluation and refinement of intelligent systems, integrated intelligent systems, intelligent agent systems, machine learning, natural language-based knowledge representations, neural network applications, nonclassical logics, secure multiparty computations and distributed constraint reasoning, spatiotemporal reasoning, and uncertainty reasoning.

Several special tracks included a significant number of presentations. The machine learning track, organized by Zdravko Markov and Larry Holder, was the most extensive, with 18 papers presented of the 35 submitted. The special track on natural language knowledge representations, organized by Vasile Rus, was the second largest.

For the first time this year, the conference featured a poster session, which was held during the conference reception. All accepted papers are included in the conference proceedings published by AAAI Press. In addition, authors of a select group of papers were invited to submit an extended version for publication consideration in a special issue of the International Journal on Artificial Intelligence Tools.

A best paper award was presented to Jeffrey A. Coble, Diane J. Cook, and Lawrence B. Holder of the University of Texas at Arlington for their paper titled "Structure Discovery in Sequentially Connected Data." The paper addresses an important topic in data mining, the development of data mining techniques to discover structural patterns consisting of complex relationships between entities. The authors present an incremental discovery algorithm that operates over relational data received incrementally. Second place went to Michael D. Moffitt and Martha E. Pollack of the University of Michigan for their paper titled "Partial Constraint Satisfaction of Disjunctive Temporal Problems," in which the authors present a method

for finding optimal partial solutions to overconstrained instances of the disjunctive temporal problem (DTP). A paper titled "Semantic Derivation Verification" by Geoff Sutcliffe and Diego Belfiore of the University of Miami ranked third. The authors describe a technique for semantic verification of derivations and report on its implementation in the (DVDV) verifier.

The conference featured a stimulating set of invited talks given by four distinguished speakers: Ted Senator from DARPA, David Stork from Ricoh Innovations and Stanford University, Lawrence Hunter from the University of Colorado, and Martha Pollack from the University of Michigan.

The opening invited talk was given by Ted Senator who is currently a program manager in DARPA's Information Processing Technology Office (IPTO). His talk on "Link Analysis: AI Applications and Research" focused on the recent realization that the relationships, or links, among entities in data are key to uncovering patterns of behavior in a variety of domains. Senator first motivated this idea, frequently referred to as "connecting the dots," using numerous examples and fielded AI solutions from the domains of intelligence analysis and law enforcement, including securities fraud, money laundering, and counterterrorism. He then presented a more general perspective on the problem, noting the significant AI challenges, including the huge amount of real-time data, the very low signal-to-noise ratio (that is, illegitimate to legitimate behavior), and the intention of the illegitimate entities to appear legitimate. Mathematical models for many of these issues have been developed and used to determine optimal approaches to aspects of the problem (for example, optimal number of analysts working on cases). The results suggest modifications to the traditional knowledge discovery (KDD) process based on models of collaboration and data management. While reemphasizing the significant challenges of the link analysis problem, Senator concluded that AI solutions offer the potential to address many of these challenges and augment the capabilities of the intelli-

gence analysis and law enforcement communities.

David Stork talked about the use of modern computer vision and image processing to analyze Renaissance paintings. The motivation for this research was a recent theory by artist David Hockney and scientist Charles Falco about the techniques that Renaissance artists employed to achieve the high quality of their realistic paintings. They claimed that the artists used optical devices such as concave mirrors to project images onto their canvases, which they then traced or painted over. Stork discussed a number of paintings by Jan van Eyck, Robert Campin, Hans Holbein the Younger, and others to show how optical science and sophisticated image processing techniques can help reconstruct the original setting and light conditions in the Renaissance studios. Analyses of symmetry, perspective, and illumination in most cases show the existence of imperfections in the images that tend to reject the idea that optical devices were used. On the other hand, paintings of chandeliers and mirrors and self-portraits, which couldn't be done with optical devices, show that artists can do projections very well. Thus, Stork's answer to the question "did Renaissance masters cheat using optics?" was "probably not."

Lawrence Hunter discussed an interdisciplinary area that integrates biomedicine, computational science, and AI. He named this area with a new term he has introduced for this purpose—biognostic ("life knowing") systems. Biognostic computing faces the challenges of revolutionary changes in biomedicine—the use of high-throughput instruments to collect and organize vast amounts of data and open access to these data as well as to articles describing approaches and techniques in the area of biomedicine. Hunter pointed out a number of AI technologies that bioinformaticians rely on, including machine learning (hidden Markov models, clustering, support vector machines), knowledge representation (ontologies), and natural language processing. Currently the area of biognostic computing is in the phase of building large libraries and ontologies integrated

with natural language components. The next phase will be providing tools for building and using knowledge bases for hypothesis generation and refinement, inference, and graph-based (link) analysis of biomedical literature. The lesson learned from this talk is that computation is a key to understanding life. Thus Hunter proposed a new version of the famous Turing test (the "Hunter test") to answer the question "Can a computational theory of intelligence make a contribution to inventing a new drug?"

The fourth invited speaker, Martha Pollack, surveyed AI technologies that can assist individuals with cognitive impairment. Because the over-60 segment of the world's population is steadily increasing, intelligent automation capabilities are needed to lighten the caregiver's load and promote "aging in place." Assurance technologies monitor a person's daily activities to provide updates to caregivers and detect whether intervention is needed. For individuals who need extra assistance, compensation technologies provide help for navigating around an environment, locating objects, recognizing faces, maintaining daily schedules, and completing multistep tasks. Finally, assessment technologies can provide in-home determination of the individual's cognitive health and physical capacities. Although the number of research groups working in this area is increasing, there remain a number of challenges to address, such as inferring activities from sensed data, engaging individuals in meaningful activities, and ensuring privacy and security of collected data. The ideas presented in this talk provided an important starting point for addressing a problem that, if handled well, can save caregivers money and time. More importantly, it can improve the quality of life for individuals in a world where these technologies are becoming increasingly critical.

In all, approximately 200 attendees from 35 countries participated and 163 papers were presented. FLAIRS 2006 will be held May 11–13, 2006, in Melbourne Beach, Florida.² Philip Chan and Debasis Mitra of the Florida Institute of Technology are the conference general chairs. Geoff Sutcliffe of

the University of Miami and Randy Goebel of the University of Alberta serve as program chairs. We look forward to another successful FLAIRS conference in 2006.

Note

1. www.flairs.com
2. www.indiana.edu/~flairs06/



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