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AAAI News

IJCAI-97 to Feature RoboCup

RoboCup, World Cup Robot Soccer, is a task for a team of multiple, fast-moving robots in a dynamic environment. The first RoboCup Competition will be held as part of the special program at IJCAI-97 in Nagoya, Japan, 23 to 29 August. There will be two tracks: one for physical robots and a second for software simulations. The RoboCup task offers opportunities for research on both the hardware and software aspects of multiagent systems. More information can be found at the RoboCup web site, http://www.robocup.org/RoboCup.

1997 Spring Symposium Series

The American Association for Artificial Intelligence's (AAAI) 1997 Spring Symposium Series will be held 24 to 26 March 1997 at Stanford University. The titles of the eight symposia are

- Artificial Intelligence in Knowledge Management
- Computational Models for Mixed-Initiative Interaction
- Cross-Language Text and Speech Retrieval
- Intelligent Integration and Use of Text, Image, Video, and Audio Corpora
- Memory and Medicine: Using Past Solutions in Medical Problem Solving
- Natural Language Processing for the World Wide Web
- Ontological Engineering
- Qualitative Preferences in Deliberation and Practical Reasoning

Registration materials have been mailed to all AAAI members and invited participants. They are also available on the AAAI web site. Please note that the deadline for registration for invited participants is 7 February, and the general registration deadline is 28 February.

1997 Fall Symposium Series

At press time, the following five symposia had been selected for inclusion in the 1997 Fall Symposium Series, to be held 7 to 9 November 1997 in Cambridge, Massachusetts:

- Communicative Action in Humans and Machines
- Context in Knowledge Representation and Natural Language
- Reasoning with Diagrammatic Representations II
- TS Authoring Tools
- Frontiers in Soft Computing and Decision Systems

Additional symposia are listed in the call for participation, sent to all AAAI members and posted on the AAAI web site. Submissions are due 15 April 1997.

Fellows Nominations Solicited

The 1997 Fellows Selection Committee is currently accepting nominations for AAAI fellow. The AAAI Fellows Program is designed to recognize people who have made significant, sustained contributions to the field of AI, usually over at least a 10-year period. All regular members in good standing are encouraged to consider nominating a candidate. Two references (at least one from a current AAAI fellow) must accompany nominations. For further information about the Fellows Program or to receive nomination and reference forms, please contact AAAI by telephone at 415/328-3123, by fax at 415/321-4457, or by e-mail at fellows@aaai.org. The deadline for nominations is 15 February 1997.

AAAI Nominations

Every two years, the AAAI membership elects an individual to serve a two-year term as president-elect, followed by two years as president and, finally, two years as immediate past-president. In addition, every year, four new councilors are elected to serve three-year terms on the AAAI Executive Council. The Nominating Committee encourages all regular members in good standing to place an individual's name before it for consideration. The Nominating Committee, in turn, will nominate one candidate for president-elect and eight candidates for councilor in the spring. In addition to members' recommendations, the committee will actively recruit individuals to provide a balanced slate of candidates. AAAI members will vote in the late spring.

To submit a candidate's name for consideration, please send the individual's name, address, telephone number, and e-mail address to Carol Hamilton, Executive Director, at AAAI, 445 Burgess Drive, Menlo Park, CA 94025; by fax to 415/321-4457; or by e-mail to hamilton@aaai.org. Nominators should contact candidates prior to submitting their names to verify that they are willing to serve, should they be elected. The deadline for nominations is 1 March.

AAAI-97 Student Programs

AAAI is pleased to announce the continuation of its scholarship and volunteer programs for students interested in attending the National Conference on Artificial Intelligence in Providence, Rhode Island, 27 to 31 July 1997. The Scholarship Program provides partial travel support and a complimentary technical program registration for students who (1) are full-time undergraduate or graduate students at colleges and universities, (2) are members of AAAI, (3) submit papers to the technical program or letters of recommendation from their faculty adviser, and (4) submit scholarship applications to AAAI by 15 April 1997. In addition, repeat scholarship

applicants must have fulfilled the volunteer and reporting requirements for previous awards.

In the event that scholarship applications exceed available funds, preference will be given to students who have an accepted technical paper and then to students who are actively participating in the conference in some way. However, all eligible students are encouraged to apply.

After the conference, an expense report will be required to account for the funds awarded. For further information about the Scholarship Program or to obtain an application, please contact AAAI at scholarships@aaai.org or 445 Burgess Drive, Menlo Park, CA 94025, 415/328-3123.

All student scholarship recipients will be required to participate in the Student Volunteer Program to support AAAI organizers in Providence. The volunteer program is an essential part of the conference, and student participation is a valuable contribution.

Students not requiring travel assistance should only apply for the volunteer program, which provides complimentary registration to full-time students, including conference proceedings, in exchange for assisting AAAI-97 organizers in Providence. This program does not provide any scholarship funds and is designed for local students or students who have other sources for travel funds. For further information about the Student Volunteer Program, please contact AAAI at volunteer@aaai.org or at the previous address. The deadline for volunteer applications is 31 May 1997.

Minutes, AAAI Executive Council Electronic Meeting, April 1996

Participants: Randall Davis, Danny Bobrow, Tim Finin, Ken Ford, Peter Friedland, Barbara Grosz, Pat Hayes, Richard Korf, Steve Minton, Norm Nielsen, Ramesh Patil, Martha Pollack, Howard Shrobe, Lynn Stein, Katia Sycara, David Waltz, Bonnie Webber, Dan Weld, and Carol Hamilton

The Executive Council Meeting typically held in conjunction with the AAAI Spring Symposium Series at Stanford University was not held this year. Instead, an electronic meeting was held in early April. The purpose of the meeting was to discuss and vote on a few issues that either could not wait until the summer meeting at the national conference or were fairly straightforward. Reports from standing committees and updates on pending business were postponed until the summer meeting.

The issues were as follows:

Confirmation of Jude Shavlik as Editor-in-Chief of *AI Magazine:* Bob Engelmore, the publications committee chair, conducted a search for a new editor of the magazine after Ramesh Patil announced his intentions to step down at the last meeting. Jude Shavlik was enthusiastically endorsed by the Publications Committee. The Executive Council unanimously approved Jude's appointment as editor-in-chief of *AI Magazine.*

Multiple-Submission Policy for Technical Papers: A proposal for a ban on multiple submissions of technical papers was submitted to the council by 1997 National Conference Program Cochairs Bonnie Webber and Ben Kuipers. Webber and Kuipers cited several disadvantages to allowing multiple submissions: First is the considerable drain on reviewing resources. Second, papers submitted to more than one conference can still only be presented at one. Third, after the review process, the program committee has to deal with authors who want to keep their papers at all the conferences at which they were accepted by rewriting them with different emphases, thus multiplying their publications. Fourth, the reviewing schedules of various conferences often force an author to choose one conference over another before he or she has all the decisions. Finally, most other premier conferences, such as the International Joint Conference on Artificial Intelligence, have a policy banning multiple submissions.

Webber and Kuipers also noted that the following arguments have been made in support of multiple submissions: First, young researchers need to build up their publication record, and multiple submissions increase the likelihood that their papers will be accepted somewhere. Second, some people fear that dropping the multiple-submission policy would reduce the number of papers submitted to AAAI. Finally, AAAI might lose unpolished but innovative papers.

Because our decision strongly affects other conferences, such as ECAI, the council generally agreed that we need to try to find a unified approach to this issue. At the least, it was agreed that AAAI should notify ECAI and PRICAI of its intentions before a final decision is reached.

Final resolution was reached after several weeks of discussion. The council agreed to ban multiple submissions, and a subcommittee was formed to notify ECAI and PRICAI of this decision. Unless there is input from this committee to the contrary, the multiple-submission policy will take effect with the 1997 national conference.

Review of Carnegie Mellon University Proposal for AAAI Press: Raj Reddy submitted a proposal for Carnegie Mellon University (CMU) to prepare past AAAI proceedings for distribution on the AAAI web site. CMU will prepare the files in an agreed-on format and will then return them to AAAI, which will act as the repository for all AAAI electronic publications. Because this arrangement will have no financial impact for AAAI until the files are returned, the council generally agreed that this idea was a good one. Because the financial issues associated with the maintenance and distribution of these files, as well as those issues associated with who gets access to these files, are significantly complex, decisions regarding them will be discussed by the Publications Committee. The Publications Committee is responsible for the development of AAAI's electronic publishing policy.

Fellows 10-Year Rule: Barbara Grosz submitted a proposal stipulating that nominees for fellow must have received their Ph.D. by June 30 ten years prior to the year in which they are being considered for AAAI fellow. Because a significant number of nominations have been borderline, a clear-cut definition is needed for selection committees to operate consistently from year to year. Grosz point-

ed out that exceptional candidates can always be considered regardless of this rule, and that this rule would apply to the "average" candidate. The council approved Grosz's proposal concerning the 10-year rule.

Minutes, AAAI Executive Council Meeting, Portland, Oregon, 4 August 1996

Attending: Randall Davis, Tom Dean, Jon Doyle, Bob Engelmore, Ken Ford, Tim Finin, Peter Friedland, Barbara Grosz, Barbara Hayes-Roth, Leslie Pack Kaelbling, Rich Korf, John McCarthy, Mel Montemerlo, Steve Minton, Norman Nielsen, Ramesh Patil, Martha Pollack, Edwina Rissland, Dave Waltz, Brian Williams, and Carol Hamilton

AAAI President Randall Davis began the meeting at 9:05 AM. He extended a special thank you to retiring councilors Tom Dean, Bob Engelmore, Peter Friedland, and Ramesh Patil for all their work on the council over the past three years. He also congratulated and introduced the new councilors, who will serve until 1999. They are Jon Doyle, Leslie Pack Kaelbling, Mel Montemerlo, and Edwina Rissland.

Standing Committee Reports

Finance Secretary Treasurer Norm Nielsen reviewed the final choices made for the new managers of the AAAI investments. The reserve is split among three managers, each with a different emphasis: growth, value, and fixed income. It is hoped that this division of management will provide a steadier return for the portfolio. Nielsen noted that there was a realized gain of $1.5 million during the transition to new managers. The council asked Nielsen to provide a comparison of these new managers to the standard indexes by the next Executive Council meeting.

In response to the new cost of developing the web site and decreasing membership rolls, Nielsen proposed a membership fee increase of $10 a member. Because membership fees were just raised two years ago, the council did not approve this proposal. The proposal will be reconsidered in one year. The council requested that Nielsen circulate the budgeting and investment policy to the Executive Council by the next meeting so that some decision could be made about how to fund the web site. Council members were supportive of further development of the site but did not see its function as purely for membership service.

Because the makeup of the membership has changed over the past few years, and the services that AAAI provides have grown, it was suggested that a meeting of the Strategic Planning Committee (the past and current presidents) be held in the near future. Davis will prepare a membership survey that will be the first step in assessing the current needs of the community and an important tool in deciding future directions.

Symposium: Symposium Committee Cochair Tim Finin announced the seven symposia that will be held in Spring 1997. Four proposals were under consideration for Fall 1997, but more proposals are needed. Another call for proposals will be issued. It was suggested that successful symposia be repeated more frequently in the future.

Fellows: Fellows Selection Committee Chair Barbara Grosz announced the five new fellows for 1996, who were honored at a dinner at the national conference in Portland. Several issues were raised during the fellows selection process this year, and Grosz will be revising the fellows nomination materials in the fall to clarify some of the election procedures and encourage more nominations from a wider cross section of the community.

In addition, Grosz, who had studied the practices of other association fellows programs, had some specific proposals for the council about the membership status of nominated and current fellows. The proposals called for all nominated fellows to be AAAI members at the time of nomination and to have been AAAI members for a minimum of three years prior to nomination. In addition, current fellows who do not maintain their memberships will be placed on an inactive list, will not be included on the e-mail distribution list, and will not be included on the list of fellows distributed with the nomination materials each fall. They will, however, continue to be included in all AAAI fellows listings and will remain AAAI fellows. All these proposals were approved by the council.

Publications: Publications Chair Bob Engelmore announced that Jude Shavlik had taken over as editor of AI Magazine and thanked Ramesh Patil for his five years of service on the magazine. Engelmore presented a proposal from Elsevier Science for AAAI sponsorship of its new electron-

ic journal, entitled "Intelligent Data Analysis—An International Journal." Because the journal is not yet established, the council decided not to sponsor it at this time.

Several people did suggest, however, that AAAI either publish its own electronic journal or sponsor one that is already in existence. JAIR is one possibility, and Randy asked Steve Minton to submit a proposal to the Executive Council for consideration at the next meeting. The sponsorship of an electronic journal would be similar to that given to other journals and would entitle the publisher to advertise to AAAI members in return for a reduced subscription price or other consideration.

AAAI Press Editor-in-Chief Ken Ford reported that the press has seven new edited collections coming out in the next year and that its collection of conference proceedings continues to grow. The technical report series now has over 60 titles in it. In general, the press is quite successful, and Ford is pleased with the marketing effort put forth by The MIT Press.

Carol Hamilton circulated a report about the current status of the web site, which now contains over 2000 files pertaining to all the programs that AAAI sponsors, with links to hundreds of other related sites. The goal is to make this site one-stop shopping for all AAAI materials and the best source of information for AI researchers. There was some discussion about how to increase the scientific content on the web site, and an ad hoc committee was formed to address this issue.

Conference 1996 Tutorial Chair Brian Williams addressed the council regarding the changes that had taken place in the tutorial program this year. The name has been changed to Tutorial Forum, and the pricing structure has been revamped. In addition, Williams made a significant effort to change the focus of the tutorial program content. He suggested that an entirely new name would help the program establish its new identity. Although no new name was agreed on by the council, the members did agree to allow the tutorial cochairs to modify the name after consultation with the conference chair and president. Because attendance per tutorial almost doubled in 1996, some concern was expressed that another name change would be confusing and unnecessary. Williams also requested that money from the operating reserve be used to advertise next year's program. This topic will be discussed at the next Executive Council meeting as part of the larger study of AAAI's budgeting and investment procedures. Expanded information on the web and an article about the revised tutorial program in AI Magazine were also suggested as methods of publicizing the tutorials. Tim Finin, Martha Pollack, and Dave Waltz agreed to help the tutorial cochairs for 1997 identify potential new tutorials.

Dan Weld, who could not attend the meeting, submitted a report on the technical conference. The acceptance rate for papers was slightly higher than in 1994, and the technical program was strong. The self-selection system on the web worked well, and Ramesh Patil is working on further modifications and improvements in 1997. More time will be allowed for self-selection in 1997, which should give the chairs better assignment data. Weld and Bill Clancey also initiated the new video program, which encourages authors to submit a supplemental video with their technical paper. Although this program had a modest response in 1996, Weld is hopeful for the future. He recommended that a separate person be assigned to chair this program in the future. The Student Abstract Program continued in 1996 and was well received. Student posters were presented at an informal reception. Students who participated in the SIGART-AAAI Doctoral Consortium also presented posters at this event. The workshop program was significantly smaller in 1996 than it has been in the past, but the program was good.

Carol Hamilton distributed a conference registration report, which indicated that attendance was significantly off for the technical conference and for the innovative applications conference. The Council discussed several reasons why this might have happened: competing conferences, less technical papers, less workshops, and so on. Because the size of the conference dramatically affects budget issues and other conference planning, the council decided to hold an additional meeting on 8 November 1996 to discuss future options. Several suggestions were made about how to increase attendance at the conference, including converting the conference into a federated conference for several smaller AI conferences or creating several miniconferences or tracks within the larger conference. Ken Ford, Tim Finin, and Jon Doyle agreed to put together alternate plans aimed at improving conference attendance. These plans will be discussed in depth at the meeting.

Some concern was voiced about the lack of women represented in the invited speaker track this year. An analysis of the percentage of women authors versus women AAAI members will be presented at the next Executive Council meeting. It was agreed that every effort should be made to have an equitable representation of geography, research area, institution, and gender in all phases of the conference, from program chairs and subchairs to invited speakers. The conference committee chair should review the slate of invited speakers to identify any obvious imbalance.

The Second International Conference on Knowledge Discovery and Data Mining (KDD-96) was collocated with the national conference this year and attracted over 450 registrants. The conference next year will be held in Newport Beach, California, near the site of the American Statistical Association. The chairs of KDD-97 hope to establish some cooperation between the two conferences.

Scholarships and Grants

Ninety-eight AAAI student scholarships were awarded for the national conference, totaling $48,325. Of these, 11 were awarded to international students. An additional 10 scholarships were awarded to students attending the KDD conference.

Student scholarship funds totaling $24,083 were distributed in the last year for the 1996 Spring and 1995 Fall Symposium Series. Other scholarship activity included $5000 for the AAAI-96 Robot Competition Scholarship Program and a subsidy of $5874 for the first SIGART-AAAI Doctoral Consortium, which was held at the national conference.

AAAI continued its annual contribution of $10,000 toward the AAAI-ACM Alan Newell Award and awarded Women and Minority grants of $5,000 each to the American Indian Science and Engineering Society, Girls, Inc.; the Math-Science Network; and Prime, Inc. Other areas for outreach were discussed, and the addition of an outreach coordinator to the scholarship committee will be discussed at the next meeting.

Five workshop grants, totaling just over $14,000, and four conference grants, amounting to $25,000, were awarded during the previous 12 months. Although the workshop grant awards were lower than normal, this was mainly as a result of a lower number of requests.

Old Business

Tom Dean, who serves as the AAAI appointee on the Computing Research Association (CRA) Board, submitted a report of CRA activities during the past year. Dean reported that CRA has launched a series of web pages, each concentrating on a different area of computer science. It is still seeking a page on AI. Dave Waltz volunteered to write this page and solicited suggestions from other members of the council. It was also suggested that AAAI establish a pointer to the CRA on its science policy page. CRA currently has a pointer to AAAI's page. Waltz also encouraged people to look at the web page of the Computer Science and Telecommunications Board (CSTB) of the National Research Council. Any suggestions should be sent to Marjorie Blumenthal, the director of CSTB.

CRA also cosponsors the Federated Computing Research Conference every two years, which collocates existing specialized research meetings. It is hoped that a smaller AI conference or workshop will participate in the next meeting in 1999. Several suggestions for possible participants were made. CRA has a successful outreach program for women in computing, and some discussion was held about whether AAAI should establish such a program. Rick Weingarten, CRA director of government affairs, was an invited speaker at AAAI-96, discussing science policy and politics.

Tom Dean has been putting together some videos on selected research areas in AI and reported that two of these videos are now complete. A more formal program on how to make an impact with these videos is needed. The addition of quicktime to the web page will be investigated.

As a follow-up to an inquiry at the last Executive Council meeting, Carol Hamilton reported that she had been able to identify two middle school or high school student science fairs thus far. They are (1) the Junior Science and Humanities Symposium, funded by the U.S. Army Research Office (USARO) and the Office of Naval Research (ONR) and administered by the Academy of Applied Science, a nonprofit organization under contract to USARO and ONR, and (2) the International Science and Engineering Fair, sponsored by Science Service Inc. Science Service Inc. also organizes the Westinghouse Science Talent Search, funded by the Westinghouse Foundation. Further information about possible AAAI participation in these two programs, as well as upcoming deadlines, will be available at the next meeting.

New Business

A letter from AAAI member Lee Giles about the lack of neural network papers at the national conference was distributed to the council. Giles had several suggestions for future chairs on how to increase participation by this community. It was agreed that the 1997 program cochairs should make every effort to bring work in from at least one of the fields, such as neural networks, whose work has not been well represented at the national conference in the last several years. Possible suggestions for including some of these areas are invited presentations, the expansion of the program committee to include better representation from these fields, and presentation of best paper awards in selected areas.

A proposal to have AAAI wholly sponsor a new conference entitled "Context in Knowledge Representation and Natural Language Processing" was considered. It was decided that this area had not yet demonstrated a need to convert from a workshop or symposium format, at least as measured by registration numbers. Tim Finin, symposium committee cochair, suggested that the group consider holding an oversize symposium instead, hopefully as part of the 1997 Fall Symposium Series. If the interest is sufficient, the conference proposal will be reconsidered at a later date.

Finally, the council requested that the AAAI office begin to put together a list of services that it can provide to a small conference as well as their associated costs. This list might include services such as providing permanent addresses, processing registrations, administering bank accounts, processing technical papers and reviews, and providing logistical support.

The meeting adjourned at 5:00 PM.

Congratulations to Jack Minker

An AI pioneer and a tireless advocate of human rights for scientists, Jack Minker has been a member of the University of Maryland community for nearly 30 years and, according to the University of Maryland publication *Outlook*, is largely responsible for the growth of the university's Department of Computer Science into a nationally acclaimed graduate program. In recognition of his many achievements, AAAI fellow Jack Minker was presented with the 1996 University of Maryland Presidential Medal on 8 October 1996. The medal is awarded to an individual who has made extraordinary contributions to the social, intellectual, and cultural life of the College Park Campus.

AAAI-96: National AI Conference Continues the Tradition of Excellence

Sara Hedberg

The Thirteenth National Conference on Artificial Intelligence (AAAI-96) was a week rich with the latest in AI research, experiments, and applications. Attendees—from AI's founding fathers to the up-and-coming generation of graduate students—met in Portland, Oregon to share advances in the diverse field of AI. Intelligent agents, data mining, robots, machine learning, artificial life, and a wealth of other topics were presented and discussed in formal sessions and hallways. The membership owes a special thanks to the program committee for the countless volunteer hours that went into such a multifaceted, high-quality program.

If one stands back and looks at the totality of the AAAI-96 conference, it is clear that in all its diversity, AI is continuing to make significant strides in achieving its goal of understanding what constitutes intelligent thought and behavior and how it can be exhibited in computers. In a technical field that is increasingly fragmented into special-topic areas, AAAI continues to be the "wholistic" national conference that brings together noted authorities across the field, covers a breadth and depth of subjects not found elsewhere, and catalyzes cross-fertilization between specialties.

For the first time this year, the technical AAAI-96 conference and the 1996 Innovative Applications of AI (IAAI-96) conferences were joined. One program fee gave attendees access to all AAAI and IAAI sessions, invited talks and panels, the vendor and robot exhibitions, and both conference proceedings. Thus, researchers were able to learn more about the challenges and triumphs of the applications side of AI, and vice versa.

Wide Spectrum of Programs and Topics

The AAAI-96–IAAI-96 program included 197 papers, 13 invited talks, 16 tutorials, 14 workshops, 17 award-winning applications, and a student abstract and poster program. Topics of the technical papers spanned a broad range of topics, including intelligent agents (20 papers including Syskill and Webert who identify interesting web sites), AI in art and entertainment, constraint satisfaction, natural language, knowledge representation, learning, perception, connectionism, uncertainty, and planning. The diversity and depth of the papers are surely an indicator of the vitality of the AI field.

Invited speakers presented some of the latest work and ideas in various areas of AI. Machine learning, for example, is emerging from the lab to early adoption for commercial use, particularly for data mining—and like agents is a hot topic in the computer world at large these days. Tom Mitchell, a leading researcher in machine learning and professor of computer science and robotics at Carnegie Mellon University (CMU), gave the keynote address, "What Have We Learned about Learning?" Mitchell examined recent progress in both the theory and application of machine learning as well as possible future directions for machine learning over the next decade. (Mitchell's talk will be published in a future issue of *AI Magazine*.) Other invited speakers presented a range of topics of current interest, such as intelligent agents that traverse the web, autonomous vehicles, and the politics of science.

The relevance of recent work in intelligent agents to the explosive phenomenon, the World Wide Web, was clear in Oren Etzioni's talk, "Moving Up the Information Food Chain: Deploying Softbots on the World Wide Web." He cited several examples of experimental agents for document searching, locating people's home pages, and comparison shopping at web stores. Taking a pragmatic approach, Etzioni believes that with a commitment to building usable and useful softbots, "we will help to rid AI of the stereotype 'if it works, it ain't AI'." Agents were also the topic of Joseph Halpern's (IBM Almaden Research Center) invited talk "Using Multi-Agent Systems to Represent Uncertainty."

An all-star panel assembled to pose "Challenge Problems for Artificial Intelligence." Rodney Brooks (Massachusetts Institute of Technology), Thomas Dean (Brown University), Eric Horvitz (Microsoft), Tom Mitchell (CMU), and Nils Nilsson (Stanford University) each gave his spin on problems that could stimulate developments in the field. Other invited talks included "Refinement Planning," "Recent Developments in Decision Tree Induction and the Weak Learning Framework," "The Database Approach to Knowledge Representation," and "Brain Dynamics in the Genesis of Trust as the Basis for Communication by Representation." The complete proceedings of AAAI–IAAI-96 is available from AAAI Press.

The program committee is already hard at work preparing for AAAI-97–IAAI-97. Hope to see you in Providence, Rhode Island, next year.

Robot Competition Gains Renown

A film crew from the PBS television series *Scientific American Frontiers* was on hand this year to film the Autonomous Mobile Robot Competition. The competition will be part of an upcoming show on robots (tentatively scheduled for February 1997).

Winners of the 1996 AAAI Robot Competition

Event 1: Office Navigation

First Place: SRI International

Second Place: Kansas State University and USC/ISI (tie)

Third Place: Kansas State University and University of Texas at El Paso (tie)

Event 2: Tennis Court Cleanup

First Place: Newton Research Labs

Second Place: Carnegie Mellon University–Real World Interface–Bonn University

Third Place: University of Utah

Alan Alda, the show's host, was on hand for a few of days, learning from roboticists, enjoying the competition, and even taking M&M candies from a gracious robot.

Even as cameras rolled, more than 20 robots from many of the leading laboratories around the world tested their muster over the three days of competition while their humans worked behind the scenes making last-minute modifications with soldering irons and keyboards. The goal of the conference was to show the progress in robotics in a range of robot behaviors, such as planning a task, maneuvering obstacles, and locating and picking up objects.

"A mobile robot is a robot that can move from place to place," explained David Kortenkamp, chair of the event and a contractor at the National Aeronautics and Space Administration (NASA) Johnson Space Center. "It has no tether—no physical connection—to the outside and is autonomous. *Autonomous* means that it is making its own decisions based on its programming. No one is controlling it with a joystick or other commands. The term *mobile robot* is often used to distinguish from fixed robots such as factory robot arms that are bolted to the floor."

All robots in the competition had wheels to move—although robots can have legs or tracks. They also had a range of sensors to detect and avoid obstacles, vision sensors to find their targets, and on-board computers to process information and make decisions.

This year, there were two different events. Event 1 pitted the robots in scheduling a meeting of several people within an officelike environment. In event 2, the robots cleaned up some tennis balls, including one powered "Squiggle" ball that moved around a tennis court–like room. To look back over the five years of the competition, each year the ante seems to go up—the events get harder to keep pace with the growing capabilities of the electronic entrants.

In 1996, many of the best research groups in the country competed, as well as some from overseas, according to Kortenkamp. "As such, they represent what will be the future of robotics over the next several decades," he noted. The teams participating in this year's competition and exhibition were from Carnegie Mellon University, Colorado School of Mines, Dartmouth, Iowa State, Kansas State, McGill, McMaster, North Carolina State, and Stanford University; the Universities of Bonn, Chicago, Michigan, Minnesota, New Mexico, Stuttgart, Texas at El Paso, Southern California, and Utah; and Angelus Research Corporation, Newton Research Laboratories, Real World Interface, and Stanford Research Institute.

Today, mobile robots are starting to be routinely used for tasks such as vacuuming large warehouse and hotel areas and ferrying x-rays and medicines in hospitals. "Robots will deliver mail in office buildings, vacuum houses, and deliver food in restaurants; work in space, nuclear reactors, and battlefields; and there will be robot wheelchairs for the disabled," said Kortenkamp. "Some of these are available now but are overpriced and not very effective. Over the next several decades, these robots will be smarter, faster, and safer."

In addition to eight papers on mobile robots, Pete Bonasso (Metrica, Inc.) and Tom Dean, both of whom have been judges of the competition over the years, gave an invited talk—"Robots with AI: A Retrospective on the AAAI Robot Competitions

and Exhibitions." Using video and anecdotes, they reviewed the competitions to draw lessons and speculate on future implications for the AI community and society at large. They surveyed the role that planning, learning, machine vision, and spoken-language understanding have played over the years as well as single and multiple agents, reactive and deliberative control schemes, use of active perception, and the various problem-solving approaches of various teams.

Bumper Crop of Innovative Applications

This year's IAAI-96 award winners continued the tradition of showcasing new ways that AI is having an impact in industry and government. "Although there is no shortage of AI conferences, what makes IAAI unique is its specific focus on commercial AI applications," says Curt Hall, editor of *Intelligent Software Strategies* newsletter (Hall, C. 1996. Seventeen Intelligent Information Systems. *Intelligent Systems Strategies* 12(8): 1–15). "I know of no other AI conference that goes to the pains IAAI organizers do to ensure that IAAI remains dedicated specifically to showcasing the use of various AI techniques employed in business, industrial, and government applications. ...For the past eight years IAAI conferences (and their published proceedings) have provided the best documented findings on the actual development, deployment, payback, and use of AI techniques across a broad-range of business, industrial, and government organizations."

This year's winners included cutting-edge, high-impact applications in organizations such as Price Waterhouse, Reuters, Swiss Bank, Pacific Bell, Frito-Lay, NASA, GTE, BULL HN, and the White House. They span various industries and functional areas within organizations, such as telecommunications, finance, government, news service, health care, oil and gas, manufacturing, consumer goods, information management, and engineering. A summary of each application follows.

For those who have any doubt about the strategic role AI is playing in business today, the invited talk by Bob Abarbanel of Boeing Information and Support Services clearly demonstrated AI's value in engineering the Boeing 777 aircraft. Abarbanel, a long-time AI veteran, described FLY THRU, the all-digital airplane developed to reduce the cost and time involved in developing a new airplane. The system supports shared engineering designs in a flexible computing environment in contrast to previous practices of manuals and mainframe programs. The goal was to reduce design reworks by 50 percent and replace physical mock-ups of designs with digital preassembly mock-ups. Abarbanel reported that there has actually been a 60- to 90-percent reduction in rework. "FLY THRU provided the glue among and across design teams," he stated. The system is now being used by other design teams for other aircraft such as the *F*22 and the *Space Station*.

Innovative Applications of AI 1996 Award Winners at a Glance

This year's 16 award-winning applications of AI (plus one alumnus who returned with an update report and a fascinating experimental machine-learning application) represent a broad cross-section of organizations, business problems, and AI solutions. Most of the quantified benefits are in the millions and tens of millions for each application. Judging from this sample of recently deployed AI systems, the technology continues to play a central and strategic role in organizations worldwide. The complete papers, which include details about the application problem, architecture, and benefits, are included in the AAAI-96–IAAI-96 conference proceedings. Special thanks to Program Chair Howard Shrobe and Cochair Ted Senator for all their efforts.

Telecommunications The three telecommunications applications were from Pacific Bell and GTE Laboratories.

Pacific Bell Application: Localization of Troubles in Telephone Cable Networks—It detects the location of troubles in a local telephone cable network. It has been deployed statewide for over six months.

G*TE Laboratories Application:* PERFEX (performance expert)—It involves the performance and configuration management of cellular networks. It helps engineers locate and determine probable causes of performance problems and provides intelligent advice on how to correct them. It is used daily at more than 25 GTE mobile switching centers.

GTE Laboratories Application: SSCFI, Autonomous Fault Isolation in Communications Circuits—Autonomous expert system that diagnoses problems in a wide variety of special circuits (other than regular business and residential lines). It selects which circuit to work on, reads its design, selects and initiates tests by remotely activated test equipment, interprets test results, and writes a detailed description of the problem and routes it to the party responsible for its repair. In service since 1991, it has been in operation at all GTE U.S. sites since 1994.

Information Management The four information-management applications were from the White House and MIT AI Lab; Chase Manhattan

Bank and Brightware; Reuters America and Inference; and Fannie Mae, Brightware, and Tangram.

White House–MIT AI Lab Application: BMES (bounced-mail expert system)—The White House Office of Media Affairs sends out a daily stream of documents (press releases, speeches, and so on) to 4000 direct subscribers by e-mail on the web. More than 100,000 people receive the information through redistribution channels. In the process, there are hundreds of bounced-mail messages each day. BMES diagnoses the failures of information delivery.

Chase Manhattan Bank–Brightware Application: EZ READER (embedded AI for automatic electronic mail interpretation and routing)—It is an e-mail reader that classifies and responds to large volumes of incoming e-mail. It selects responses and adds attachments and advice to each incoming message based on how previous similar messages were handled.

Reuters America–Inference Application: Global-Scale Help Desk—Reuters supplies financial and news information to over 40,000 subscribers worldwide. This help-desk system for customer support covers 38 products. This case study discusses putting a global knowledge organization in place, building and deploying knowledge bases at multiple distributed sites, and maintaining and enhancing knowledge bases in a global framework.

Fannie Mae (Federal National Mortgage Association)–Brightware–Tangram Application: KARMA (knowledge-acquisition and rule-management assistant)—It is a business-policy storage and publishing system with regard to the selling and servicing of mortgage loans for Fannie Mae, the largest supplier of conventional home mortgage funds in the United States.

Engineering The two engineering applications were from BULL HN and Schlumberger Cambridge Research.

BULL HN, Italy, Application ROLLCUTTER—It optimizes the cutting plans of regular-shaped two-dimensional objects (for example, steel, paper) through dimensional unfolding.

Schlumberger Cambridge Research Application CEMQUEST—It is a commercial product that uses neural networks to predict the quality of oilfield cements. Many key cement properties are captured within the Fourier transform infrared spectra of cement powders and are predicted using neural net techniques to analyze the spectra. The system has been deployed for more than 12 months.

Looking Backward and Forward These two applications were from United HealthCare and the University of New South Wales.

United HealthCare Corp Application (update on past award winner)*:* ADJUDIPRO 2.0—It is a physician claim-adjudication expert system. The new version has been redesigned to meet a much higher load. The paper describes key issues faced during the past three years of use.

University of New South Wales, Australia, Application: Monitoring Frog Communities—It recognizes and distinguishes the vocalizations of 22 species of frogs that reside in a remote area of Northern Australia. It is being used unattended to monitor the effect on frog populations of the introduced Cane Toad, a voracious predator. The system uses machine-learning techniques, deployed on solar-powered laptop computers, to census frog populations.

Finance The four finance applications from Frito-Lay, Price Waterhouse, Swiss Bank and Inference, and Equifax and Brightware.

Frito-Lay Application: SAX (settlement analysis expert)—It is a diagnostic system for inventory-related errors. It is in production and is used regularly by 12,000 salespersons, 1,000 sales managers, and 60 clerical accounting employees.

Price Waterhouse Application: COMET—It analyzes accounting systems and their controls to assist auditors in evaluating a company's financial statements. An auditor uses COMET to create a hierarchical flowchart model that describes the intended processing of business transactions by an accounting system and the operation of its controls. COMET automatically analyzes the effectiveness of the controls in detecting potential errors. It is now in use within Price Waterhouse worldwide.

KDD…is important because it has become the conference focusing on the application of advanced knowledge discovery and data-mining techniques.

Swiss Bank–Inference Application: BALET (balance-sheet estimation tool for financial risk assessment)—It automates the assessment of financial indicators and simulates possible effects of various economic trends. The principal user is a company's chief financial officer or corporate treasurer whose goal is to propose options that directly reduce the organization's operational financial exposure, particularly those associated with interest-rate risk and fluctuations. It has been in operation at Swiss Bank and at more than 12 of its customers.

Equifax Check Services–Brightware Application: EASY (expert authorization system)—It assists agents in the authorizing of customer checks through online links with point-of-sale terminals. It has been fully deployed since February 1995, handling as many as 800,000 transactions a day during peak holiday seasons.

Business Operations The three business applications were from J. Sainsbury, SIGNAL, and NASA–Johns Hopkins University.

J. Sainsbury, London–Inference Application: Intelligent Retail Logistics Scheduling—It automates the planning and scheduling of transportation for perishable and nonperishable commodities into J. Sainsbury depots. It produces schedules for 22 depots across the United Kingdom.

SIGNAL, Germany, Application: Insurance Sales Expert Counselor and Computer-Aided Selling—It helps 500 customer-service representatives produce high-quality benefit analysis at the point of sale for a wide range of products. It runs on notebooks.

NASA Headquarters–Johns Hopkins University Applied Physics Lab Application: NASA Personnel Security Processing Expert System—It automatically determines the appropriate personnel background investigation required for a civil servant or contractor occupying a position of national security or public trust. It instructs personnel security-processing staff to perform special checks based on a specific position.

Newest Trends in Advanced Data Mining: KDD-96 Conference Brings Together Researchers and Practitioners

The Second International Conference on Knowledge Discovery and Data Mining (KDD-96), sponsored by AAAI, is fast becoming the premier gathering for those on the cutting edge of data-mining techniques, tools, and applications. It was held 2 to 4 August 1996 in Portland, Oregon, in conjunction with AAAI-96–IAAI-96.

Data mining is one of the hottest computer-related topics today because it provides a way to tap into data warehouses—to find the trends and knowledge buried in terabytes of data. Data mining is being used, for example, to detect financial fraud, analyze market trends, find medical expert system rules from clinical databases, and detect earthquakes from space. It is even being used by the National Basketball Association. Some of the major players in the computer industry, such as IBM and AT&T, now offer data-mining software tools. The field is young and growing fast, propelled by intense interest in the business and scientific communities to exploit the enormous amounts of computerized data.

Many of the most advanced researchers and practitioners in data mining gathered at KDD-96 to discuss various approaches and experiences in this burgeoning field. Leaders in the field from major corporations such as GTE, AT&T, IBM, Honeywell, Silicon Graphics, NCR, Daimler-Benz, Sara Lee Meats, NYNEX, NEC, Hughes, Microsoft, and SRI International presented advanced applications and algorithms. From applications that assist with quality control in auto manufacturing and try to determine RNA sequences in families of HIV to those that evaluate marketing programs and combat cellular fraud, the KDD papers included some of the newest and most exciting uses for AI techniques, such as expert systems, neural networks, and machine learning. Researchers from leading universities, government agencies, and research institutions around the world also participated in the program. Presenters traveled from as far as Australia, England, Japan, Canada, Germany, Holland, Finland, and Poland to participate in KDD-96.

This conference is growing in popularity. At the first conference in 1995, there were about 250 attendees, this year more than 540. Of the 215 papers submitted to the conference, a discriminating review committee accepted 42. The conference organizers are to be congratulated for an outstanding program. The range of topics was broad, including various approaches to machine learning, decision trees and rule induction, an overview of application trends and issues, mining with noisy and missing data, prediction and deviation, scalability and extensibility, multimedia data mining, the mining of large databases, and genetic algorithms. The proceedings are available from AAAI Press.

"KDD…is important because it has become the conference focusing on the application of advanced knowledge discovery and data-mining techniques," says Curt Hall (Hall, C. 1996. KDD-96: New Trends and Applications in Knowledge Discovery and Data Mining. *Intelligent Software Strategies* 12(9): 1). In the future, organizers plan to colocate KDD with a variety of conferences, including statistics and database conferences, to facilitate the cross-pollination of ideas and techniques. AAAI will continue to sponsor the conference.