YODA Wins the Silver at AAAI

Gal Kaminka, Bonghan Cho, Jihie Kim, Jafar Adibi and Wei-Min Shen

As many of you have undoubtedly heard, USC/ISI's first robot, YODA, has won second place at this year's AAAI-96 Robot Competition. This achievement was the result of a great deal of hard work by the YODA team, a group of graduate students and one professor, who have been spending their spare time working on this project as a hobby. The professor is of course Wei-Min Shen, and the students are Bonghan Cho, Jihie Kim, Sheila Tejada, Behnam Salemi, Jafar Adibi, and Gal Kaminka. The details? We scored a perfect score of 295, and were second only to the SRI team, led by Kurt Konolige, which got a lower score on the task itself, but received bonus points for doing the task much faster than any other team. The competition was recorded by PBS for its Scientific Frontiers show, hosted by Alan Alda (yes, we got our pictures taken with him...).

YODA participated in the navigation event of the competition. The task is to navigate in an office-like environment much like we have here at ISI (except that the walls in the competition itself were only three feet tall). The teams were given an approximate map of the office only four days before the competition. The robot was to leave the director's room, look for an empty conference room, and then call on two professors and the director to start a meeting at a given time — ideally, one minute after getting back to the director's room. Points were taken off for not taking the optimal path, for hitting walls or people, for incorrectly estimating the time remaining for the meeting, and for scheduling the meeting more than one minute after getting back. In fact, this is where YODA really did well — getting the time right down to the second! There were more than 20 teams competing, one team coming from as far as Germany. Most of these teams had previous experience, and were from top universities and robotics programs.

Details aside, we wanted to give a group perspective on the path leading to this achievement, and to share with you some of the history of this project, and some of the many lessons that we've learned from it.

So how did it start?
This whole thing started shortly after Rod Brooks of MIT gave a talk at USC and presented some video clips of his robots in action. They were so

Tom Wins Logo Contest

The winning logo for the ISD logo contest was submitted by Tom Russ.

Tom will be awarded a $20 gift certificate to California Pizza Kitchen for his efforts and creativity. Thank you to everyone who participated in the contest, both by submitting entries and by voting.
EXPECT can INSPECT

Yolanda Gil, Bill Swartout and Andre Valente

The EXPECT project recently took part in the Fourth Integrated Feasibility Demonstration (IFD-4) of the DARPA/Rome Laboratory Planning Initiative (ARPI). In the words of Tom Garvey, ARPI’s Program Manager, “the demonstration...was highly successful and very well received.”

The event took place on June 12 at the US Air Force Air Combat Command in Hampton, Virginia. The goal was to demonstrate how ARPI-supported research in planning and scheduling can improve the current process of Air Campaign Planning in the Air Force. Experts from the “Checkmate cell” at the Pentagon used the Air Campaign Planning Tool (ACPT) built by ISX as a structured editor to build their plans. For IFD-4, a team of researchers from ISI, ISX, GE and SRI extended ACPT with tools for plan visualization, assessment and revision. The EXPECT team from ISI contributed a plan assessment tool that we call INSPECT, and collaborated with ISX to provide a formal language and an editor for specifying goals in this domain. SRI and GE built a feasibility analysis and plan visualization tool based on the TACHYON temporal reasoner and the SIPE planner.

INSPECT is a knowledge-based system that we developed using the EXPECT framework. Working with experts from Checkmate, we developed a knowledge base of commonly occurring plan flaws. INSPECT uses this knowledge base to detect plan incompleteness, problems with plan structure, and lack of resources. It then produces an agenda of all the kinds of problems found with the plan, and shows it to the user. INSPECT gives a detailed explanation of each problem and suggests ways the user can fix each problem.

A tool like INSPECT helps ACPT users avoid creating inconsistent or low-quality plans. INSPECT can also help users plan effectively in crisis situations, when time pressures make it very hard to manually check the consistency of all the alternative plans that are considered for a given crisis, each one changing as the crisis evolves. Ultimately, INSPECT could also be used as a training tool for AI planning tools, by pointing out possible faults in the plans they create.

Although not demonstrated in IFD-4, an important benefit of building a tool like INSPECT with the EXPECT framework is to support users in knowledge acquisition and maintenance. Because each campaign is different, the knowledge base of any planning tool must be updated to include all the particulars of the scenario: forces and resources available, specific rules of engagement, etc. As part of our research, we continue to develop interactive knowledge acquisition tools that allow end-users to maintain and update knowledge-based systems.

The first IFD was DART, a system developed to schedule the transportation of all U.S. personnel and materials (such as vehicles, food, and ammunition) from Europe to Saudi Arabia during operations Desert Shield and Desert Storm. It prompted the now-famous quote that DART alone “more than offset all the money the Advanced Research Projects Agency had funneled into AI research in the last 30 years.” (“Critical Technology Assessment of the U.S. Artificial Intelligence Sector,” U.S. Department of Commerce, August 1994.)

Although ACPT is a relatively new system, it was used by Checkmate to help NATO commanders select targets in Bosnia. Eventually, the technology shown in the IFD-4 demonstration will be transformed into a usable tool for Checkmate and ultimately for the numbered air forces throughout the world.

Air Campaign Planning is an application domain that is of increasing interest to DARPA and other funders of projects within our division. We’ll be happy to share more details if you are interested in learning more about this domain, ACPT, or INSPECT.

ISD Retreat Next Spring

We are in the planning stages of our second ISD retreat, to be held sometime next spring. We have made some preliminary plans and need your input so we can reserve a date.

We are looking into using the UCLA Conference Center in Lake Arrowhead again. We tried to reserve a Friday through Sunday so that families could attend, but unfortunately, the weekends...
were booked through the fall of '97! The center would be able to accommodate ISD staff and their families on almost any Sunday through Tuesday, but this might conflict with school and spouses' jobs.

Please tell us how you and your families like the idea of a Sunday-Tuesday retreat. Spouses and children would be welcome to stay the duration if their schedules allowed, or just Sunday if not.

Please email Theresa (tcox) with your opinions on the following:

- Approximately how many in your family might attend?
- Would your family be able to stay until Tuesday or just for Sunday?
- Do you have any suggestions for a good weekend? For example, you might want to see when your school-age children will have their spring break.

We've got some fun ideas in the works, with lots of activities for kids and spouses (and some work too!) and we welcome any suggestions you may have.

Div Dir Rides Across Iowa (and lives to tell about it!)

Bill Swartout

On the last week in July, I rode my bike across the state of Iowa as part of the Register's Annual Great Bicycle Ride Across Iowa (or RAGBRAI). RAGBRAI was started about 24 years ago by a few reporters from the Des Moines Register, who decided to ride their bikes across Iowa with some friends and write about it in the paper.

Each year, more and more people have joined, and now over 10,000 people participate in this event. The route changes every year, and visits a variety of small (and smaller) towns in Iowa. This year we started on the western side of the state in Sioux Center and traveled 437 miles to our eastern destination in Guttenberg on the Mississippi River.

RAGBRAI is something of a mix between a long bike ride and a rolling state fair. The towns along the way have street festivals as RAGBRAI rolls through. The locals set up booths to sell home-baked pies, fruit, and other goodies. As someone pointed out, it is difficult to go on this ride and lose weight. Many of the riders are organized into teams that often have, shall we say, provocative names. One of my favorites, the Dairy Aires, wore black and white jerseys that made them look like a herd of Holsteins. The various branches of the military also had teams. This year, the Air Force's was the largest, with about 130 members. I was told that the Secretary of the Air Force, who is an avid cyclist, was also on the ride. An Air Force rock band, Night Wing, provided entertainment during our nightly stopovers. Having a rock band in Air Force uniform perform songs from the sixties was a bit different, to say the least.

I had been expecting that folks on the ride would be in great shape, and was a bit surprised to find out that was not always the case. It clearly helped to do a bit of training beforehand, but a lot of the riders were just out to enjoy themselves, rather than set records. Although I had been told to expect temperatures in the 90's with humidity to match and strong headwinds, we actually had cool weather in the 70's and low 80's and some strong tailwinds. It was a great experience.

For more information on RAGBRAI check out:
http://www.ragbrai.org/
http://www.main.com/%7Eplummer/ragbrai.htm

AI Seminars on the WWW

The ISI AI Seminar now has its very own Web page. It contains the schedule for upcoming talks, with pointers to the abstracts and the speakers' homepages. It also has up-to-date information about who is meeting the speaker and when, so check it out if you want to find out who is really next after your meeting is over ;)

You will find it at http://www.isi.edu/~gil/isi-ai-seminar.html.

Happy browsing!
New Faces in ISD

Jonghee Park

I am Jonghee Park, visiting from Korea. Every dog has his day because everything, including the universe, repeats itself. Not surprisingly, this is causing relativism's to rampage out of proportion in the current world. We tend to forget humanity itself is the only being without vicissitudes, and even the universe is a dust in the ocean compared to humanity. While I wish to call myself a futurist, others view me from the blue-sky. I tend to bite off more than I can chew. The fortunate aspect of this relative world for me (but only for the time being) has been that even a daydreamer could find his/her place in this evanescent world.

Among my favorite activities:

Golf: Advised back to the driving range every time on the course.
Tennis: Still in C-group in tournaments after all these 20 years plus of playing.
GO game: First grade in one year of training—Implying this game is more intellectual than physical.
Playing the guitar: My major accomplishment in my undergraduate—My nominal major was Electrical Engineering.
Drawing pictures of fine landscapes: I have drawn a picture of a Palos Verdes park around my residence. I cannot afford to buy equipment for oil painting so all my drawings have been in colored pencil. Incidentally, I started drawing after I found I could not afford to buy fine drawings for my sons and wife to decorate our home with. In high school, I was picked by our art teacher as the only student who knew how to draw out of over 500 students. (I may have ended up wrongly suggesting Koreans are such poor artists. All the students in fact were too busy preparing for entrance exams.)

Roaming around a fool’s paradise:. Good for health without incurring expenses and fitting for a daydreamer turned futurist.

One caveat: Still, I am a graduate from the top schools in Korea (Seoul National University and KAIST). I got a Ph.D. in DB/AI from the University of Florida. Devoted currently to ITS for English Teaching (presumably my life-long undertaking.)

To help you understand a little bit about Korea: Entering the top schools is such a feat in Korea that parents would confer a top-grade decoration (or even erect a statue) on their young achievers. (I still under-described its cutthroat competition)

Ion Muslea

I was born in Romania in 1967, and I have spent most of my life trying to avoid becoming an adult. I think that I did a pretty good job: if you know me, I am sure you'll confirm it!

If you don't know what Romanians look like, just check my homepage on the WWW at http://www.isi.edu/~muslea/ion.html and you'll get an idea. If you don't know what Romanians are like, I must tell you a joke that will give you a good understanding of what our neighbors (Hungarians, Bulgarians, Yugoslavians, and ex-USSR-ians) think about us.
They say that when God created the Earth, He made Romania as a wonderful land with great mountains, splendid rolling hills, fertile plains, and wonderful rivers. The neighboring countries were far from being that lucky: Hungary had dry plains, Bulgaria had dusty mountains, Yugoslavia had rocky hills, and the ex-USSR had infinite plains. Consequently, Hungarians, Bulgarians, Yugoslavians, and the ex-Soviets went to God and told Him:

Oh, our God, this is not fair! Why did you bless Romania with all these beauties, and you left nothing wonderful for our countries?

God thought a second about a way to repair this injustice, and then He created the Romanians.

To tell you the (whole) truth about Romanians, they are not that bad. If you want to make sure that Romanians are OK, stop by my temporary office (953), and you'll always find somebody ready to treat you with a donut, to tell you the last joke, or to play some (poor) tennis.

And now let's go back to my (ongoing) childhood. I enjoyed math and hated physics (which I never really understood), I was fond of dogs (I had two wonderful boxers) and I hated fish, I was crazy about playing with the kids and I hated homework.

I was born on July 13 (Friday!), which is the un-luckiest day in Romanian superstitions. I tried to practice all the sports in the world, I had no talent at all, and the trainers tried to avoid me because they were too narrow-minded to understand my love for sports. There were only two wonderful exceptions: my karate trainer (who made me a decent Shotokan brown belt), and my rock-climbing trainer (who helped me understand better what the mountains really are).

As an undergrad I was fascinated by C++, and I've spent quite a while trying to understand all its secrets. After writing two books on C++, I thought that it's big time to move on, and I decided to keep myself busy with some new stuff, like distributed systems, theory of CS, CogSci, and, eventually, AI.

After getting my BS in Romania, I worked for FAST Electronic, which is a German company that develops multi-media products. The first year with FAST was great, the second one was OK, but after the third one I was so bored by in-
dustry (don't get me wrong: FAST was and still is a great company!) that I decided to come back to school (exams & assignments are really fun, aren't they?).

In 1994 I went to West Virginia University, where I worked for my MS, and I started to enjoy doing my homework (am I getting old? or insane?). As an RA at WVU, I had to do a lot of hacking with C++ and CORBA, and I decided that this is not fun enough for a MS thesis. Consequently, I decided to have a great time by working for my MS on some purely theoretical topics, like vehicle routing problems in trees. Oh boy, that was really fun! I almost went nuts trying to figure out nice NP-complete proofs and approximation ratios, but I was able to prove seven theorems that will be named after me! "Muslea's First Theorem" sounds really great, doesn't it?

I am crazy about writing, and I cannot help sending papers for BYTE-Romania (a great Romanian magazine that lets me publish all kind of things more-or-less related to computer science). After taking a technical writing class at WVU, I started to improve my English prose too, but I have far more fun writing in Romanian. I *LIKE* cinema, some of my favorite directors being Fellini, Tarkovski, Antonioni, Mikhalkov & Kontchakovski, Kieslowski, and Clint Eastwood (I guess that I have at least one hundred other favorite directors). The best movie I've ever seen is "8 1/2", and I am ready to argue with anyone that there is no other movie half as good as this one. When I'm not writing, watching movies, or doing some research (8-), I'm certainly doing one of the following: reading Romanian newspapers (I'm really addicted!), listening to a great piece of music (classic, jazz, or rock), hiking around LA, skiing as fast as I can, playing soccer with the ISI gang, roller-blading along the beaches, or eating in a Mexican/Asian/Indian "all you can eat buffet."
Getting to Know ISD

Educational Technology Group

In an effort to get to know each other better we will be highlighting members of the ISD staff in each newsletter. This month we are highlighting the members of the Educational Technology Group.

The Educational Technology Group (ETG, aka Educational Toys and Games) has been in existence for about a year, comprising a set of projects concerned with technology for education and training. We are working with several technologies of relevance to education, including intelligent agents, distributed learning environments, and virtual reality. In the process, we get to play with lots of cool hardware and software that our funders give us money to buy.

Responsibility for the origin of ETG largely belongs to Herb Schorr and Bill Swartout, who felt that ISI should get involved in the educational computing area, and that ISD was the logical home for this work. Since joining ISD three years ago Lewis Johnson has been working to make it happen. He felt that research should be fun, and he couldn't think of anything that would be more fun to do than develop educational technology. Unlike other ISD projects such as Loom or Soar, which are built around a single technical thrust, ETG has been attacking multiple technical thrusts in an effort to make some quick inroads into the educational technology area. Yet at the same time there is a lot of overlap of concerns between projects, and sharing of technologies and ideas. We also build upon the other efforts going on in ISD, such as the Soar project, Loom, the Natural Language effort, and SIMS.

The acronym ETG was inspired by Apple Computer's Advanced Technology Group (ATG), which does lots of neat things. But while prospects are uncertain for ATG these days, ETG is doing just fine, thank you.

Overview of the Educational Technology group-created with a Java-based Medic-Doc tool by Amy Biermann
Lewis Johnson

I started playing with computers as a kid, long before it occurred to people to use computers to help teach kids. I was a member of the computer club called R.E.S.I.S.T.O.R.S. (Radically Emphatic Students Interested in Science, Technology, and Other Research Studies), which was featured in Ted Nelson's book Computer Lib. When I knew Ted back then he was just in the process of hatching the idea that has since come to be known as hypertext.

In spite of this early exposure to computers, I did not at first intend to make a career in computer science. In college I thought that the computer majors were a bunch of geeks who worked much too hard on one narrow thing. Instead, I defined my own major, in the area of linguistics, and used computers as a tool for processing samples of spoken utterances. Later on I found out that AI was fun and not too geeky, and included work on natural language processing. So I switched over to computer science in graduate school, and ended up at ISI.

My main interest in linguistics these days is in its application, computationally or otherwise. ETG is building agents that incorporate natural language processing capabilities, although language is just one of the available communication mechanisms available to our agents. I also as a kind of hobby like to pick up foreign languages when I have an excuse to do so. I've been known to speak a number of Indo-European languages, as well as Chinese and some Malay. If you're from a non-English speaking country I'd be glad to chat with you in your language, but you may have to give me a couple of minutes to get the right set of neurons firing. My linguistic skills are often called upon during my activities as a singer. I usually make a point of trying to learn the right way of pronouncing a song text in whatever language it happens to be written in. [Editor's note: I wish more singers felt this way! :-) ]

In any case, interests in linguistics and music have taken a back seat these days to work on educational technology. If you are going to spend time working on something, it might as well be fun, and there are lots of fun problems to work on related to educational computing. I tend to view the notion of "educational computing" broadly, and look for education and training issues that arise in other areas, such as helping people to understand how complex software systems work. It is good to see that our friends at DARPA have come to recognize that educational technology is important, and want to do something about it.

When not at ISI I work on our old house near the beach in Venice, which seems to fall apart at about the same rate as I can find time to remodel it. My wife Kim and I have a number of dogs, mainly golden retrievers, which like to think of good house repair jobs for me to do and contribute their efforts to the disrepair.

Ali Erdem

I was born and raised in Istanbul, Turkey. Istanbul is one of the oldest cities in the world (founded in the 7th century BC) and is the only city in the world located on two continents (i.e., cultural fault line). I grew up in the historical part of the town and my main interests as a kid were history, literature and the sea. I spent most of my time reading and fishing.

My interest in the sea and the desire for adventure caused me to attend Naval High School, which was a military high school located on an island in the Marmara Sea. I had a lot of fun and met some of my best friends during high school, but after graduation I realized that being a Naval Officer was not what I wanted to do for the rest of my life. so I attended a computer polytechnic for one year and learned programming. Meanwhile I took the national university entrance tests and entered the Electrical Engineering department of Bogazici University. I also started working for a management consulting company that year and continued to work during my undergraduate years, mainly developing database programs for textile and tourism companies.

One of the memorable things I did during college was to travel around Southern Europe with an Interrail pass (which was a monthly pass valid on all European railroads). Although it was very tiring since I visited 21 cities (9 countries) in 30 days and spent most nights sleeping on a train, it...
The InSiDer was a great experience. (The city I liked most was Salzburg.)

I was born in Arak (a city 240 KM far from Tehran) and grew up in Tehran. In 1982, I started studying electronics and later I changed my major to computer science. In 1984 I bought my first home computer and connected it to our TV and spent lots of time on that, sometimes long enough to make my father angry for not letting him watch the news! I graduated from Iran National University in 1991 and started my military service in the Army Communication Training Center. Afterwards I got a job in the telecommunications industry and was busy with that before coming to LA. I started the MSCS program at USC in fall 1994 and in December I joined the Veil project at ISI. Currently, I am working with Lewis Johnson on the PROBES project and would like to do my Ph.D. in Educational Technology. I enjoy applying my knowledge to solve problems. My family still lives in Tehran. My mother is a teacher and I have two sisters whom I miss a lot. My favorite activities are hiking, being close to nature, playing music, soccer and almost everything else.

Amy Biermann -> Hughes

I am currently working with the Media-DOC project. My work focuses on finding ways to graphically display meaningful information about software code and execution. Right now, I am developing a Java applet which will receive information from software and allow a user to tailor the information to their preferred viewing style. This applet created the diagram of the organization of the Educational Technology Group (see page 6).

I married Scott Hughes on August 10 in Big Bay, Michigan. At that time I became Amy Hughes—or I will, once I figure out all the 10,000+ places where I must change my name. My husband is a graduate student in Physics at Caltech. Scott and I have a nice little apartment with a bedroom for us and a bedroom for our computers. We also have two 8-month-old kittens, Mough and Chutney. They have a little house of their own.
work presented was in the areas of learning and learning systems (distance, distributed, interactive, cooperative, etc.), multimedia and hypermedia, authoring, and evaluation. I really enjoyed the conference and recommend it to anyone interested in educational technology. All roads seem to meet in the field of education.

Question of the day: Isn't a computer-based world defined by arbitrary physical laws really a virtual unreality?

Jeff Rickel

Since my bio already appeared in the January issue of the InSiDer, I'll just elaborate on my work at ISI. I work on the Virtual Environments for Training project, and my role is to develop STEVE, a pedagogical agent for virtual environments. (STEVE is an acronym for "Soar Training Expert for Virtual Environments.") STEVE inhabits a 3D virtual environment, and his job is to teach students how to perform procedural tasks, like operating and repairing complex devices.

I enjoy working on STEVE because many interesting AI issues arise in STEVE, and they must be addressed in a single agent. STEVE must use perception to track the state of the environment (although vision is not required), he must construct and execute plans, he must revise his plans to handle unexpected events, and he must use motor commands to implement actions in the virtual world. He must also explain things to students and answer their questions. However, unlike most explanation systems, STEVE is not restricted to text; he can also use gestures and other body language to communicate with students. He must follow the actions of students, including their visual focus of attention, and understand enough about their plans and goals to give them useful feedback. Learning is also an important issue: we want to allow people to teach STEVE new tasks by demonstrating them in the virtual environment, and we want STEVE to refine his understanding of tasks by experimentation. Of course, many other interesting AI issues arise in STEVE, such as spatial reasoning, but we are focusing on the issues described above, and they are more than enough to keep me busy!

Rogelio Adobbati

I was born in Balcarce, Argentina (a small farm town deep in the heart of the "pampas"). I received my B.S. in Computer Science from the University of Buenos Aires in 1986, and joined the corporate life for a couple of years as a consultant (I did some work for Exxon, the Buenos Aires Stock Exchange, and a few other companies).

From October 1989 to May 1990 I went to Japan on a scholarship; after those few months, I realized that I was missing the challenges of academic life. I applied and got admitted to the MS program in Computer Science at USC in 1992. After completing that degree in 1993, I joined the Ph.D. program.

I came to ISI in January 1996, and am currently working with Lewis Johnson in the I-Doc project. My interests include human-computer interfaces, VR, and the Web. Lately I've been working on the interface between I-Doc and the latest version of the Refine software engineering tool.

Other activities that I enjoy are soccer (you can usually see me playing with the soccer gang on Tuesdays and Fridays at lunch time), sailing (I sort of inherited Matthew Haines' sailboat), tennis, and biking; on a less sporty note, I also like guitar playing (but it seems guitars don't like me).

Finally, I should say that I am very proud of having contributed to the 1.5 carpool ratio at ISI by rowing my dinghy to work almost every day. If you want to try this, don't forget your lifevest: I was actually stopped by the sheriff's patrol boat for not having one!

STEVE

I was conceived by Lewis Johnson (mother unknown) during the summer of 1995. The doctor that delivered me (in January of this year) was Jeff Rickel, and Jeff has been teaching about the control panel.
Physically, I haven't matured a lot since the early days. I now have a good-looking hand in place of that silly red arrow, but the rest of my body is still pretty wooden and I don't use it very often. I've been working with a new physical therapist, Erin Shaw, who has been teaching me how to move my hand into different positions. She says that soon I'll also be able to turn my head without it falling off. (They tell me this can be distracting to students, so I don't do it during demonstrations.)

Stop by and see me some time. I'd be glad to show you around the ship. And if you want to know how to inspect an air compressor, I'm your guy!

YODA (continued from front page)

incredibly cute, and looked like a lot of fun to have around. Our first thought — "How hard can it be?" In retrospect, our first lesson — Things are never as simple as they look.

Of course, not having the benefit of experience, we were hooked! We decided we simply had to have something like this going around on our floor. The immediate thought was (faithful to our agent-based AI paradigm) "an M&M Distribution Agent". We then remembered that Wei-Min had an unused robot in his office, so we approached him about using it. In retrospect, I guess it was chance that we did so just at a time when he was thinking about doing something with the robot as well, and so our group was formed.

Towards the end of February we were already seriously discussing plans for the robot. Wei-Min suggested entering the robot competition, and it seemed like a good framework to work within. We divided up some tasks between us (planner, controller, etc.) and started to work. The general idea was to have a planner that plans the path based on the map, a commander that executes the sequence of operations needed to move from location to location, and a controller, which will be responsible for avoiding obstacles on the way from one location to the next. Wei-Min took on the responsibility of coordinating our efforts and actually coding parts of the software himself to make sure all the pieces fit together.

Of course, like any project, we needed a good name, and Sheila and Wei-Min insisted that it also be an acronym, so after much debate (we spent much too much time on this) we agreed on
YODA, which stands for Young Observant Discovery Agent but is really named after the famous character from the Star Wars movie trilogy. It seems appropriate enough — short, stubby, guy, can't even speak English right, dressed in black, and potentially very powerful.

Early Attempts
One of the earliest lessons we learned from working with YODA is that a robot of this mass and power can potentially be dangerous. Occasional bumps into the wall, doors, trash cans, and people have proved to us that robustness is really a hard problem to solve, especially if your sensors are lying to you. On more than one occasion, we were amazed to see that the sonar sensors simply did not sense the walls at certain angles, and so our obstacle avoidance algorithm couldn't identify that there was a problem. So we had to come up with better sensing methods (such as giving less weight to sensors at 45-degree angles, smoothing readings, etc.) to circumvent a real problem at the hardware level. There are more examples of sensors not performing as well as they should — but the bottom line is the same: In the real world, things don't work as they should. We spend a lot more time on the low-level behaviors than on the planner. Lesson number two: Murphy's Law is not the exception, it is the norm.

Teamwork
One of the best experiences in this project was working as part of a team. From early on it was obvious that we needed to divide the tasks because none of us could afford to work full time on this project. So teamwork was a necessity if we wanted to get YODA up and running. Of course, part of the experience is the great feeling of working with friends, learning more about each other, sharing experiences and thoughts. We learned about our different backgrounds and our different cultures, and were thrilled to notice the similarities in human behavior that underlie seemingly different cultural backgrounds. Differences are easy to find, but who would have guessed that Iran, the U.S., China, Korea and Israel have a lot in common?

The Competition
We have to admit that we didn't feel very optimistic when we first arrived at the huge hall where all the teams were unloading the robots and setting up their equipment. There we were, a group of newbies, with our two small notebooks, a big robot, and a box filled with M&Ms, looking at the other groups setting up their networked sun workstations(!), talking to each other with walkie-talkies, and unloading piles of electronic components. What followed were four nights of very little sleep, a lot of tension, and many ups and downs: At first we had serious hardware problems — the robot simply refused to boot up. Then we discovered that the carton boxes used to build the walls in the arena were invisible to our sonar sensors under certain conditions (see Murphy's Law, lesson number one). So we had to rewrite some code, fine-tune other segments of it, and run and rerun and rerun until we were convinced there was nothing else for us to do. When it finally came down to the preliminaries, we were surprised to discover that we were actually doing very well compared to other groups — including those with newer, more sophisticated robots. Lesson number three: It's not the hardware. It's the software (and the people behind it).

The rest is history. We don't think any other team got louder cheers from the crowd, or better publicity from Alan Alda (he really liked how we tested for motion while inviting people in the conference rooms to try some M&Ms). Of course, having our advisors and fellow ISDers there for moral support helped quite a bit. When it was finally done, and YODA announced "Director, the meeting starts in 1 minute," one could hear our screams probably all the way back here. We then did the sensible thing, and went to catch a good night's sleep before the long drive back home.

Of course, this success could not possibly have been achieved without the support of all of you here at ISD. Thank you all for not getting upset when we bumped occasionally into your doors, or when we went as slow as turtles, blocking the hallway. Special thanks to our advisors and project leaders — Ramesh Patil, Paul Rosenbloom, Milind Tambe, Lewis Johnson, Yigal Arens, and Craig Knoblock — for letting us "have our fun." Special thanks to Ram Nevatia, who trusted us in making good use of his Denning robot, Yolanda Gil, for providing optimism and moral support from the earliest stages of the project, and ISI's Action team, who helped us overcome many desperate hardware failures.
ISD Tidbits

Kudos to Erin
Erin Shaw’s paper, “Hierarchical Radiosity for Dynamic Environments,” based on her master’s thesis research, has been accepted for publication in Computer Graphics Forum, the journal of the European Association for Computer Graphics. Congratulations on your first publication, Erin!

Teaching Fellowships Awarded
The ISI Teaching Fellowship Committee has just completed deliberations for the ’96-’97 academic year. We received more applications than there were fellowships available this year, so the decision process was not an easy one, and some deserving applications had to be turned down. However, we were able to award fellowships to three very deserving teams. Our heartiest congratulations to them.

Fall
Yolanda Gil & Craig Knoblock: CSCI 541 (Artificial Intelligence Planning)

Ramesh Patil, Bill Swartout & Milind Tambe: CSCI 598 (Knowledge-Based Systems)

Spring
Martin Frank & Pedro Szekely CSCI 588 (Human-Computer Interaction)

In addition to teaching, many of these folks will be spending a significant amount of time outside of class at the University Park campus during their fellowship semesters. It should make for an interesting year.

Biermann & Frank Wed
...on the same day, in separate states and NOT to each other! Some mysterious force of ISD synchronicity led to Amy Biermann and Martin Frank getting married on the same day. Amy’s wedding was in Big Bay, Michigan, and Martin’s was in Atlanta, Georgia. Amy is planning to change her last name from Biermann to Hughes, but Martin seems to be one of those modern people who believe in keeping one’s own name after marriage. (Yes, it’s a joke!) Congratulations to both of the happy couples.

Jihie Passes Ph.D. Oral Exam
Congratulations to Jihie Kim for passing her orals with flying colors. According to her proud advisor, Paul Rosenbloom, she did a wonderful job. Jihie says we can’t call her Dr. Kim just yet because she still has some work to do on her thesis, but the goal is definitely in sight. Typically, Jihie isn’t resting on her laurels — she was hard at work the day after her exam preparing her AAAI slides!

Chunnan Accepts Position at ASU
Chunnan Hsu is leaving us to join the Computer Science Department at Arizona State University. He’ll start work as a lecturer this fall and be miraculously transformed into an Assistant Professor as soon as he turns in the final version of his thesis. His thesis defense is scheduled for October and he will also give a talk at ISI around that time. His thesis is on learning effective and robust knowledge for semantic query optimization.

ISI’s Newest Researcher Attends Her First Conference

Upcoming AI Seminars
Sep 11 Bruce Croft, University of Massachusetts at Amherst
"Information Retrieval: What Do We Do for the Next 40 Years?"

Sep 26 Manuela Veloso, Carnegie Mellon University
No title available

Oct 11 Wei-Min Shen, Jafar Adibi, Bonghan Cho, Gal Kaminka, Jihie Kim, Behnam Salemi, and Sheila Tejada, USC/ISI
"YODA: The Young Observant Discovery Agent"