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BUSINESS

SECTION C
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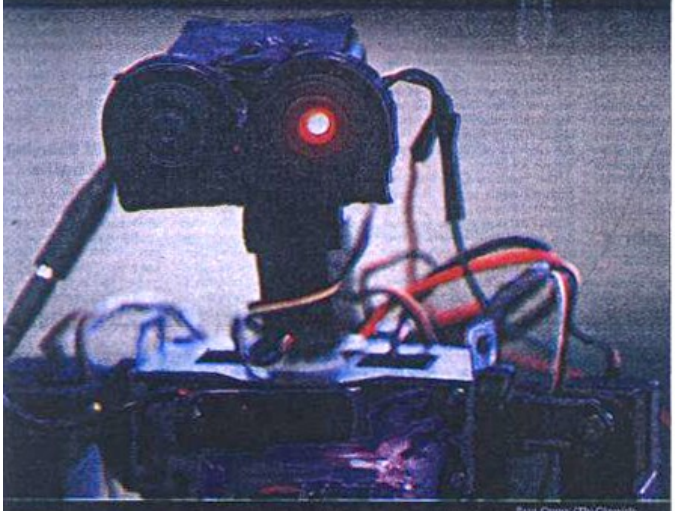
"We're coming into a time when robotics is being incorporated into school curriculums throughout the United States."
DAN KARA, *president of Robotics Trends*



PAUL CHINN / The Chronicle

Ami has one eye that beams red and another that is a camera. The artificial machine intelligence, a wireless robot, responds to voice commands — if the room is quiet — and will even do pushups.

Once in love with Ami

Smitten seniors at DeVry University show off robot that responds to voice

By Tom Abate
CHRONICLE STAFF WRITER

An energetic chatter filled the Fremont campus of DeVry University, where seniors showing off their technology projects made such a din that Ami, a one-eyed robot programmed to respond to voice commands, seemed oblivious to its three creators who were whispering urgent nothings into its, well, audio receptors.

Soon, however, the clever students moved the 18-inch-tall robot to a quiet conference room, where 22-year-old Eduardo Arreloa prepared to put Ami through its paces while his collaborators, Perseo Gonzalez, 22, and Feras Khatib, 21, kept their fingers crossed.

Watch video of the Stanford team testing its robotic car for this year's race at sfgate.com/ZBGT

"Thank you very much, Eduardo," Ami said in metallic but distinctly female tones. "I am waiting for your commands."

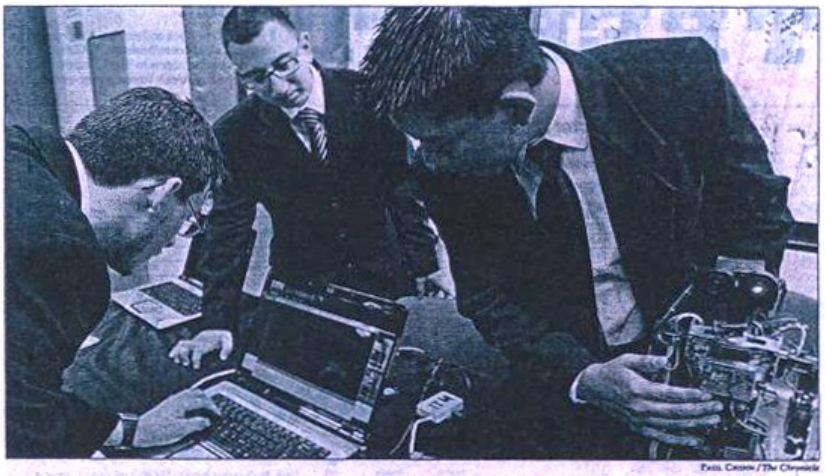
Ami, whose body was built from a kit but whose sensors and software were designed by the three students, puts a face on what may be the next big thing in technology — the emergence of mobile machines capable of some degree of autonomous action.

Are robots buggy? Sure. Are they useful? Not yet. But have they seized the imaginations of today's young innovators the way personal computers captivated the Steves — Wozniak and Jobs — 30 years ago? You betcha.

"We're coming into a time when robotics is being incorporated into school curriculums throughout the United States," said Dan Kara, president of Massachusetts' Robotics Trends, which on Thursday opens a two-day conference, Robo Development Conference and Expo 2007, in San Jose.

In yet another sign of the ferment in robotics, on Friday the federal Defense Advanced Research Projects Agency, or DARPA, will begin safety tests on more than 30 computer-controlled cars, trucks and off-road vehicles that will attempt to drive on the citylike environment of a former Air Force base in Southern California.

▸ ROBO: *Page C3*



PAUL CHINN / The Chronicle

Eduardo Arreloa (left), Feras Khatib and Perseo Gonzalez prepare Ami (lower right) for the demonstration at DeVry University.

Wireless robot makes moves away from the excitement

▸ ROBO
From Page C1

Friday's qualifying round will precede the third in a series of DARPA-sponsored robo-car races that have energized corporate, university — even high school — computing and engineering enthusiasts. A team from Stanford University won the last such race, in 2005, when their robotic Volkswagen nicknamed Stanley was the first of five robo-cars to complete a 132-mile course over the open desert. Now the defending champions face an even bigger, smarter, tougher set of competing entries in a race that will test the ability of these robo-cars to figure out which vehicle gets to cross the intersection first when two or more of the software-controlled machines come to a four-way stop.

"The response has really overwhelmed us," said DARPA Director Anthony Tether. "We've got people working day and night and putting their hearts and souls into this."

Even robo-fans would have to agree that, aside from a few uses such as the automated welding arms on assembly lines and research marvels like NASA's Mars Rover vehicle, today's robots cost a heck of a lot and do darn little — just like computers back in the goofy days before they could run spreadsheets or word processors.

Take Ami, for instance, which is short for artificial machine intelligence. In the quiet room, Ami took several steps forward, then several steps backward under voice command, which may seem like a cinch to a human, but remains a challenge for bipedal machines, said Khatib, who collaborated with Arreloa on the software while Gonzalez handled hardware.

"Walking is one of the most underdeveloped forms of locomotion for robotics," said Khatib. "It requires feedback and stability and constant correction."

Given the rather primitive state of the art, most of the action in robotics today is occurring in classrooms and laboratories, according to Kara, who hopes that the $45 exhibit pass for the two-day expo will encourage local enthusiasts to make the trek to San Jose's McEnery Convention Center.

The conference will mark the formal introduction of another promising undertaking in robotics, the coming out of Willow Garage Inc., a product-development lab in Menlo Park. Founded by software engineer and entrepreneur Scott Hassan and led by former Xerox PARC and IBM researcher Steve Cousins, the new outfit is so far a tiny team of smart computer scientists who will focus on a handful of projects and try to split the difference between the impossibly-short product cycles of commercial firms and the pie-in-the-sky timetables of think tanks.

"Companies have a time horizon of maybe a year," said Hassan, whose company will be collaborating with Stanford computer scientist Andrew Ng to transform a one-of-a-kind Stanford robot built on campus into sort of a high-end robotics kit for advanced researchers.

During a recent visit to Willow Garage, company researchers Eric Berger and Keenan Wyrobek demonstrated the prototype, which rolled around looking like a cross between R2D2 from "Star Wars" and a chimpanzee with long arms and pincer claws.

Although outsiders may scoff at these early attempts to create machines that can perform primitive actions — Ami, for instance, did three pushups on command — insiders know that what's happening today is that computer scientists and engineers have started to see what is already possible, and are trying to push the technology a bit further. Tether, the DARPA director, said the secret is setting a goal that challenges the imagination.

"I'm old enough to remember (former President John F.) Kennedy's race to the moon," he said.

Online resources

Robo Development Conference and Expo 2007
✦ robodevelopment.com

DARPA Urban Challenge 2007
✦ links.sfgate.com/ZBIE

Willow Garage
✦ willowgarage.com

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