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FOCUS ON learning & teaching

JASON KOSKI/UNIVERSITY PHOTOGRAPHY

Kamran Munshi fine-tunes his team's robot before a demonstration of its programming to follow a pattern on the floor. The addition of a compact computer and a video camera gives the basic iRobot more sophisticated capabilities.

To learn programming, students teach robots to do something cool

BY BILL STEELE

Visitors entering the computer lab where Ramin Zabih teaches Computer Science 100R often must dodge little saucerlike robots wandering around the floor. These iRobots – a modified version of the famous Roomba robot vacuum cleaner – are controlled by radio signals from desktop computers programmed by first-year students who learn computer programming by dabbling in robotics and computer vision.

Robot programming and computer vision are not usually first-year material.

"We've scaled down the problems from Ph.D. level to freshman level for this course," Zabih explains. "Programs that interact with the world are much more appealing. Computer science is about much more than programming, and so is CS100R."

Every freshman in engineering and computer science is required to take a basic course in computer programming. The choices have been CS100J, which teaches the Java programming language, or CS100M, which teaches the Matlab language, widely used in engineering. Unfortunately, Zabih says, too many students think programming is boring, and therefore so is computer science.

CS100R, an honors version of CS100M open to all Cornell students, also uses the Matlab language. "It satisfies the College of Engineering requirement that students learn Matlab," Zabih says, "and beyond that we use it for some rather compelling applications."

Through most of the course, students work with the iRobots, which have been upgraded with cameras and additional processing power. Students must complete four exercises:

- Teach the robot to figure out the position of a bright red lightstick (a flashlight with a plastic extension, like the ones used to guide airliners around a field) and use the lightstick to guide the robot around the floor.
- Build a robot speedometer/accelerometer.
- Teach the robot to distinguish a red object from a blue one, by identifying Coke and Pepsi cans.
- Track a robot from an overhead camera and guide it through a maze.

The semester ends with an independent project Zabih assigns simply as "do something cool," usually using either the iRobots or Sony AIBO robot dogs. (The dogs are expensive and no longer manufactured, so they're kept on the shelf until needed.)

One student programmed three dogs to dance in unison. Another taught an iRobot to follow a "road" defined by white tape on the floor and respond to a traffic light: If the light was red, stop; green, go ahead; yellow, speed up. Others have taught robots to spell out words on the floor, chase each other around and play baseball. Some students have delved into computer vision without robots, programming desktop computers to change the screen display in response to a wave of the hand or to read Braille.

"The primary goal," Zabih says, "is to increase their skill in computer science by exposing students to a wide variety of problems where you have to interact with the physical world."

Creation of the course was supported by a grant from the Faculty Innovation in Teaching Program funded by the Office of the Provost, and by grants from Intel and Microsoft.

spotlight ON GREEN ENERGY

As part of walking the talk on the energy front, the School of Chemical and Biomolecular Engineering introduced a new course this year on ag-based renewable fuels, taught by Samir Somaiya '90, M.S. '92, MBA '93 (and MPA '05, Harvard), executive director of the Godavari Sugar Mills Ltd. in India.

Somaiya took time off from his job to teach the course, which focused on the potential of agriculture to provide renewable energy resources from the perspective of the Indian agricultural market and the Indian economy, both of which differ considerably from conditions in the United States and Western Europe.

For example, Somaiya looked at sugarcane as a feedstock, explaining how markets can create an environment that allows for innovation; he then discussed how successful implementation includes the need to extend innovation in areas of biotechnology, chemistry, engineering, agriculture, public policy, markets and even microfinance.

The course was well received, and Somaiya will return in two years to offer it again. The course is a model for the Engineering College to offer international perspectives in electives, in which speakers visit every two to three years to present a concentrated three-week course for "energy-hungry" students.

What's happening

Cornell summer courses are hot

The close of the spring semester means the start of summer – summer classes, that is. Cornell offers hundreds of courses throughout the summer, both on campus and off, in Ithaca and around the world, in classrooms and via distance methods. Admissions is open; most courses and programs are scheduled between May 16 and Aug. 6, and run from a day or two to nine weeks in length.

The academic fare available during this beautiful time of year at the university runs the gamut, and, unlike most universities, the majority of courses are taught by Cornell's world-class faculty. "And, classes are small enough that you actually get to know your professors," says Charles W. Jermy Jr., associate dean of the School of Continuing Education and Summer Sessions, and director of Cornell University Summer Session.

Among the several dozen summer-only courses are a Field Course in Iroquois Archaeology; Islam in America; Severe Weather Phenomena; Poetic Montage; Body, Mind and Health: Perspectives for Future Medical Professionals; Water Skiing; and Introduction to Small-Boat Sailing. Cornell Summer Session also offers more than 50 special and executive education programs, including the Prelaw Program; courses in Arabic, Chinese, Japanese and Nepali; satellite remote sensing; the Institute for Computer Policy and Law; the Administrative Management Institute; and even one for teachers of writing.

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For more information, see <http://www.sce.cornell.edu>.

Rusty Red is a robust wine with a nose for charity, education and lacrosse

BY NINA ZHANG

Rusty Red, a new wine developed by a lacrosse-loving Cornell alumnus who is donating all profits to charity, will have a robust educational nose.

LINDSAY FRANCE/UNIVERSITY PHOTOGRAPHY

Joe Lizzio '88 (left) and Lauren Billings '11 listen to Jason Davis '09 discuss his team's showcase, which won for best display and pitch. Other members of his team include Billings, Bryan Kreefer '09 and Laura Chen '10.

The wine, developed by Joe Lizzio '88, will be marketed with input from Cornell students who developed marketing plans for a contest, April 13, in Warren Hall.

Their creative concepts included a refer-a-friend plan (which won first prize), contacting restaurants owned by Cornell alumni, introducing the wine at an annual golf outing for alumni lacrosse players and serving the wine at a formal dinner party during Cornell's Homecoming.

The contest was part of Cornell lecturer Debra Perosio's Marketing Plan Development course in the Department of Applied Economics and Management (AEM), home to Cornell's Undergraduate Business Program.

A former managing director at Citigroup, Lizzio retired a year ago April from Wall Street and went to Italy to work at the Stefano Berti Vineyards and Winery. The winery, which Lizzio now owns, will make Rusty Red. Rather than compete with other wineries, Lizzio decided to create the Rusty Red Foundation. Donations and profits from the wine will endow foundation scholarships for underprivileged children and fund community athletic projects in needy neighborhoods. Lizzio will cover all costs of wine production, importing, delivery and administrative costs and also will match the first donated $300,000. His short-term goal is to raise a $1 million endowment and then allocate 10 percent of the funds each year to the community projects.

The foundation's advisory board includes Wall Street financiers as well as educators and lacrosse players. While at Cornell in the 1980s, Lizzio went to two NCAA championships, leading the Cornell team as tri-captain in his senior year. The veteran players later joked that they were no longer the "Big Red" but the "Rusty Red," the origin of the name of Lizzio's new wine.

"It's been a lot of fun," says Tiffany Chiou '09 about developing Rusty Red's marketing plan. "I think it's really great because as AEMers, because this is the one class where you work in a group environment, so it's different. You get to really use your creative juices." Chiou, with Marlies Wabeke '09, Nicole Morson '11 and Kimberly Liang '09, developed the idea of referring a friend: When the wine is purchased by someone referred by a friend, Rusty Red would donate 25 percent of the purchase plus profits to the foundation.

The winning student team for the best display and pitch included Brian Kreefer '09, Jason Davis '09, Lauren Billings '11 and Laura Chen '10.

Nina Zhang '09 is a writer intern at the Cornell Chronicle.