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Playing With Robots

February 3, 2014 — **UW professors welcome Laramie's middle and high school students to play with robots and learn math, science and programming in the process.**

By Micaela Myers

Every Thursday since October 2013, a number of Laramie's middle and high school students have been coming to campus to play with robots. In the process, they learn math, science and programming.

It all started when a local father came to campus, explains **Jeff Clune**, assistant professor of computer science at the University of Wyoming and director of the Evolving Artificial Intelligence Lab. "He was looking for anyone that would listen to let them know that he was interested in having his kids learn about robotics and programming, and that he had tried and failed to find resources in Laramie for them to learn these skills," Clune says. "I was already thinking about creating a program that would allow local area kids to learn to program and play with robotics, and his comments convinced me it would be a helpful thing to have in Laramie."

Together with Associate Professor **Ruben Gamboa**, the father and a graduate student, the **Laramie Robotics Club** was born.

"We meet in the **Computer Science Department**, which is in the Engineering Building, and we think that is fun for the middle school and high school students to be exposed to walking down the halls of a university and being in a computer science lab," Clune says.

Each week involves a game, where the students program the robots to accomplish the task at hand. "My graduate student, Roby Velez, has been leading the charge on coming up with lesson plans for the students," he explains. "It typically involves telling them we want to play a certain game, like make the robot go through a maze and get to the end. So that's the challenge. In order to do that, you have to learn a bit about how to control the robot and make it move, so you teach them some basic concepts of programming that will be useful in any context of programming, but to them it's just a means of making the robot work. They learn increasingly about more and more complicated programming tools in order to make the robot move, and then the challenge is to see if you can get your robot to the end of the maze. If they can do that, then we give them increasingly harder challenges. What's really cool is that a lot of students come up with their own challenges like, 'I want to make the robot draw my name.' So they start coming up with their own way to solve these problems, and if they're doing it in a really inefficient way, we show them an easier way and we get to teach them extra programming tools. Slowly they're leveling up in their programming skills because they just want to get stuff done, which is pretty fun.

"We also have them working with virtual robots," Clune adds. "In addition to working with the real robots, they can learn how to make robots move around in a simulated world and thus learn additional programming skills that way."

At first, Clune used some of his research money to buy an initial set of introductory robots. Recently the club applied for and received an Engineering Fund for Enrichment grant, which allowed the purchase of more introductory robots plus an advanced robot.

"We still don't have nearly as many as we'd like, and we'll be looking for funding to buy more advanced robots for the students," Clune says.

While the current group of students ranges from 10 to 20, Clune hopes it will continue to grow and sees no need to cap the group, as many from around the Laramie campus have offered to help.

"We see people excited to teach Laramie's students robotics," Clune says.

Laramie's middle school and high school students aren't the only ones who want to learn robotics, however. "A lot of undergraduates and graduate students at the university also want to play with robots and learn how to use them," Clune says. "So we've had literally in the same room everyone from sixth-graders to Ph.D. students with every level in between, all learning side by side how to do robotics. It's a fun teaching challenge because you're catering to such a diverse audience. So far we've made it work by having the senior people teach skills to the younger people and also giving different levels of challenges to different students.

"The overwhelming takeaway I have is that there's a great thirst for this type of activity in town. It's great to be able to help provide it."

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