

# I, robot -- and gardener: MIT droids tend plants

April 10 2009, By MELISSA TRUJILLO , Associated Press Writer

---



In this March 18, 2009 photo, Massachusetts Institute of Technology student Huan Liu of Shanghai, China, positions a robot gardener near a tomato plant while demonstrating its capabilities in the Artificial Intelligence Laboratory on the schools campus in Cambridge, Mass. (AP Photo/Steven Senne)

(AP) -- These gardeners would have green thumbs - if they had thumbs.

A class of undergraduates at the Massachusetts Institute of Technology has created a set of robots that can water, harvest and pollinate [cherry tomato plants](#).

The small, \$3,000 robots, which move through the garden on a base similar to a Roomba vacuum, are networked to the plants. When the plants indicate they need water, the robots can sprinkle them from a water pump. When the plants have a ripe tomato, the machines use their

arms to pluck the fruit.

Even though robots have made few inroads into agriculture, these robots' creators hope their technology eventually could be used by farmers to reduce the natural resources and the difficult labor needed to tend crops.

Last spring, Daniela Rus, a professor who runs the Distributed Robotics Lab at MIT, began a two-part course. In the first semester, the students learned the basics of creating and using robots. By the fall, the students were ready to have robots tackle a real-world problem. Rus and Nikolaus Correll, a postdoctoral assistant in Rus' lab, challenged the students to create a "distributed robotic garden" by the end of the semester.

The 12 students broke into groups, each tasked with solving a different problem, such as creating the mechanical arm needed to harvest the tomatoes or perfecting the network that let the plants and robots share information.

By the end of the fall term, the "garden" inside Rus' lab was green and growing.

Now there are four cherry [tomato plants](#) nestled into a plywood base covered in fake grass. Next to each pot is a gray docking station for the robots.

Each plant and [robot](#) is connected to a [computer network](#). The plants, through sensors in their soil, can tell the network when they need water or fertilizer, while the robots use a camera to inventory the plants' fruit. The robots also are programmed with a rudimentary growth model of the cherry tomato plants, which tells them roughly when a tomato will be ripe enough to be picked.

But the students quickly encountered challenges, both robotic and

biologic.

Huan Liu, a 21-year-old computer science major, said designing the [robot](#) to pick the delicate tomatoes was made more difficult because the fruit would grow in unreachable places, such as behind stems or above where the robot's arm could reach.

"The tomatoes, they come out of nowhere, or just in weird places," Liu said.

Robots have made factory assembly lines more efficient and are being developed for in-home purposes, such as serving as health care aides. Yet there hasn't been much use for robotics in agriculture, partly because of the challenge of getting machines to work in unpredictable environments.

There have been attempts to get robots to replace humans at farm tasks, from thinning apple trees to picking asparagus, but none of the machines "have sufficient capacity to compete with human beings," said Tony Grift, an associate professor in the Department of Agricultural and Biological Engineering at the University of Illinois.

Even when technology has proven to be useful in agriculture, such as on tractors equipped with satellite imagery of fields, it often is prohibitively expensive.

Rus and Correll hope to conquer those kinds of challenges and get robots to work in farms.

"Agriculture contributes a lot of damage to the land, the soil, the water and the environment," Rus said. "So if we can figure out a way of using robots and automation to deliver nutrients to plants - pesticides, fertilizers, water when it's needed - instead of sort of mass spreading

them, then we hope we would have an impact on the environment."

*©2009 The Associated Press. All rights reserved. This material may not be published, broadcast, rewritten or redistributed.*

Citation: I, robot -- and gardener: MIT droids tend plants (2009, April 10) retrieved 20 April 2024 from <https://phys.org/news/2009-04-robot-gardener-mit-droids.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.