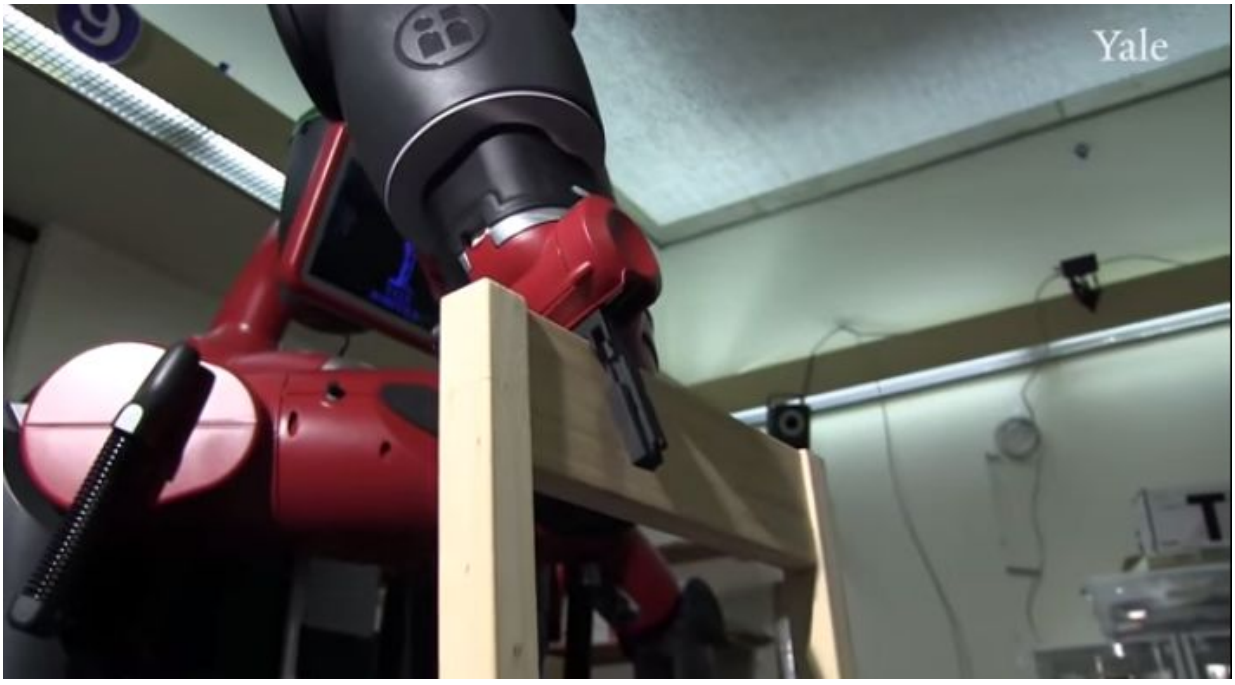
Video: Can robots make good teammates?

September 22 2015, by William Weir



Are they our evil overlords, or our personal servants? Another possibility altogether is that they're our dependable co-workers, helping us put together that new Ikea bookcase.

At the Yale Social Robotics Lab, run by Professor of Computer Science Brian Scassellati, robots are learning the skills needed to be good teammates, allowing people to work more safely, more efficiently, and

more effectively. Such skills include stabilizing parts, handing over items, organizing a workspace, or helping people use a tool better.

Some robots are perfectly capable of doing certain tasks all by themselves, and are often used in manufacturing. But their capabilities are limited, performing tasks repeatedly on assembly lines. It's extremely difficult to make a robot that does a wide variety of tasks, which is what would be necessary for use in a small business or a home.

Developing robot teammates is one route to achieving this with current technology. Not much work has been done in this area. For one thing, sharing a workspace with most robots can be dangerous.

"It's only now that this is becoming feasible, to develop robots that could safely operate near and around people," said Brad Hayes, the Ph.D. candidate who headed up the project. "We're trying to move robots away from being machines in isolation, developing them to be co-workers that amplify the strengths and abilities of each member of the team they're on."

In particular, Hayes' work focuses on robots learning "supportive behaviors", actions that make others' jobs easier to do. These behaviors require the robot to learn about tasks and teammate preferences, but do not have the same mechanical requirements of doing the entire task alone.

So how does a robot learn to be a good teammate?

"One way is autonomously—the robot tries to figure out how to help during tasks by simulating hundreds of thousands of different possibilities and then guessing if that's going to be helpful for you," Hayes says. But that can take a long time, and for certain tasks, they may never figure it out.

Another approach is to show it directly. "Here, you're naturally demonstrating to the robot and having it retain that knowledge," he explains. "It can then save that example and figure out if it's a good idea to generalize that skill to use in new situations."

Hayes thinks the technology has value for both the workplace and the home, particularly for small-scale, flexible manufacturing or for people who've lost some of their autonomy and could use help with the dishes or other chores.

"Collaborative robots can be deployed into these spaces, be helpful and change people's lives in a much more immediate way than waiting 20 years for us to solve some of the difficult problems associated with the robots doing some of these things all by themselves," he says.

Provided by Yale University