Our bots, ourselves

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Sci-fi movies would have us believe that robots will take over the world by force, but reality tells us the quicker way might be through our hearts. Starting, perhaps, with an autonomous cleaning bot many people already have in their home.

Consider the Roomba.

New research shows that the appeal of the vacuum — produced by Bedford-based company iRobot — is based on more than marketing or pricing or even cleaning power. Rather, owners experience an emotional connection with their little self-propelled bots.

Some owners love theirs so much, they give them names. But why do people feel much of anything toward the blinking, buzzing, plastic gizmos? And how might the relationship between people and their autonomous vacuums shape future technology? Researchers at Germany's Heinrich-Heine-Universität Düsseldorf brought a Roomba into the lab to find out.

The HHU team monitored people's emotional reactions to the cleaning robots by way of the mirror neuron system (MNS). Experts in the field of human-robot interaction have found that these mirror neurons are responsible for responding to social actions, and play a role in the way humans relate to robots that look human. But they weren't sure how the neurons would respond when dealing with non-anthropomorphic robots (like autonomous vacuums).

Does something need to look human to warrant a human response, the scientists wondered?

To try to answer the question, participants were hooked up to an EEG machine to measure brain activity and were shown a video of a human behaving aggressively towards the robot, kicking and "verbally harassing" it before exiting the room.

The study, published in April in the journal Computers in Human Behavior, showed that after watching the aggression video (versus a neutral control video), the subjects' brains revealed more compassion toward the robot — demonstrating that people perceived the vacuum as a social entity. As something more than a machine.

Matthias Hoenen, a research assistant in the department of experimental psychology at the University of Dusseldorf who co-authored the study, said he was inspired to do the study after watching his friends interact with their Roomba, giving it a name and letting it "sleep" at the foot of their bed like a dog.

"Our mind has to justify why we act to an object like it is living," Hoenen said, "and the only explanation [in our brains] is that the object is living."

Breaking up is so hard to do

Colin Angle, chief executive of iRobot, says the company regularly receives customer service calls asking for help to fix "Rosie" or "Seamus" or "Floorence." (For the record, Angle has named his Roomba "Roswell.") The calls have affected the way the company operates. For example, customers would express concern when iRobot told them to mail in their Roomba and receive a new one in return — just as they might with another small appliance.

But they didn't want a new vacuum, Angle said. They wanted "Rosie" to be fixed, or more to the point, healed. Since the device was designed to be modular, iRobot began shipping out parts so that owners could operate on their robots instead.

Soon, the company began offering customization packages allowing people to change their Roomba's color to match their decor or favorite sports team. iRobot was trying to embrace the "cell phone case phenomenon for your robot," Angle said. But it never took off the way he imagined.

"Perhaps [people customize their phones] because we don't view our phone as an independent lifeform," he speculated. "It's more of an expression of ourselves. Whereas who are you to dress Roomba?"

Kate Darling, a researcher specializing in human-robot interaction at the MIT Media Lab, said she thinks the difference between appliances and robots is in their perceived autonomy.

"Even though Roomba, which is kind of a dumb robot, moves according to an algorithm, we're biologically hardwired to respond to physical movements in our space," she said. "It's not just a matter of getting used to a new technology, but rather evolution has put this in our system."

Darling thinks these instinctive behaviors will only increase as more robots are incorporated into the home. We're not going to be looking at a human-computer romance like the movie "Her" anytime soon, but that type of deep emotional connection is not out of the realm of possibility.

"If you think about kids and the way they develop attachments to their stuffed animals, now imagine that this stuffed animal is moving and can interact with them," Darling said. "It's not just your imagination anymore, it's actually targeting your biological responses."

More than just robots

Other home robotics companies are also focusing on the customer-bot connection.

Robomow, a Florida-based company that produces an automated lawn mower, has embraced the emotional connection that customers have to their devices.

“We just had a contest to see the creative names that people come up with for their mowers,” said Giselle Sendra, Robomow’s digital marketing director. “It’s so cool that people really connect with these robots.”

Robomow created a promotional video that featured people comically and unexpectedly interacting with their robot. Picture a sweltering hot day. A man steps out of his car drenched in sweat and wiping his brow when the camera pans over to a woman coming to greet him with a glass of water. At the last second, she bends down and holds the drink out to the Robomow at the man’s feet, adding, “Good boy, Charlie.”

The team at California’s Neato Robotics have also noticed the phenomenon surrounding their Botvac models. Vice President of Marketing Nancy Nunziati said Neato altered its social media strategy to reflect the personalities of their robots.

The company’s Instagram account features whimsical scenes starring household messes and miniature toy figures called Messmakers, the sworn enemies of the Botvac. One photo caption reads, “The Messmaker’s plan to incriminate the dog by shredding its new toys was swiftly foiled by the bot with a brain.”

Angela Smith, director of marketing at LG, which produces its own robot vacuum called Hom Bot, said she thinks the personal relationship people feel toward their robots will only strengthen in the future. Newer models of the Hom Bot will feature smart phone capabilities like photo sharing and security alerts allowing consumers to be in touch with their bots all day long.

When home bots first went on the market, no one anticipated how customers would respond. In the early days of iRobot, which launched in 2002, the creators made an effort to ensure Roomba was not cute or cuddly. They wanted a "serious appliance" that cleaned better than the competition. Their marketing methods followed that logic.

"We shot beautiful videos of the Roomba cleaning up stuff. No people, just cleaning, cleaning, cleaning," Angle said. "[That commercial] did nothing. It had no impact. Things were really kind of dire."

But then, during the 2004 Super Bowl, Pepsi came out with an advertisement starring comedian Dave Chappelle that featured a mischievous Roomba stealing Chapelle's pants and helping him get a date. After the commercial aired, Roomba sales tripled. The difference between Pepsi's video and iRobot's was that Pepsi gave the bot a personality and showed it interacting with people.

"They portrayed it as intelligent and taking part in a wonderfully human experience," Angle said. "That marked for iRobot a huge turn in our strategy from portraying robots as high-tech chrome machines to your partner in cleaning your home."

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Many consumers are not shy about revealing how important their bots are to them.

Helen Arnold, 36, a Texas YouTuber, gained overnight fame by recording her cat Max wearing a shark costume and riding a Roomba around her kitchen. The two-minute video, posted in 2013, has over one billion views and inspired others to replicate it with their own pets.

Arnold said she was surprised the video went viral because she didn't stage it. Max just loves the Roomba so much, Arnold said, she has a hard time separating him from it.

"When the cat feels depressed or has been sick or stressed, we bring him the Roomba to sit on," she said. "When he sees it, he feels right at home, it's like his security blanket."

Some people have found inspiration in the Roomba. Stephanie Olexa, a former biochemist turned executive leadership coach, wrote a book in 2012 called "Leadership Lessons from a Vacuum Cleaner !! ?? !!", about applying a Roomba's traits to business. Olexa personifies the robot as something that "has a vision, mission, and goals," and describes its ability to hit a wall and keep going as something to aspire to.

Experts in the field of human-robot interaction believe that this is just the beginning. With smart-home connectivity and the "internet of things" already becoming a reality, our homes may someday be full of autonomous robots performing tasks. These could range from cleaning and organizing to taking care of the elderly or teaching children to read.

Kate Darling of the MIT Media Lab thinks the next hurdle will be separating the human from the robot.

"I'm much less concerned with the robots developing their own agendas than I am with the people making the robots and using the robots to manipulate people," she said. "They're not going to look like Terminator, they're going to look more like every day objects."

That said, we need to be aware of the role robots are playing in our lives because, like it or not, we're biologically bound to them, she added.

"This isn't science fiction," Darling said. "This technology is already here. So we need to start thinking about this strange new relationship we have with these objects now."

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