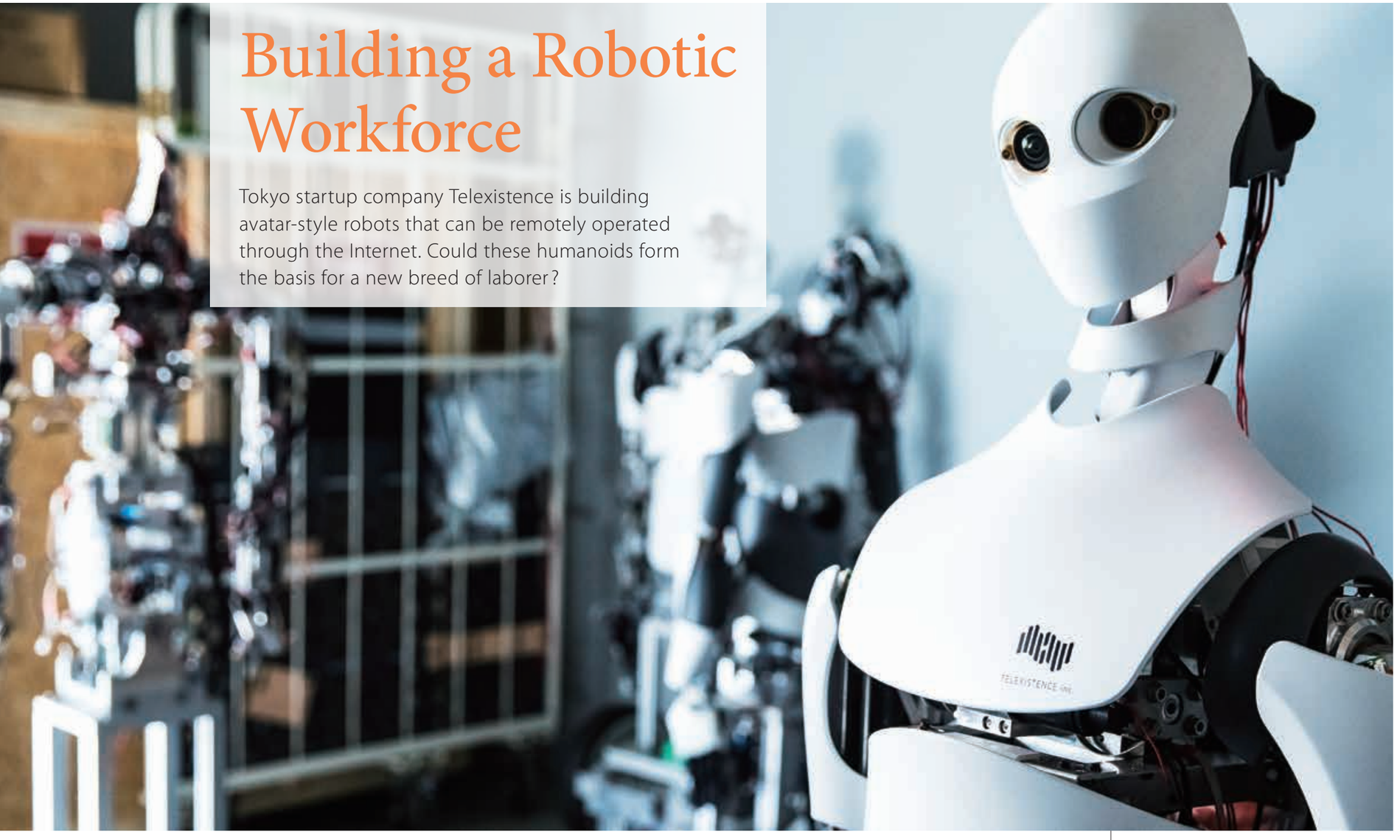
Building a Robotic Workforce

Tokyo startup company Telexistence is building avatar-style robots that can be remotely operated through the Internet. Could these humanoids form the basis for a new breed of laborer?



Telexistence technology welcomes workers to a new era.

Last summer, an unusual visitor disembarked from a ferry docking in Tokyo's Ogasawara Islands. It was a humanoid robot, a sophisticated machine that can project the presence of a user to a remote location. Since the islands are 1,000 kilometer south of central Tokyo, it was a great place for the prototype robot to be put through its paces. While a user in central Tokyo controlled the robot through special gloves, a head-mounted display, and a high-speed Internet link, the machine did something perfectly natural given its tropical setting: it fed some local sea turtles.

Model H, as the robot is known, is the creation of a Tokyo startup that is at the cutting edge of avatar robotics. "Telexistence" is both the name of the company and the term it uses to describe the field of robotics that it is opening up. Think of science fiction films in which people remotely control robots, and you will get a rough idea of the possibilities.

"The concept of Telexistence means you can be any place without physically travelling, because with the Internet, we can transfer our kinesthetic abilities anywhere," says chief operating officer Yuichiro Hikosaka. "That's why a distant robot that can move by using our abilities should be close to the form of a human being, with a head, two eyes, five fingers, and so on."

Built in 2018, Model H is one of four prototype robots that Telexistence has developed. Equipped with cameras for eyes and joint sensors, the robots can move around on a wheeled base and have multi-joined arms and fingers. A fingertip haptic sensor developed by Telexistence can convey a sense of touch to the user when the robot is handling or touching objects. The Model H prototypes now have 35 degrees of freedom, or the number of axes their joints can move, and will have 49 in the future. That is a relatively high total compared to the world's most advanced humanoid robots.

Telexistence chairman Susumu Tachi, an emeritus professor at the University of Tokyo and head of its Tachi Lab, first came up with the concept of Telexistence in 1980.

"Telexistence lets you work remotely, travel all over the world, entertain distant guests, or play sports you couldn't play otherwise," says Tachi. "Children who are hospitalized long-term could visit Disneyland and share real experiences with their friends and family. Elderly people with mobility issues could attend a grandchild's wedding. There are endless applications."

Telexistence could be one solution for Japan's shrinking labor force and rapidly aging population. In one scenario, Telexistence robots could be used to staff convenience stores and their human operators could be in foreign countries; businesses could be open around the clock if operated by workers in various time zones.

While commercialization of the robots remains a few years away, Telexistence could be a natural fit with the Japanese government's program to promote Society 5.0, a "super-smart society" that will leverage technologies, such as the Internet of Things (IoT), artificial intelligence, big data, and robotics to digitize all aspects of society and overcome demographic issues and other social challenges.

"Any robot can be used for this—what's important is how you connect the user to the robot in a natural, seamless way," says Telexistence cofounder and CTO Charith Fernando. "This technology can help free people from repetitive, tedious work so they can focus on creative activity."

"Telexistence is a device to change the world and a worthwhile task with a great potential," adds Tachi. "AI and Japanese technologies are perfectly compatible. By using Telexistence, we can build a system in which many people who want to work can really work, and thus make the impossible possible."