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JOURNAL REPORTS: HEALTH CARE

For the Elderly Who Are Lonely, Robots Offer Companionship

Researchers are testing whether digital assistants can help older people stay healthy



Mabu and other digital helpers can provide elderly people with health reminders and relay health information back to care providers. PHOTO: CATALIA HEALTH

By Imani Moise

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Twice a day a little robot in Rayfield Byrd's living room lights up and asks him a very personal question: "Have you taken your medication?"

For the past few weeks, Mr. Byrd, a 67-year-old retired transit worker who lives alone in Oakland, Calif., has been able to proudly answer "yes."

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The portable robot's name is Mabu, and at the recommendation of his health-care provider, she now lives with Mr. Byrd to help monitor his irregular heartbeat. She checks in on him two or three times a day to make sure he weighs himself, takes his medication and exercises regularly—and relays information back to his health team.

"She's my little blue-eyed girlfriend," he says. "She keeps me on my toes."

Avoiding the ER

With the senior-citizen population expected to nearly double to 88 million by 2050 and some nursing programs stretched

thin, researchers and elder-care centers are exploring the potential of digital companions, in robot or chatbot form, to help the elderly. Digital assistants like Mabu and others are being developed to do everything from monitor chronic health conditions to encourage patients to stay active and engaged—with the overall goal being to find ways to meet the needs of a growing elderly population without overburdening the health system.

While the idea of bringing automation to elder care has been discussed for years, recent technological advances in natural-language processing have moved it closer to reality, says Dor Skuler, the founder of the firm behind ElliQ, a robot that encourages the elderly to stay active

and connected to loved ones. Before such advances, people had to speak to digital assistants in specific formulaic commands, making the technology difficult and frustrating to use, especially for seniors.

Already, digital assistants have allowed some health systems to cut back on nurse home visits and prevent unnecessary trips to the emergency room.

Element Care, an elder-care program in Boston, last year began dispatching digital avatars, instead of nurses, to help some patients manage their chronic conditions at home. The technology, from Care.coach Corp., uses an animal avatar on a tablet to remind patients to take their medications and follow their treatment plans. About 70% of what is spoken by the avatar is written out by human specialists working behind the scenes, says Care.coach Chief Executive Victor Wang, while the other 30% is generated via artificial intelligence.

Kendra Seavey, Element Care's clinical administrative manager, estimates that the center has saved \$150,000 in emergency-room costs by assigning Care.coach avatars to patients who make the most frequent hospital trips. Sometimes, the avatars guide patients through breathing exercises to calm them down; other times, just giving patients an ear to talk to prevents them from calling 911.

"We have individuals who just get anxious and want to go to the hospital or are lonely and want to go to the hospital," she says. "There's no need for them to go there."

Alleviating loneliness

Indeed, loneliness is one of the key problems researchers and companies are trying to solve with digital companions. Loneliness is a significant predictor of poor health, and it is widespread, affecting more than one-third of older adults in the U.S., according to a 2010 AARP study.

"Robots that help people connect with and maintain their relationships with others are becoming increasingly important," says Timothy Bickmore, a professor at Northeastern University who is developing a digital assistant to help the elderly navigate the final stages of life.

While older people aren't usually early adopters of new technologies, seniors who lack companionship tend to be receptive to having automated friends, says Maja Mataric, a professor of computer science and neuroscience at the University of Southern California. "In many cases their friends have died, no one cares to spend time with them, and the grandkids think they smell funny," she says. "So when they actually have someone or something that's interested in them, they are willing to explore it."

Ms. Mataric, who has studied using robots to improve the attention spans of dementia patients, says robots give patients the illusion of having a physical companion, and the elderly often interact with them in surprising ways, such as by petting them and asking how they are feeling.

Programming robots and chatbots to act as friends is simpler than it might seem, developers say. ElliQ, now in beta testing, turns to face users when they are talking, to show attentiveness, and bounces with excitement when a message arrives from a loved one. Mabu, from Catalia Health Inc., uses eye contact to show it is listening to users.

"It isn't actually very hard to project empathy," Ms. Mataric says. "Empathy is what you do, not what you feel."

Most of today's socially assistive technology also is designed to be cuddly and cute, defying the stiff and scary stereotype associated with robots in the past. Paro, a speechless lap-sized robot from Japan's National Institute of Advanced Industrial Science and Technology, looks like a baby seal and is used much like a live therapy animal to soothe patients. Paro, which displays emotional reactions to touch and sound, became a certified medical device in the U.S. in 2009 and has sold roughly 5,000 units world-wide, primarily in Japanese elderly facilities.

Toy maker Hasbro Inc. and researchers at Brown University, meanwhile, have said they would use a \$1 million grant from the National Science Foundation to add artificial intelligence to Hasbro's robotic companions, which resemble cats and dogs, so that they can help the elderly



Paro, a robot that resembles a baby seal, reacts to touch and sound and is used much like a live therapy animal. PHOTO: YAMAGUCHI HARUYOSHI/CORBIS/GETTY IMAGES

with everyday tasks such as locating lost objects, in addition to providing comfort.

Real people

But even as technological advancements make empathy and companionship easier to simulate, those in the field say digital companions aren't meant to replace the human touch.

Care.coach's Mr. Wang says human specialists will remain an important part of his product because building a long-term supportive relationship with a patient requires an actual person.

Real people also are going to be needed to perform the harder, and dirtier, tasks associated with elder care—at least for the foreseeable future, experts say. "We aren't developing robots who can toilet the elderly anytime soon," says Ms. Mataric.

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