

Domo Arigato, Mr. Roboto



Randy D. Daniels, PhD, PA, DFAAPA

A few months ago, I purchased an Amazon Echo system. The device is built on Amazon’s cloud-based voice service, Alexa, which can hear, understand, and respond to any question or command. The speaker is always listening and is activated when the user (eg, me!) says the name *Alexa*. For instance, I can say “Alexa, what is the weather today?” and it will provide the forecast. In fact, each morning I request my daily news briefing, and Alexa quickly tunes to NPR Radio. By linking to my Google calendar, it also tells me my agenda for the day. It researches and provides information that might otherwise take me a while to locate.

Now, I confess: I’ve had to train myself to refer to Alexa as “it” instead of “her.” Human beings have a rich history of wanting to “humanize” computers, as the science fiction film genre can attest. Go back nearly 50 years to *Colossus: The Forbin Project* (1970) and you have a story of two super-computers—one built by the United States, the other by Russia—that join forces and take over the world, making humans their slaves. The award-winning *Bicentennial Man* (1999) follows the life and times of Andrew, an NDR-114 robot originally purchased as a household appliance to perform menial tasks; when it begins to experience emotions and creative thought, the owners discover Andrew is no ordinary robot. And who can forget Hal, the computer in *2001: A Space Odyssey* (1968) that takes over a space mission until a clever astronaut manages to disengage it (I almost said *him*), or Data, a very likable android in the successful franchise *Star Trek: The Next Generation*.

Let’s face it: We are both obsessed with, and leery of, new technology—particularly artificial intelligence (AI). Some detractors have denounced Alexa’s capabilities as “just a glorified smartphone.” Others have ex-

pressed grave concerns about the security of personal information and conversations, as Big Brother may be listening. (In that case, it’s not the machines that are evil; it’s those who use them!)

But—cue a John Williams score—what if we harnessed the power of AI for good and not evil? I’ll be serious now: At the recent Leadership in Healthcare Summer Institute (which I was honored to teach at), a group of doctoral students gave a presentation on the potential of AI in the identification and care of anxiety and depression. They identified a need—every 16.2 minutes, a person dies by suicide in the US—and proposed a solution. Because access to care may be limited (by provider shortages, remote locations, etc), the students suggested a hybrid AI/telehealth platform that offers 24/7 support and provider access to individuals with

anxiety and depression, via a secure mobile app.¹ It got me thinking: Could this technology be a positive intervention in health care?

Actually, it’s already happening. Mayo Clinic researchers have used AI to identify the genomic infor-

mation of brain tumors without biopsy. At Stanford University, researchers are training an AI neural network to recognize skin cancer lesions with the accuracy of an expert dermatologist. The same deep-learning technology is being used in the field of pathology for the detection of liver lesions.²

Now, I’m sure some of you are questioning whether a machine can really match or replace a human when it comes to assessing a patient’s condition. There were many who resisted the idea of *telehealth* when that was the latest, greatest thing, because providers cannot do a full assessment with the required diagnostic testing and imaging from a distance. Some feel that telehealth should be reserved for situations in which, say, a remote provider is reviewing and reporting on test results, or a patient just needs to follow

➤ Could artificial intelligence technology be a positive intervention in health care?

up with his/her provider for a minor issue.

Mental health, however, entails less “laying on of hands” and may be a good candidate for AI-based interventions—at least for follow-up and support services. (I am certainly not discounting the value of real human interaction in *any* sphere of health care.) We know patients benefit from early mental health intervention programs, but we also know those benefits may not be sustained over time and distance. Logistical issues that any of us may face—time, transportation, availability—are often exacerbated for those with impaired functioning due to a mental illness. If a patient with major depression cannot bring himself to get out of bed to make a cup of coffee, how is he going to travel across town (changing buses two or three times) to keep an appointment with his health care provider?

Here’s where AI might make a difference:

What if there were a patient-focused e-platform that could provide cost-effective and accessible services across the continuum of care? Current Internet-based interventions rely on human mediators to deliver therapeutic content, which is then refined into a model that can interpret and respond to critical user data—resulting in tailored online therapy. But if we could integrate the user experience with sophisticated and cutting-edge AI technology, we could deliver content more effectively to redefine these interventions and improve outcomes.

A paper recently featured in *Frontiers in Psychology* discussed the value of doing just that. D’Alfonso and colleagues reported on an Internet-based social therapy web application that uses a series of interactive modules to help users navigate situations and develop psychosocial skills. In its current form—within a research setting—the

system is utilized by small groups of users, making human-supported engagement via moderators possible. But D'Alfonso and colleagues note that the incorporation of automated suggestions within the modules would allow the technology to be rolled out to a larger audience and ensure that "interaction" is available whenever a user needs it—not just when a human moderator is "on the clock."³

Another article, in the *International Journal of Swarm Intelligence and Evolutionary Computation* (2016), discussed the development of socially intelligent robotic

vealed significant concerns that would certainly apply to the health care arena. When asked which of the following participants most feared about the use of AI,

- 33% of respondents chose "It will never know me/my preferences as well as a human being"
- 24% chose "The rise of the robot and enslavement of humanity"
- 5% feared "Robots uncovering my deepest secrets."⁵

Despite all this, however, respondents also expressed optimism in the power and potential of AI: Nearly 70% said they are in support of further use of AI if it helps make their lives easier.⁴ Wouldn't life be easier if AI could be used to significantly reduce errors, increase access to care, and bring a fresh viewpoint to the issue of patient education?

What do you think? Would you trust a robot to be your coworker, identifying tumors and conducting mental health screenings? Is it possible to convince patients to accept help via an impersonal medium (and risk exposure of their personal health information)? Share your fears, support, or concerns about AI with me at PAeditor@frontlinemedcom.com. **CR**

REFERENCES

1. Halabi AH. How will artificial intelligence change healthcare? June 8, 2017. www.quora.com/How-will-AI-change-healthcare. Accessed July 12, 2017.
2. Hepburn D, Francis D, Hoosier M, et al. smaRT MD2: a patient-focused e-platform for use across the continuum of care for anxiety and depression. A June 2017 presentation to Leadership in Healthcare, Summer Institute, Nova Southeastern University, Tampa, FL.
3. D'Alfonso S, Santesteban-Echarri O, Rice S, et al. Artificial intelligence-assisted online social therapy for youth mental health. *Front Psychol*. 2017;8(796):1-13.
4. Gulrez T, Neftimeziani S, Mc evoy P, Hodgson A. Loneliness kills: can autonomous systems and robotics assist in providing solutions? *Int J Swarm Intel Evol Comput*. 2016;5:1.
5. Pegasystems. What consumers really think about AI: a global study. www.pega.com/AI. Accessed July 7, 2017.

► Would you trust a robot to be your coworker, identifying tumors and conducting mental health screenings? And could we convince patients to accept help via an impersonal medium?

systems, not unlike Alexa, to address social connectedness. The author proposes an autonomous assistive system (AAS) as a low-cost, standalone interventional device to reduce social isolation. This could easily be deployed in homes for the elderly or even at remote sites. The AAS has been programmed to detect isolation in patients based on data regarding skeletal movements, facial expressions, and speech patterns. In the not-so-distant future, this high-density data will be sent over the cloud to allow clinicians to monitor in real-time and intervene remotely, as appropriate (eg, by initiating a home visit).⁴

Of course, in any form, implementation of AI will not be simple—there are real costs to be considered, and we still have to contend with the fears that all those sci-fi films have instilled. A recent global study re-