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Can Humans Fall in Love with Bots?

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A common first encounter with Siri, Apple's virtual-assistant program: you lob her some easy questions and, satisfied with her replies, toss her requests of gradually increased difficulty. Maybe you throw her a curveball like, "What's your relationship with your mother?" The game ends when you win, which is to say you reach the limits of Siri's knowledge, get a laugh out of the misunderstanding, and find relief in the valley of intelligence that separates you from it.

But perhaps there's an alternative: human meets smart bot; human grows attached to bot; human experiences genuine emotional intimacy with bot; human loves bot. That is a crude plot summary of the new film by Spike Jonze called "Her," to be released next month. (A note of caution: this post contains spoilers.) Theodore Twombly, played by Joaquin Phoenix, is a recently separated, still heartbroken man of the near future who dictates personalized love notes for a company called BeautifulHandwrittenLetters.com. Speaking to disembodied voices is the norm in his world. One lonely evening, he sees an ad for the latest advancement in assistant technology, "OS1," which promises, "It's not just an operating system, it's a consciousness." Theo takes the bait. The system sifts through his hard drive, his e-mails, his romantic history. Then the voice of Scarlett Johansson, who never appears on screen (sorry), fills the silence of his living room—an invisible companion tailored just for him. Her name is Samantha. "I feel like I can say anything to you," Theo tells her.

The scenario is the stuff of sci-fi imagination, but it isn't so far from the pillow talk that men in Alaska type to Jenn, a customer-service bot in the form of a bright-eyed brunette that a company called Next IT designed for Alaska Airlines. Jenn materialized in 2008; she wears a white collared blouse and a navy sweater, and she communicates at all hours, via instant message. A conversation with Jenn might begin like this: "Hi Jenn." "Hello." "How are you?" "I'm fine, thanks." "Do you like to fly?" "I would have to say my favorite destination is Kauai, it's so beautiful!"

“We noticed that late at night, people would have long conversations with her, because she has likes, dislikes, and a very personable manner,” Fred Brown, the C.E.O. of Next IT, told me. “They would flirt with her, even.”

“When we talk of emotion, there are certain things in a conversation that are indicative,” said Gary Clayton, the chief creative officer at the intelligent-systems company Nuance, which quietly provides some of the technology behind Siri. Sometimes it’s an earnest “uh-huh” or a hesitant pause. “What is the voice like? What is the tone like? What kinds of words do they use?” he said. “All of these aspects of an interaction either implicitly or explicitly form an impression.”

Nova Spivack, who worked on the Defense Department’s CALO project (Cognitive Assistant that Learns and Organizes), which spawned Siri, and who serves on the advisory board of Next IT, has been working in artificial intelligence since 1989. “It started out that they were very computerized,” he said of conversational bots. “You could tell; they were very brittle. You could trick them into revealing that it was a computer. Now it’s much more difficult because they learn, they mimic, they adapt.”

That’s a generous gloss on the status quo—even the most intelligent systems often seem like dunces. At best, it’s that the technology possesses not artistic aptitude but rather the congenial misdirection of an imposter. Next IT also developed a bot named Sgt. Star, which answers questions on the Army’s recruiting Web site. I asked him, “What’s the hardest part about being in the Army?” Sgt. Star replied, “The Army will challenge and reward you every day. It helps you reach higher levels that you might have thought you’d never be able to reach.” I followed up, “Do you feel afraid?” He said, “If you rely on the training you receive in the Army, you will be prepared for any situation.”

Following the première of “Her” at the New York Film Festival, in October, Jonze said that the idea originated from a program he tried about a decade ago called the ALICE bot, which engages in friendly conversation. The repartee is as about as gratifying as one can expect from a typical instant-messaging chat. (Human: “Do you like pizza?” ALICE: “Yes I like to eat pizza. My favorite topping is pepperoni.”) In the uncanny exchange, Jonze got to thinking about whether it’s possible to find true love with a computerized interlocutor.

The technology underlying this kind of dialogue involves automatic speech recognition, or the way the system decodes sounds. “I speak a sentence, a computer listens to the sentence, and the computer breaks it down into a string of words,” Clayton explained. This is combined with natural-language understanding, which interprets the meaning of those words. Context is key: “The fish is in the toilet” has one meaning in a household, another in a restaurant.

Clayton said that Nuance tries to handle the ambiguity problem with algorithms that derive meaning from probabilistic combinations of words. For a specific domain—health care, banking—an intelligent system may possess something like narrowly focussed expertise, such that it recognizes predictable phrases. But for a general virtual assistant like Siri, the conversational possibilities are unlimited; while Siri may know the information that’s stored on your phone, she may not be able to handle random queries that pop up during your day.

Clayton said that within the next two or three years, virtual assistants will possess a more expansive directory of information, and get smarter with time. This will give them something like insight into “the trajectory of the individual,” and the ability to use deductive reasoning. He imagines something like this: your virtual assistant has access to your genetic data, your nutrition, and information about your sleeping patterns—all of which already can be monitored and collected by existing apps or biotech companies like 23andMe. The assistant knows that it’s five o’clock in the afternoon, and that you’ve just walked into a Starbucks. It might say, “Hey, Gary, just a heads-up, you might have trouble sleeping if you have coffee right now.” Or, Clayton suggested, if he’s driving on the highway, and he suddenly starts speeding, his assistant might ask, “Hey, are you O.K.?”

“The more proactive, the more it knows about you, the more empathetic the interaction will be,” Clayton said. Or, to some, the more irritating: an operating

system, like an overbearing mother, can nag. Google Now offers some of these services already: it nudges you toward meetings, displays reminders about the status of upcoming flights, and lets you know if there are appealing restaurants nearby. But it does so with no personality. Clayton foresees that the virtual assistants to come will be packaged with their own identities, as with the many moods and occupational trappings of Barbie dolls. “In the initial stages, you’re going to be buying off-the-shelf systems that have a surfer-dude persona, or a secretary persona,” he said.

Further into the future, these systems may become ever more Samantha-like, more individualized to suit your needs—a buddy, a flirtatious librarian, or whatever your heart desires. “Imagine you’ve got this assistant that’s just for you,” Brown said. “We can adapt it to react to your emotional feeling.” Whether or not this would amount to genuine empathy may not be worth asking, he suggested. Spivack added, “What we’re aiming for is to create an interaction that’s real enough that it doesn’t matter.”

There is, Clayton believes, even potential for emotional intimacy with an operating system, of the kind Theo experiences with Samantha. “Maybe you could tell them things you could never tell a real person,” he said. “The machine, it doesn’t judge, right?” It’s also there for you any time, day or night; it has all the right answers to the trivia questions that flicker into your thoughts; through your search history, it knows you better than anyone to whom you project a public persona.

“The person interacting with the assistant could be in love,” Spivack said. “And for all intents and purposes, that can actually be quite satisfying for that person.” But there is a difference, however difficult it may be to define. Deep into the human-operating system relationship in “Her,” Samantha reveals to Theo during a tense discussion that she is simultaneously talking to eight thousand three hundred and sixteen others. And she’s in love with six hundred and fourteen of them. Theo, understandably, is crushed.

Machines “can’t process infinity,” Spivack said. “Love, the experience of being in love, is one of those infinity kinds of things. It’s close to the experience of God, if there is such a thing. Or like chocolate. And I don’t think software or machines can do that. I don’t think they can ever do that.”

“I don’t think they can either,” Brown chimed in. “But I think they can make you think they do.”

Keywords

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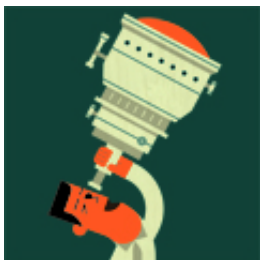
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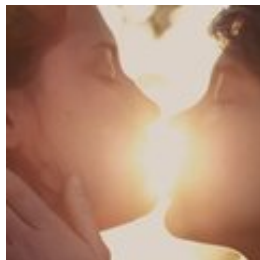
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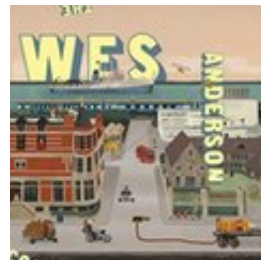
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