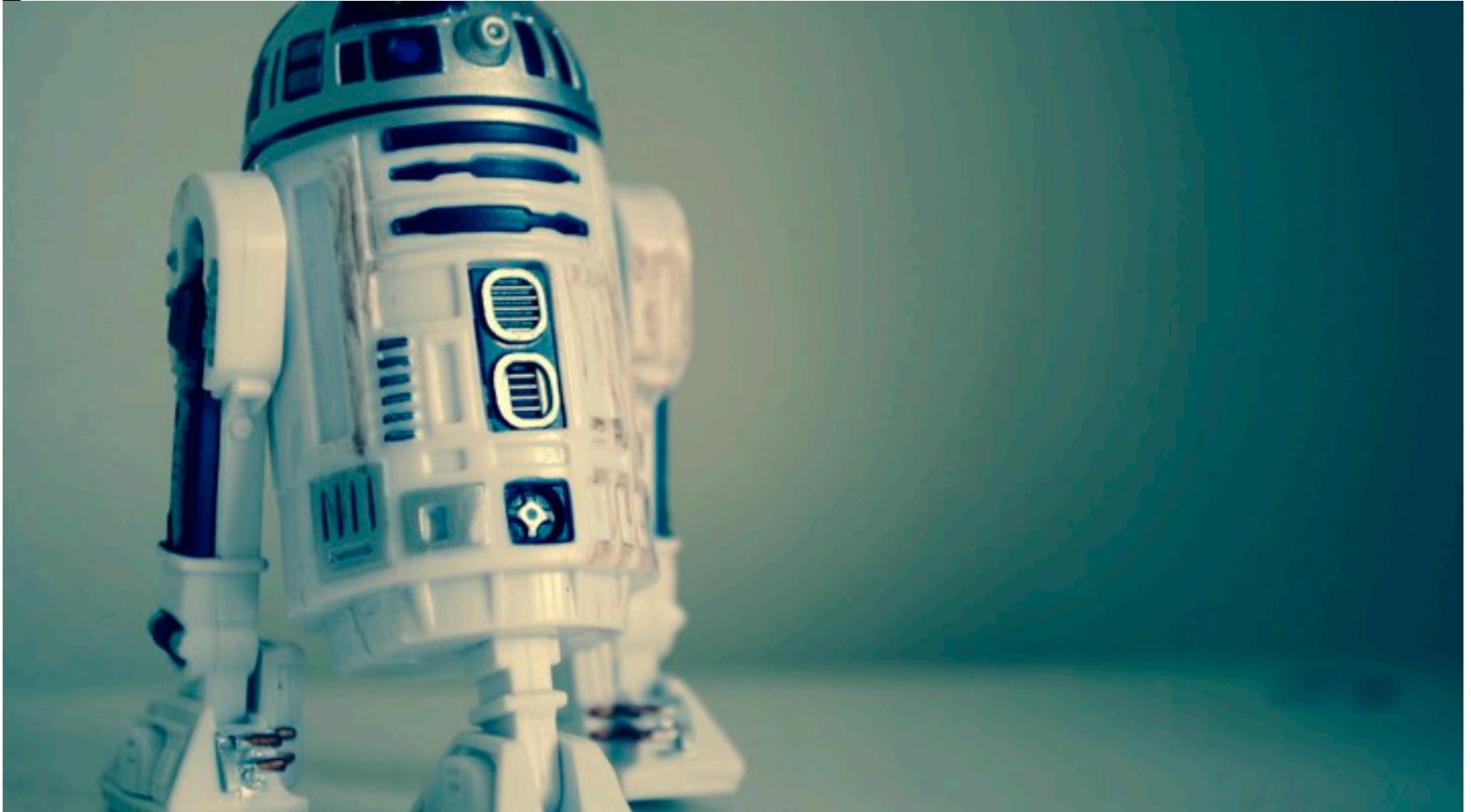


Why Can't Robots Understand Sarcasm?

Artificial intelligence has yet to grasp some of the finer nuances of human communication.

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LILIVANILI/FLICKR

Artificial intelligence and algorithms are capable of stunning feats: Computers can sweep *Jeopardy!* boards, calculate π to a staggering degree, and tweet every word in the English language without developing carpal tunnel syndrome.

But when they depart the realm of mathematics and enter the more nuanced domain of human communication, artificial intelligence often flounders. And that's being kind: Bots' understanding of humor is so stunted and feeble, it's often a punchline itself.

Recently, when Siri fumbled a song request, I communicated my irritation with a sarcastic barb.

“Siri, you’re brilliant,” I said, deadpan.

“Aw, shucks,” Siri responded earnestly. Her ignorance is just one example of the chat bots and vocal operating systems that serve as quirky distractions and indispensable digital assistants, but are sorely comedy-deficient.

Can we ever expect artificial intelligence capable of sarcasm? The fictional examples are tantalizing: In Spike Jonze’s *Her*, Scarlett Johansson’s Samantha is more cheeky than her human companion. And in the *Star Wars* universe, R2-D2 is able to deliver acerbic gibes through just beeps and whistles.

According to Noah Goodman, an assistant professor at Stanford University specializing in psychology, computer science, and linguistics, humans will first need to firm up our own understanding of sarcasm. “Before you can program a computer to do something cool, you have to understand what the cool thing is,” Goodman said. “We’re sort of only at the beginning of understanding what nuanced communication actually is.”

Sarcasm is deceptively complex, agrees Elisabeth Camp, an associate professor at Rutgers University who studies the philosophy of language and mind. “There are all these issues [like]... social dynamics and power dynamics,” she said, labeling sarcasm as something “deeply, deeply human.”

It’s the context surrounding sarcasm that makes it function, Goodman and Camp explained. But for machines, that deep framework of past experiences and emotional subtext can be a stumbling block. Porting that level of knowledge into a bot requires far more than writing a few lines of snappy code, Goodman said. And it’s for this same reason we don’t often encounter bots that flirt or understand hyperbole.

Existing systems that marry comedy and artificial intelligence are somewhat effective, Goodman said, but rudimentary. “They usually work based on recognizing or generating very limited templates,” he explains. That’s why a bot might tell a “Yo’ Mama” joke one moment, but be utterly devoid of humor the next. Oren Tsur, a postdoctoral researcher at Harvard and Northeastern universities specializing in natural language processing and network science, built a sarcasm-

seeking algorithm a few years back. The program could detect sarcasm in Amazon reviews and tweets, he said, but couldn't quite banter. Instead, it learned to identify certain patterns in text.

Missy Cummings, an associate professor at MIT studying human interaction with systems, says sarcastic bots aren't possible with today's technology. "Robots [are still] having difficulty understanding very clear, distinct commands as opposed to nuanced differences based on sarcasm," she said. A sarcastic robot is a "Holy Grail," she explained. "You could do all the machine learning in the world on the spoken word, but sarcasm is often in tone and not in word," she added. "[Or] facial expressions. Sarcasm has a lot of nonverbal cues."

Cummings also notes—perhaps sardonically—engineers may not be the best equipped to decipher sarcasm and transform it into code: They require help from comedians. "We need to think more about how to make this a more collaborative process between a lot of different types of researchers," she said.

It's an idea John Lutz, the comedian who writes for *Late Night with Seth Meyers* and played *30 Rock*'s dopey J.D. Lutz, is entirely open to. "I know the world is clamoring for the Lutz-bot 4000, and who am I to deny them," he told me. Besides, Lutz notes, advanced artificial intelligence is already on primetime television. "I think Bill O'Reilly is doing a really nice job," he said. (Were a computer to read Lutz's quip, it would likely interpret the jape literally.) Comedian Keith Powell, who also starred on *30 Rock*, says robots don't need to learn sarcasm: They've nearly conquered the world already, and done a fine job stamping out interaction, human or otherwise. "I wait in line for coffee, and everyone is looking at their phones," Powell said. "At this rate, robots will not need to discern sarcasm in conversations because there will simply be no conversations."

If sassy robots are far off, can scientists at least share a tentative date for their arrival? "Sarcasm, irony, any kind of nuanced emotion [in artificial intelligence]—we're incredibly far from that," Cummings said. "In an academic world, I think we would say 20 years, at least."

Goodman is a bit more uncertain. "I'm never particularly comfortable putting a date on anything," he said. But he notes clever machines won't come unannounced

—they’ll arrive on the heels of bots markedly smarter than today’s.

There are those, though, who don’t want a sarcastic robot. Imagine: A surly, teenage smart car that refuses to start on account of the non-premium gasoline in its tank.

“The last thing I want my robot to be is sarcastic,” said Sebastian Thrun, a robotics expert with pedigrees at Stanford University and Google. “I want them to be pragmatic and reliable—just like my dishwasher.”



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