

THE
NEW YORKER

The Marriage-Saving Robot That Can Assemble IKEA Furniture, Sort Of

By [Alan Burdick](#)

2:58 P.M.



Given twenty minutes with a flat-packed STEFAN chair, the IKEA bot uses a suite of grippers, force sensors, and 3-D cameras to perform “fast, collision-free motions in a highly cluttered environment.”

Photograph by Johnny Jones / Alamy

IKEA’s furniture-assembly instructions aren’t for everyone, although they’re meant to be. No mistranslated languages are involved, only a happy bubble person proceeding through a series of black-and-white

pictograms—nonverbal Esperanto for amateur carpenters. Never mind monkeys; a robot should be able to follow along.

And now one has. In this week's issue of *Science Robotics*, in a paper titled "[Can Robots Assemble an IKEA Chair?](#)," Francisco Suárez-Ruiz and a team of engineers at Nanyang Technological University, in Singapore, demonstrate that, yes, a robot can indeed assemble an *IKEA* chair—flawlessly, in about twenty minutes. Of course, making it happen took years. Suárez-Ruiz and his colleagues began, in 2015, with the goal of seeing whether they could build a robot from off-the-shelf parts that could, in turn, assemble everyday human stuff. Their hope was to emulate "the genericity of human 'hardware,'" they write in the new paper. "The same eyes and hands are used to assemble a large variety of objects."

Watch a robot flawlessly assemble an IKEA chair—well, almost flawlessly.

Their creation, shown at work in an accompanying video, consists of two industrial-style robot arms with grippers and force sensors for hands and 3-D cameras for eyes. The researchers bought a basic chair from *IKEA*—the *STEFAN* model, made of lacquered pine—and, to simulate the human experience, took the pieces out of the box and put them "randomly within the environment." First, the robot assessed where everything was; that took three seconds. Then it used an algorithm to plan out what to move where, and how; that took eleven minutes and twenty-one seconds. Actually building the chair took just under nine minutes. The sequence of steps was hard-coded in advance—the robot essentially followed the manual—but everything else was done on the fly. "The challenge is to quickly and consistently find fast, collision-free motions in a highly cluttered environment," the researchers note, which pretty well describes every *IKEA*-furniture-building undertaking ever.

The *IKEA* bot's arms move in extreme slow motion; it's like watching two people try to put a chair together while stoned. (My point of reference here is [Hikea Productions](#), a seemingly defunct YouTube channel featuring videos of humans assembling *MICKE* desks and *NORDLI* dressers while tripping on psychedelics.) Sluggish as it is, though, the robot is a welcome change from the more alarming autonomous creatures that have debuted in recent years. [WildCat](#), which Boston Dynamics markets as "the world's fastest quadruped robot," resembles [a lawn-mower engine with a catcher's mask for a face](#); it can gallop, on methanol, at twenty miles an hour. [Atlas](#), "the world's most dynamic humanoid," takes winter walks, carries boxes, and does parkour. In another of the company's videos, [SpotMini](#), [a bionic yellow Rottweiler with a grabber](#)

[claw for a head](#), turns a door handle to try to escape a lab as an engineer holds it back with a leash attached to where its tail should be.

The *IKEA* bot, by comparison, is charmingly incompetent. Suárez-Ruiz and his colleagues offer a video of its unsuccessful efforts—a robot blooper reel. In “Failure 1,” one of the arms takes an inordinately long time to locate a peg hole, then misses it and drops the peg. The second arm retreats to its starting position, its pincer head hung in shame.

IKEA has a squad of humans who will assemble your furniture for you, if the pictograms prove too opaque. The *IKEA* bot will not replace these people anytime soon; in 2015, *MIT Technology Review* [noted that](#) “the biggest problem is that this system cannot interact with humans, who have to be kept away entirely lest the robot injure them.” Why would it do such a thing? Automated recklessness? Sheer frustration? Because it lost one of those weird screws, and what was supposed to be an *EKEDALEN* looks more like a *NORRÅKER*?

Wait and see. Because, make no mistake, the robots are coming. By land, by sea, by air, to Mars [as a swarm of robot bees](#). They will assemble our cars and thrash us at Monopoly after dinner. They will open the door and stroll right through. And, when the time finally comes for them to rest on their achievements, they will rest on the *IKEA* chairs that they bought, delivered, and assembled themselves. If we’re lucky, that last task will take them years.