

New robot faces the ultimate challenge: assembling an Ikea chair

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They can build cars, enter nuclear reactors that have melted down, and walk on Mars. Now a robot has been developed in Singapore that has penetrated the final frontier of human endeavour: successfully assembling pieces of Ikea furniture from a flat pack.

Created by a team from the School of Mechanical and Aerospace Engineering at Nanyang Technological University, the robot can assemble an Ikea chair in less than nine minutes. Much like a human, however, it must first spend 11 minutes staring at the assembled pieces, wondering how in the world they are supposed to fit together.

The robot has two arms that can pick up and grip the components, insert the pins and dowels, and attach them to one another. Faced with a “Stefan” chair from Ikea, it can assemble it in 8 min 55 sec.

Before that, however, the robot’s operators must input the contents of the manual and the pieces need to be laid out so that a 3D camera can analyse them (for 11 minutes and 21 seconds) to plan the sequence of steps needed.

The researchers hope that improving the robot's artificial intelligence will eventually allow it to construct furniture by copying humans, reading an instruction manual or just viewing a finished product.

“For a robot, putting together an Ikea chair with such precision is more complex than it looks,” said Pham Quang Cuong, an assistant professor at the university.

“The job of assembly . . . has to be broken down into different steps, such as identifying where the different chair parts are, the force required to grip the parts, and making sure the robotic arms move without colliding into each other.”

He added: “We have achieved the low-level capability to teach the robot how to do it . . . In the next five to ten years high-level reasoning could be done too.