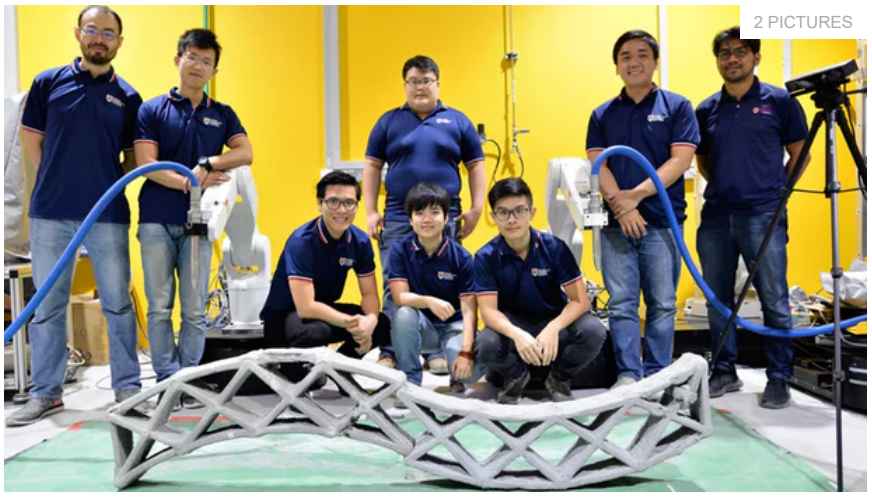
3D PRINTING

Robots collaborate on 3D-printing concrete structures

Ben Coxworth 7 hours ago



The NTU team with the two robots and the structure that they built (Credit: Nanyang Technological University)

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Although we've already seen 3D printers that can create full-size concrete structures, the huge size of the devices could make them difficult to install at construction sites. Singaporean scientists are developing an alternative, in the form of mobile robots that work together to do the job.

Created at Nanyang Technological University, the wheeled robots are each equipped with a hose-fed arm that extrudes wet concrete. They're guided by a computer map of the build project, with an algorithm dividing the work between them in such a way that they don't run into each other as they move about.

Additionally, the computer ensures that the concrete is applied in an overlapping pattern at the points where the different sections of the structure meet. If those sections were each printed by a single robot as complete units, and then simply "glued" together with concrete along the joining edges, they wouldn't bond with one another properly.

So far, the two robots have 3D-printed a concrete structure measuring 1.86 x 0.46 x 0.13 meters (6.1 x 1.5 x 0.4 ft) – so no, it's not something that you could go inside of. It took them just eight minutes to build, requiring a further two days to harden and a week to reach full strength.

"We envisioned a team of robots which can be transported to a work site, print large pieces of concrete structures and then move on to the next project once the parts have been printed," says assistant professor Pham Quang Cuong, who is leading the project. "This research builds on the knowledge we have acquired from developing a robot to autonomously assemble an Ikea chair. But this latest project is more complex in terms of planning, execution, and on a much larger scale."

The robots can be seen in action, in the video below.

MIT has also built a mobile concrete-structure-printing robot, although it works by itself.

Source: Nanyang Technological University