

ChatGPT designs its first robot

June 7 2023



The tomato picker robot designed with ChatGPT by researchers from TU Delft and EPFL moves through a testing environment. Credit: Adrien Buttier / EPFL

Poems, essays and even books—is there anything the open AI platform ChatGPT can't handle? These new AI developments have inspired researchers at TU Delft and the Swiss technical university EPFL to dig a little deeper: For instance, can ChatGPT also design a robot? And is this

a good thing for the design process, or are there risks? The researchers published their findings in *Nature Machine Intelligence*.

What are the greatest future challenges for humanity? This was the first question that Cosimo Della Santina, assistant professor, and Ph.D. student Francesco Stella, both from TU Delft, and Josie Hughes from EPFL, asked ChatGPT.

"We wanted ChatGPT to design not just a [robot](#), but one that is actually useful," says Della Santina. In the end, they chose [food supply](#) as their challenge, and as they chatted with ChatGPT, they came up with the idea of creating a tomato-harvesting robot.

Helpful suggestions

The researchers followed all of ChatGPT's design decisions. The input proved particularly valuable in the conceptual phase, according to Stella. "ChatGPT extends the designer's knowledge to other areas of expertise. For example, the chat robot taught us which crop would be most economically valuable to automate."

But ChatGPT also came up with useful suggestions during the implementation phase: "Make the gripper out of silicone or rubber to avoid crushing tomatoes" and "a Dynamixel motor is the best way to drive the robot". The result of this partnership between humans and AI is a [robotic arm](#) that can harvest tomatoes.



A tomato picker robot designed by ChatGPT and researchers from TU Delft and EPFL in a field test together with a researcher. Credit: Adrien Buttier / EPFL

ChatGPT as a researcher

The researchers found the collaborative [design process](#) to be positive and enriching. "However, we did find that our role as engineers shifted towards performing more technical tasks," says Stella. In *Nature Machine Intelligence*, the researchers explore the varying degrees of cooperation between humans and Large Language Models (LLM), of which ChatGPT is one.

In the most extreme scenario, AI provides all the input to the robot design, and the human blindly follows it. In this case, the LLM acts as

the researcher and engineer, while the human acts as the manager, in charge of specifying the design objectives.



A robot tomato picker arm designed by ChatGPT and researchers from TU Delft and EPFL "looks" at the camera. Credit: Adrien Buttier / EPFL

Risk of misinformation

Such an extreme scenario is not yet possible with today's LLMs. And the question is whether it is desirable. "In fact, LLM output can be misleading if it is not verified or validated. AI bots are designed to generate the 'most probable' answer to a question, so there is a risk of misinformation and bias in the robotic field," Della Santina says.

Working with LLMs also raises other important issues, such as plagiarism, traceability and intellectual property.

Della Santina, Stella and Hughes will continue to use the tomato-harvesting robot in their research on robotics. They are also continuing their study of LLMs to design new robots. Specifically, they are looking at the autonomy of AIs in designing their own bodies. "Ultimately an open question for the future of our field is how LLMs can be used to assist robot developers without limiting the creativity and innovation needed for robotics to rise to the challenges of the 21st century," Stella concludes.

More information: Francesco Stella et al, How can LLMs transform the robotic design process?, *Nature Machine Intelligence* (2023). [DOI: 10.1038/s42256-023-00669-7](https://doi.org/10.1038/s42256-023-00669-7).
www.nature.com/articles/s42256-023-00669-7

Provided by Delft University of Technology

Citation: ChatGPT designs its first robot (2023, June 7) retrieved 2 May 2024 from <https://techxplore.com/news/2023-06-chatgpt-robot.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.