

Robot hand moves closer to human abilities

December 15 2021, by Bob Yirka

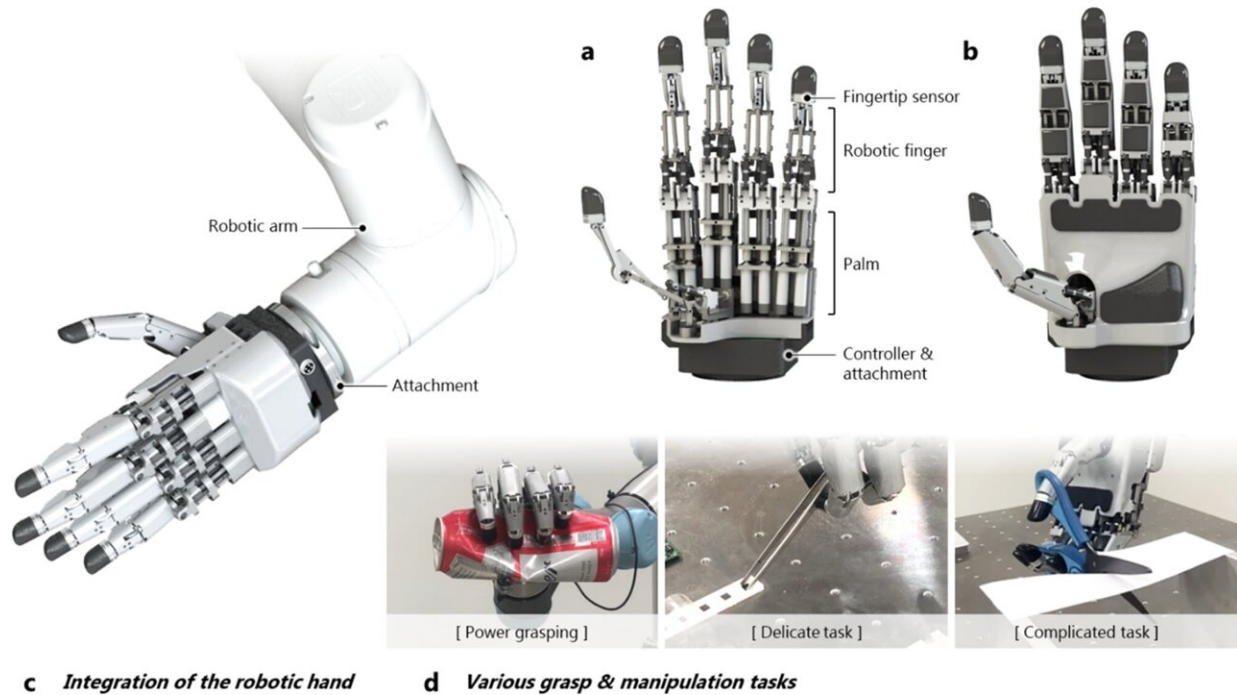


Fig. 1: Overview of the ILDA. a Configuration of the ILDA hand composed of five robotic fingers with fingertip sensors, the palm side integrating the actuators, and the controller and attachment. b ILDA hand with covers. c Ease of attachment of the ILDA hand to a developed robotic arm. d Actions performed using the ILDA hand such as grasping and manipulating everyday life tools, showing delicate and strong grasping. Credit: DOI: 10.1038/s41467-021-27261-0

A team of researchers affiliated with multiple institutions in Korea has developed a robot hand that has abilities similar to human hands. In their

paper published in the journal *Nature Communications*, the group describes how they achieved a high level of dexterity while keeping the hand's size and weight low enough to attach to a robot arm.

Creating [robot](#) hands with the dexterity, strength and flexibility of [human hands](#) is a challenging task for engineers—typically, some attributes are discarded to allow for others. In this new effort, the researchers developed a new robot [hand](#) based on a linkage-driven mechanism that allows it to articulate similarly to the human hand. They began their work by conducting a survey of existing [robot hands](#) and assessing their strengths and weaknesses. They then drew up a list of features they believed their hand should have, such as fingertip force, a high degree of controllability, low cost and high dexterity.

The researchers call their new hand an integrated, linkage-driven dexterous anthropomorphic (IDLA) robotic hand, and just like its human counterpart, it has four fingers and a thumb, each with three joints. And also like the human hand, it has fingertip sensors. The hand is also just 22 centimeters long. Overall, it has 20 joints, which gives it 15 degrees of motion—it is also strong, able to exert a crushing force of 34 Newtons—and it weighs just 1.1.kg.

The researchers created several videos that demonstrate the capabilities of the hand, including crushing soda cans, cutting paper using scissors, and gently holding an egg. They also show the robot hand pulling a film off of a microchip, manipulating a tennis ball and lifting a heavy object. Perhaps most impressive is the ability of the hand to use a pair of tweezers to pick up small objects.

The researchers note that the hand is also completely self-contained, which means it can be easily fitted to virtually any robot arm. They also suggest that its abilities make it ideal for applications such as applying tiny chips to circuit boards.

More information: Uikeyum Kim et al, Integrated linkage-driven dexterous anthropomorphic robotic hand, *Nature Communications* (2021). [DOI: 10.1038/s41467-021-27261-0](https://doi.org/10.1038/s41467-021-27261-0)

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