Robot Hand Picks Up Nyan Cat, What Else is Possible?

Humans take their hands for granted. We're just as quick to make an obscene gesture with them as we are to paint the next Mona Lisa. For those building robots, however, dexterous hands are a never–ending conundrum. Building them is tough and expensive. Roomba [1] manufacturer iRobot [2] is working on innovating its way around at least a few of these major obstacles to build effective, affordable, and maybe even intuitive digits.

Take the hand in this video [3]. Actually, it looks nothing like a traditional appendage, but according to iRobot scientists, this "Jamming Gripper" (part of iRobot's HANDLE– Hardened, Adaptive, Novel, Low-Cost, End Effector strategy) can pick up virtually anything, but in a novel and truly effective way.

No, it's not some sort of esoteric, hard-to-replicate technology, instead, the Jamming Gripper uses a confining membrane (some sort of strong rubber) filled with sand or, perhaps, coffee grounds. That pouch is attached to a vacuum. When the robot finds its target object, it lays the gripper gently on top of it, the vacuum turns on and tightens the pouch until it's molded firmly around the object.

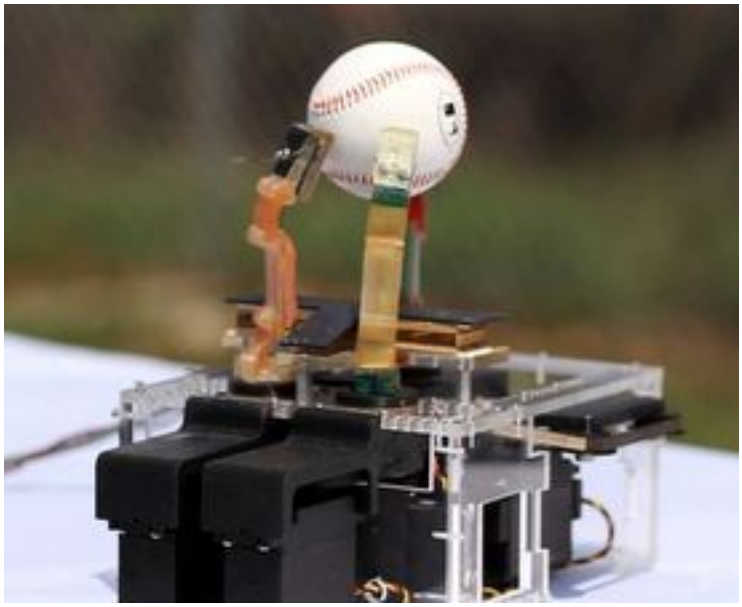
In the demonstration above, iRobot researchers play the role of the intelligent robot behind the "hand" and had the jamming gripper pick up whatever I told them to. I lined up a 3D-printed meme (Nyan Cat [4]), a Doctor Who Dalek robot toy (meta, right?), a pen and a bottle.

The technology, though, is quite extensible. Vacuums can be used temporarily harden universal joints. iRobot, for example, combine the jamming gripper "hand" with a flexible ball joint arm that's vacuumed and stiff when the robot wants to turn a doorknob, but loose and free moving when the robot needs to swing the door open.

This solution could be far less expensive and just as effective as a much more complicated system of gears and sensors.

iRobot is not against anthropomorphism. Dr. Chris Jones, iRobot's Director for Research Advancement, also showed me a three-fingered robot prototype "hand" that's notable for its rubberized and highly compliant construction. The fingers and joined are mostly rubber, which allows the robot fingers to move until they hit stuff, but without damaging anything or hurting anyone.

That affordance goes beyond rubberized compliance. All of the three fingers can pop out of their magnetic base. Again, the idea is the robot gives before it environment does.



It also relies on an impressive array of tactile sensor arrays to sense its surroundings. Place the robot hand on your wrist and it can actually read your pulse.

The hand can pick up everything from a basketball to a credit card. (see the video [3]for evidence).

For now, this three-fingered hand and the jamming gripper are experimental. iRobot is still working out details of availability and, more importantly, which direction market-ready robot hands might take.

Read More [3]

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