A supernumerary robotic arm adds functionality for carrying out common tasks

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A team of researchers at Université de Sherbrooke with assistance from a group at Exonetik Inc., has created a wearable supernumerary robotic arm that adds functionality for common human tasks. In their paper published in *IEEE Spectrum*, the group describes their robotic arm, its

abilities and their plans for expanding its functionality.

A supernumerary robotic device is of a type that adds functionality to an existing system. In this case, the team in Canada added a third arm and associated three-fingered hand to a human subject.

The bottom part of the robot is strapped to the waist and hips of the user, anchoring it in place. The robot arm extends from its anchor and performs functions as the user either watches or carries out his or her own activities. The arm is motivated by magnetorheological clutches and hydrostatic transmissions, giving it three degrees of freedom. It does not weigh much, either, just four kilograms. But that is because it has a tethered power/control source that remains on the ground. It also is remotely controlled by another person standing nearby. Future plans call for semi-autonomous control.

The robot arm was designed to show the possibility of a supernumerary device that could be used to assist its wearer in a variety of activities. Video of the robot arm in action shows it helping the user pick artificial apples off a tree, helping to paint a wall, and retrieving power tools. To show its strength, the robot arm is also depicted bashing a hole in a wall with its fist. Thus, the arm is meant to do the things a human arm and hand can do, giving the user the extra versatility of having three arms.

Future plans for the robot include giving it some degree of AI control to allow it to learn to do the things that the user wants it to do, thereby removing the need for remote control by a second person. Also, the team plans to add a lightweight battery to the system to eliminate the tethered power source.

More information: Catherine Veronneau et al. Multifunctional Remotely Actuated 3-DOF Supernumerary Robotic Arm Based on Magnetorheological Clutches and Hydrostatic Transmission Lines, *IEEE*

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