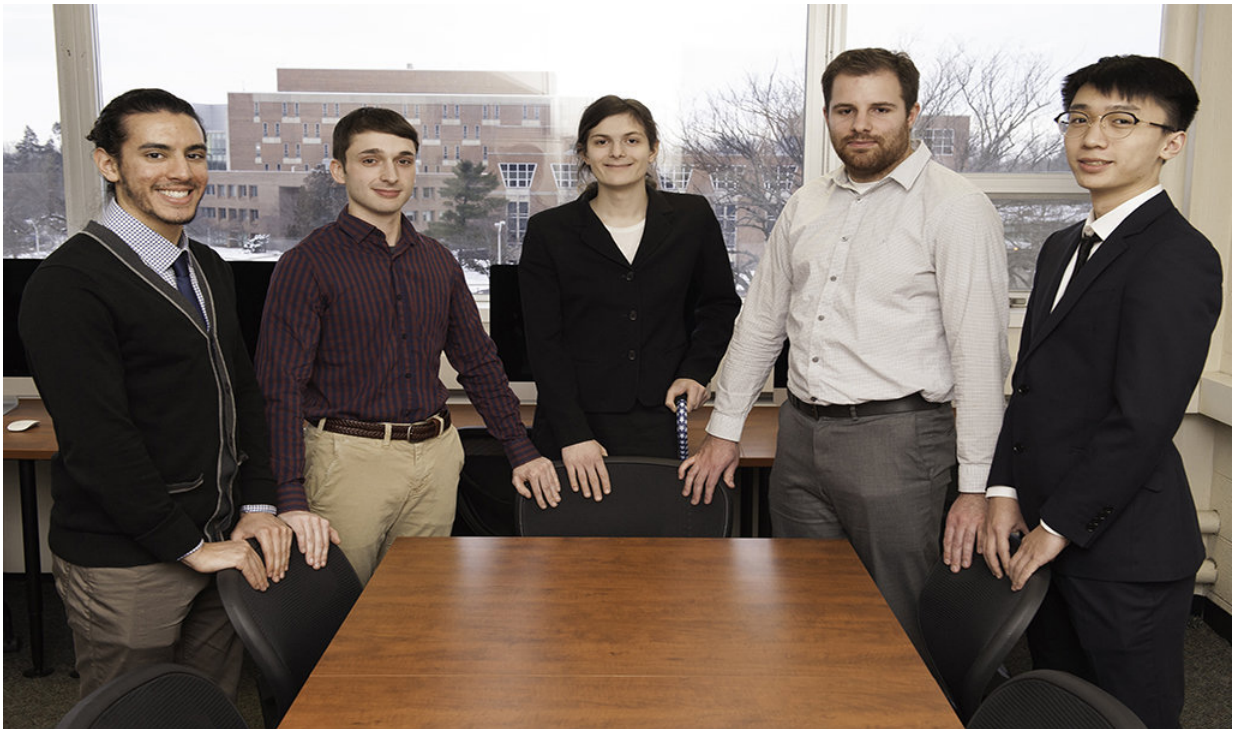


Students create exoskeleton app for patient with muscular dystrophy

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MSU students create exoskeleton app for patient with muscular dystrophy.
Credit: MSU

Zach Smith has Duchenne muscular dystrophy, a genetic disorder marked by progressive muscle degeneration. His lack of muscle control and being in a wheelchair made him a prime candidate for a computer-controlled exoskeleton arm.

Talem Technologies gave him an X-Ar exoskeleton that allows him to do many daily tasks, such as drink from a glass and turn on a light switch. Keeping everything level however, proved to be a challenge. That's where a team of Michigan State University students stepped in.

Working with the Talem Technologies and Urban Science, a Detroit-based consulting firm, a College of Engineering team of computer science students developed an app that allows Smith, who lives in Orlando, Florida, to maximize the use of his bionic-looking arms.

Mustafa Jebara, Dane Rosseter, Samantha Oldenburg, Alex Wuillaume and Shun Yan created Mobile Maestro, available for iPhones and Android devices, that conveniently puts the exoskeleton's controls on the user's phone.

Mobile Maestro is operated via a simple light touch or voice commands. Using the phone's gyroscope technology, the app also can be set to auto level. (The team was particularly excited about offering this feature.) Another option allows Smith to lock the exoskeleton to let him and his wheelchair squeeze through tight spaces, such as doorways.

Committing to a project that helps people who are sometimes overlooked appealed to the team.

"There is a humanitarian aspect to our project that we liked," Wuillaume said. "Our app helps people who are often forgotten."

Talem Technologies has similar motivations. But since the company's exoskeleton is purely mechanical, it needs to be calibrated to a stable angle of incline. Users initially had to use a key fob to make the needed adjustments.

Like many people, though, Smith always has his phone nearby. In fact,

many times he keeps it mounted to his wheelchair. Rather than fumble for a key fob, having his exoskeleton controlled by his phone made better sense.

"This is an excellent example of our hands-on education that provides students with opportunities to engage in real-world problem solving - students making a difference in the lives of others and in turn having a life-changing experience themselves," said Wayne Dyksen, computer science and engineering professor and executive director of Design Day, where Mobile Maestro and many other student-led projects were displayed. "We're not looking at this as simply a student project; this is something that has commercial potential for anyone facing mobility challenges."

Adding to that commercial viability is Mobile Maestro itself. As it assists mobility, it's also collecting data on how the app is being used. The team can then analyze where tweaks can be made to improve functionality.

But then again, the team can also get plenty of input directly from Smith.

"I like that the app is very simple and, because it's on my phone, it's always in my reach if I need to adjust the arms," Smith said. "I believe that with the arms being powered by this app, that they'll be able to be used to their full potential."

Provided by Michigan State University

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