The Future of Prosthetics: Making Prosthetics with More Capabilities at a Lower Cost

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In the United States, amputations have been occuring at a rate 185,000 amputations per year, and this high rate adds to the current 2,000,000 amputees needing prosthetics. To provide a sense of control to amputees, myoelectric prosthetics were created to respond to electromyography signals emitted by the human nervous system. This type of control gives the user realistic capabilities, but myoelectric prosthetics are not widely affordable. The cost of myoelectric prosthetics can be four to five times more expensive than prosthetics with lower capabilities. The goal of this project is to maximize movement control while minimizing the costs of a prosthetic. To meet these goals, I 3D printed a model hand in which I attached micro linear actuators that were light and compact to control the fingers. To control the prosthetic itself, I used a combination of force-sensitive resistors and an EMG sensor. Using multiple types of sensor input, I was able to increase capabilities without making the prosthetic invasive. The end product will ultimately be a cheap prosthetic that can be easily manufactured for less than $500, which will also be able to conduct standard day-to-day functions of the human hand. This prosthetic shows that price can be minimized while advancing capabilities. As technology progresses, prosthetics can be given even more realistic capabilities for a lower price than those which are sold today.

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