Using Electromyographic Technology and Voice Control to Create a Cost-Effective Prosthetic Arm

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We don’t think about it, but many of our daily actions require our hands. But the truth is not everyone is fortunate to have their hands by their side. Prosthetics are available but they either have limited functionality at a cheap price or greater performance at a steep premium. This is why, for my project, I set out to create a prosthetic hand that uses electromyography (for muscle control) and voice control to provide an affordable yet reliable solution. At its core, my project’s main goal was to a prosthetic capable of restoring valuable hand function at a fraction of the cost of existing commercial prosthetics. I used an Arduino micro-controller to read muscular activity and interpret voice commands in order to control the prosthetic hand. The way it works is by monitoring EMG values to open and close the fingers and using voice control to shuffle through different grip types (each suitable for a specific action). I was able to successfully create a viable prosthetic that had a total cost of $300. A commercially available prosthetic capable of the same functionality (with only muscle control) would cost roughly $30,000. Overall, my work has created a new foundation for cost-effective DIY (Do-it-yourself) prosthetic hands that will hopefully change the lives of current and future amputees.

Awards Won:

Third Award of $1,000