BIONIC HAND

Technological Revolution in Medical Accessibility

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The Bionic Project 3 emerged from the desire to make bionic prostheses affordable and accessible to all. Inspired by the daily challenges faced by amputees, our team committed to leveraging technological advancements in 3D design, electronics, and programming to create an innovative solution. Our goal is to bridge the financial gap by offering a high-quality bionic prosthesis at an affordable cost, while improving quality of life and promoting inclusivity in the medical field.

Objectives

Our project initially focused on three main goals: optimizing the mechanical design of the bionic hand for ergonomics, functionality, and durability; enhancing the electronic board design for seamless integration and optimal performance; and establishing a connection between the mechanical prosthesis and the human nervous system to enable intuitive interaction with the bionic hand.

Team Organization

Our team comprises dedicated members, each contributing valuable expertise:

- Hermione: Biometric signals expert
- Victoria: Specializes in electronic board design
- Awa: Proficient in 3D design
- Foued: Skilled developer who conducted bench testing on the board using a Python-designed graphical interface, facilitating testing of servo motor ports.

Technologies Utilized

We employed various advanced technologies in developing our bionic prosthesis:

- Solidworks: For precise and ergonomic 3D design.
- MSP430: To generate pulse-width modulation (PWM) for motor control.
- EAGLE: For reliable electronic board design.
- VSCODE: For flexible and simple control code development.

Results thus far

For now, we didn’t get many advanced results, but we found a lot of problems dated from years ago that we need to solve. The first problems are ports that are not working on the electronic card: 3 out of 6 ports, the good news is , there isn't any short-circuit so it must be coming from the code. We have observed a problem with the servo motors. They moved by smalls angles and have trouble finding the right position. The signal injected is not maintained when it should be. This implies that after reaching the right position, the propellers are still movable, which is not what we are looking for. We want the signal to be maintained for the fingers to be bent and contracted so the hand can grab an object. The idea was to create a more simple and efficient benchmark, which lead us to not use BioSignal PLUS and instead to design a graphical interface with Python, it allow us to send different angle position over the panel of servomotors. The design of a new hand, anatomically compatible is on its way and it's necessary for the next events. The bionic hand that we got had many problems. It couldn’t execute well the movement of a finger and the strings attached from the servo motors to the fingers were often loosened and intertwined. That is why we want to try bike brakes with housing, which got better resistance and don't get lose. We also want to be able to fit the electronic card around the wrist.

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