Prosthetic Replacement Technology Mark 6 (PRT-6)

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The world is plagued with dangerous situations including everything from accidents to wars that often result in people losing a hand, arm, or leg. Industrial accidents, as a result of dangerous processes, faulty equipment, or poor safety practices can also lead to limbs being severed with no hope of reattachment. Prosthetic limbs can be very expensive and do not necessarily provide a patient with an aesthetically pleasing or functional replacement. However, there have been tremendous advancements in technologies such as 3D printing using bio-degradable polymers, micro miniature motors, micro-controllers, and materials, which can be easily adapted to provide low-cost, functional solutions. It is proposed that a low cost, 3D printer-based robotic hand can be developed, which can be easily modified for use by many different people. The structure of this prosthetic hand will use 3D printed plastic, servo motors will drive finger movement, and low cost Arduino-type microprocessor components will provide control. If a wireless eight-channel electromyography sensor is used to collect and analyze skeletal muscle data, micro controller translates and sends that data to command servo movement, and 3D printing is used to create the structure of a movable prosthetic hand, then the resulting prosthetic hand will have gesture recognition, facilitate EMG collection to map individual finger characterization, be aesthetically pleasing, and have the functional ability to perform simple everyday tasks.

Awards Won:

Fourth Award of $500

Arizona State University: Arizona State University Intel ISEF Scholarship