DeltaBionics: Open Source Bionic Hand

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This project aims to help millions of people in need to replace the lost limbs. So I decided to develop and manufacture an accessible 3D printable anthropomorphic bionic hand to temporarily replace a lost human limb. In the course of the work, a control Board and a mechanical arm and a myographic sensor were designed. Software for the device was written. The N20 micromotors were used as a finger drive because they are the most common of all existing drives of this size and power. In order to control each finger independently, the projects has N20 based self-designed linear actuators. ESP32-Wroom is used as a main controller that reads and processes the data of the electromyographic sensors and then drives the motors using an H-Bridge DC motor drivers. A cascade of 18650 batteries is used as the power source. The result of the development is a full-fledged affordable device that allows people to temporarily replace a lost human limb. Comparing with all existing devices of this type, my solution has the best strength and strength characteristics (each finger has a bending force of up to 30N and a holding force of up to 200N), as well as compact size and lightweight (less than 300g). The design of the hand is completely made on a 3D printer and practically does not require after processing. This fact makes it possible to print a hand in 20 hours and then assemble it within 4 hours. All the necessary production files are already available for download which makes this project accessible to anyone.

Awards Won: