Prosthetic Arm Controlled by Legs’ Transmitter for Disabled People

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Nowadays in Vietnam there are many people with arms disabilities. According to the principle, prosthetic arms available on the markets are divided into three categories(brain wave control, mechanical field force sensor using embedded systems, simple type). Robots using embedded systems have some limitations on gesture movements and they can be applied to only people without one arm. On the basis of the second category, I created an arm that uses legs to control the robot, improves motions and it has affordable price for people who have lost both arms. The arm moves flexibly, knuckles move in three steps respectively and a sensor attached to the tip of the toe is used to control three separate sets of fingers: the thumb, the middle finger and the two little fingers. A tilting sensor is attached to the foot to measure the angle of the foot. When the leg is tilted horizontally, it controls the cuff of the hand, tilts vertically, and controls the stretch of the forearm. There are a total of 31 motions. Another tilting sensor attached to the ankle checks whether the user is standing still or moving in order to avoid little eccentricities during the user's movement. Technically, the hardware and the shell are designed in the Sketchup environment, and then use 3D printing technology to print the product. Micro Controller is Arduino, programmed in C language. The arm weighs 0.9 kg, half as light as an adult’s arm. It can hold a weight of about 2kg and perform basic tasks such as holding a spoon, a bowl for eating, turn the lid, pour the glass to drink, etc. Basically, the arm has increased the number of motions, responding to basic human gestures. Control principle is simple, flexible,and easy to operate. It costs about $ 150 in line with the income of people with disabilities.

Awards Won:

Third Award of $1,000

IEEE Foundation: IEEE Foundation Third Place Award $400