Roco 504-abstract

Project: compliant humanoid hand

The intention is to produce a working humanoid hand that has variable stiffness actuation.

mechanical

Each finger is to have the metacarpal and proximal joints powered; the distal joint will be mechanically linked to move with the proximal joint.

The powered joints will be closed using geared dc motors, located in the palm, pulling sprung/elasticated tendons.

Extension for each finger will be passive by the use of a spring/elasticated tendon.

Variable stiffness will be achieved with the use of a motor applying tension to the return spring/tendon.

Positional feedback will be obtained from small potentiometers imbedded into the powered joints of each finger.

The thumb will have 3 powered joints and three potentiometers for feedback.

The fingers will be able to be spread using a mechanical linkage; A potentiometer will be used for feedback.

Electrical

To control the three bi-directional motors, and two potentiometers in each finger, a small microcontroller will be used (i.e. attiny 84), along with dedicated motor drivers.

A larger microcontroller will be used for the thumb as well as additional functions.

control will be in the form of pid positional regulation and feedback for each joint and communication with an external bus system (i.e. iic)

software

the intention is to link the hand to a computer running ROS, either by direct gpio or usb