

# Hand gesture control and design of a rotary pneumatic soft actuator using leap motion sensor

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## Abstract

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The development and testing of a soft rotary actuator for gesture-based control is described in this paper. The soft rotary actuators are fabricated via a molding process and connected to a rotary joint as an antagonist and agonist pair, which gives rise to the clockwise and counter-clockwise rotation of the joint. The range of movement of the soft rotary actuator is  $0^{\circ}$ – $90^{\circ}$  for positive pressure actuation and  $0^{\circ}$  to  $-16^{\circ}$  for negative pressure actuation. The flexible robotic system is controlled using the leap motion controller, which is a gesture-based device. Gesture commands executed include circle, swipe, screen tap, and key tap gestures to produce clockwise, counter-clockwise, stop and start movements of the rotary actuator. The advantage of the novel soft rotary actuator is in its better integration and compatibility with natural and biological interfaces. The value of a gesture-based control with a soft actuator is the ease of interfacing and integrating the soft device with the control interface as well as its combined use for hand and finger rehabilitation using the soft rotary actuator.

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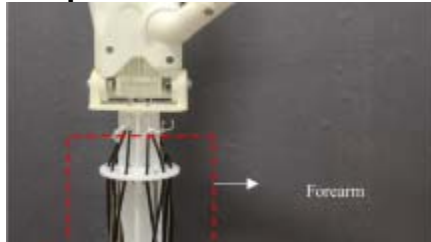


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