The Hong Kong University of Science and Technology
School of Engineering

Disney-HKUST Grant for Technology and Well-Being

Transcript of "Soft Robotic Hand"

Hi, we are a team of Year-4 students studying Mechanical Engineering in The Hong Kong University of Science and Technology. Our project is supervised by Professor Kai Tang (Professor, Department of Mechanical and Aerospace Engineering).

We believe anyone who has watched the movies of "Star Wars" would not feel strange about robotic hands. Many of the characters were installed with robotic hands due to serious injuries in the wars.

In reality, robotic hands can be used in many different ways; for example, prosthetic hands and humanoid robots which is becoming more popular as a substitute for human to do housework, take care of elderly and patients and so on. However, the robotic hands nowadays are usually made of metal, very hard and also powered by strong motors.

Metallic robotic hands indeed have their functions, but when they are applied to situations with human contact, would give cold feeling to the skin and is relatively dangerous if a malfunction occurs. Therefore, we have conducted a research using "soft robotics" to produce a cost-effective robotic hand and safer to human being.

We use soft and flexi material "silicon" to replace metal and plastic which are hard materials for making fingers of traditional robotic hands. Soft robotics is not powered by electric motors. Its theory is like blowing up a balloon – compressed air changes the shape of materials; in turn make the joints of fingers to bend. In addition, we have also tested wearing the gesture control armband to sense the upper arm muscles' movements. Therefore, prosthetic hand users can use upper arm muscles to control the robotic hands.

We wish soft robotic hands would become widely used in future for prosthetic limbs and also humanoid robots, which necessarily contact with human for providing services and healthcare, so as to help users feel less cold and keep them safer.