Hyper Bending Actuator For Use In Wearable Robots

Tech ID: 34002 / UC Case 2025-660-0

FULL DESCRIPTION

Background:

Soft wearable robots or exosuits are a promising solution for delivering constant physical support to the mobility impaired because they can be made lightweight, compliant and safe. However, major challenges include the development of soft actuators that deliver adequate force while maintaining a small form factor, and the attachment to the body in a comfortable way and with efficient force transmission.

Technology:

Prof. Realmuto and his team have designed and developed a novel, hyper bending fabric actuator by leveraging compliance in two independent directions across the surface of an inflatable. The hyper bending actuator generates more bending as compared to prior efforts. The actuator generates sufficient force to assist during sit-to-stand transitions.

Image of the inflated hyper-bending actuator

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OTHER INFORMATION

KEYWORDS

actuators, assistive technology, cerebral palsy, exosuits, human-robot interface, hyper-bending actuator, nemaline myopathy, soft wearable robots, assistive device, wearable robot

CATEGORIZED AS

- Engineering
  - Robotics and Automation

RELATED CASES

2025-660-0

Prototype of a wearable knee bending exosuit using the hyper-bending actuator.

ADVANTAGES

- Flexible, modular and can be adapted to various assistive applications
- Generates more bending for a given pressure
- Higher bending angles and higher stiffness at lower pressures
- The actuator is designed to be easily mounted to and oriented parallel to the knee so that the bending motion provides extension torque.

SUGGESTED USES

- Soft wearable robots for mobility impaired
- Children suffering from incurable ailments such as Nemaline Myopathy or Cerebral Palsy

STATE OF DEVELOPMENT

The team has developed prototypes for user testing and believe the technology is at a TRL of 3/4.

USER DEFINED 1

- Please read recent news about Prof. Realmuto at UCR
- Please visit Prof. Realmuto's group website to learn more about their research

RELATED MATERIALS

- A Soft Robotic Exosuit for Knee Extension Using Hyper-Bending Actuators

PATENT STATUS

Patent Pending

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