AzTE Arizona Technology Enterprises

www.azte.com

Tactile Sensor Skin for Artificial Fingertips

AzTE Case # *M10-012*

Inventors

Veronica Santos

Assistant Professor

School of Mechanical, Aerospace, Chemical, & Materials Engineering

Jonathan Posner

Assistant Professor

School of Mechanical, Aerospace, Chemical, & Materials Engineering

Ruben Ponce Wong

Graduate Student

School of Mechanical, Aerospace, Chemical, & Materials Engineering

Kevin Bair

Graduate Student

School of Mechanical, Aerospace, Chemical, & Materials Engineering

Intellectual Property Status

Patent pending

Contact

Bill Loux

Director of Business Development

Arizona Technology Enterprises, LLC (AzTE)

480.884.1996 main

480.884.1992 desk

Email: bloux@azte.com

Background

Robotics is a field that has grown substantially in the past few years, specifically in the advancement of sensors for environmental detection. Currently, artificial tactile vibration sensors only report one composite spectrogram of vibration data for a single fingertip. Although the human tactile mechanoreceptors, or sensors that respond to mechanical deformation, have the lowest spatial resolution in the finger, there is still 22 per square centimeter in the human fingertip. Therefore, the robotic manipulation capabilities in unstructured environments are rather rudimentary compared to those of the human hand. Employing autonomous, simple systems that can identify stimuli and initiate a response could increase the use of robotic manipulators in limited-access or dangerous environments that face uncertainty, control delays, or limited human-machine information flow.

Invention Description

Researchers at Arizona State University have designed a tactile sensor skin for artificial fingertips that measures local vibration and skin stretch, which leads to the tracking of moving elements as well as the perception of friction. This design utilizes metal plates that are embedded in a polydimethylsiloxane (PDMS) polymer. The plates are paired, and one receives an applied voltage while the other is grounded. After forces are applied and the structure deforms, there should be measureable changes in capacitance.

Potential Applications

- Prostheses
- Human-robot interaction in limited-access or dangerous environments that face uncertainty, control delays, or limited information flow

Benefits and Advantages

- More realistic artificial tactile sensor
- More modalities than existing sensors
- Length of air pockets on sides of plates can be tailored to accommodate different sensing needs and increase sensitivity