

A New Electromechanical Sensor With Manufacturing Method and Application of Making a Wearable Device

 Communications & Information

 Health & Wellness

 Manufacturing

Computer/AI/Data Processing and Information Technology

Consumer Electronics

Sensors

Opportunity

Recent years have seen explosive growth in the field of wearable technology. The most well-known wearable technologies are smart watches and step counters, but other wearable technologies include smart waist bands that can track biometrics such as heartbeat and body temperature. Wearable technologies often rely on sensors that need to be either strapped onto the body or applied using sticky gels. In other cases, wearable technologies may have to house sensors within garments such as pockets. This invention provides a means of manufacturing a wearable device that can be based on yarn or other strings, thereby providing even greater flexibility for the design of wearable technology. Potential applications of this invention include smart gloves for robotics and smart bandages for healthcare.

Technology

This invention involves an electromechanical strain sensor with an elastic carrier that can be extended when subjected to an external mechanical load. The carrier includes one or more strings of yarn or similar filaments. A sensing sheath is arranged around this elastic carrier. Thus, when the yarn connected to the carrier is extended, the sheath detects changes in electromagnetism, and thereby enabling the sensor to pick up minor changes in movements. The sheath is encased in a thin film of polydimethylsiloxane (PDMS), which is beneficial as PDMS is both nontoxic as well as hydrophobic. This makes the device resistant to external liquids such as rain and human sweat.

Advantages

- This invention exhibits high flexibility and durability.
- This invention is highly water resistant, making it valuable in a variety of applications.
- This invention is highly sensitive to small changes but is also able to sense a wide range of strain.

IP Status

Patent granted



Technology Readiness Level (TRL) ?

4

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Develop
Concept

Proof
Concept

Follow-on

Build Value

- This invention can be easily integrated into a variety of wearable technologies.

Applications

- This invention can be integrated into textile bandages for use in healthcare-related applications such as disease diagnosis and preventative care.
- This invention can be applied in textile gloves for applications such as injury rehabilitation and robot controlling.

