Docket #: S19-198

A bio-inspired stretchable membrane-based compliance sensor

Stanford engineers at Zhenan Bao's laboratory have designed a compliance sensor which can identify softness (compliance) of touched objects and provide human-like sensation to robots and prosthetics. This unique design integrates a strain and pressure sensor with decoupled responses which can differentiate materials and provide important feedback during manipulation of objects. Compared to conventional devices, this invention is compact and has a thin structure, does not require external components, and is low power. In addition, it is easily integrated into robotic systems due to its small form-factor. These highly-tunable sensors enable robotic systems to handle more advanced and complicated tasks such as classifying touched materials.

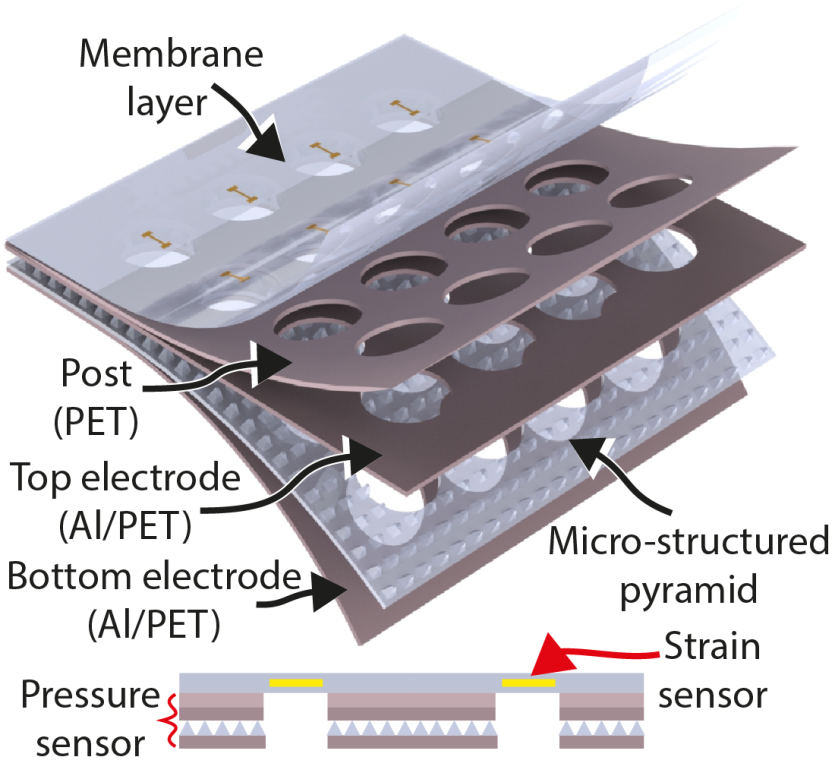

Figure: Layers of the device.

Video

video from doi.org/10.1073/pnas.1909532117

Stage of Development

- **Proof-of-concept**
- Integrated sensor to a robotic finger to demonstrate the capability of the sensor for robotics

Applications

- **Robotics**
- Prosthetics
- Wearable devices such as pulse wave sensing for health monitoring and force sensitive mapping applications

Advantages

- Provides human like sensing capabilities
- Can differentiate touched material softness
- Thin and compact form factor
- Easily integrated into robotic systems due to its small form-factor
- Highly-tunable
- Easy fabrication method
- Can advance smart robotics

Publications

- Beker, L., Matsuhisa, N., You, I., Ruth, S.R.A., Niu, S., Foudeh, A., Tok, J.B.H., Chen, X. and Bao, Z., 2020. A bioinspired stretchable membrane-based compliance sensor. *Proceedings of the National Academy of Sciences.*

Patents

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