Docket #: S20-235

One-step laser-machined stretchable and flexible Kirigami sensor network

One of the largest challenges for soft robotics is obtaining adequate feedback control while forming dexterous movements. Here Stanford researchers have developed a patterning technique using a UV laser on metalized plastic film. A first pass cuts the metal layer followed by a second pass to cut the plastic substrate. This can be done in a single step to produce piezoresistive elements for temperature or strain sensing or capacitive elements for proximity and contact sensing without the need for alignment. These interconnects are exceptionally flexible, making the sensor arrays ideal for soft robotics and dexterous tasks. A 10x20 array initially occupying ~150x200 mm can be expanded to ~500x1600 mm, enough to cover the surface of a soft robotic arm.

Stage of Research
Proof of concept

Applications

- Patterned flexible electrodes
- Flexible and stretchable sensing devices
- Soft robots

Advantages

- No alignment needed
- Reduced manufacturing steps: two-layer patterns in a single laser ablation step
- Customizable by computer-aided design

Patents

- Published Application: 20230294307
- Issued: 12,558,800 (USA)

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