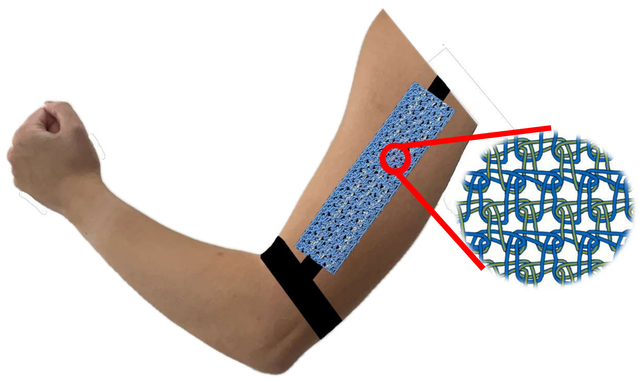
Fabrication and Evaluation of Woven and Crocheted Strain Sensors for Soft Rehabilitation Robots

Meghan Newkirk[1,2], J. Guillermo Colli Alfaro[3] and Ana Luisa Trejos[2,3]

[1]Mechatronic Systems Engineering Program, [2]School of Biomedical Engineering, [3]Department of Electrical and Computer Engineering, Western University, London, Ontario, Canada. atrejos@uwo.ca

MOTIVATION

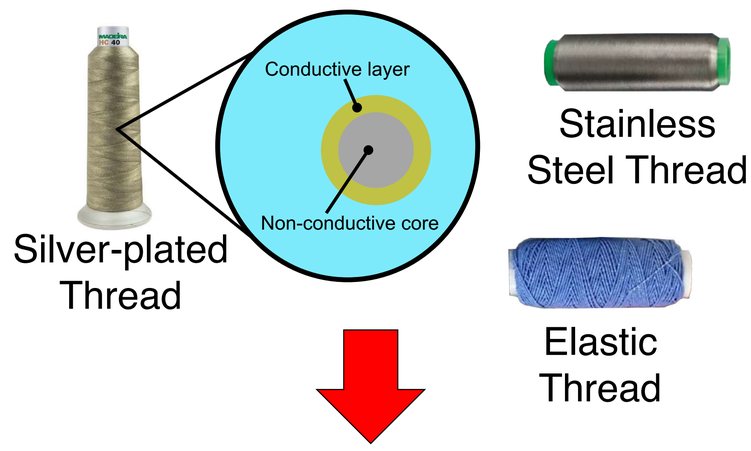


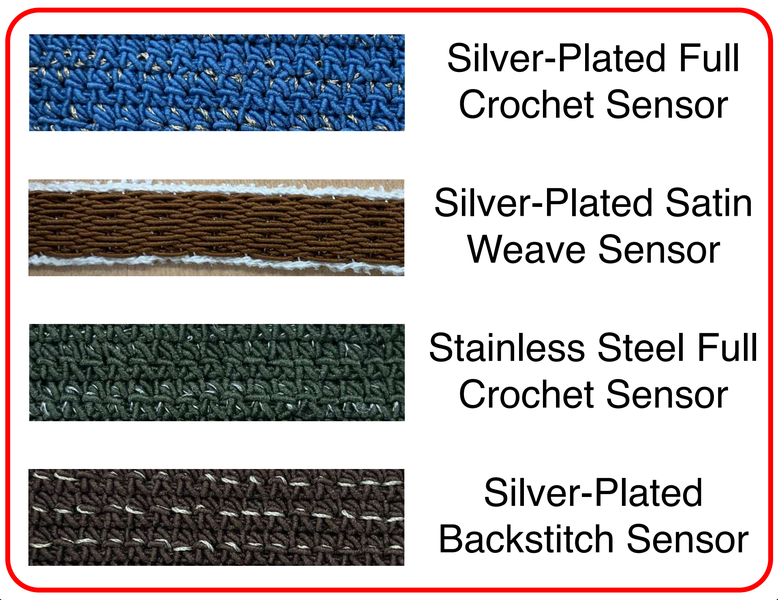
Soft motion-tracking sensors used in wearable robot applications use complex methods for fabrication. Simple and low-cost solutions are required for the fabrication of these sensors in communities with limited funds for medical resources.

OBJECTIVE

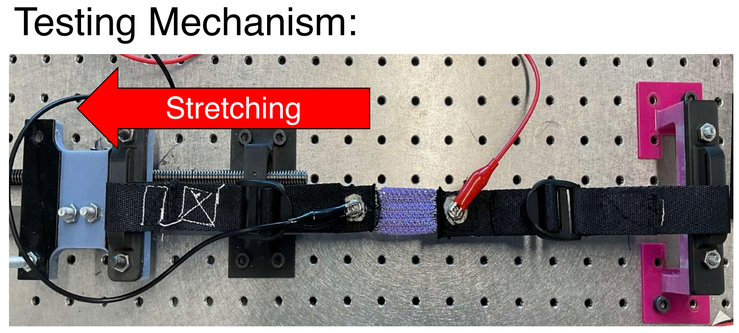
To create and test the performance of soft sensors manually fabricated by crocheting and weaving.

METHODS

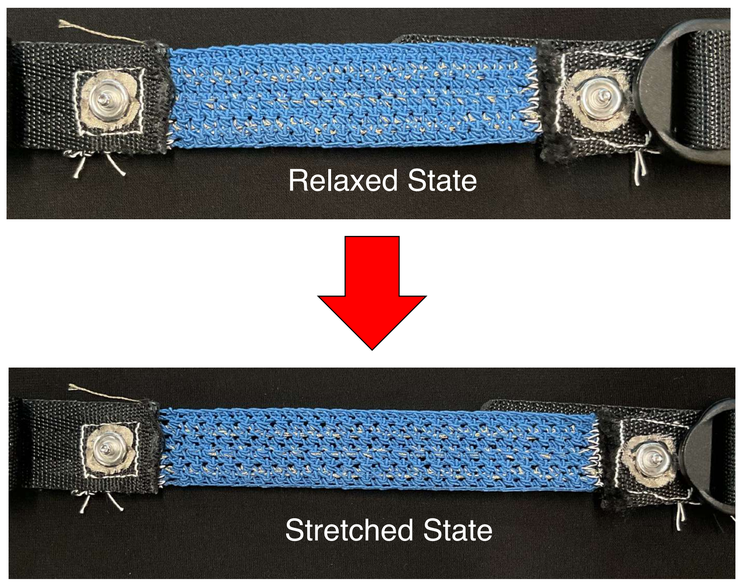




Testing Mechanism:

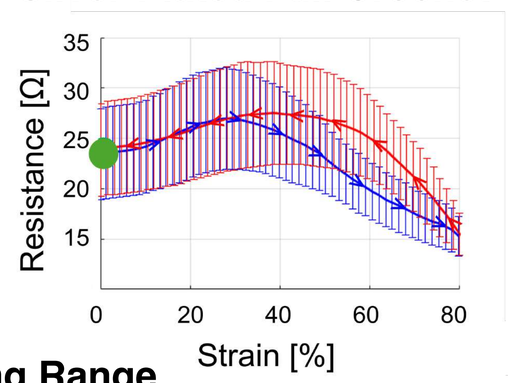


Sensor Deformation:

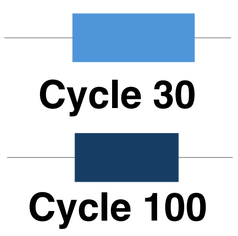


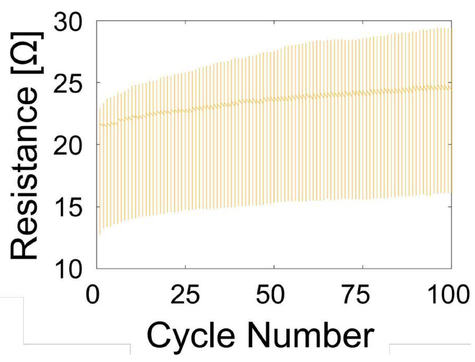
RESULTS

Silver-Plated Full Crochet

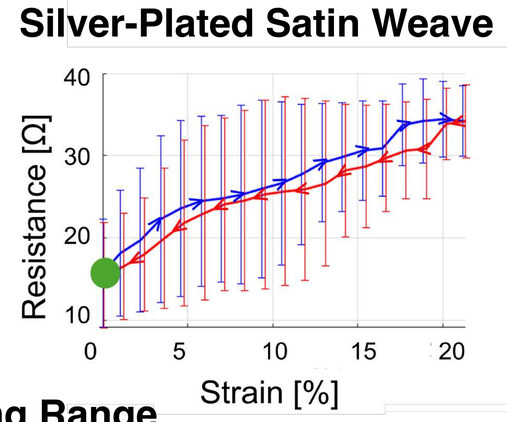


Working Range (Scale 0–100%)

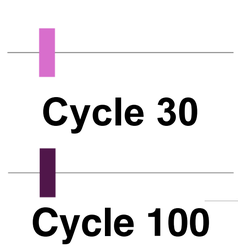


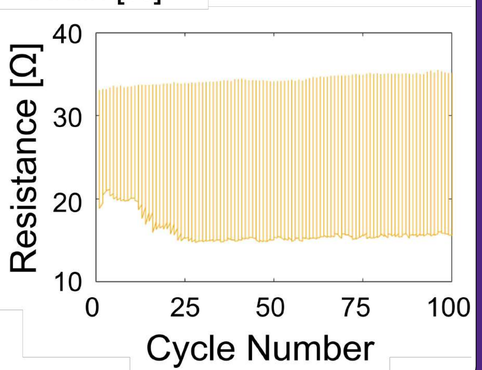


Silver-Plated Satin Weave

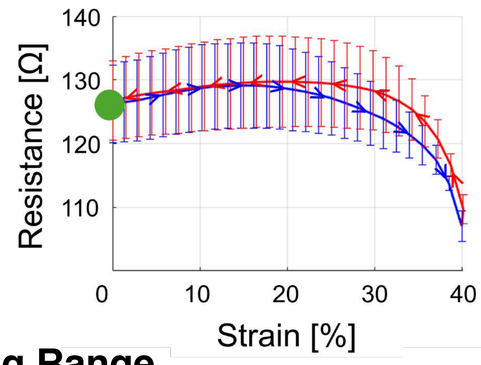


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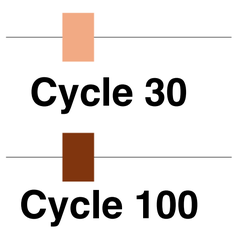


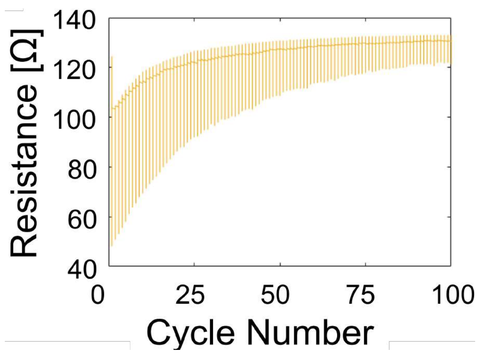


Stainless Steel Full Crochet

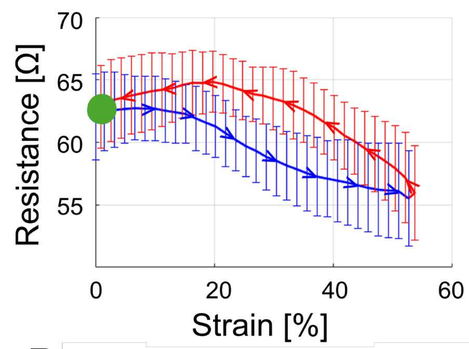


Working Range (Scale 0–100%)

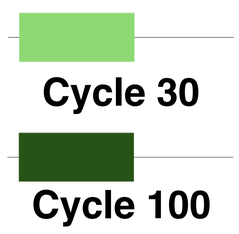


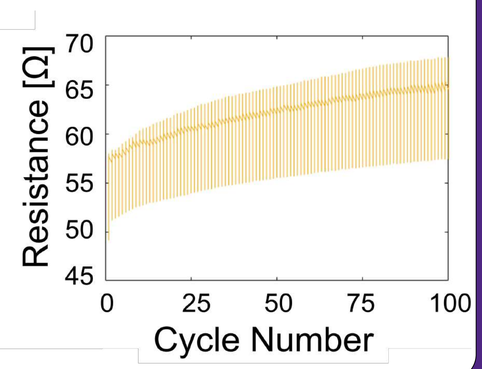


Silver-Plated Backstitch



Working Range (Scale 0–100%)





CONCLUSIONS

Crocheted and Weaved sensors

- ✓ Offer a **simple fabrication method for soft, textile strain sensors.**

Silver-plated full crochet sensors

- ✓ High **working range of 49.76%**
- ✓ **High repeatability**
- ✓ Relatively good **hysteresis (20.12 ± 19)**
- ✓ Good **linearity (R^2 of 0.7741 ± 0.03)**

Overall, these sensors have the **potential** to be used in **applications** requiring **tracking of human motion**, meaning that they could be used as integral components of soft wearable robots.

ACKNOWLEDGMENT

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Canada

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