Electronic SKIN: Sensory-Kinetic Integrated Network
Pressure, temperature, touch sensing glove

Team Fuzzy Wuzzy:
Lili Mooney
Mels Burns
**ECE Senior Design 2021-22**

Problem

Capturing the human sense of touch with electronics is useful for applications in prosthetics, robotics, and sensory data collection. However, touch is a complicated sense that requires multiple electronic sensors to capture. This project aims to build a glove with an array of different sensors that collect the most useful parts of the sense of touch.

Customer

Dr. Sameer Sonkusale, Tufts Nano Lab
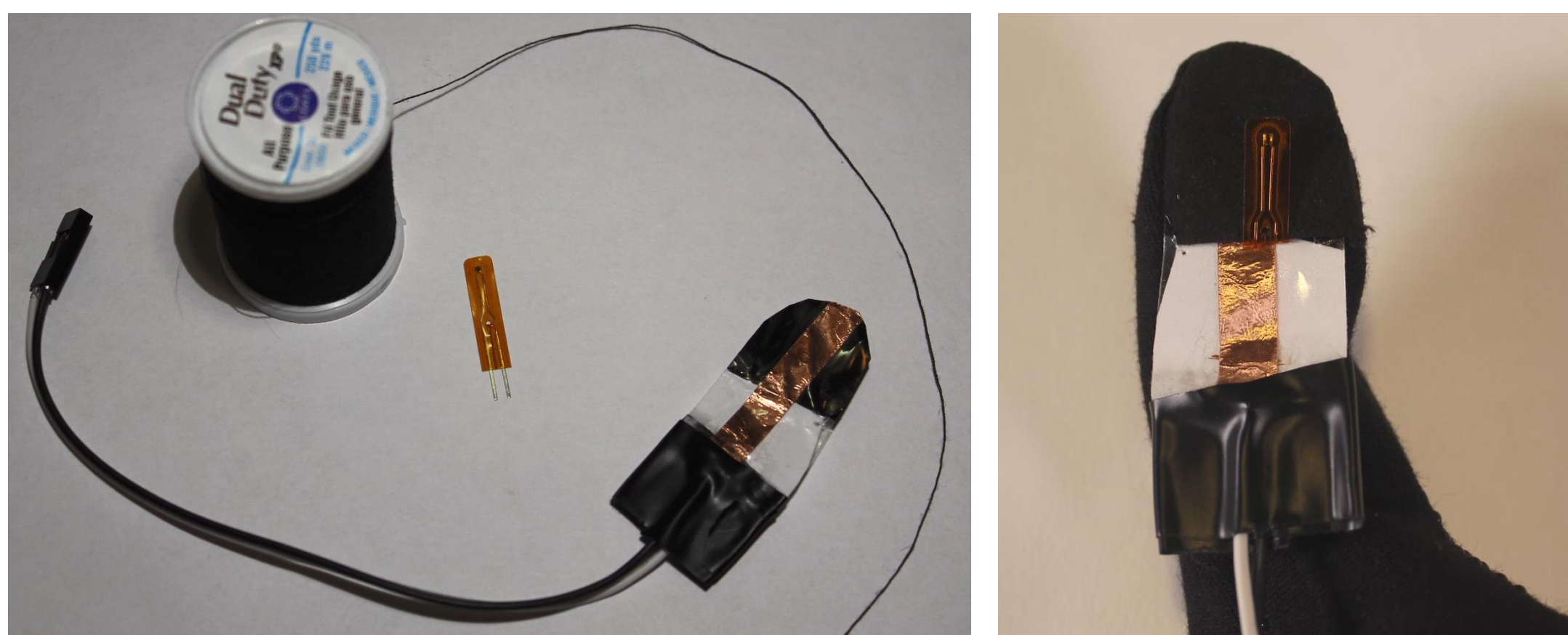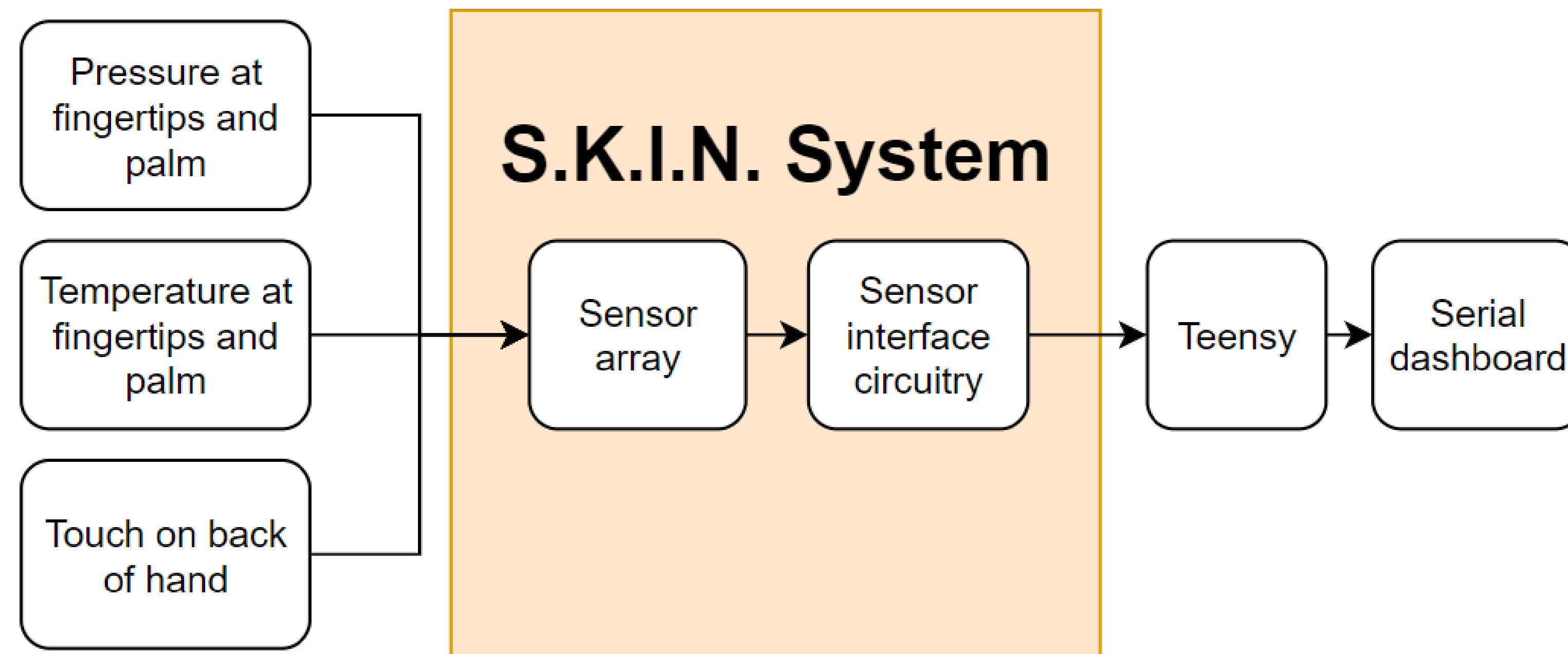
Glove Sensors

1. Binary touch: A grid of resistive strain-sensing thread in a grid on the back of the hand senses when the glove is touching an object.
2. Pressure: Velostat (a flexible pressure-sensitive material) senses the pressure applied to an object on the fingertips and palm.
3. Temperature: Flexible B3950 NTC thermistors on the fingertips and palm sense the temperature of an object being touched.

Interface

Sensor values are read with a Teensy 3.6 microcontroller and sent over serial to a Python dashboard. The UI shows relative sensor values at each sensing point on the glove.

Outcome

The final glove has 6 pressure sensors, 6 temperature sensors, and 7 thread touch sensors. It outputs sensor readings as voltages, which the interface reads and displays. The sensors are accurate to relative values and don't output exact values.

Next Steps

The project could benefit from additional functionality in the future:
- Add more touch sensors for higher resolution (requires more microcontroller pins)
- Switch to a more exact sensing approach while remaining physically flexible
- Make sensor reporting wireless
- Refine fabrication techniques