Contact sensing over an entire body surface is a critical issue in autonomous robots. Recently, a resistance reconstruction-based contact sensing has shown efficient large-scale contact sensing (Fig. a). A conventional resistance reconstruction utilizes a single microcontroller to connect multiple electrodes with electric wires (Fig. b). However, this scheme has limitations in terms of noise susceptibility, scalability and generalizability.

In this project, we investigate to modularize the resistance measurement system by using microcontroller and peripherals for resistance measurement (Fig. c). We aim to build a proof-of-concept level prototype for large-scale contact sensing.

Tasks of the thesis:

- Design a printed circuit board for resistance measurement.
- Embedded programming for peripheral controls and digital data transmission.

Requirement:

- Basic knowledge in microcontrollers, analog circuit design, digital communications, programming
- Requires hands-on practices. Looking for someone enjoying electronics design and building