

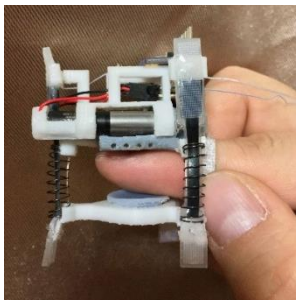
Wearable Cutaneous Haptic Device with Soft Stretch Sensors and an IMU

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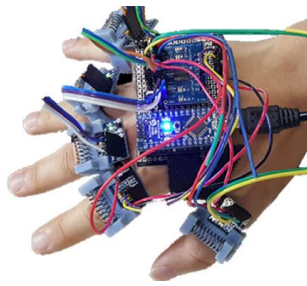
● Introduction

We introduce a new wearable cutaneous haptic device (WCHD) that brings a synergy of a hard device and soft stretch sensors (SSS). We implement the WCHD with SSS and an IMU. The SSS measures the relative position/rotation between the upper WCHD body and lower contact plate, which is hard to be obtained only by IMUs due to the magnetic interference or slowly measured if implemented by servo-motors with rotary encoders.

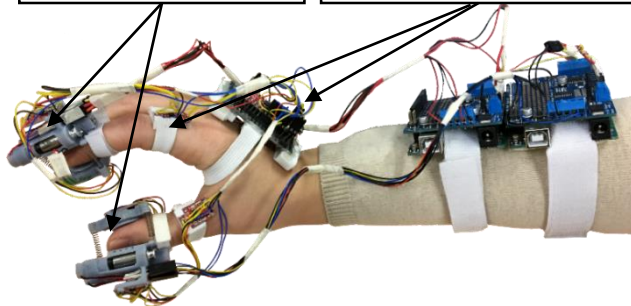
● Wearable Cutaneous Haptic Device (WCHD)



[Finger tip feedback module]



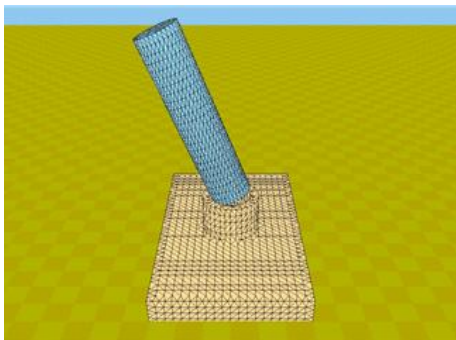
[IMU-based tracking module]



- Integration of 3-DOF finger tip haptic feedback module and IMU-based hand tracking module
- The IMU-based tracking module estimate each finger tip, phalange between PIP and MCP joint, and palm
- The finger tip feedback module consists of the body and contact plate
- Three micro DC motors is used for the haptic feedback generation with multi-sensor system: 3 Stretch sensors, 1 FSR, and 1 IMU sensors
- SSS is employed for the relative position/attitude estimation b/w the body and contact plate via Newton-Raphson method

● Live Demonstration Plan

We plan to prepare live two finger manipulation for the virtual haptic interaction using our WCHD. We will demonstrate the performance of our WCHD through the real time multi-contact virtual peg-in-hole scenario. If possible, we also plan to do virtual tele-manipulation over the internet.



[peg-in-hole]