

IoT が拓く未来  
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An Accessibility Assessment Toolkit for Inclusive IoT Design using Onbody Sensing  
～インクルーシブ IoT デザインに向けたアクセシビリティ評価ツールキット～

## § 1. 研究成果の概要

We evaluated this year several prototypes regarding on-body sensing modalities to include in the accessibility toolkit. We also explored form factors to integrate these sensing modalities into (handles for umbrellas, walkers etc.).

The most straight forward modalities to record stress responses include the use of heart activity, galvanic skin response as well as breathing activity. The project build two early stage prototypes and did several initial evaluations with them.

One prototype focuses on integrating galvanic skin response and heart activity sensors in an umbrella handle (can be any kind of handle) and evaluated the sensors signals [1].

The second prototype uses capacitive sensing in two breast straps to detect the type and depth of breathing, including an initial evaluation in a meditation application [2].

We established the basic functionality of the prototypes in lab experiments to ensure we can use them to record stress events. We will continue to develop the sensor prototypes to be able to use them in-situ.

### 【代表的な原著論文情報】

- 1) Chen, Kanyu, Jiawen Han, George Chernyshov, Christopher Kim, Ismael Rasa, and *Kai Kunze*. "Affective Umbrella-Towards a Novel Sensor Integrated Multimedia Platform Using Electrodermal and Heart Activity in an Umbrella Handle." In 20th International Conference on Mobile and Ubiquitous Multimedia, pp. 208-210. 2021.
- 2) Malaver Turbay, Silvana, Igor Igorevich Segrovets, George Chernyshov, Jiawen Han, Christopher Changmok Kim, and *Kai Kunze*. "Ethereal Phenomena-Interactive Art, Meditation, and Breathing Biofeedback: From Mind and Body Wellness Towards Self-Transcendence." In *Sixteenth International Conference on Tangible, Embedded, and Embodied Interaction*, pp. 1-6. 2022.