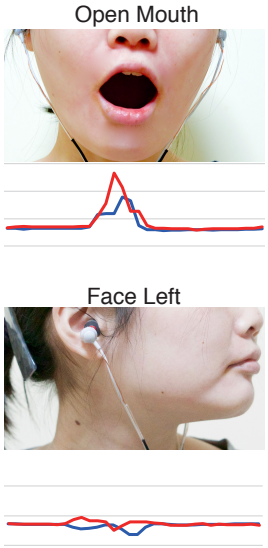

Figure 1: Examples of face-related movements and waveforms.

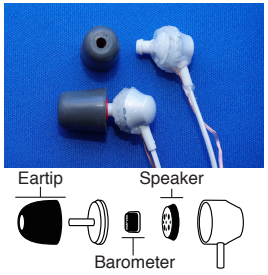

Figure 2: Barometer embedded in an earphone.

CanalSense+: Face-Related Movement Recognition and Identification System based on Air Pressure in Ear Canals

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Abstract
We present a jaw, face, or head movement (face-related movement) recognition and identification system called CanalSense+. It recognizes face-related movements using barometers embedded in earphones. We found that face-related movements change air pressure inside the ear canals, which shows characteristic changes depending on the type and degree of the movement; moreover, such characteristic changes can be used to recognize face-related movements. As a result of an experiment, per-user recognition accuracy was 87.6% for eleven face-related movements. During an experiment, we also found that there are individual differences of changes in the air pressure. Based on this finding, we examined a possibility of user-identification/authentication. As a result, CanalSense+ can identify 12 users with the accuracy of 90.6%.

Author Keywords
Biometric Identification; Wearable Device; Barometer.

ACM Classification Keywords
H.5.2 [Information interfaces and presentation (e.g., HCI)]: User Interfaces - Interaction Styles

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