

Digital Musical Instruments Application for Deaf and Hard of Hearing People

Ryo Iijima

Playing musical instruments is a popular hobby. However, many barriers (e.g., cost, soundproofing of the room, and availability of practice time) stand in the way of purchasing an acoustic instrument. Since the release of digital musical instruments apps for smartphones, anyone can easily experience playing musical instruments, but these apps are difficult for Deaf and Hard of Hearing (DHH) people to play. Because when DHH people play a real instrument, they usually feel the music from the vibrations transmitted from the instrument and their own body movements, but these are not provided while playing with these apps. In previous studies, sensory substitution, which converts sound into vibration and light, was used to provide DHH people with a musical experience. Since these studies require the development or purchase of new devices and assume that the instruments are already in hand, the distance between DHH people and the instruments is still not shortened. Therefore, aiming to make digital musical instruments applications accessible to DHH people so that they can make playing musical instruments a hobby, a prototype of a gesture-based digital musical instrument, “Smartphone Drum,” was developed. Six DHH people participated in a preliminary study on Smartphone Drum and gave initial feedback on the concept of a musical instruments app that plays vibrations. Based on the results of the semi-structured interviews, a Gesture Elicitation Study (GES) was conducted in which vibration feedback from instruments was presented and the end-users were asked to devise gestures corresponding to the performance of the vibration. GES provided important insights into the design of apps and gesture sets for playing instruments with a smartphone. In the future, based on the results of the GES, we plan to develop an application that allows end-users to play instruments other than drums using the gestures that they are involved in designing.

(Adviser Tatsuki Fushimi, Yoichi Ochiai)