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Sound and Music Computing Group, KTH Royal Institute of Technology

Background

The presented project has been urged by two trends. First, the number of people world-wide with hearing impairments is growing. This is due to several reasons such as the increasingly ageing population, listening habits and general sound environment. At the same time, common hearing aids are becoming more sophisticated and new technologies for hearing assistance are emerging. Second, smartphones are now more and more dominating the market for handheld computers and mobile phones. They are used for telephony and messaging, but also for listening to music, playing games and experiencing multi-media services on the Internet.

Not everyone can or want to use the sound-based services available. The Soundpark project is about developing applications for smartphones that can enable more users to partake in these services. It is funded by the Swedish Post- och Telestyrelsen, PTS, which has been “assigned by the Government to ensure that crucial services within areas such as telephony, the Internet and postal services are available to persons with functional impairment”.

The Soundpark combines resources and research results from several completed and ongoing projects. Ljudskrapan (The Soundscraper) provides means for sound exploration for children with complex needs, accommodating hearing aids and cochlear implants. It has several “sound models” that the user can engage in, initially inspired by how disk jockeys manipulate recorded music. Another major direction is sonification of data, and especially body movements and gestures (SONEA and SOM). Some work has also been done with Symbian mobile devices (SAME).

Goals

The main goal is to present applications on smartphones that encourage active listening, and especially for hearing impaired users. This will require that we also can provide the means necessary for allowing more people to take part of the sound and music applications available. One outcome of the project is a proposal for new methods for hearing training and self-assessment of hearing, based on causal interaction with sounds.

Method

The user interaction is based on using the device’s built-in sensors such as inertia (accelerometer, gyroscope), positioning (GPS, compass) and others (microphone, camera, proximity sensor, touchscreen). Users are for the most part given high-level control of the sound as opposed to having detailed control. This reduces the time for learning and mastering the system.

The Soundpark encompasses new applications as well as methods for interacting with existing services such as streaming sound. The implementation is primarily with Pure data (pure-data.info) and OSC applications. We use participatory design with user studies and focus groups.

An important undertaking is a state-of-the-art mapping of existing sound-based applications. Results from this mapping show that most applications today are either very simple (a sound effects button, a percussive shaker, a piano keyboard…), or copies of existing computer programs (sequencers, equalizers, music players…). The mapping is ongoing work as new applications surface continuously.

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Keywords

sound interaction, hearing training, hearing impairments, diagnosing, smart phones, Android