Knowledge Transfer Office
香港城市大學
City University of Hong Kong

Apparatus and Method of Processing Audio Signals

Health & Wellness

Biomedical and Genetic Engineering/Chemical Products

Opportunity

Modern cochlear implants (CIs) are effective at restoring functional hearing and are primarily tailored for processing speech to enhance its intelligibility. Thus, CIs are unable to accurately process elements of complex acoustic signals, such as the rich array of harmonies, frequencies and timbres that comprise music. In addition, the effectiveness of CIs may vary between users due to surgical and clinical factors, such as the depth of cochlear implantation and physiological variations between patients, respectively. Consequently, CI users currently experience diminished perception of music. Thus, there is a need for a new audio-processing system for implementation in CIs to enable them to process music in a manner that provides an enhanced musical listening experience for users. Such a system should also be capable of being calibrated by individual users, thereby compensating for user-specific variations in the effectiveness of CIs.

Technology

Researchers have designed a new audio-processing system specifically for incorporation into CIs that extracts and enhances the dominant melody of typical music recordings. This is distinct from systems that subtract elements from audio signals of music to reduce harmonic complexity or reduce music to elements that are assumed to translate best to a CI user. Moreover, the novel method that the new system employs for processing audio signals can be calibrated by CI users to optimise the musical listening experience in accordance with their preferences, the characteristics of their CI hardware, their hearing loss, and associated artifacts. This calibration is performed by offline software on consumer devices, hardware arranged between an audio source and a playback device, or in real-time via audio sensors, e.g., microphones, and involves enhancement or reduction of existing features of original audio signals or generation of new audio content based on features extracted from these signals.

Advantages

- Allows cochlear implant users a better musical-listening experience that what is currently available to them.
- Can be calibrated to individual users to suit their preferences and compensate for the limitations of their specific CI system and hearing loss.

IP Status
Patent granted

Technology Readiness Level (TRL) ?
4

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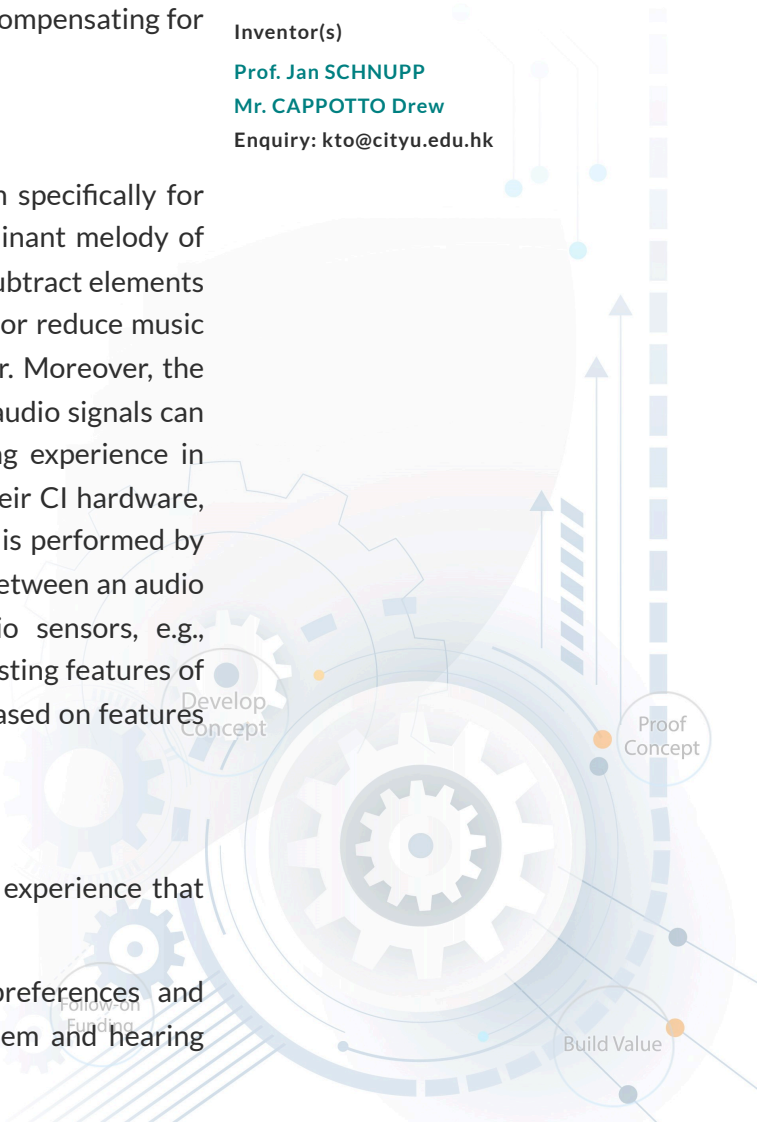

- Can be configured to achieve playback via a loudspeaker or headphones, if desired by a CI user.

Applications

- Cochlear implant (CI) users who wish to have a better musical listening experience than their current CI systems provide
- Would be particularly appealing to musicians and composers with CIs