Enhancing Communication and Music Sensory Perception for the Hearing Impaired Through Haptic Feedback in an Improved Tactile Glove

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According to the 2010 statistic by the Ministry of Economy and Planning, there are 720,000 hearing impaired persons in Saudi Arabia. Currently, efficient devices that enhance their experience are not readily available. This project endeavors to empower the hearing-impaired community to feel and enjoy music by delivering the music as vibrations to their skin. It also strives to provide better communication for people without sign language as the primary communication between a hearing-impaired person and a person with normal hearing. This method will be accomplished in the most efficient and least costly manner possible. The innovative device developed in this project consists of a vibrating haptic glove that includes sound sensors to transduce the sound into electrical signals, then micro-vibrators convert the signals to motion. A single-board computer displays the audio to text on an LCD screen. In the design stage, the weight, price, and safety of the device were considered. Trials were conducted on three different hearing-impaired categories; People that developed hearing loss over the years; People with moderate to severe hearing loss and; People who are profoundly deaf. The results show that the first and second categories had immersive musical experiences and better communication, while the third category had some difficulties understanding the music. Visual light display will be incorporated with the music for further enhancement with this group. The device proposed in this project shows significant potential to improve the way a hearing-impaired person encounters music and enhances communication experiences via these beneficial technologies.

Awards Won:
Arizona State University: Arizona State University ISEF Scholarship