Design of Analytic Application for Music Therapy Focused on Function between EEG and Sound Using Machine Learning Approaches

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Music has been used to relieve the human stress from ancient times. Nevertheless, most of the music therapists do not have analytic utilities and music selection strongly depends on their experiences. For these reasons, we set up the analytic method and design the intuitive application for practical use of music therapist. We use EEG scanner to catch the response of music and among EEG signals, we focus on the meditation signal as a representative value of emotional status. To determine the most affecting segment of music to our mind, we build an analyzing program using a linear regression algorithm that can extract transient periods automatically. Based on this segment information we can go further to analytic factors of the music include frequency distribution, loudness, beat speed, and human voice portion. From our frequency test, we can find the breakpoint from the EEG data where meditation was radically changed. Together with the meditation changes, the average intermediate frequency is changed from 4000.0Hz to 4500.0Hz. For the loudness, the meditation has increased too as the loudness increased from–4.1dB to 0.7dB. In another test for beat speed and the human voice, meditation is decreased while the beat speed increased from 33bpm to 50bpm and the portion of human voice decreased from 50% to 31%. By using these computational parameters, a therapist can understand the client's preferences precisely and recommend the music more appropriately. Through further studies, we expect our approaches can be used for more personalized music retrieval service also.

Awards Won:
Association for the Advancement of Artificial Intelligence: Honorable Mention