# Portfolio

Yeaji Lee

# Audio Augmented Reality to Enhance Visual Art Experiences

Sonification for Visual Art (2023)



#### Audio Augmented Reality to Enhance Visual Art Experiences

#### Sonification for Visual Art (2023)

Augmenting visual art in art galleries can be an effective Audio Augmented Reality (AAR) application for indoor exploration. In the current study, eight paintings from four genres were augmented with audio through their sonification. Basic Audio was generated using a sonification algorithm by identifying the major colors of the paintings, and Enhanced Audio was generated by a musician enhancing the Basic Audio; these were presented with the paintings to compare against No Audio. Twenty-six participants viewed each painting in all three conditions; eye gaze metrics, and qualitative data were collected. Results showed that Enhanced Audio led to significantly greater engagement and positive sentiments, compared to Basic Audio. Thematic analysis showed semantic and syntactic relationships of the audio with the paintings, and a tendency to guide users' gaze over time. Findings from this study can guide future AAR developments to improve auditory display designs to enhance visual experiences.



# Effects of Sentiment-based Sonification on Fairy Tale Listening Experience

Robot Sonification (2022)



#### Effects of Sentimentbased Sonification on Fairy Tale Listening Experience

Robot Sonification (2022)

Sonification translates emotional data into sound, allowing us to interpret emotional information. However, the effectiveness of sonification varies, depending on its application. The main purpose of the current study is to investigate how the emotionreflecting sonification vs. the emotion-mitigating sonification influences the experience of listening to fairy tales. We analyzed three fairy tales using sentiment analysis and created two types of sonification: one that reflects the representative emotion of each paragraph (emotion-reflecting sonification), and another that reflects the opposite emotion of the paragraph (emotionmitigating sonification). For the story-telling agent, we used a humanoid robot, NAO and designed three voices with Azure. We conducted five focus groups with 22 participants. The results showed that participants' ratings of the "pleasing", "empathy", and "immersiveness" categories were higher in emotionmitigating sonification than in emotion-reflecting sonification. Moreover, participants showed a preference for male voice than female or child voices. The results are discussed with implications and future directions



Interactive instrument (2012)



Interactive instrument(2012)

When listening to music, the listener's traditional role is listening according to the intentions of the composer or performer. Sloboda (1989) suggested that listening to music was part of a "pharmaceutical" model in which music listeners are considered passive recipients of musical stimuli. However, why is the choice of listening or not listening to music that is already created by someone else the only option? Is there any other type of active listening proposal out there? With this question in mind, I proposed a new listening system that expands the listener's domain.

This interface introduces a new music listening system that can alter various elements of existing music. More specifically, we propose a new role for the listener as an active agent, meaning one who can alter certain musical elements while listening according to their desired emotion.

I created a prototype to communicate between the performer and the listener, and I designed a new instrument and an application for mobile phones. If a listener chooses one desired emotion through a mobile application, the listeners can control the musical elements of a song based on the desired emotion through OSC(Open Sound Control).



Interactive instrument(2012)



# EPM

Emotional Piano Music



#### EPM

**Emotional Pian Music** 

I collaborated with Eunsung Song (Design) and Hyun-soo Kim (Engineer) to create an art work called EPM:Emotional Piano Music. Based on the idea of my master's thesis, this art work is an instrument that can change the same song to a different version based on the emotion chosen by the user. The original was made with a mobile application, but we wanted to create an interactive experience where users can create and experience their own songs through their own emotions and actions in space. I participated in this art work as the sound designer.



#### EPM

#### **Emotional Pian Music**



Glow Music Stick



Glow Music Stick

I designed an interface that uses a mobile phone's gyroscope sensor that creates different Tonality, Timbre, Tempo, and Pitch according to their emotion whenever the arm swings. I designed it separating four simple emotions: happiness, sadness, anger, and peacefulness, and applied musical elements corresponding to each emotion, so a musical rule could be applied based on a simple arm movement to create a musical loop.



Glow Music Stick



### Music Seat

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Music Seat enables the people with the hearing impaired to feel music as vibrations.

We find differences in the notes that can be identified by touch through experiments.

The results of this experiment enabled us to deliver music through vibration without distortion of the original music flow.

#### **Music Seat**



I assisted in a study under the supervision of Dr. Eunsung Song about creating tactile music for the hearing impaired, enabling them to feel music as vibrations. In this experiment, I helped to test whether a hearing-impaired person could feel a minute difference in vibration (threshold of audibility) with the tip of their index finger. We used the principle of hearing aids, which amplify sound to a size beyond the hearing threshold of patients with hearing difficulties but at the same time compress the sound to a proper range so as not to make the hearer feel discomfort from sounds that are too loud. Tactile testing was conducted to convert high-frequency areas that hearing aids cannot recognize into low-tactile areas. The results of this experiment enabled us to deliver music through vibration without distortion of the original music flow.



#### VRWARE

I designed the BGM and button sounds for VRWARE, which was educational-content authoring software with various characters and objects to build a user's 3D virtual environment and experience it with motion-detecting technology.



Clink the link for listening : <u>https://soundcloud.com/yeaji-lee-3</u>

#### VRWARE





www.yeajilee.com