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School of Computing

MUSIC EMOTION CAPTURE: ETHICAL ISSUES AROUND EMOTION-BASED MUSIC GENERATION

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Introduction

People's emotions are not always detectable, e.g. if a person has difficulties/lack of skills in expressing emotions, or if people are geographically separated/communicating online. Brain-computer interfaces (BCI) could enhance non-verbal communication of emotion, particularly in detecting and responding to users' emotions e.g. music therapy, interactive software that can 'empathise' with the user.

We developed Music Emotion Capture, a system that detects a person's emotions using Electroencephalogram (EEG) signals, and uses their current emotional state to play a song relevant to their emotional state.

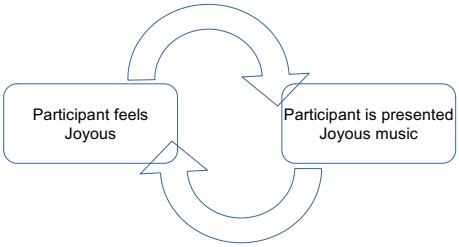
While developing this system, a number of ethical issues arose both from the designed paradigm, and from decisions that needed to be made for the system

Feedback loops

When interpreting a participant's emotions, it is up to the system to decide how to interpret that emotions Do you simply present the users emotion back to them, or do you make a decision about how to interpret that emotion?

Positive Feedback loop

Present the participant with their current emotional state:



Emotional Manipulation

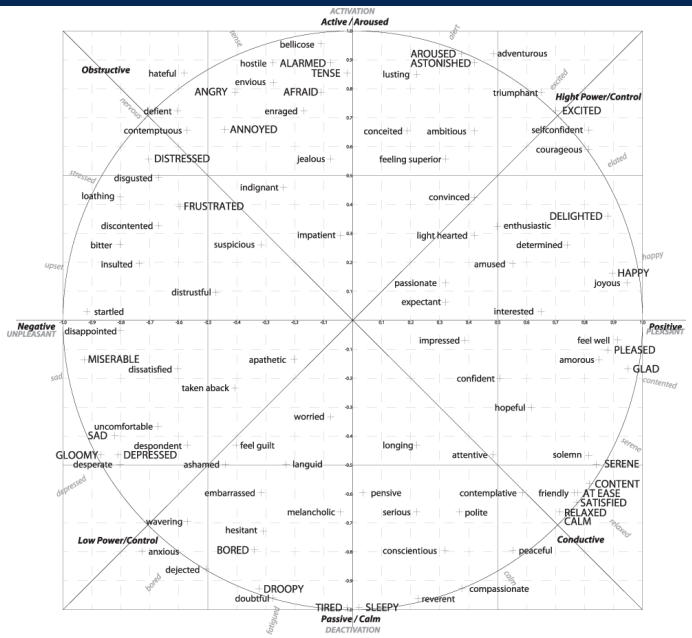
Regardless of which paradigm is chosen, a decision on how to interpret the participant's emotions must be made. The participant's emotional state will be influenced while listening to the system, and how their state changes will be dictated by this decision. Is it acceptable to alter and control a participant's emotional state, and is either decision fair to make? Or should this decision be given to the person having their emotions captured?

Privacy

While the data is recorded, the participant's emotional state is revealed. The music that plays reflects their state, so anyone who can hear that music can gain insight into the participant's mood. In the current implementation, the participant has no way to hide this should they wish to.

Is navigating these challenges worthwhile?

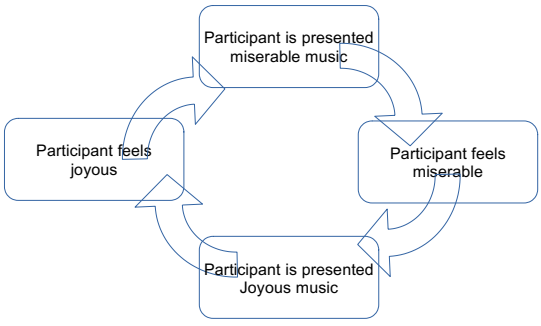
Do the advantages of a system of this type make navigating these ethical decisions worthwhile? While co-creative systems and understanding the emotions of those who cannot properly express themselves could be incredibly useful, designing a system that does this while being ethically sound will be challenging.



The Music Emotion Capture system [1] detects, models and sonifies people's emotions based on their real-time emotional state, measured by mapping EEG feedback onto this pictured valence-arousal emotional model [4] based on [3], using co-ordinates from [2].

Negative Feedback loop

Present the participant the emotional inverse to their current state:



Inaccurate detection

While the data is recorded, the participant's emotional state is revealed. The music that plays reflects their state, so anyone who can hear that music can gain insight into the participant's mood. In the current implementation, the participant has no way to hide this should they wish to.

Model Interpretability

If a system designed to process and present emotions, is it acceptable for the model to be opaque, or must the model be fully interpretable. If a person is to consent to having their emotions sonified and influenced by a system, should they have a full understanding of how it translates the signal into music?

References:

[1] Langroudi, G., Jordanous, A., & Li, L. (2018). Music Emotion Capture: emotion-based generation of music using EEG. Emotion Modelling and Detection in Social Media and Online Interaction symposium @ AISB 2018, Liverpool.
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[4] K. R. Scherer, 'What are emotions? and how can they be measured?', Social Science Information, 44(4), 695–729, (2005).