Studying induced musical emotion via a corpus of annotations collected through crowd-sourcing
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One of the major reasons why music is so enjoyable is its emotional impact. For many people, music is an important everyday aid of emotional regulation. As such, music is used by musical therapists to and in entertainment industry. Recently, mechanisms of emotional induction through music received a lot of attention from different scientific fields, including musicology, neuroscience, psychology, and computer science [1]. In this study we present a computer-science approach to this problem, comprising crowd-sourcing for data collection and a size and structure of the dataset that allows for building a computational model.

We created an online game with a purpose, 'Emotify', launched and advertised through social networks, in order to collect annotations of induced musical emotion for a set of 400 pieces in four musical genres. The annotations were collected using a nine item GEMS (Geneva Emotional Music Scale) [2]. The data collection process lasted 6 months and more than 1500 participants from different linguistic backgrounds and age groups participated in the study. The collected data contains music (1 minute excerpts) licensed under Creative Commons, annotations (emotional labels, preference and familiarity with the song, optional comments), anonymized personal data (age, gender, mother tongue, current mood of the annotator), and is going to be released publicly.

Influence of age, gender and musical preferences on induced musical emotion were studied. We found that preference for a certain piece affects induced emotion greatly, as well as the mood of the person (e.g., a person in bad mood tends to perceive any music as sad). Also, consistency of responses was examined for different conditions (genres, moods of participants, language proficiency). As an outcome of the study, we suggest to modify GEMS model by changing or removing, at least from the computational model, one of its categories (amazement) that was found unclear by one third of participants and received very inconsistent responses as well. The robustness of the model for annotating music in four different musical genres (rock, electronic, classical, pop) is also examined.

[1] Eerola, Tuomas, and Jonna K. Vuoskoski. "A Review of Music and Emotion Studies: Approaches, Emotion Models, and Stimuli." (2013) Music Perception: An Interdisciplinary Journal (30, no. 3)
[2] Zentner, Marcel, Didier Grandjean, and Klaus R. Scherer. "Emotions Evoked by the Sound of Music: Characterization, Classification, and Measurement." (2008) Emotion (8, no. 4)