

# A Regression Approach to Music Emotion Recognition

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**Abstract**—Content-based retrieval has emerged in the face of content explosion as a promising approach to information access. In this paper, we focus on the challenging issue of recognizing the emotion content of music signals, or music emotion recognition (MER). Specifically, we formulate MER as a regression problem to predict the arousal and valence values (AV values) of each music sample directly. Associated with the AV values, each music sample becomes a point in the arousal-valence plane, so the users can efficiently retrieve the music sample by specifying a desired point in the emotion plane. Because no categorical taxonomy is used, the regression approach is free of the ambiguity inherent to conventional categorical approaches. To improve the performance, we apply principal component analysis to reduce the correlation between arousal and valence, and RReliefF to select important features. An extensive performance study is conducted to evaluate the accuracy of the regression approach for predicting AV values. The best performance evaluated in terms of the  $R^2$  statistics reaches 58.3% for arousal and 28.1% for valence by employing support vector machine as the regressor. We also apply the regression approach to detect the emotion variation within a music selection and find the prediction accuracy superior to existing works. A group-wise MER scheme is also developed to address the subjectivity issue of emotion perception.