Correlation analysis and gradient boosting for music genre prediction

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Music has been influenced by technology; hence data is the fundamental building block. Through the concepts of Music Information Retrieval (MIR), data immersed in music can be retrieved and effectively used for data mining and machine learning aspects. This study aimed to utilize correlation and gradient boosting technique to increase the accuracy of the music genre prediction. MIR techniques were used to retrieve data from 200 music tracks and conducted preprocessing followed by a correlation analysis. With correlation analysis, the most correlated set of music features were identified to be roll off, beats, zero crossing rate, spectral centroid, tempo, spectral bandwidth and Mel-frequency cepstral coefficients (mfcc2). Then experiment was designed to measure the accuracy in using correlation and gradient boosting technique. Hence, as the first experiment a Random Forest Classifier (RFC) and XGBoost Classifier (XGBC) were developed to predict the genres using all the extracted feature set as the output. Here f-score of 60.5% and 63% were yielded respectively for RFC and XGBC. Then, for the second experiment, with the use of identified set of correlated features a RFC and an XGBC were developed with as accuracy of 93.5% and 100% respectively. In both the experiments, models were trained to classify 10 music genres and 80:20 training to testing data split was used. Considering above results, it can be concluded that utilization of gradient boosting technique with correlation analysis has increased the accuracy level in music genre prediction using music data.

Keywords: Correlation Analysis, Gradient Boosting, Music Genre, Random Forest Classifier, XGBoost Classifier

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