IDENTIFYING RAAGA IN CARNATIC MUSIC- AN AUDIO SIGNAL PROCESSING IN COMPUTATIONAL MUSICOLOGY

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Abstract

Music is a very complicated when it comes as a research topic. Musical classes are categorizable labels made by humans to characterize pieces of music. A music class is characterized by common features. The procedure of categorizing a given set of data into classes is classification. Machine learning techniques can be applied to extract features. *Carnatic music* is a type of South Indian Classical music practiced all over the world and it has got its own melodic frameworks called *Raaga*. These *Raaga* acts as the backbone of Carnatic music. All these are mathematically formed using only 5 to 7 musical notes. There are 72 fundamental *Raaga* and more than 30,000 permutated *Raaga*. The character of *Raaga* makes the project more difficult to classify because of fluctuations in human voice which may lead to misclassification errors, non- linear timing errors, rapid movements around notes, assumption of wrong tonic independent, fundamental frequency and age variation and the pitch variates person to person with their age and gender. Moreover, the music will be polyphony where the musical texture contains more than one independent melody. The author has encountered 3 *Raaga* with a limited dataset to put an effort to classify these classes using MFCC, Direct Fourier Transform and Gaussian Mixture Model which is a novel idea in this Carnatic field to work with polyphonic music. In this work, *Raaga* will be recognized based on feature extraction from audio file using Mel Scale. The *Raaga* identification is performed using Gaussian Mixture Model, a classifier which is a probabilistic model following supervised machine learning. The audio set used for this is prepared by the author herself.

Keywords: *Raaga*, Carnatic music, Audio signal processing, MFCC, Discrete Fourier Transform, Polyphonic, Gaussian Mixture Model