Music Genre Classification

Kacper Szkudlarek, Szymon Kowalczyk, Anna Kudela

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1 Project Proposal

As a Machine Learning project for this year, we would like to do music genre classification. We believe that this topic is very interesting because it covers two topics - machine learning and signal processing.

We would like to use GTZAN Database - it is a database created in 2004 exactly for the purpose of music classification. This database was created using CDs, vinyls, tapes and radio. It contains 10 music genres and approximately 1000 songs - about 100 per genre from artists like Madonna, Metallica, Mozart, Bob Marley and many more.

But to use machine learning to classify music we will need some parameters. Audio files are extremely complex signals, that can be represented in various different ways - time domain, frequency domain, spectrograms, mfcc's, etc. - from those plots we can extract some parameters and then we will find out which are the most important in the problem of music classification. For example, we can use BPM, tempo or energy distribution of the signal. We will transform those parameters into a pandas file and then normalize them to easily work with it in Python. Then we will split the database into train and test sets. We are planning to play with parameters to achieve the best results. After that, we will perform predicting using machine learning methods such as Naive Bayes, K-Nearest Neighbours, Support Vector Machine as well as different ones that we don't know about yet. Next, the results for every method will be compared and tested. We will try to check if there is some not obvious features or connection between genres that our algorithm noticed. We will use librosa, numpy, scikit-learn, pandas, matplotlib, seaborn and hopefully many more.

Papers that we would like to read include:

1. https://ieeexplore.ieee.org/abstract/document/1021072/
2. https://dl.acm.org/doi/abs/10.1145/860435.860487
3. https://academiccommons.columbia.edu/doi/10.7916/D8QV3WWQ
4. and more