Music Genre Classification

Final Project Proposal

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Applied Machine Learning Final Project Assignment

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1. Introduction

This project mainly aims to perform comprehensive analysis of music genres using a variety of machine learning techniques. The GTZAN dataset, found on kaggle, encompasses 10 diverse music genres with 100 tracks each, totaling 1000 songs. Our primary objective is to extract and analyze audio features using the librosa library, which provides a rich set of tools for music analysis.

2. Methodology

a) Part 1: Feature Extraction and PCA Analysis

Using librosa, we intend to carry out a thorough extraction of audio features such as rolloff, spectral centroid, zero-crossing rate, and Mel-frequency cepstral coefficients (MFCCs). In order to prepare the data for efficient model training, additional data preprocessing procedures will be carried out, such as using Principal Component Analysis (PCA) for dimensionality reduction and MinMaxScaler for feature scaling.

b) Part 2: Model Training

The project will involve training various machine learning models, including Random Forest, K Nearest Neighbors (KNN), Support Vector Machine (SVM), and XGBoost. These models will be evaluated using metrics such as accuracy, precision, recall, and F1-score to assess their performance in accurately classifying music genres.

3. Conclusion

The key findings of this research are expected to significantly contribute to the accuracy of music genre classification by effectively utilizing key audio features extracted using the librosa library. The methodology and findings of this project could have broader implications in the field of audio classification such as animal sound detection and can be applied to other related tasks.