Music Genre Classification with MFCC and K-Nearest Neighbors

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Introduction

This project focuses on classifying music genres using the Mel Frequency Cepstral Coefficients (MFCC) feature extraction technique and the K-Nearest Neighbors (KNN) algorithm. Music genre classification is a fundamental task in music analysis, and this project serves as an example of how to perform this task using Python.

Project Overview

- **MFCC Features:** The project utilizes the MFCC features of audio files to extract relevant characteristics from music tracks.
- **K-Nearest Neighbors:** KNN is used as the classification algorithm to predict the genre of a music track based on its extracted features.
- **Dataset:** The project assumes the availability of a pre-processed dataset containing audio features. It includes a script to load this dataset and classify music genres.

Prerequisites

- Python 3.x
- Required Python packages (install using pip):
  - python_speech_features
  - scipy

- numpy
- librosa

Usage

1. **Load the dataset:** Run the `loadDataset` function to load your pre-processed dataset into memory.
2. **Feature Extraction and Classification:**
   - Provide the path to your audio file in the `wav.read` line.
   - Adjust the parameters for MFCC feature extraction, such as `winlen` and `appendEnergy`, in the `mfcc_feat` line.
   - Set the number of neighbors (`k`) in the `getNeighbors` function.
3. **Run the script to classify the music genre.**

Dataset

This project assumes you have a dataset of pre-processed audio features. The dataset should contain MFCC features and genre labels for training and testing.

Code Explanation

For a detailed explanation of the code, including how the distance calculation, neighbor selection, and genre prediction work, please refer to the `video_file`.

Results

The code provides classification results for the given audio file based on the trained KNN model. The predicted genre label is output as a result.