Automatic Music Genres Classification using Machine Learning

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***Abstract*—Classification of music genre has been an inspiring job in the area of music information retrieval (MIR). Classification of genre can be valuable to explain some actual interesting problems such as creating song references, finding related songs, finding societies who will like that specific song. The purpose of our research is to find best machine learning algorithm that predict the genre of songs using k-nearest neighbor (k-NN) and Support Vector Machine (SVM). This paper also presents comparative analysis between k-nearest neighbor (k-NN) and Support Vector Machine (SVM) with dimensionality return and then without dimensionality reduction via principal component analysis (PCA). The Mel Frequency Cepstral Coefficients (MFCC) is used to extract information for the data set. In addition, the MFCC features are used for individual tracks. From results we found that without the dimensionality reduction both k-nearest neighbor and Support Vector Machine (SVM) gave more accurate results compare to the results with dimensionality reduction. Overall the Support Vector Machine (SVM) is much more effective classifier for classification of music genre. It gave an overall accuracy of 77%.**

***Keywords*—K-nearest neighbor (k-NN); Support Vector Machine (SVM); music; genre; classification; features; Mel Frequency Cepstral Coefficients (MFCC); principal component analysis (PCA)**

I. Introduction

Nowadays, a personal music collection may contain hundreds of songs, while the professional collection usually contains tens of thousands of music files. Most of the music files are indexed by the song title or the artist name [1], which may cause difficulty in searching for a song associated with a particular genre.

Advanced music databases are continuously achieving reputation in relations to specialized archives and private sound collections. Due to improvements in internet services and network bandwidth there is also an increase in number of people involving with the audio libraries. But with large music database the warehouses require an exhausting and time consuming work, particularly when categorizing audio genre manually. Music has also been divided into Genres and sub genres not only on the basis on music but also on the lyrics as well [2]. This makes classification harder. To make things more complicate the definition of music genre may have very well changed over time [3]. For instance, rock songs that were made fifty years ago are different from the rock songs we have today. Luckily, the progress in music data and music recovery has considerable growth in past years.

According to Aucouturier and Pachet, 2003 [4] genre of music is possibly the best general information for the music content clarification. Music engineering encourages the practice of categories and family based operators like to organize their sound accumulations by this clarification, so the requirement of involuntary organization of audio files into categories improved extensively. In addition, the latest improvements in category organization here are still an issue to accurately describe a type, or whether mostly relay on a consumer understands and flavor.

In order to establish and explore increasing composition groups we implemented an automatic technique that can be used for data mining for valuable data about audio composition direct from the audio file. Such data could incorporate rhythm, tempo, energy distribution, pitch, timbre, or other features. Most of the classifications depend on spectral statistical features timbre. Content collections relating to further musicological contents such as pitch and rhythm are too suggested, however their execution time is very less and furthermore they are closed by tiny info collections pointing at different audio arrangements. The inadequateness of audio descriptors will positively have a limitation on music categorization methods.

In this paper, we use machine learning algorithms, including k-nearest neighbor (k-NN) [5] and Support Vector Machine (SVM) [6] to classify the following 10 genres: blues, classical, rock, jazz, reggae, metal, country, pop, disco and hip-hop. In addition, we perform a comparative analysis between k-nearest neighbor (k-NN) [5] and Support Vector Machine (SVM) [6] with and without dimensionality reduction via principal component analysis (PCA) [7]. The k-nearest neighbor is automatically non-linear, and it can sense linear or non-linear spread information. It inclines to do very well with a lot of data points. Support Vector Machine can be used in linear or non-linear methods, once we have a partial set of points in many dimensions the Support Vector Machine inclines to be very good because it easily discovers the linear separation that should exist. Support Vector Machine is good with outliers as it will only use the most related points to find a linear separation (support vectors).

In our research we used Mel Frequency Cepstral Coefficients (MFCC) [8] to extract information from our data as prescribed by past work in this field [9].

Automatic Music Genres Classification Using Machine Learning

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Automatic Music Genres Classification Using Machine Learning:

The Enigmatic Realm of **Automatic Music Genres Classification Using Machine Learning**: Unleashing the Language is Inner Magic

In a fast-paced digital era where connections and knowledge intertwine, the enigmatic realm of language reveals its inherent magic. Its capacity to stir emotions, ignite contemplation, and catalyze profound transformations is nothing lacking extraordinary. Within the captivating pages of **Automatic Music Genres Classification Using Machine Learning** a literary masterpiece penned by a renowned author, readers embark on a transformative journey, unlocking the secrets and untapped potential embedded within each word. In this evaluation, we shall explore the book is core themes, assess its distinct writing style, and delve into its lasting effect on the hearts and minds of those that partake in its reading experience.

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