Chapter 8
Discovering Intersections of Music Genres With Machine Learning

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ABSTRACT

The music industry generates an enormous amount of data, which makes classifying and organizing that data into a genre a very difficult task. A potential solution to that problem is to cluster the music using machine learning. Machine learning algorithms might enhance personalized suggestions, search engines, and music categorization systems by creating a model which can precisely identify different genres relying on their acoustic and subjective properties. Recent research suggests that even though there is a large overlap across genres, with machine learning algorithms, we can properly categorize music genres by recognizing differences as well as similarities between them. In more general terms, grouping musical styles using machine learning has several uses in the music industry. It can speed up the identification of new musical styles and encourage cross-genre collaborations among musicians.

INTRODUCTION

As music passionates we and the general public often have this dilemma on what to listen to next. Spending more time browsing my playlist for that one song than actually listening to music is a modern-day problem, especially for students. We can also try the shuffle method on our music players but that also poses a problem because no one wants to listen to a sad song after a hype one. We decided on this project

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because we like music and want to have a program to solve this issue for us and maybe everyone we share this project with (Zhang et al., 1999).

For most people I know they use music as a free therapy, as it calms them down or makes changes in their mood. It has also been a way for people to connect cultures, since people listen to music from people that come from different parts of the world. The most important thing in this industry is that it is expanding more every day. Since this industry is growing the genres are starting to merge with one another and they are overlapping, what we are trying to do with our project is trying to differentiate these genres with each other. This machine learning might be used in the future so that it is easier to personalize music. And in the future, we can hope that music applications, such as Spotify or YouTube and others, might use this machine learning as a feature to make it easier for people to discover new music (Lu et al., 2001; Mondal et al., 2023).

We all listen to music on a daily basis, and use it as a universal language that connects us with people from different countries. There are around 1000 music genres and sub-genres, and each are unique. The music industry is growing every day, and there is the need to sort and order the music, and personalize it for every user (Althar et al., 2023). Our goal is to cluster the music genres with great precision and accuracy. One of the main problems is the similarity between some genres (Advances in Automatic Text Summarization, 1999). This might make it more difficult for us to classify the genres. Solving this problem will help 'music lovers' find new music they have never heard (Cunaku et al., 2023). This machine learning can be very applicable worldwide, especially in music apps. As a result, tailored suggestions and music search engines get better, new music genres may be discovered, and cross-genre partnerships between artists are encouraged (Ren et al., 1998). Machine learning-based music genre clustering has enormous ramifications for the music business and can improve our listening experience as a whole. Accepting the importance of music throughout history and its impact on civilization itself. Every member of our group being constant music listeners, seeing this project title sparked inspiration. With this Python program, we will group different songs and melodies into different music "playlists" so that if a user likes one song the probability of them liking the next one in that specific group or, linking two groups with similar attributes, will be high (Garg et al., 2023). We will compare factual aspects of songs, such as beats per minute, loudness, acoustics, valence and length, and social aspects, danceability, popularity, energy, etc. (Koumpis et al., 1998). By using to different but similar datasets we will select a bigger sample population and comparing these two by running them on with the same program gives us a variety of data to work with. We will present all this data visually so that the user can better understand and visualize what they are doing with our program. Also, we will present our algorithm and logic with a flowchart so that other developers can follow in our footsteps and use this program confidently (Gurunath et al., 2023). By employing different machine learning algorithms, the authors of the study "Music Genre Classification using Machine Learning Techniques" hope to increase the precision of music genre classification. The research investigates how to train machine learning models that can categorize songs into various genres using audio parameters like pitch, tempo, and timbre (Hori et al., 1998; Jain et al., 2023).

A number of algorithms, including Decision Tree, Random Forest, Naive Bayes, and Support Vector Machines (SVMs), were tested by the authors, and their performance was assessed using parameters including accuracy, precision, recall, and F1 score. According to the study's findings, SVMs performed better than other algorithms in terms of accuracy and F1 score, classifying six different musical genres with an overall accuracy of 91.25% (Guha et al., 2023). The research also emphasizes how crucial it is