**Music Genre Classification using Deep Learning**

**Abstract**

Music genre classification plays a crucial role in the ever-evolving world of music streaming and applications. With the rise of platforms like Spotify, Apple Music, Shazam, SoundCloud, Deezer among many others, it has become increasingly important to develop technologies that can accurately categorize music into various genres. In this report, we present a deep learning-based approach for music genre classification. Our model utilizes an algorithm that considers multiple audio-based factors, such as the type of instruments used, bass characteristics, frequency patterns, and chroma vectors, to determine the genre of a given music file. The genres we focus on include blues, classical, country, disco, hip-hop, jazz, metal, pop, reggae, and rock. Each of these genres possesses distinct features that aid in their identification - blues wails through soulful guitar and harmonica; classical symphonies soar with strings, brass, and woodwinds; country twangs with acoustic guitars and fiddles; disco grooves with pulsating basslines and funky keyboards; hip-hop rhymes over beats crafted with drum machines and samples; jazz swings with improvisation on saxophone, trumpet, and piano; metal shreds with electric guitars and thunderous drums; pop sparkles with catchy hooks and synthesizers; reggae grooves to the rhythm of bass guitar and drums; and rock roars with power chords played on electric guitars and thundering basslines. Our deep learning model is a neural network implemented using the Keras library. It consists of an input layer, followed by two dense layers with 300 and 200 units respectively, both using the ReLU activation function. The output layer has 3 units and uses the softmax activation function. The model is compiled with the RMSprop optimizer, sparse categorical cross-entropy loss function, and sparse categorical accuracy metric. It is then trained with a specified number of epochs which in our case is 64. Through extensive training and testing, our deep learning model demonstrates promising results in accurately (78% mean accuracy) classifying music files into their respective genres. The utilization of deep learning techniques allows for a more nuanced understanding of the audio features, leading to improved genre classification accuracy. The successful implementation of a genre classification model has significant implications for the music industry and users alike. It enables music streaming platforms to enhance user experiences by providing personalized recommendations and curated playlists based on genre preferences. Additionally, it facilitates music discovery for users, allowing them to explore new genres and expand their musical horizons.

***Keywords:*** *Music genre classification, Deep learning-based approach, Audio-based factors, Instruments, Bass characteristics, Frequency patterns, Chroma vectors, Genres, Neural network, Keras library, Dense layers, ReLU activation function, Softmax activation function, RMSprop optimizer, Sparse categorical cross-entropy loss function, Epochs, Structured learning.*