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MUSIC GENRECLASSIFICATION USING HYBRID MODEL

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Abstract: People's lives are greatly impacted by music. Like-minded people come together via music, and it serves as the community's binding agent. The genres of music that different communities write or even just listen to can be used to identify them. Our research aims to develop a machine learning system that can predict music genres more accurately than the current approaches.We constructed many categorization models for this project and trained them using the Free Music Archive GTZAN dataset. All of these models' performances have been compared, and the results have been recorded in terms of prediction accuracy. A select few of these models are trained using both the mel-spectrograms and the audio characteristics of the songs, while a select few others are trained exclusively using the spectrograms of the songs. One of the models, a convolutional neural network, was shown to have the highest accuracy of all the models when only given the spectrograms as the dataset.

Keywords: Music, communities, Listen.

I. INTRODUCTION

A piece of music's genre can be predicted by a piece of software that analyses audio files. These gadgets are utilised for things including selecting the right background music for events and automatically tagging songs for distributors like Spotify and Billboard. Since the distinctions between musical genres are mostly arbitrary and subjective, this task has not yet been mechanised by traditional computational methods. Machine intelligence is ideally suited to this task because genreclassification is ambiguous.

Making a proof-of-concept is the goal of this research. deep learning music genre classifier that can accurately distinguish between Western music's genre and degree of confidence from a number of candidate genres.

Any song's genre is a crucial component that can direct listeners to their favourite category. Many music lovers make playlists based on particular genres, which could lead to apps like playlist management and suggestion. Although numerousalgorithms have been used in earlier works on music genre classification using machine learning approaches and have shown promise, there is always opportunity for enhancing genre classifier performance. In this work, a system for categorising musical genres is developed using a variety of machine learning approaches.

In this study, we will outline our efforts to develop classification techniques that will enable us to recognise a certain genre from audio features. We'll start by giving a brief overview of the dataset we used and how we handled the data. Then, to train our dataset, we used support vector machine and softmax regression with optimum settings.

II. LITERATURE SURVEY

Different methodologies can be used to classify different musical genres. It is common practise to process a collection of audio recordings, extract their features,to train machine learning clasifear. Since this strategy contains the methods It is the method that has been studied the most and will therefore be the focus of the majority of this literature review. that have been demonstrated to be the most successful when categorising utilising a single modality.

Literature Reviewabout Music Genre Classification, Lam HoangNN). june,2018, They covered how the Neural Network, orNN, categorises music genres in general in their paper. Important neural network techniques have been listed, such as the recurrent neural network (RNN) and the convolutional neural network (CNN) (CNN).

Using deep neural networks and transfer learning, musical genre and style are recognised. Maheshkumar H, Feb 2018, The authors of this study propose a revolutionary system for categorising the musical styles and genres using an ensemble of convolutional neural networks (CNN).

Music Genre Classification, M.D Nevatha, Nov 2019, To categorise the genres in the current system, we used k-closest neighbour (k-NN). This does not provide a perfectly logical association between different learning techniques for

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categorising music. Prior to piecewise, filter modelling is used. Gaussian \sModelling.

Machine Learning for Music Genre Classification, Bryn Lansdown, Feb 2019, There are numerous directions for more research. First, as has been mentioned, the inclusion of time-based information would enable categorization based on more intricate musical characteristics, as could be done by techniques like recurrent neural networks.

Deep attention based music genre classification, LinFeng[b] , Nov 2020, In this essay. Parallelized attention is more adaptable and produces superior outcomes in our trials as compared to serial attention. The CNN-based parallelized attention models that take STFT spectrograms as input significantly outperform the previous work..

III. PROPOSED MODEL

The Following Figure 1 depict the working steps os proposed model

Support vector machines (SVM) and k-nearest neighbour (K-NN) (SVM), which were built in convolutional kernels with the aid of convolutional neural network (CNN), were employed in this classification system to provide greater accuracy than the prior method.

The test data set has accuracy of greater than 95%.

the data-set for the gtzan genre collection. It consists of 1000 audio files, each of which is 30 seconds long. 100 audio tracks, representing 10 different musical genres, make up each lesson. The tracks are all in wav format. It includes audio files from the following 10 genres.

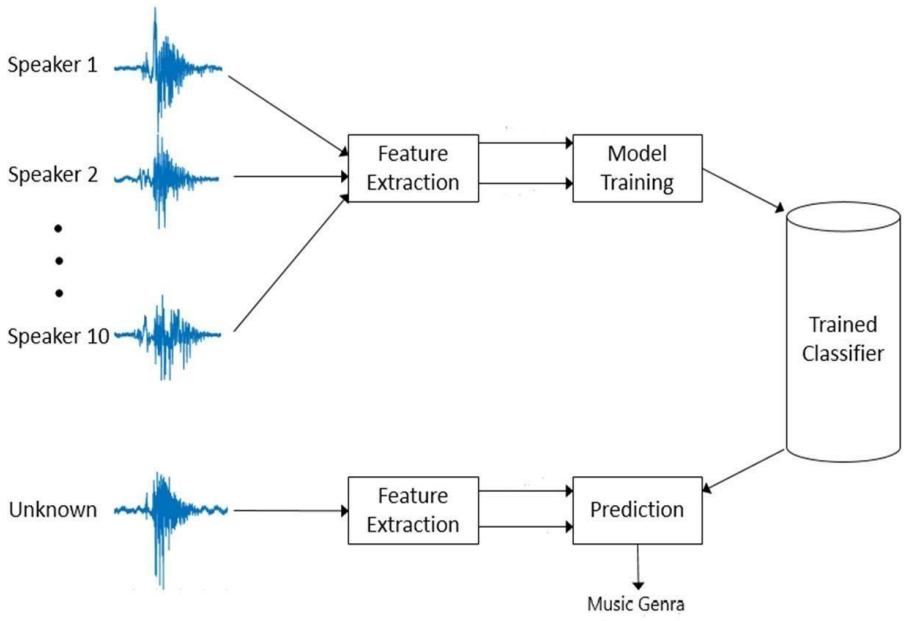

Figure.1 PROPOSED MODEL

A. Data Collection

Any machine learning project depends on the dataset that is selected. There are frequently a number of potentially useful datasets available, each with their own benefits and drawbacks, and the choice of one dataset over another can have a big impact on the project's progress. we have used recent audio files collected in the year of 2018 to 2021. It also consists of

1000 audio files each having 30 seconds duration. Totally we have used 2000 audio files in our model.

Genre	Number of tracks
Blues	100
Classical	100
Country	100
Disco	100
Hip-Hop	100

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Jazz	100
Metal	100
Pop	100
Reggae	100
Rock	100
Total	1000

Table: 01 GENRIC DATA COLLECTION

B. GTZAN Dataset

In the field of MIR, one resource that is quite well-known is the GTZAN dataset, which is described in Tzanetakis. There are a total of 1000 audio files in it, divided into 10 groups of 100 song snippets lasting 30 seconds each. The dataset is pre-organized into folders, one for each genre, making it relatively simple to navigate and suitable for machine learning projects due to the dataset's balance.

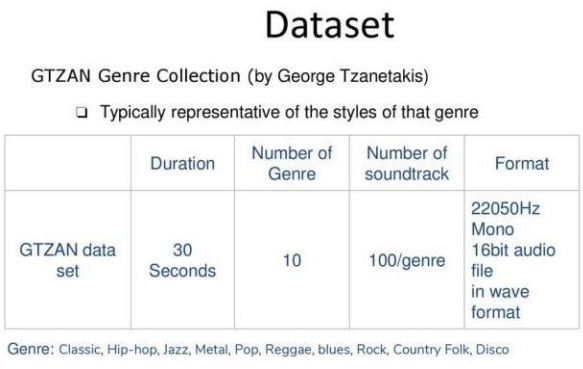

Table:2 Dataset Table

C. Data Preprocessing

In the field of MIR, one resource that is quite well-known is the GTZAN dataset, which is described in Tzanetakis. There are a total of 1000 audio files in it, divided into 10 groups of 100 song snippets lasting 30 seconds each. The dataset is pre-organized into folders, one for each genre, making it relatively simple to navigate and suitable for machine learning projects due to the dataset's balance.

D. Genre and Feature Analysis

These are a bunch of steps for generation of these features:

1. Since the audio signals are continually changing, first we partition these signs into more modest edges. Eachone is around 20-40 ms long

2. Then we try to distinguish various frequencies present in each frame

3. Now, Separate linguistic frequencies from the noise.

4. To dispose the noise, it then takes discrete cosine transform (DCT) of these frequencies. Using DCT we keepjust a particular arrangement of frequencies that have a high likelihood of data.

Database of the total collection was made and stored in a .WAV file

E. Sequential Model:

It is a straightforward and simple model. A tf.keras.Model is made up of a linear stack of methods that group a linearstack of layers. Its primary function, as implied by its name, is to sequentially arrange the Keras layers.

F. Prediction

Following model construction using the aforementioned method, prediction is completed using model.predict (xtest).Utilizing accuracy score loaded from metrics- metrics.accuracy score, the accuracy is determined (ytest,predicted)

G. Visualization

use the Sklearn mathpoltlib library. Various graphs are plotted in order to analyse the GTZAN dataset.

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i. KNN:-("k-Nearest Neighbour")

The K-NN algorithm groups the new instance, assuming that it is equivalent to the prior instances, into the category that most closely resembles the present categories. A new data point is categorised using the K-NN algorithm based on similarity after storing all the prior data.

1. Choosing the Kth neighbour is step one.
2. Calculate the Euclidean distance between K neighbours in the second phase of the K-NN technique.
3. Select the K nearest neighbours using the estimated Euclidean distance.
4. Sum the data points from these k neighbours in each category.
5. Sort the updated data into the category with the most nearby neighbours.
6. The model is finished.

The KNN algorithm has the following benefits:

- It is easy to use.
- It can withstand noisy training data.
- If there is a lot of training data, it might work better

KNN algorithm drawbacks include the following:

- K's value must always be determined, which can occasionally be difficult.
- The cost of calculation is large since it must calculate the separation between each data point in each training sample

ii. SVM (Support Vector Machines)

Support vector machines (SVMs), a potent yet adaptable supervised machine learning technique, are used for both classification and regression. However, they are frequently used in classification-related matters. SVMs were first introduced in the 1960s, but in 1990 they were enhanced. Unlike other machine learning algorithms, SVMs are implemented differently. They have recently gained a lot of popularity due to their capacity to handle various continuous and categorical data.

Operation of SVM

A hyperplane representing several classes in multidimensional space is all that an SVM model is. In order to cut down on error, SVM will iteratively construct the hyperplane. Using SVM, datasets are classified in search of the largest marginal hyperplane (MMH).

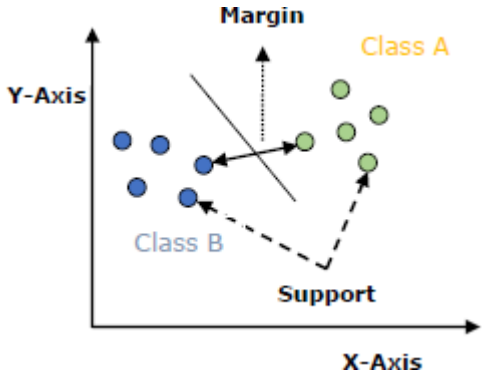

Figure.2 Classification using SVM

Kernels SVM

In reality, the SVM method is implemented by a kernel that transforms the input data space into the desired shape. The kernel trick is a technique utilised by SVM in which the kernel raises the dimension of a low-dimensional input space. Simply said, the kernel makes a problem separable by increasing the number of dimensions in it. As a result, SVM gets stronger, more flexible, and more precise. Here is a list of some of the kernel types that SVM uses.

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1. Linear Kernel.
2. Polynomial Kernel.
3. RBF Kernel, or Radial Basis Function

iii. CNN:-

The connectivity arrangement between the neurons in a CNN (Convolutional Neural Network, or ConvNet) is modelled after how the visual brain of an animal is organised.

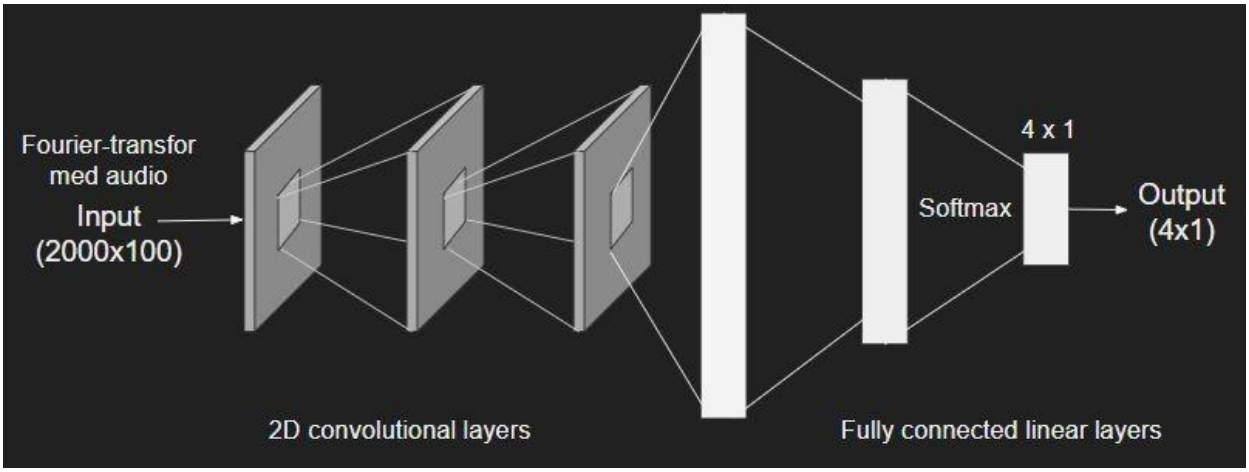

Figure.3 CNN Model

This model had three to four fully connected linear layers and two to four convolutional layers. three unique kernels configurations were tested:

Different size square kernels.
Slender rectangular kernels that only move in the time series' direction and are intended to capture features along eachsegment of the time series.
To record features along each segment, thin rectangular kernels are placed along the audio direction across time.

Due to the kernels' failure to capture any features, the first and second configurations underfitted. The third configuration,on the other hand, produced overfitting because the training accuracy was close to 80% and the validation accuracy was less than equilibrium (25%). Results were not improved by using overfitting reduction techniques such batch normalisation and dropout.

The values utilised to construct this CNN model are maximum length = 600, x = word idx, and y = tag idx. the model'soutput, which had a 91.84 percent accuracy rate and a 0.3668 percent value loss.

IV. CONCLUSION

Using the Small Free Music Archive (fma) dataset, music genre classification is examined. We suggested a straightforward solution to the categorization issue and made contrasts with numerous additional intricate, reliable models. On the basis of the input the models were receiving, we also contrasted them.
In this project to categorise the musical genres, we created a classifier on audio files to determine the genre. On the GTZANmusic genre classification data collection, we do this project. It describes how to take significant details out of audio recordings.

REFERENCES

[1]. Mlachmish/musicgenreclassification", github, 2019.
[2]. "Machine learning with signal processing techniques", 2018.
[3]. "music-classification",2021."Literature review about music genre classification":
[4]. Vishnupriya S, and K.Meenakshi "automatic music genre classification using convolution neural network", IEEE conference 2018.

DOI: 10.17148/IJIREEICE.2022.10735

[5]. G.Tzanetakis and P. Cook. "Musical genre classification of audio signals, speech and audio processing", IEEE transactions, july 2019.

[6]. Chandsheng Xu, Mc Maddage, Xi Shao, Fang Cao, and Qi Tan, "Musical genre classification using support vector machines," in International Conference of Acoustics, Speech, and Signal Processing, Volume 5, Pages V-429-32, 2019.

[7]. Hareesh Bahuleyan. Music genre classification using machine learning techniques. CoRR, abs/1804.01149, 2018.

[8]. Mingwen Dong. Convolutional neural network achieves human-level accuracy in music genre classification. CoRR, abs/1802.09697, 2018.

[9]. Music Genre Recognition Using Residual Neural Networks, Dipjyoti Bisharad ; Rabul Hussain Laskar TENCON2019 - 2019 IEEE Region 10 Conference (TENCON).

[10]. Parallel Recurrent Convolutional Neural Networks Based Music Genre Classification Method for Mobile Devices,Rui Yang ; Lin Feng ; Huibing Wang ; Jianing Yao ; Sen Luo IEEE AccessYear: 2020

[11]. On Combining Diverse Models for Lyrics-Based Music Genre Classification ,Caio Luiggy Riyoichi SawadaUeno;Diego Furtado Silva, 2019 8th Brazilian Conference on Intelligent Systems (BRACIS).

[12]. Athulya K M, Sindhu S,"Deep Learning Based Music Genre Classification Using Spectrogram", published on International Conference ICICNIS 2021 on 14 Jul 2021