



APHELION

Aphelion Music Genre Classification System

Developers' Manual

TEAM 5:

ADITYA PANWAR
PRASANNA
ANEESH
NAMAN

STEP 1: DOWNLAODING DATASET (GTZAN)

- Download the dataset called GTZAN from [here](#).
- Create a folder on your Google Drive (name it appropriately); *ME781_Project etc.*
- This folder will be used throughout the implementation.

STEP 2: MOUTNING THE DRIVE


- From the code files folder / GitHub Repo, import/download the notebook named **genre_mfcc_extraction.ipynb**
- But, before that you have to mount the drive you made in Step 1

```
from google.colab import drive
drive.mount("/content/gdrive")
```

MOUNT DRIVE (RUN THIS CODE IN
THE COLAB NOTEBOOK)


Go to this URL in a browser: https://accounts.google.com/o/oauth2/auth?client_id=947318989803-6bn6qk8qdgf4n4g3pfee6491hc0brc4i.apps.googleusercontent.com&redirect_uri=urn%3aietf%3awg%3

CLICK THE LINK GENERATED

 Sign in with Google



Make sure that you downloaded
this app from Google

 adityapanwar@iitb.ac.in

Don't sign in to [Google Drive for desktop](#) unless you're
sure that this app was downloaded from Google.

If you received a notification to move your accounts,
[Google Drive for desktop](#) may have been downloaded for
you by Backup and Sync.

If you're not sure whether you downloaded
[Google Drive for desktop](#) from Google, you should contact
Google Support.

Cancel


Sign in

AUTHORIZE BY SIGNING IN



Sign in

Please copy this code, switch to your application and paste it there:

4/1AX4XfwiyeJFWJ13gGaZIP3gvp0SucRcxv1rykU7qS7Vn
9mL_JfGe57xS_4 

COPY THE KEY

Enter your authorization code:

COPY THE KEY IN COLAB

STEP 3: EXTRACTING THE FEATURES FROM DATASET

- From the dataset, we need to extract MFCC features for various models and finally perform the prediction.
- We will use **genre_mfcc_extraction.ipynb** for this:
 - using the folder we mounted in Step 2, we will run, extract and save the .json file named **gtzan_mfcc.json**
 - You only have to provide the relative path of the dataset in line 9 (**wav_path variable**) of the notebook here:

```
labels=['pop','metal','disco','blues','reggae','classical','rock','  
wav_path = 'GTZAN/genres/' #Relative location of dataset  
files=[] #Empty list to store audio filenames
```

- Now, simply run all the cells and you are golden!
- Using the generated .json file you will be running various models

Running Models

For our product, we tested various models and the CNN model came on top!

If you want to run and check all the other models namely: [ML \(kNN, SVM, random forest etc.\)](#), [RNN](#), [ANN](#) and [LSTM](#) along with [CNN](#).

Here we will demonstrate [CNN](#) model running and prediction since that is the selected model:

- Import [CNN.ipynb](#) notebook
- You will have to mount the drive folder again (refer to Step 1)
- Remember, we extracted the features in a JSON file, that's what we will employ here (and in other models too). How?
 - Provide the path of the file from your folder

```
import json
import numpy as np
from sklearn.model_selection import train_test_split

from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense, Dropout, Flatten, Conv2D, MaxPool2D, BatchNormalization
from tensorflow.keras.optimizers import Adam
from tensorflow.keras.regularizers import l1_l2, l2

with open('/content/drive/MyDrive/ME781_Project/gtzan_mfcc.json', "r") as file:
    data = json.load(file) #Load MFCC dataset from JSON file

X = np.array(data["mfcc"]) #Load MFCCs
y = np.array(data["labels"]) #Load corresponding genre names

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=0) #Splitting
```

- Now, simply run all the cells, sit back and relax while the epochs do their thing.

Running Models

- Since based on high accuracy we are using the **CNN** model, let's save this model.
 - Check the last cell in the notebook; this saves your model named **music_cnn.h5**

```
[ ] model.save('/content/drive/MyDrive/781_Project/music_cnn.h5')
```

Prediction

- Import **CNN_genre_predict.ipynb** notebook
- You know the drill - mount the drive again, **why?**
 - *For loading the model &*
 - *For testing the dataset*
- So first, let's load the saved CNN model (using **model** variable) provide the relative path

```
!pip install pydub
from tensorflow import keras
import librosa
import numpy as np
import math
import warnings
import IPython.display as ipd
from IPython.core.display import display
warnings.filterwarnings('ignore')

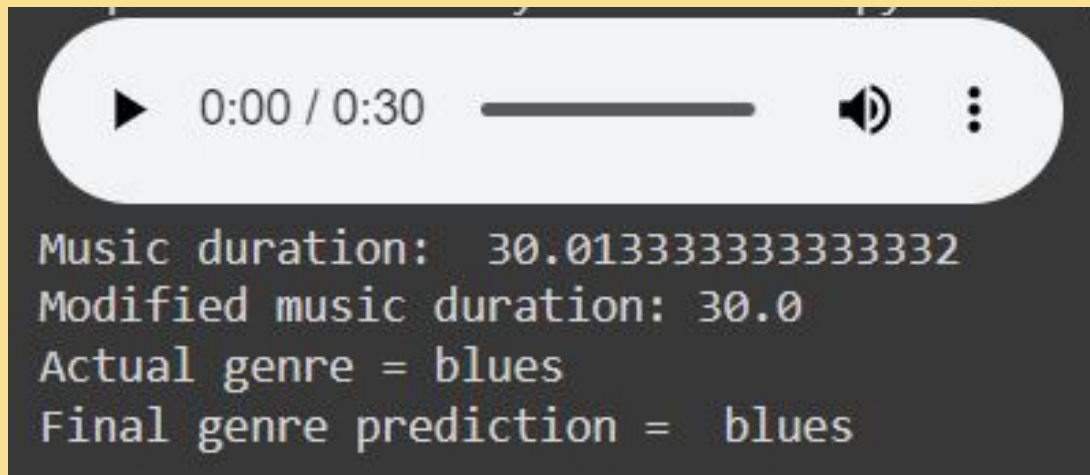
model = keras.models.load_model("/content/drive/MyDrive/ME781_project/music_cnn.h5")
#genres = ["pop", "metal", "disco", "blues", "reggae", "classical", "rock", "hiphop", "country", "jazz"]
genres = ["blues", "metal"]
for genre in genres:
    genre_new = genre + '_new'
```

- Next, pass on the testing file using the **filename** variable

```
filename = "/content/drive/MyDrive/ME781_project/test/1.wav"
```

Prediction

- Voila! You are done and using the widgets generated you can not only see the original and predicted genre but also hear the music file.



Running Other Models

- For running all other models:
 - Import individual notebooks like ANN, RNN etc.
 - Mount the drive
 - Provide the path for **gtzan_mfcc.json** in the relevant portion of the cell
 - Run the cells and you can check the accuracy
- Prediction steps remain as such



Any Queries?

CONTACT:

adityapanwar@iitb.ac.in
infoaphelion@gmail.com