APHELION

Aphelion Music Genre Classification System

Developers' Manual

TEAM 5:

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STEP 1: DOWNLAODING DATASET (GTZAN)

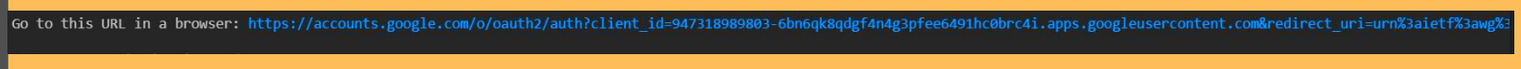
- Download the dataset called GTZAN from here.
- Create a folder on your Google Drive (name it appropriately); *ME781_Project etc.*
- This folder will be used throughout the implementation.

STEP 2: MOUTNING THE DRIVE

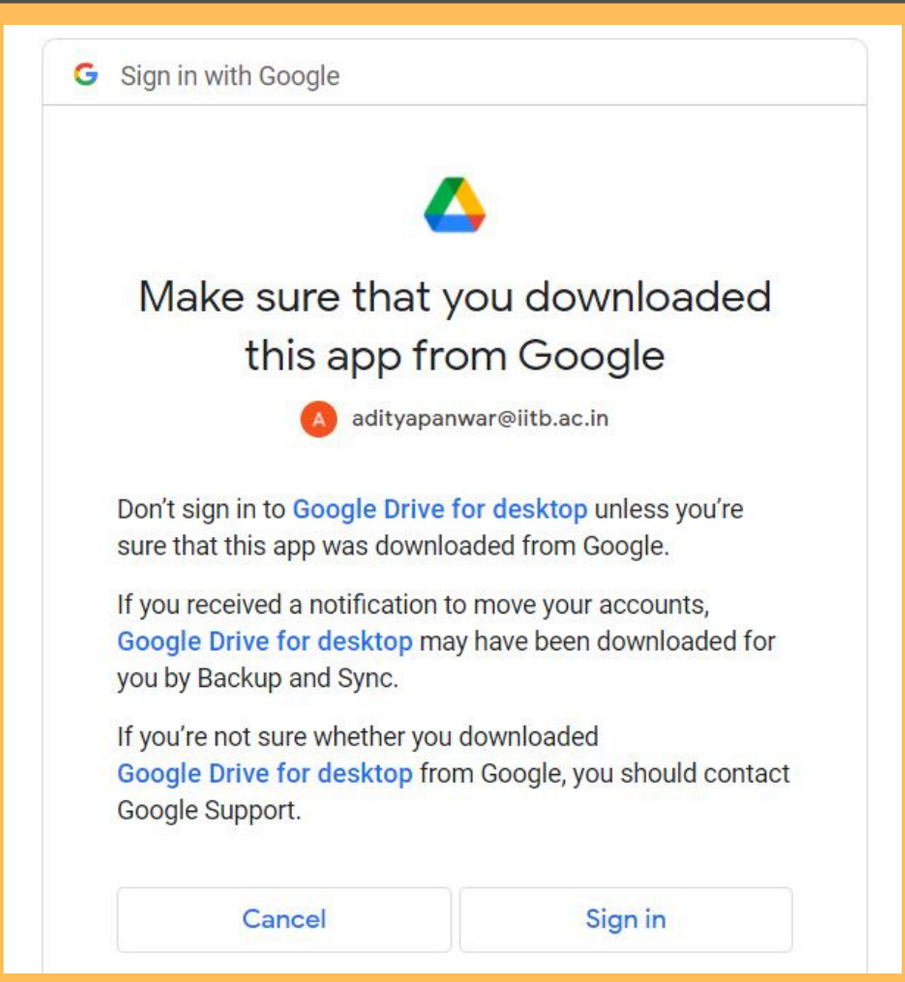
- From the code files folder / GitHub Repo, import/download the notebook named **genre_mfcc_extraction.ipynb**
- But, before that you have to mount the drive you made in Step 1

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

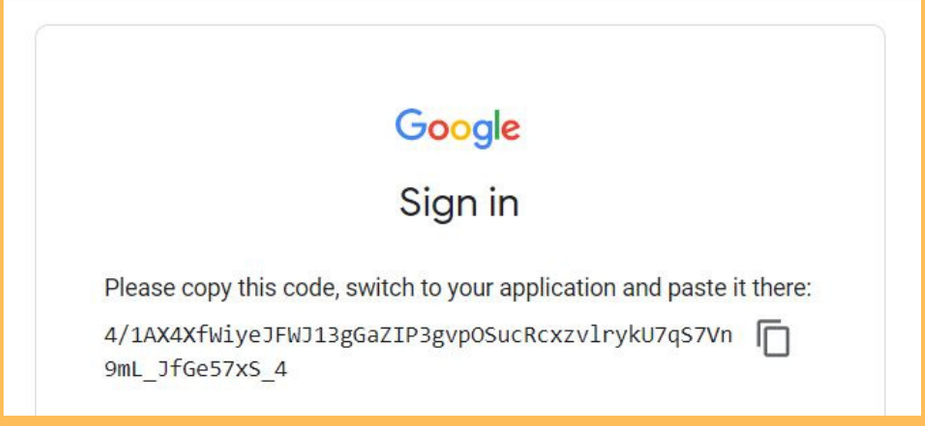
MOUNT DRIVE (RUN THIS CODE IN THE COLAB NOTEBOOK)



CLICK THE LINK GENERATED



AUTHORIZE BY SIGNING IN



COPY THE KEY

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

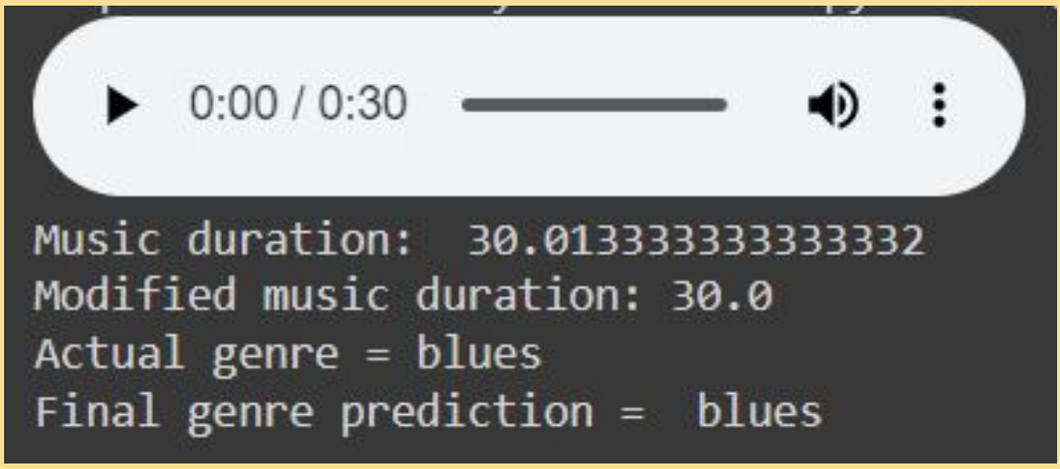
```
!pip install pydub
from tensorflow import keras
import librosa
import numpy as np
import math
import warnings
import IPython.display as ipd
from IPython.core.display import display
warnings.filterwarnings('ignore')

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?

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