Music Genre Classifier

Status Completed

Overview

This project aims to detect the genre of music by just using a music file. The model I made is trained on filtered tracks from the GTZan dataset, which originally contains 10,000 tracks across 10 genres.

Objectives

Training objectives

- Filtering out by making sure that all tracks are of same length and appropriately normalized
- Researching over similar projects done, analyze and understand the process and CNN config required
- Use Google Colab in GPU mode and try to train the model with planned config, as accurate as possible

Project objectives

- Make an easy-to-use notebook to upload tracks and get classification

- Generate waveform of the uploaded audio file
- Keep the model light-weight and local system friendly

Result

Overall

Made an outstanding model, which is able to easily classify music across genres, with some caveats as even humans are unable to differentiate between certain named genres.

Accuracy report

- Gained a 62% value accuracy, nearly competing humans (said to have 70% genre classification accuracy)
- No signs of underfitting or overfitting
- Clear description of top 3 categories with confidence score having 2-digit decimal prediction

Downsides

- Throughout the training and confidence test process, I can clearly see the model performing weak across certain genres
- This helps to understand that how often humans also confuse among certain genres like unable to differentiate between rock and metal
- Managed to decent accuracy across other 8 genres, with little low accuracy around blues and rock categories

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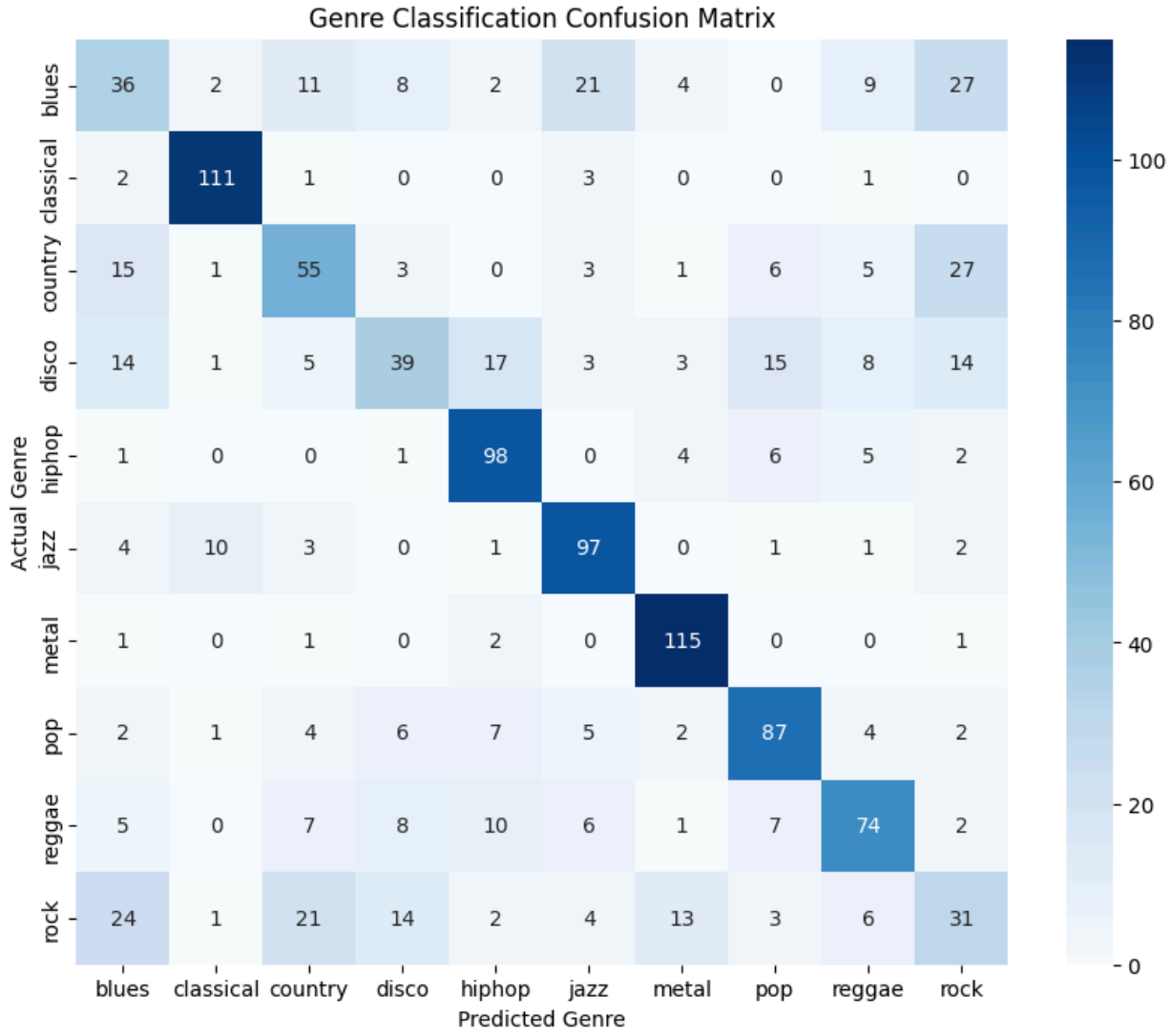
Milestones

Date	Milestone	Description	Expected outcome
Jun 12, 2025	Research	Research on the Machine Learning aspect of music and find suitable graphs, dataset, test music to properly train and classify among various genres.	A good dataset, graph and training config to work on.
Jun 17, 2025	Training	Training a model with planned configs and test out the accuracy while using different approaches (eg. weighted training vs non weighted)	A reliable model for the project
Jun 22, 2025	Finalizing	Preparing appropriate notebook file for trying out the model, writing description and report	A presentable and ready project

Screenshots and prediction demo

Confusion matrix:

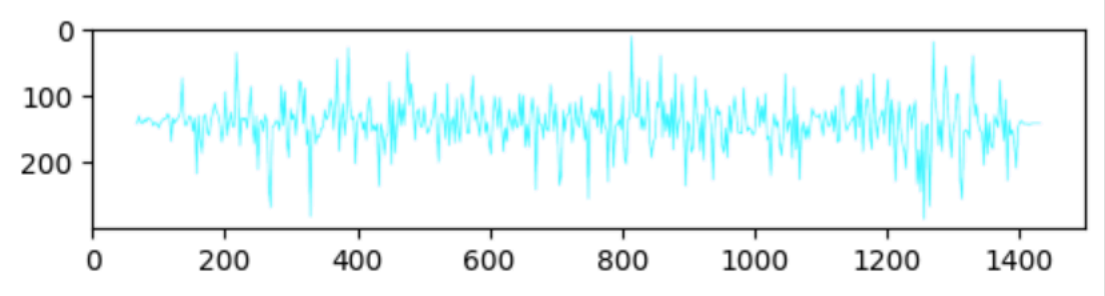


Classification Interface:

Jazz music

```
Model loaded from /gztan_melspectro.keras
Please upload an MP3 file (up to 30 seconds).
Choose Files 03TakeFive.mp3
• 03TakeFive.mp3(audio/mpeg) - 7391232 bytes, last modified: 6/25/2025 - 100% done
Saving 03TakeFive.mp3 to 03TakeFive (8).mp3

Uploaded: 03TakeFive (8).mp3
Analyzing audio...
```

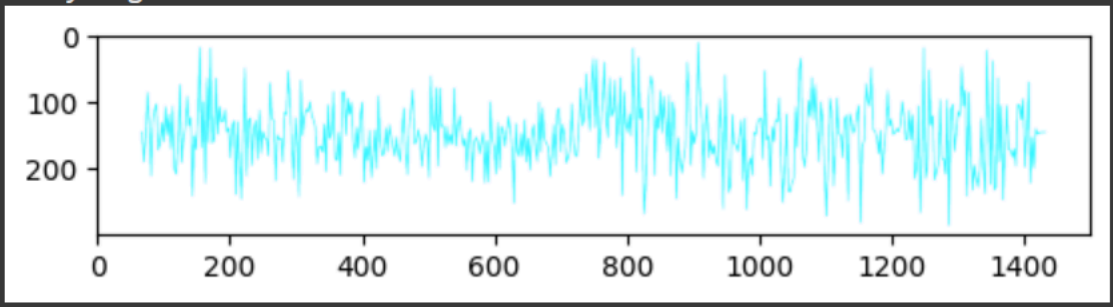



```
Predictions using gztan_melspectro.keras:
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 225ms/step
# jazz: 0.3381
# metal: 0.1717
# classical: 0.1422
```

Pop music

```
• Levitating.mp3(audio/mpeg) - 8126215 bytes, last modified: 6/25/2025 - 100% done
Saving Levitating.mp3 to Levitating.mp3

Uploaded: Levitating.mp3
Analyzing audio...
```

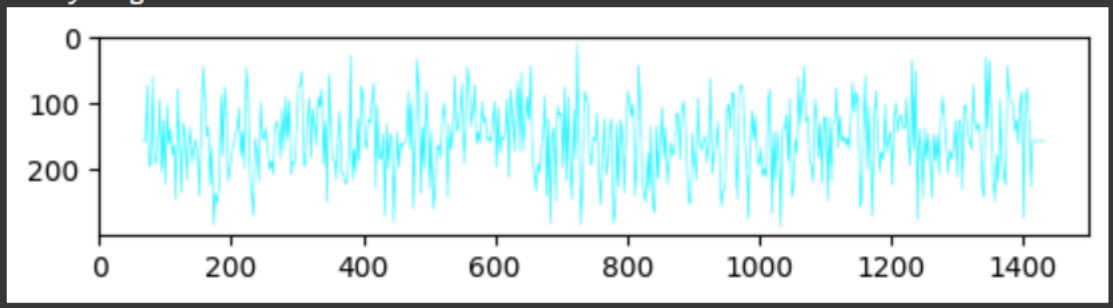



```
Predictions using gztan_melspectro.keras:
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 247ms/step
# pop: 0.3731
# reggae: 0.1779
# disco: 0.1362
```

Metal music

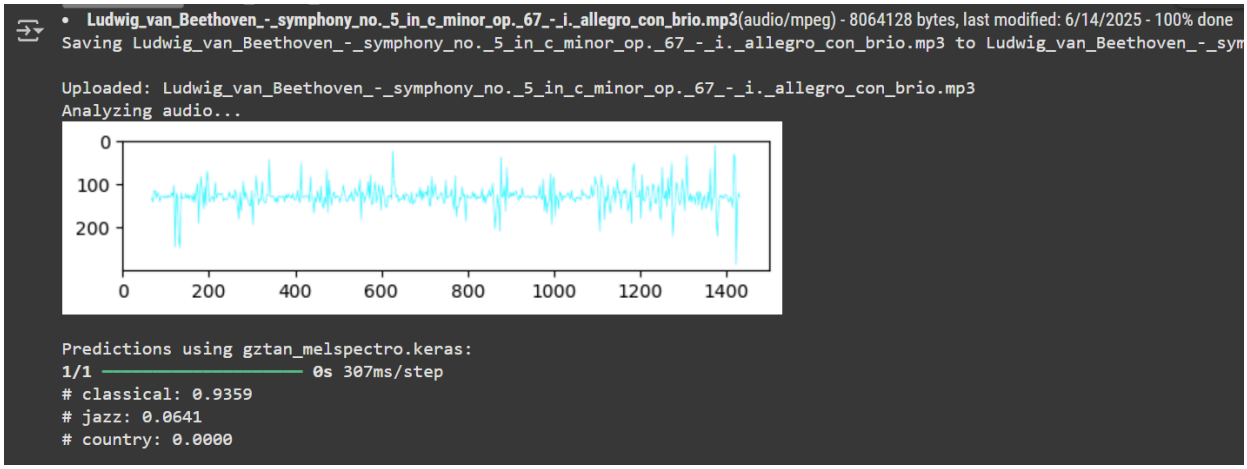
```
• 2metal_music.mp3(audio/mpeg) - 1715912 bytes, last modified: 6/25/2025 - 100% done
Saving 2metal_music.mp3 to 2metal_music.mp3

Uploaded: 2metal_music.mp3
Analyzing audio...
```




```
Predictions using gztan_melspectro.keras:
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 221ms/step
# metal: 0.2283
# disco: 0.1362
# hiphop: 0.1075
```

Classical music



Hiphop music