Audio & Music Processing Lab - 2023
Essentia Playlists - Thomas LE ROUX

1 - Audio analysis

Our goal is to extract features from a folder of 2100 files given to us.

We are going to extract 5 features :
- Tempo using the RhythmExtractor2013 algorithm (an audio signal processing one)
- Danceability using an audio signal processing algorithm
- Voice/Instrumental classification using the MusiCNN model
- Arousal/Valence values using the emoMusic MusiCNN model
- Music Styles using the Discogs-effnet model

Some details about the work done :
- We define a my_home variable, both in the bash and the python environment. This allows us to make it more flexible, and to be run with more flexibility as long as it is well defined.
- We use bash commands to create a list of all the files. This only works for .mp3 files but could be easily modified for other genres.
- The weights files are curled. No need to upload them, except if the essentia codebase is down.
- 2 files caused issues
- The whole processing took 2*1.5h on Colab with the GPU (had to do it in 2 times because of GPU usage restriction).

2 - Playlist generation

We use Streamlit to have a UI to control our playlist generator.
We extend the given UI example to introduce new ways of filtering the tracks :
- by tempo (double-ended slider)
- by Vocal/Instrumental (choice picker : both, instrumental or vocal)
- by danceability (double-ended slider)
- by arousal / valence (two double-ended sliders)

Those filters add to the music-style one already in place.

Because of a few number of tracks in this dataset, it's hard to make a very interesting playlist. This tool should be tested on a wider database to attest the quality and the accuracy of what we did.

After testing on our dataset, the behavior seems … unclear and not precise. Asking for a techno track with a decent activation (0.10 which should be enough) with a bpm between 130 and 150 and a more instrumental track gives us only 2 tracks which appear to be more of the trance genre.

With 400 sub-genres and only 2100 tracks, it's complicated to see the big picture, but it can be a good tool to automatically sort tracks with a more significant database.