Data used: **GTZAN Dataset - Music Genre Classification**
Librosa and Essentia:

- Tempo
- Energy
- Loudness: extracted in dB
- Key
- Mode
- Instrumentalness
    - Extract the vocal track in the music
    - Classify it as the vocal or speech
    - Extract the speech track and than divide over the total frame
- Danceability
- Loudness (Essentia): not in dB not same as spotify output

	energy	loudness_librosa	danceability	loudness_essentia
count	999.000000	999.000000	999.000000	999.000000
mean	0.130826	-55.592362	1.345035	0.874498
std	0.065671	7.905616	0.375967	0.194330
min	0.005270	-75.975586	0.692178	0.002467
25%	0.086566	-61.561386	1.084862	0.885666
50%	0.122181	-54.447525	1.296022	0.952602
75%	0.175621	-49.416441	1.533512	0.972000
max	0.397734	-35.390053	3.923712	0.988212

	danceability	energy	loudness	speechiness	acousticness	instrumentalness	liveness	valence	tempo
count	114000.000000	114000.000000	114000.000000	114000.000000	114000.000000	114000.000000	114000.000000	114000.000000	114000.000000
mean	0.566800	0.641383	-8.258960	0.084652	0.314910	0.156050	0.213553	0.474068	122.147837
std	0.173542	0.251529	5.029337	0.105732	0.332523	0.309555	0.190378	0.259261	29.978197
min	0.000000	0.000000	-49.531000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
25%	0.456000	0.472000	-10.013000	0.035900	0.016900	0.000000	0.098000	0.260000	99.218750
50%	0.580000	0.685000	-7.004000	0.048900	0.169000	0.000042	0.132000	0.464000	122.017000
75%	0.695000	0.854000	-5.003000	0.084500	0.598000	0.049000	0.273000	0.683000	140.071000
max	0.985000	1.000000	4.532000	0.965000	0.996000	1.000000	1.000000	0.995000	243.372000

Further Investigation for variable:

- Acousticness
    - Weather the music is purely from instrument and do not have any electric effects or components
- Liveness (Not important, detect if the track is perform live → not related)
- Speechiness:
    - Extract the vocal track in the music
        - Classify it as the vocal or speech
        - Extract the speech track and than divide over the total frame
- Valence
    - https://github.com/GlenCrawford/musical_valence_predictor/blob/master/musical_valence_predictor.py

1. Approximation from libraries
2. Using available Dataset to train model to predict above variables:

a. Data Used: **Spotify Tracks Dataset**
    i. Acousticness
        1. Root Mean Squared Error on test data: 0.68
        2. Root Mean Squared Error on training data: 0.67
    ii. Instrumentalness
        1. Root Mean Squared Error on test data: 0.87
        2. Root Mean Squared Error on training data: 0.87
    iii. Liveness
        1. Root Mean Squared Error on test data: 0.97
        2. Root Mean Squared Error on training data: 0.96
    iv. Speechiness
        1. Root Mean Squared Error on test data: 0.97
        2. Root Mean Squared Error on training data: 0.98
    v. Valence
        1. Root Mean Squared Error on test data: 0.85
        2. Root Mean Squared Error on training data: 0.86