

SPECTRAL CENTROID

It indicates where the "centre of mass" for a sound is located and is calculated as the weighted mean of the frequencies present in the sound. for instance take an example of blues genre song which has the same frequencies throughout its length, the rock song has more frequencies towards the end. it is another feature that can Distinguish between certain genres. So spectral centroid for blues song will lie somewhere near the middle of its spectrum while that for a metal song would be towards its end.

```
In [1]: import librosa as lr
import librosa.display
import matplotlib.pyplot as plt
import sklearn.preprocessing

import matplotlib.style as ms
%matplotlib inline
import numpy as np
import os
```

visualizing the

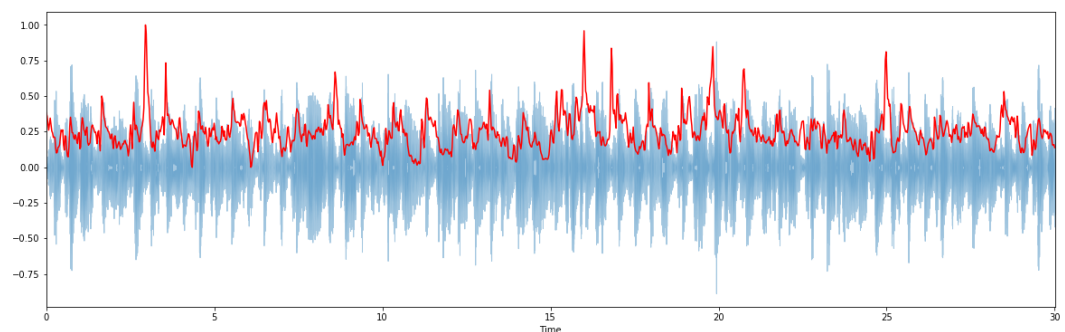
```
In [2]: blues_audio='/home/vivek/Genre_Detection/genres/blues/blues.00000.au'
x , sr =lr.load(blues_audio)
spectral_centroids = librosa.feature.spectral_centroid(x, sr=sr)[0]

# Computing the time variable for visualization
frames = range(len(spectral_centroids))
t = librosa.frames_to_time(frames)

# Normalising the spectral centroid for visualisation
def normalize(x, axis=0):
    return sklearn.preprocessing.minmax_scale(x, axis=axis)

#Plotting the Spectral Centroid along the waveform
plt.figure(figsize=(20, 6))
librosa.display.waveplot(x, sr=sr, alpha=0.4)
plt.plot(t, normalize(spectral_centroids), color='r')
```

```
Out[2]: [<matplotlib.lines.Line2D at 0x7fce98f6db00>]
```

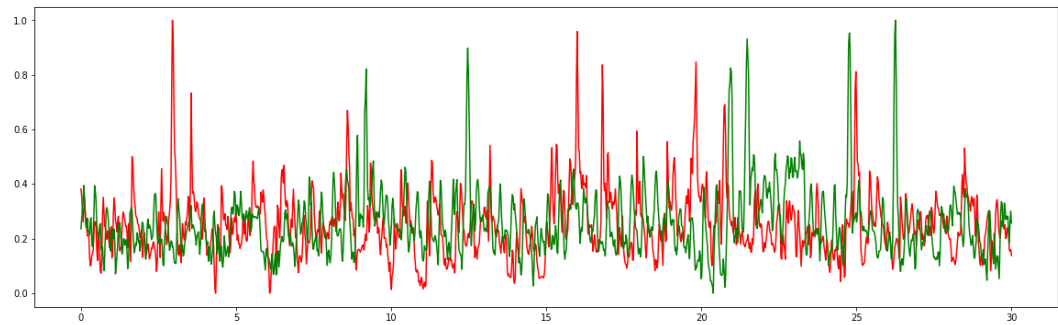


The spectral centroid is same throughout the audio

```
In [3]: metal_audio='/home/vivek/Genre_Detection/genres/metal/metal.00001.au'
y , sr =lr.load(metal_audio)
spectral_centroids1 = librosa.feature.spectral_centroid(y, sr=sr)[0]

frames = range(len(spectral_centroids1))
t1 = librosa.frames_to_time(frames)

#Plotting the Spectral Centroid of both genres
plt.figure(figsize=(20, 6))
plt.plot(t, normalize(spectral_centroids), color='r')
plt.plot(t1, normalize(spectral_centroids1), color='g')
plt.show()
```



Slightly rightwards shifting can be observed in the green graph Let's have a look at the mean of our numpy array

```
In [4]: print("For blues sample-",np.mean(spectral_centroids),"For metal sample",np.
mean(spectral_centroids1))
```

For blues sample- 1784.1658495387555 For metal sample 2922.8451953795866

```
In [ ]:
```