OnsetDetection

April 18, 2018

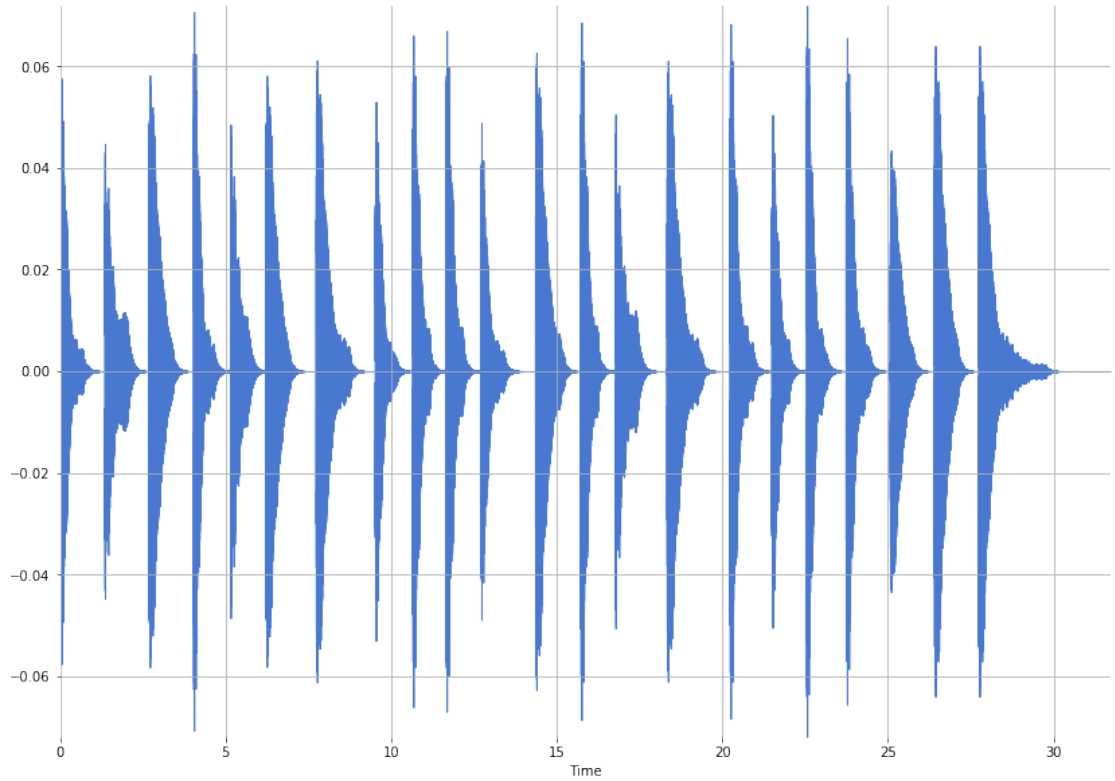
```
In [2]: %matplotlib inline
        import numpy, scipy, matplotlib.pyplot as plt, IPython.display as ipd
        import librosa, librosa.display
        import stanford_mir; stanford_mir.init()
```

```
In [140]: x, sr = librosa.load('/Users/nickpourazima/GitHub/he-sm/AudioFiles/dynamic_staccato_4
          print(x.shape, sr)
```

```
(699338,) 22050
```

```
In [141]: plt.figure(figsize=(14, 10))
          librosa.display.waveplot(x, sr)
```

```
Out[141]: <matplotlib.collections.PolyCollection at 0x1462ba6d8>
```



```
In [142]: onset_frames = librosa.onset.onset_detect(x, sr=sr)
          print(onset_frames) # frame numbers of estimated onsets
```

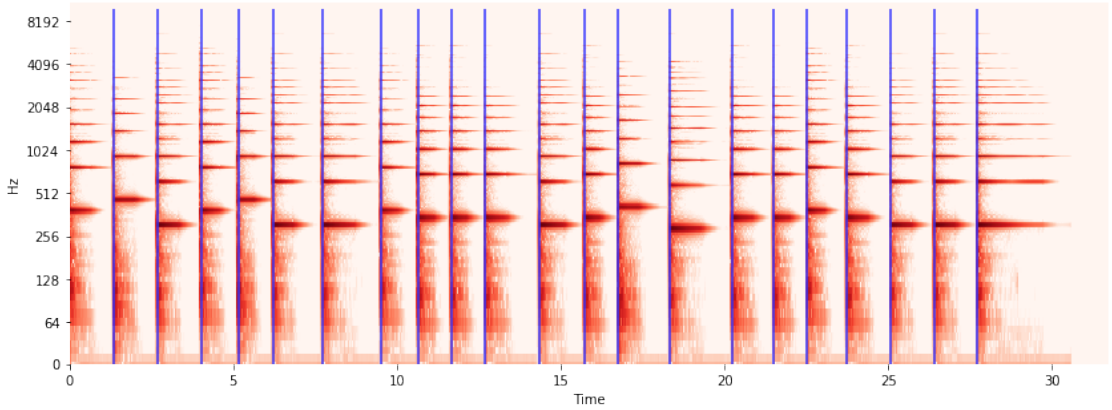
```
[  58  116  173  222  268  333  410  458  502  547  618  677  722  789
  871  925  970 1022 1080 1137 1194]
```

```
In [143]: onset_times = librosa.frames_to_time(onset_frames)
          print(onset_times)
```

```
[ 1.34675737  2.69351474  4.01705215  5.15482993  6.22294785  7.7322449
  9.52018141 10.63473923 11.65641723 12.70131519 14.34993197 15.7199093
 16.76480726 18.32054422 20.2245805  21.47845805 22.52335601 23.73079365
 25.07755102 26.40108844 27.72462585]
```

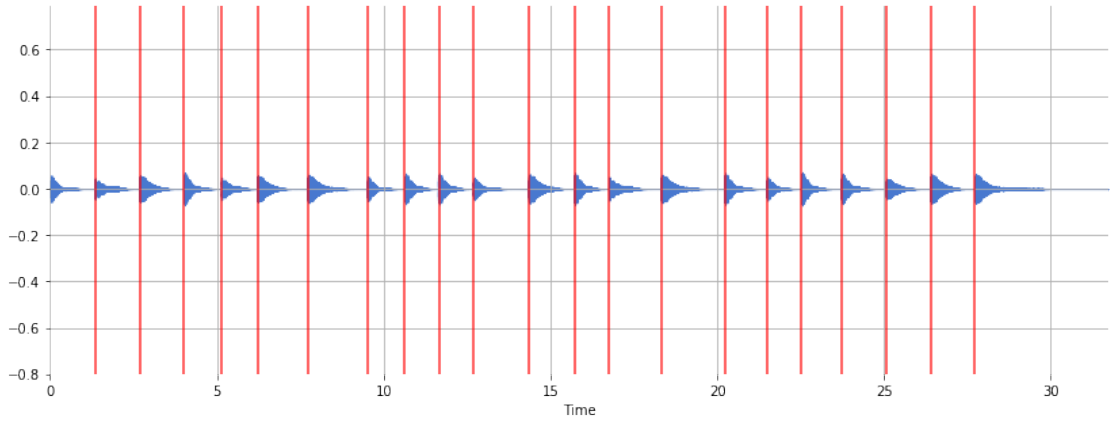
```
In [144]: S = librosa.stft(x)
          logS = librosa.amplitude_to_db(abs(S))
          plt.figure(figsize=(14, 5))
          librosa.display.specshow(logS, sr=sr, x_axis='time', y_axis='log', cmap='Reds')
          plt.vlines(onset_times, 0, 10000, color='#3333FF')
```

```
Out[144]: <matplotlib.collections.LineCollection at 0x1462c6ba8>
```




```
In [145]: plt.figure(figsize=(14, 5))
          librosa.display.waveplot(x, sr=sr)
          plt.vlines(onset_times, -0.8, 0.79, color='r', alpha=0.8)
```

```
Out[145]: <matplotlib.collections.LineCollection at 0x141e92438>
```


0.6
0.4
0.2
0.0
−0.2
−0.4
−0.6
−0.8
0
5
10
15
20
25
30
Time