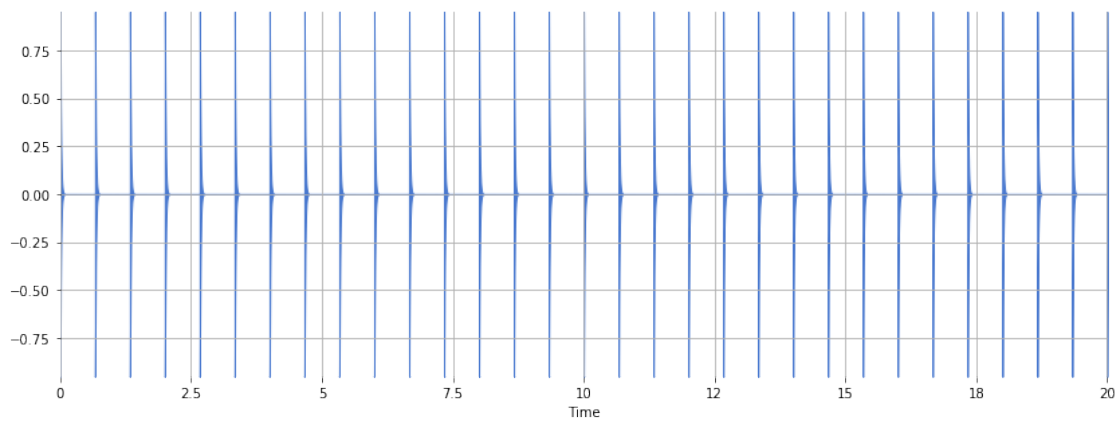# OnsetDetection

April 16, 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 [10]: x, sr = librosa.load('/Users/nickpourazima/GitHub/he-sm/AudioFiles/click_44.1_16bit_2(
         print(x.shape, sr)

(441429,) 22050


In [11]: plt.figure(figsize=(14, 5))
         librosa.display.waveplot(x, sr)

Out[11]: <matplotlib.collections.PolyCollection at 0x114fe67f0>
```



```
In [12]: onset_frames = librosa.onset.onset_detect(x, sr=sr)
         print(onset_frames) # frame numbers of estimated onsets

[ 29   58   87 115 144 173 202 230 259 288 316 345 374 403 431 460 489 517
 546 575 604 632 661 690 718 747 776 805 833 862]
```

```
In [13]: onset_times = librosa.frames_to_time(onset_frames)
         print(onset_times)

[ 0.67337868  1.34675737  2.02013605  2.67029478  3.34367347  4.01705215
  4.69043084  5.34058957  6.01396825  6.68734694  7.33750567  8.01088435
  8.68426304  9.35764172 10.00780045 10.68117914 11.35455782 12.00471655
 12.67809524 13.35147392 14.02485261 14.67501134 15.34839002 16.02176871
 16.67192744 17.34530612 18.01868481 18.69206349 19.34222222 20.01560091]


In [14]: 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[14]: <matplotlib.collections.LineCollection at 0x114e013c8>
```
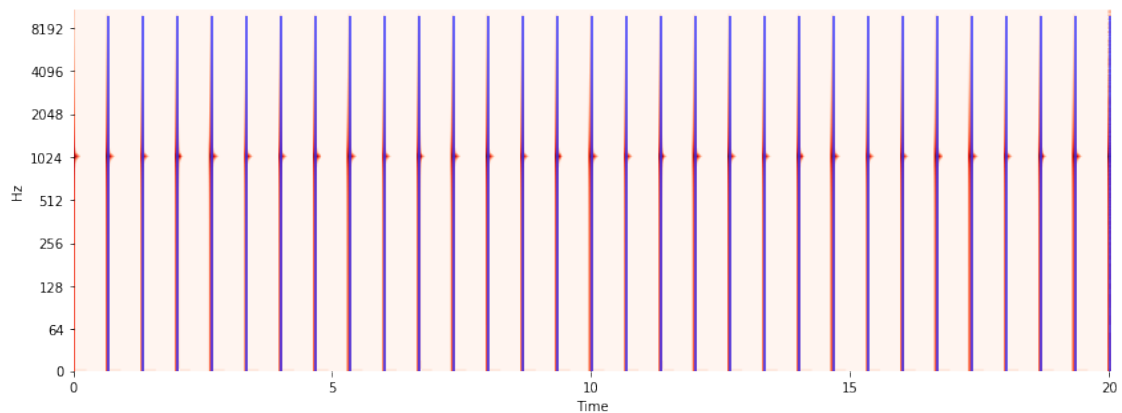


```
In [15]: plt.figure(figsize=(14, 5))
         librosa.display.waveplot(x, sr=sr)
         plt.vlines(onset_times, -0.8, 0.79, color='r', alpha=0.8)

Out[15]: <matplotlib.collections.LineCollection at 0x114faa860>
```


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