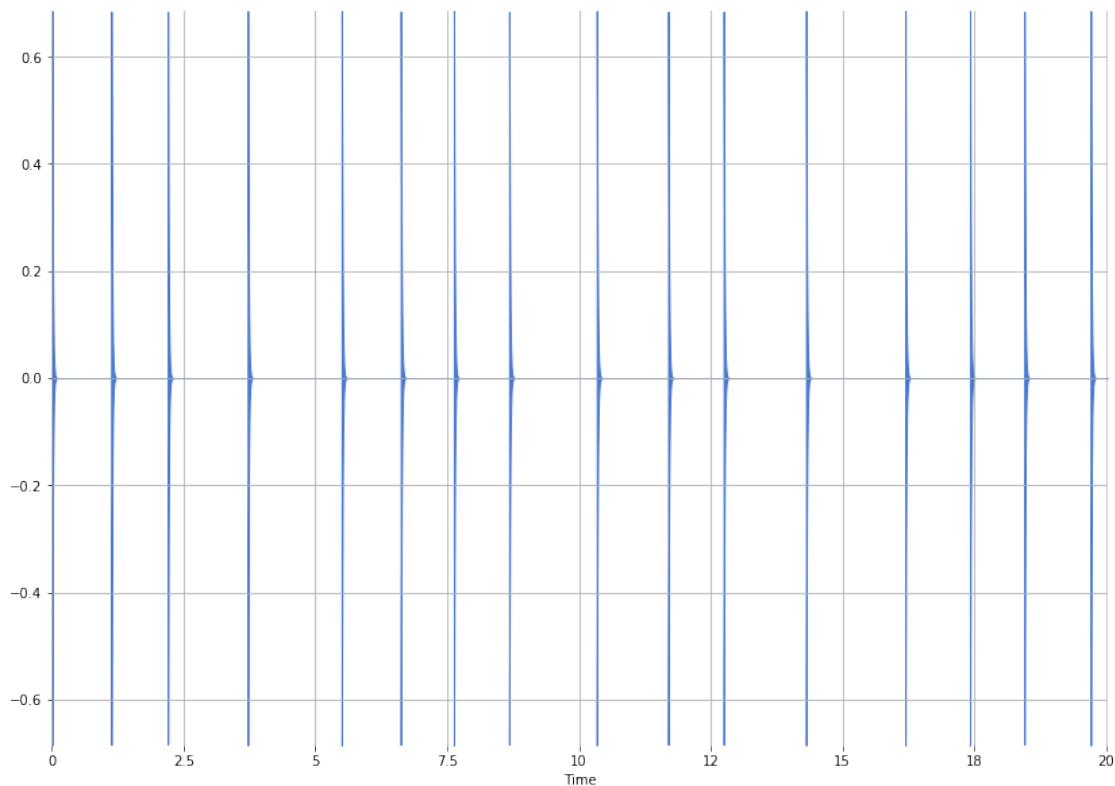# OnsetDetection

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 [103]: x, sr = librosa.load('/Users/nickpourazima/GitHub/he-sm/AudioFiles/dynamic_click_44.
          print(x.shape, sr)
```

```
(441619,) 22050
```

```
In [105]: plt.figure(figsize=(14, 10))
          librosa.display.waveplot(x, sr)
```

```
Out[105]: <matplotlib.collections.PolyCollection at 0x13b334e80>
```

```
In [106]: onset_frames = librosa.onset.onset_detect(x, sr=sr)
          print(onset_frames) # frame numbers of estimated onsets

[ 49  95 161 237 286 329 374 446 504 550 617 698 751 795 849]


In [107]: onset_times = librosa.frames_to_time(onset_frames)
          print(onset_times)

[ 1.13777778  2.20589569  3.7384127   5.50312925  6.64090703  7.63936508
  8.68426304 10.35609977 11.70285714 12.77097506 14.32671202 16.20752834
 17.43818594 18.45986395 19.7137415 ]


In [108]: 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[108]: <matplotlib.collections.LineCollection at 0x13b380400>
```
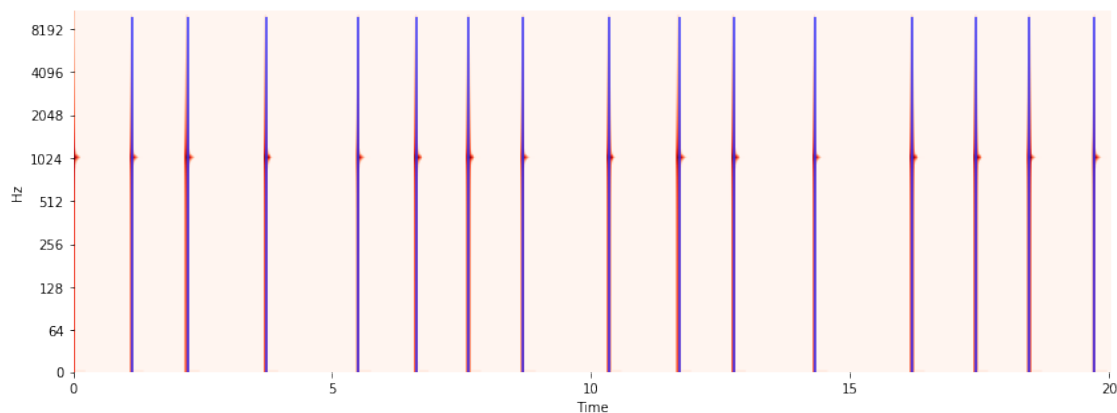


```
In [109]: plt.figure(figsize=(14, 5))
          librosa.display.waveplot(x, sr=sr)
          plt.vlines(onset_times, -0.8, 0.79, color='r', alpha=0.8)

Out[109]: <matplotlib.collections.LineCollection at 0x139fcec50>
```

Time