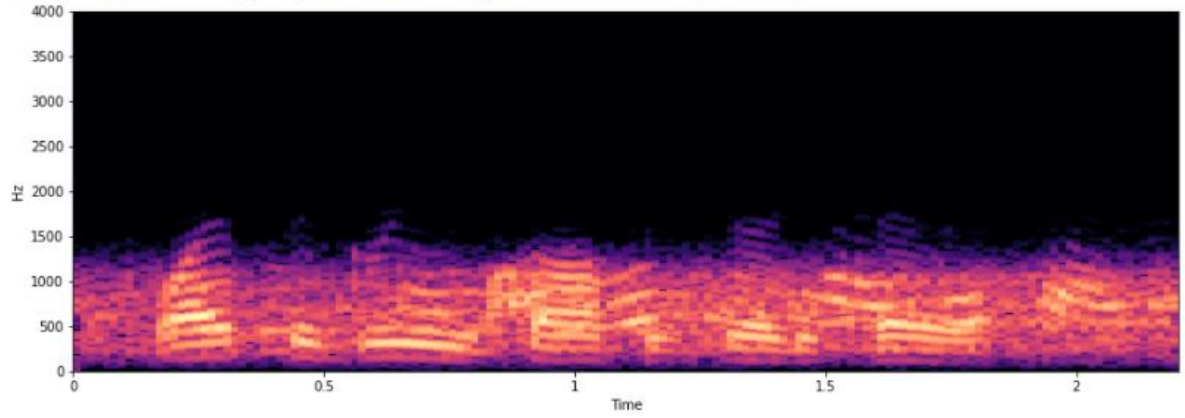
SIT789 - Applications of Computer Vision and Speech Processing

Credit Task 7.2: Speech enhancement

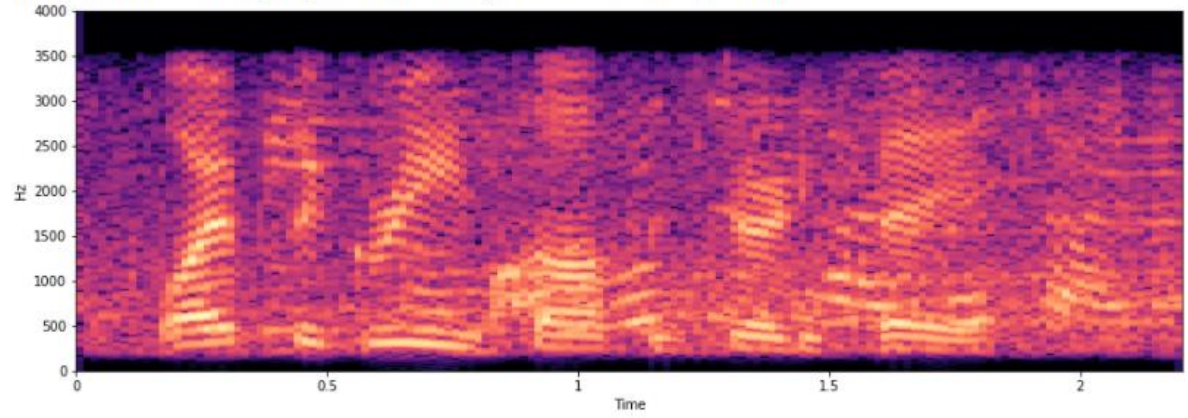
- **filtered_s visualization:**

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f0ccf99c630>
```



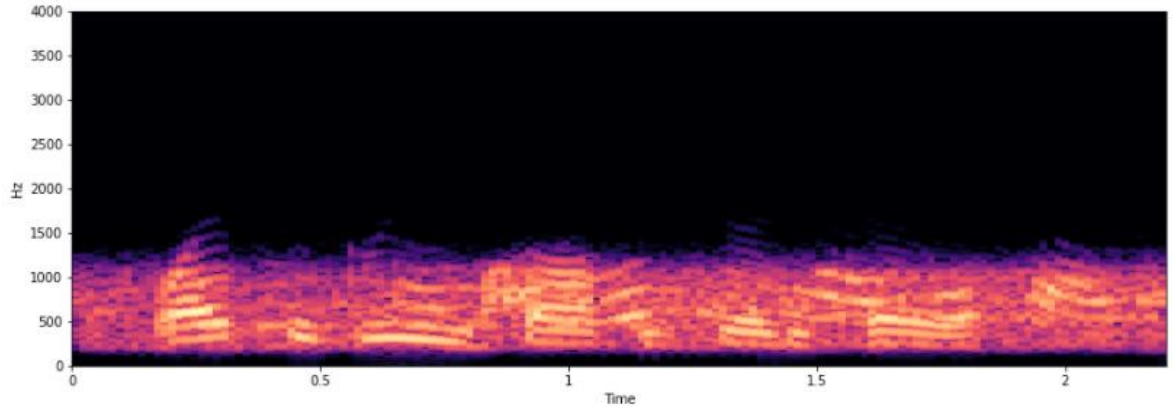
- **highpass visualization:**

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f0ccd595160>
```



- **bandpass visualization:**

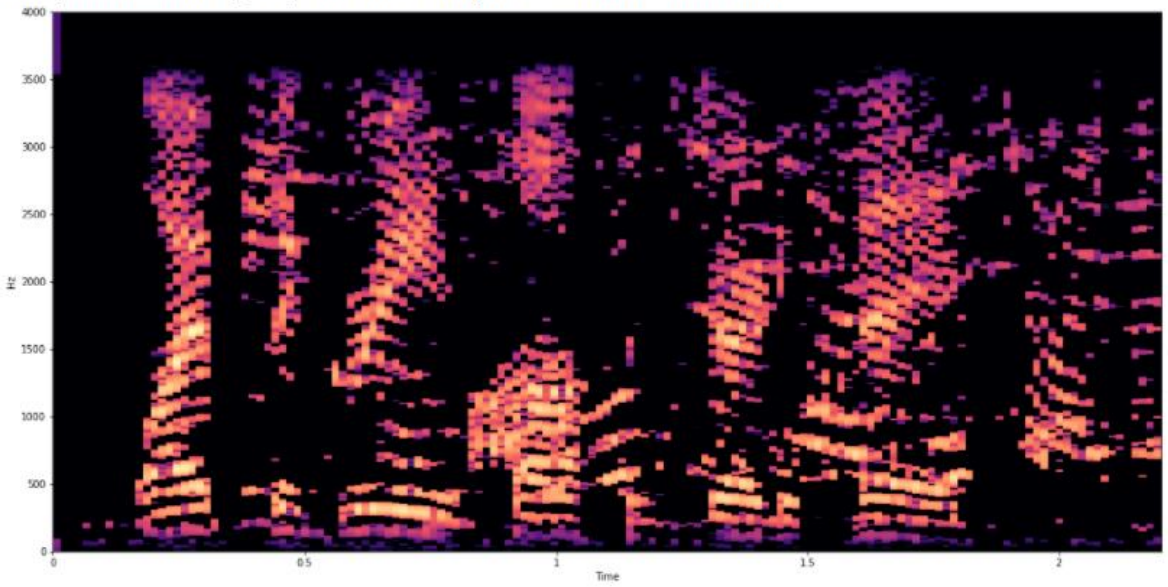
```
<matplotlib.axes._subplots.AxesSubplot at 0x7f0cc5ba49b0>
```



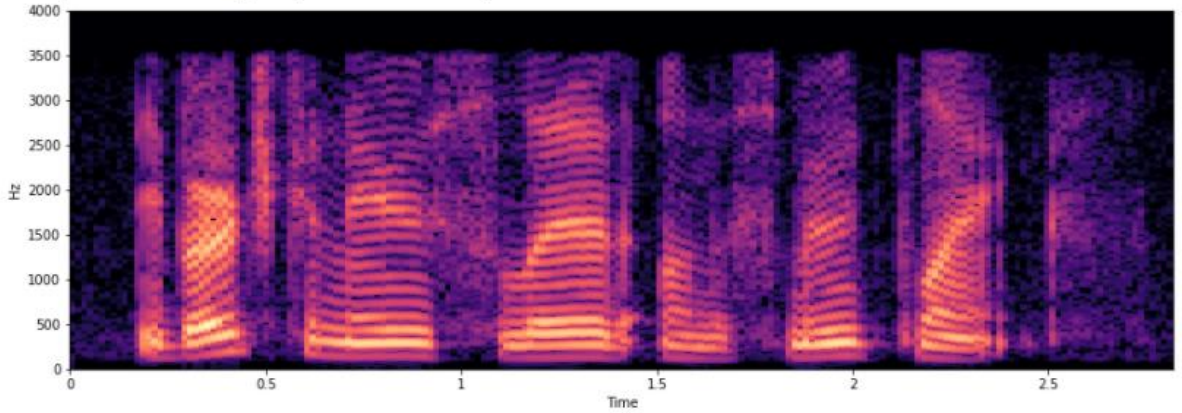
1.spectral subtraction on station_sn5 and clean signal

Observation: When observed and compared with the original data file, the file after spectral subtraction was more audibly clear with less noise.

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f0ccd8e1860>
```

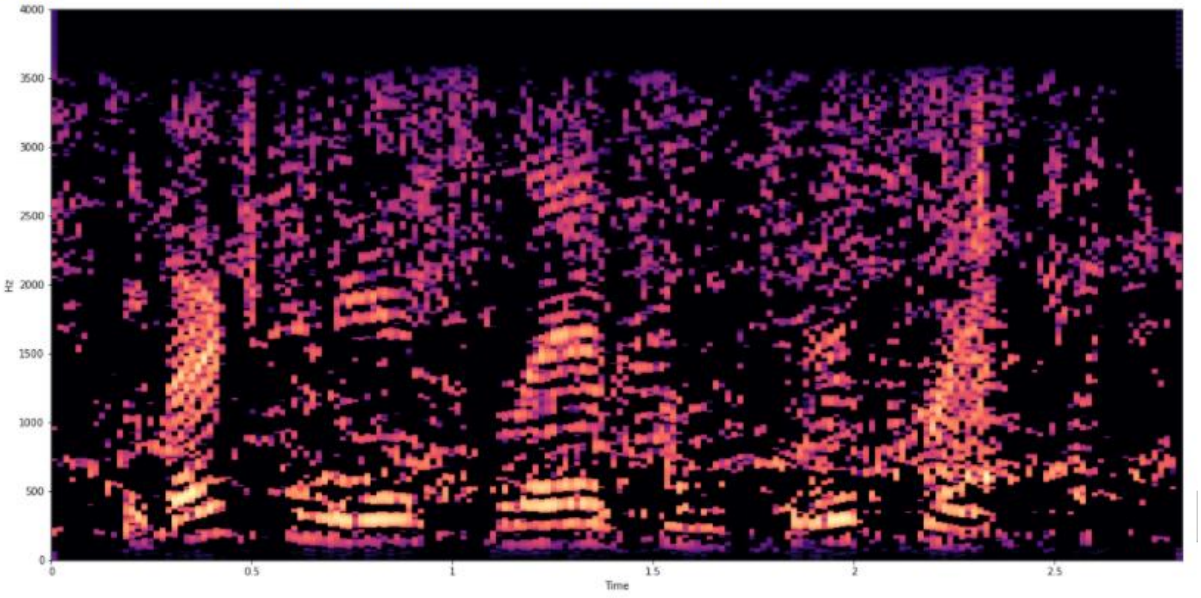



```
<matplotlib.axes._subplots.AxesSubplot at 0x7f0cc5b8d9e8>
```



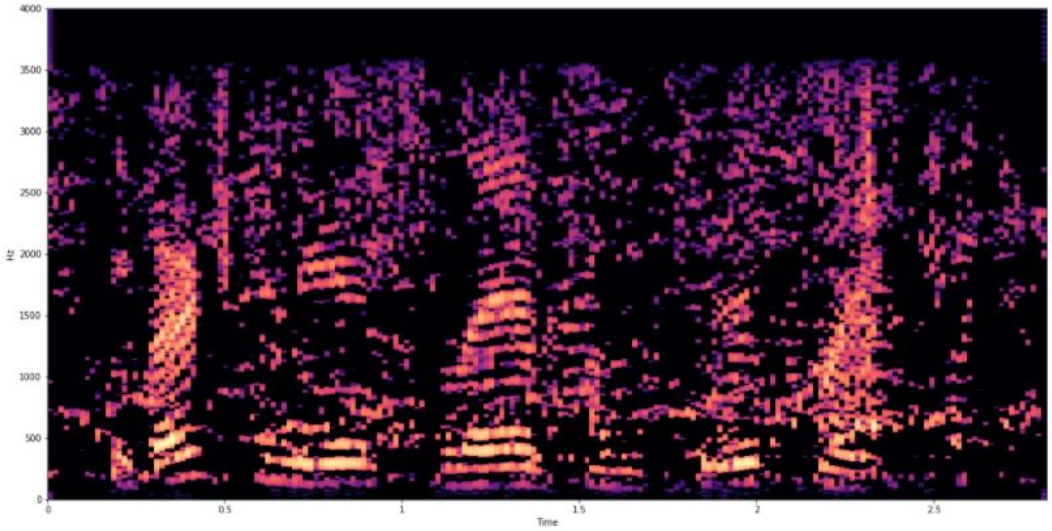
- **spectral subtraction on babble_sn5**

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f0cc5ad43c8>
```

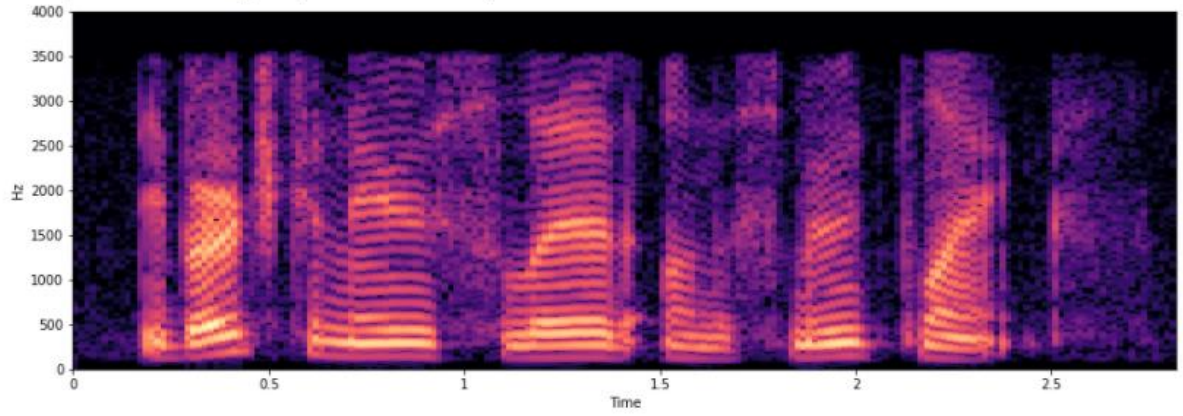


- **Wiener filter on station_sn5 and clean signal**
  Observation:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f0cc59b8278>
```

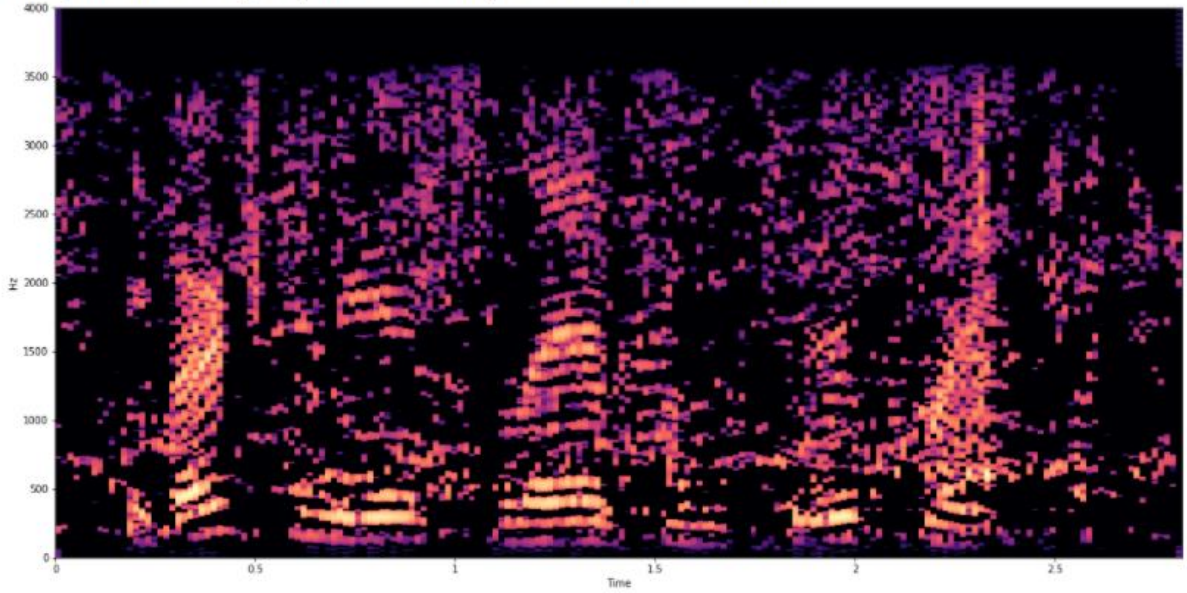



```
<matplotlib.axes._subplots.AxesSubplot at 0x7f0cc5b8d9e8>
```



Weiner filter on babble_sn5

<matplotlib.axes._subplots.AxesSubplot at 0x7f0cc59e6908>



- **Spectral subtraction and wiener filter:**

Observation: Auditorily there isn't much of a difference but visually subtle differences can be made out from the spectrograms below.

S_hat[Spectral Subtraction]

```
S_hat = np.zeros((mag_Y.shape[0], mag_Y.shape[1]), np.float32)
for k in range(H.shape[0]):
  for t in range(H.shape[1]):
    S_hat[k][t] = H[k][t] * Y[k][t]
print(S_hat)
```

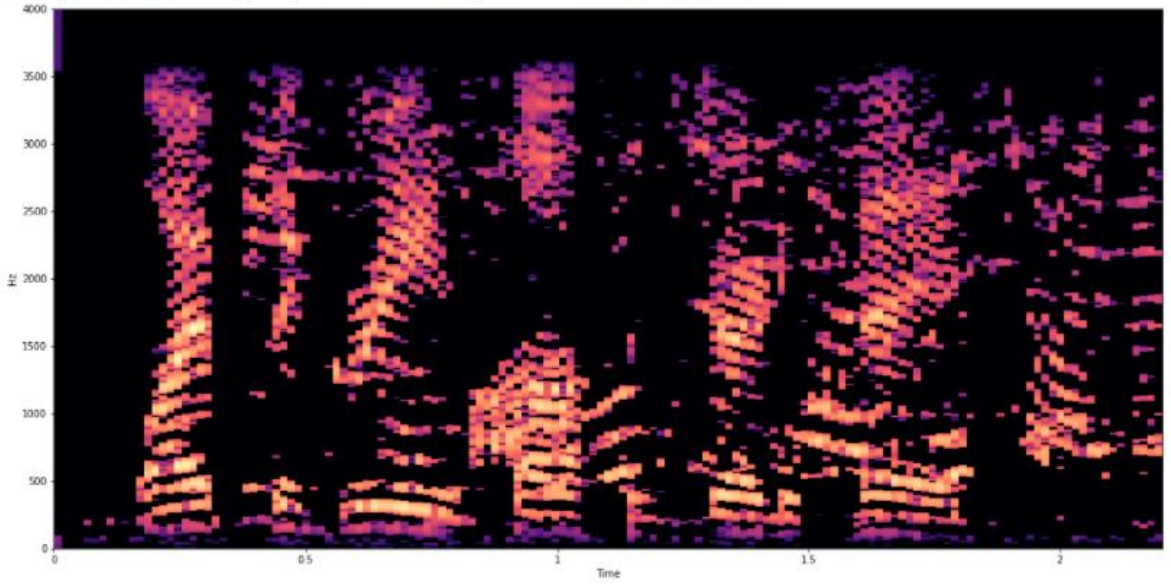
```
/usr/local/lib/python3.6/dist-packages/ipykernel_launcher.py:4: ComplexWarning
  after removing the cwd from sys.path.
[[ 322.30215      0.           0.         ...    0.           0.
     0.       ]
 [-323.26865     -0.           0.         ...    0.           0.
     0.       ]
 [ 326.3868       0.           0.         ...   -0.          -0.
    -0.       ]
 ...
 [-195.282        0.           0.         ...    3.245822     0.
     0.       ]
 [ 195.35875      0.           0.         ...   -3.3669708   -0.
     0.       ]
 [-195.38493      0.           0.         ...    3.420095     0.
     0.       ]]
```

S_hat_1[Wiener filter]

```
[ ]  S_hat1 = np.zeros((mag_Y.shape[0], mag_Y.shape[1]), np.float32)
     for k in range(W.shape[0]):
       for t in range(W.shape[1]):
         S_hat1[k][t] = W[k][t] * Y[k][t]
     print(S_hat1)
```

```
/usr/local/lib/python3.6/dist-packages/ipykernel_launcher.py:4: Complex
  after removing the cwd from sys.path.
[[ 321.4853       0.           0.         ...    0.           0.
     0.        ]
 [-322.3555      -0.           0.         ...    0.           0.
     0.        ]
 [ 325.3758       0.           0.         ...   -0.          -0.
    -0.        ]
 ...
 [-195.24983      0.           0.         ...    2.2008388    0.
     0.        ]
 [ 195.32741      0.           0.         ...   -2.3364134   -0.
     0.        ]
 [-195.3541       0.           0.         ...    2.3999567    0.
     0.        ]]
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f0ccd8e1860>
```




```
<matplotlib.axes._subplots.AxesSubplot at 0x7f0cc59e6908>
```