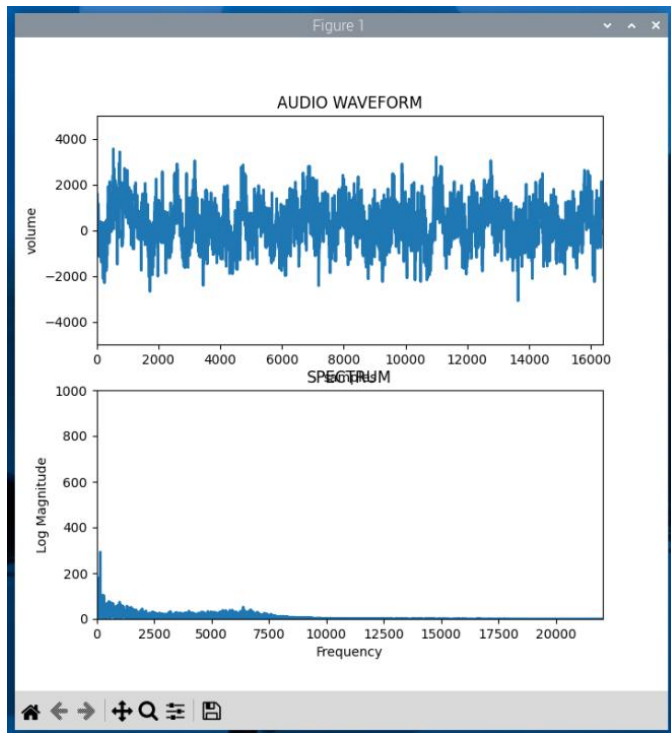
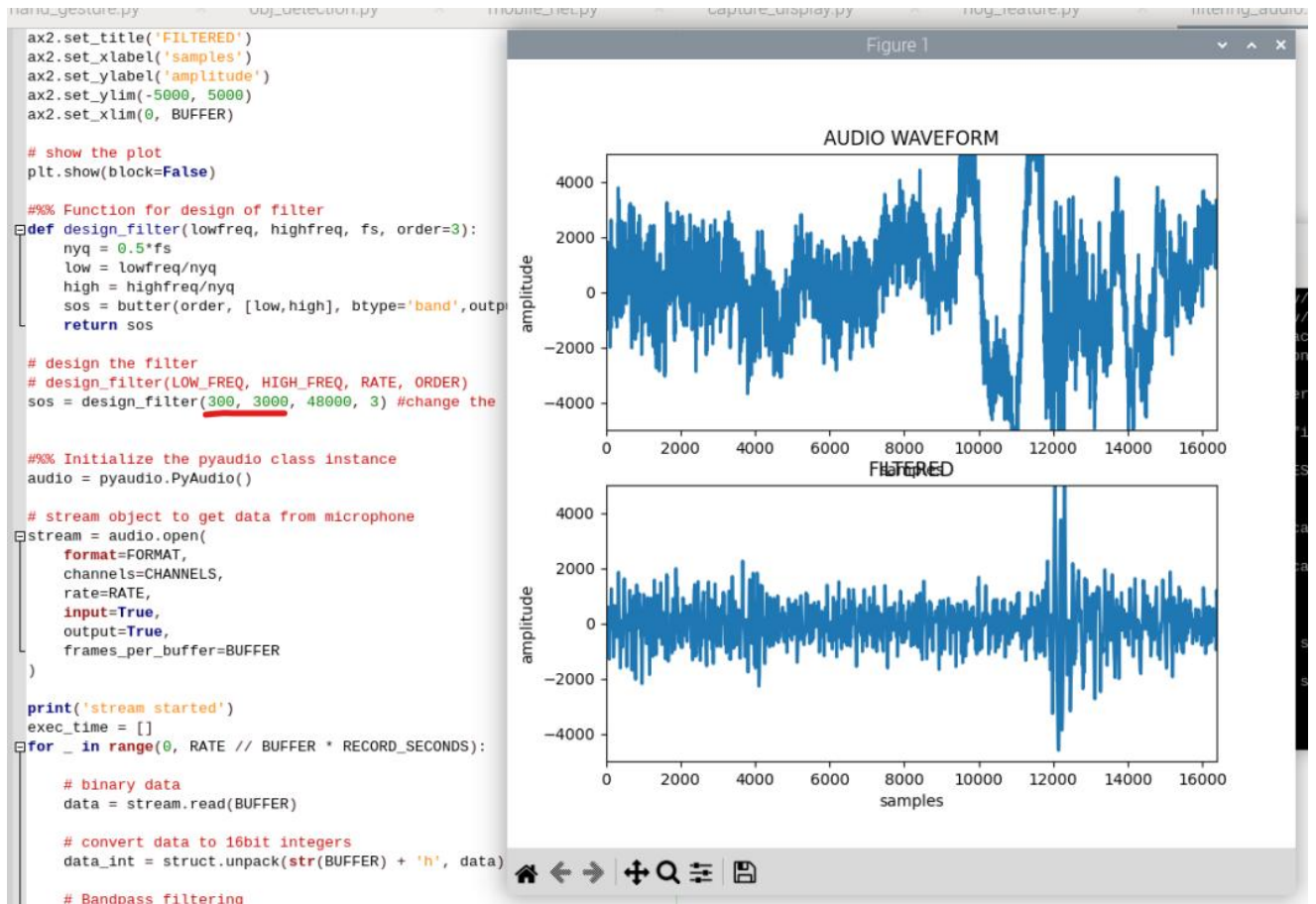


Sound Analytics Lab

Sound Processing with pyaudio

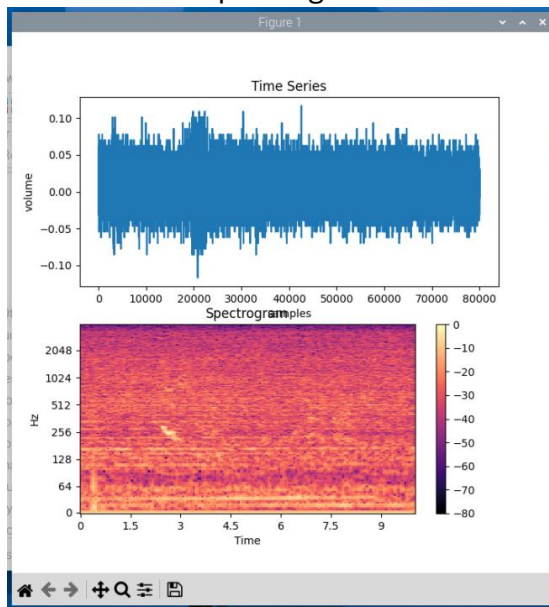


Filtering frequency with a bandpass filter

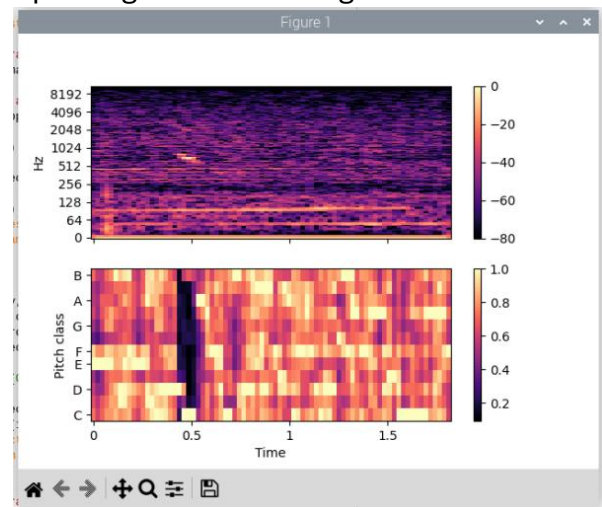


Feature extraction: Spectrogram, Chromogram, Mel-Spectrogram & MFCC with Librosa

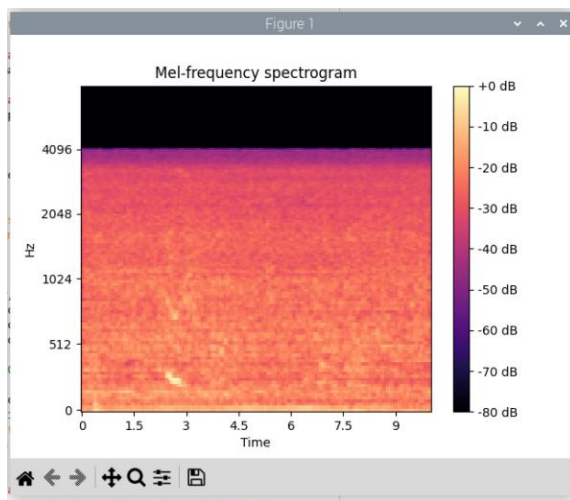
Time Series & Spectrogram of test.wav



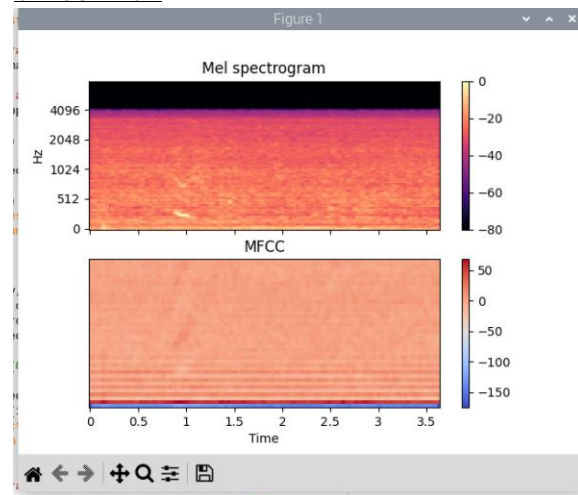
Spectrogram & Chromogram of test.wav



Mel-frequency Spectrogram of test.wav



Mel-Frequency Spectrogram & Mel-Frequency Cepstral Coefficients (MFCC) of test.wav



Advanced Sound Analytics

Speech-to-Text with Google Speech Recognition API & CMUSphinx API

```
2009t2pi@2009t2pi: ~
File Edit Tabs Help
Say something!
Google Speech Recognition thinks you said hello
Time for Google Speech Recognition recognition = 1 seconds
Sphinx thinks you said no no
Time for Sphinx recognition = 5 seconds
(audio) 2009t2pi@2009t2pi:~ $
```

Modified code to detect Wake words

```
2009t2pi@2009t2pi: ~
File Edit Tabs Help
Say something!
Google Speech Recognition thinks you said: good morning Alexa
Wake word detected: Alexa! Triggering action...

  **  **
*****
*****
*****
  ****
   ***
    *

Time for recognition = 1 seconds
(audio) 2009t2pi@2009t2pi:~ $
```