MCA-2

Sarthak Bhagat (2016189)

March 2020

1 Spectrogram

We compute Discrete Fourier Transform for our signal using two functions here. *get_fourier_coeff_abs* computes absolute of fourier coefficients multiplied by 2 upto the N_f. Other function, *get_fourier_coeff* uses the previous function to calculate all coefficients of DFT of signal.

We perform DFT on some window and this window is slided over all of signal to compute time varying frequency component. This method is also called Short Time Fourier Transform.

Size of Features: 256 x 61 (with overlap), 256 x 31 (without overlap)

2 MFCC

Steps Involved:

- Pre-emphasis: Apply this filter for amplicying high frequencies.
- Framing: Break the signal into short-time frames
- Window: Apply window function (here, we apply Hamming window) to the frames obtained.
- Fourier Transform and Power Spectrum: Perform N-point Short-Time Fourier Transform and compute Power Spectrum for it.
- Filter Bank: Apply triangular filters on Mel-scale to power spectrum obtained in the last step for getting filter banks.
- MFCC: Perform Discrete Cosine Transform (DCT) to coefficients obtained for making them decorrelated.
- Sinusoidal Liftering (Additional Step): De-emphasise the higher MFCCs for better speech recognition.
- Mean Normalisation: Subtract mean of all coefficients from all coefficients.

Size of Features: 98 x 12

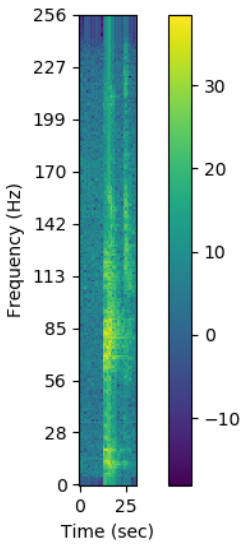

Figure 1: Example Plot for Spectrogram

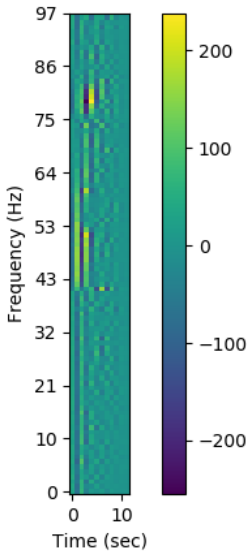

Figure 2: Example Plot for MFCC

3 Precision Recall Evaluation

Model	Precision	Recall
Spectrogram w/o Noise	77.4	77.2
Spectrogram	79.6	78.8
MFCC w/o Noise	74.6	72.4
MFCC	76.6	74.8

Table 1: Precision Recall Score for different models