DT2119 - Speech and speaker recognition - Lab 1 - Feature extraction

Mel Frequency Cepstral Coefficients (MFCCs) are coefficients used in Speech recognition based on human auditive perception. These coefficients come from the need, in the field of aoutonomous audio recognition, to extract the main features of an audio signal while discarding all the irrelevant features that will make the recognition harder to achieve (background noise, emotion ...)

The sounds generated by a human depend on the shape of the vocal tract, position of the tongue, teeth, lips etc. Then, if we can determine this shape accurately, the phoneme that was produced will be easy to identify. The main objetive of the MFCC it to accurately represent the envelope of the short time power spectrum in order to stablish the shape of the vocal tract. Consisting then of one of the most important features in Speech recognition

1.1 Enframe the audio signal

The purpose of this first step is to cut the original sample in many smaller ones. In this case, we want windowframes of 20 ms with a shift between windows of 10 ms. As the shift is smaller than the window, the computed frames will have shared parts between each other

Compute the number of samples per frame and shift

The sampling rate is S = 20 kHz. Then the period is $T = 1/S$. We have that:

Length of the window: $0.02T = 400$ samples Length of the shift: $0.01T = 200$ samples

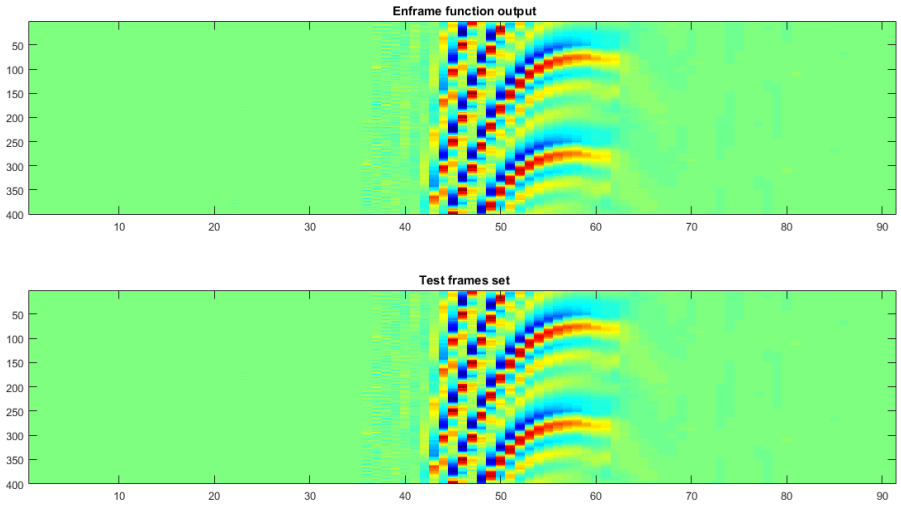
```
winlen = 400;
winshift = 200;
```

Now is time to check the performance of the written function. To do so, the function is evaluated with the example's structure data set, and compared to the frames given in the example's structure frames. The output generated must be identical to the frames stored in the data structure in example.

```
samples = example{1,1}.samples;
test = example{1,1}.frames;
frames = enframe(samples,winlen,winshift);
```

The comparison is shown in the folowwing figure.

```
subplot(2,1,1)
imagesc(frames')
colormap jet
title(' Enframe function output')
subplot(2,1,2)
imagesc(test')
colormap jet
title(' Test frames set')
```



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