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CmpE 362 – Project 3

1) ClearNoise.m

Figure 1 represents 2 original sound and their combined form. We can easily see that their sum as magnitude is ploted in frequency domain.

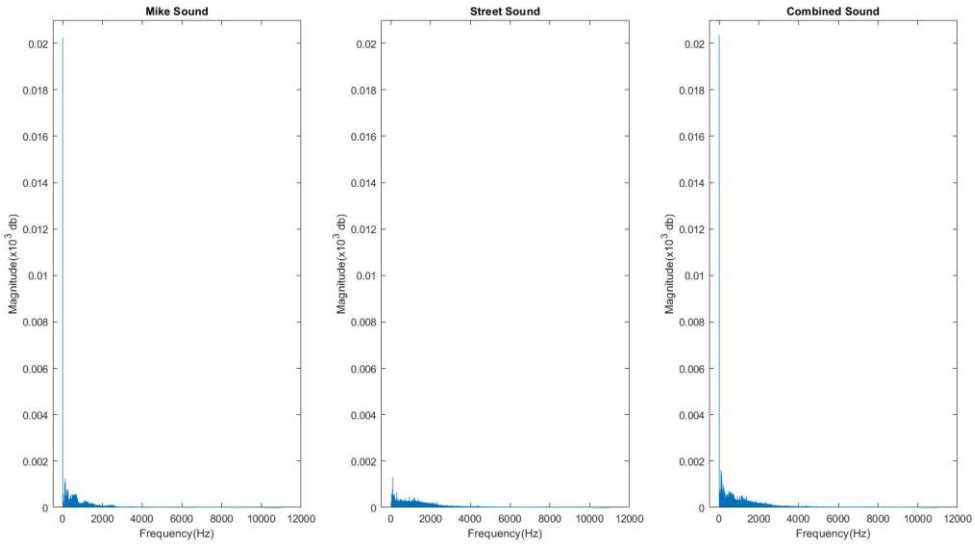

Figure 1: Frequency Domain Representation

Figure 2 represents 2 original sound and their combined form. Unlike the frequency domain their union is seen in the combined sound in time domain not sum of them as amplitude.

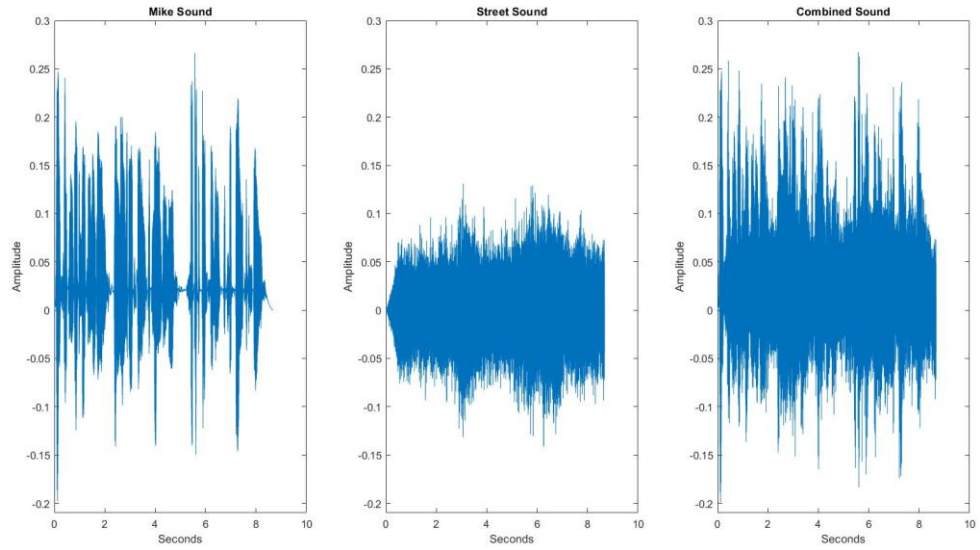

Figure 2: Time Domain Representation

Figure 3 represents original Mike.wav and filtered sound of the combination as frequency domain. We can see the change in the combination. As we can understood from the Mike's plot, +1000Hz is narrow. So it is not seen in the combined figure. It filtered noise not in perfect form, yet in acceptable form.

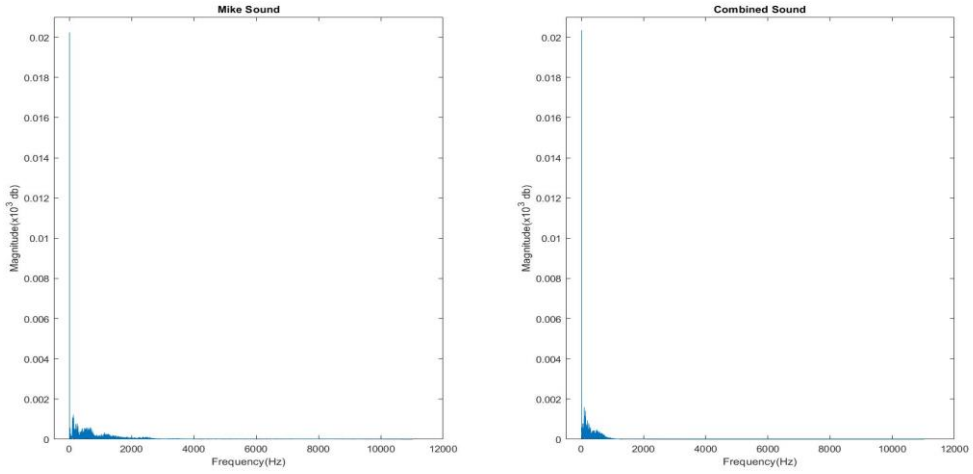

Figure 3: Frequency Domain Representation (Filtered)

Figure 4 represents original Mike.wav and filtered sound of the combination as time domain. As we can see from the figure, it is not in perfect from, yet it came closer from the original combination. There stays some noises after all.

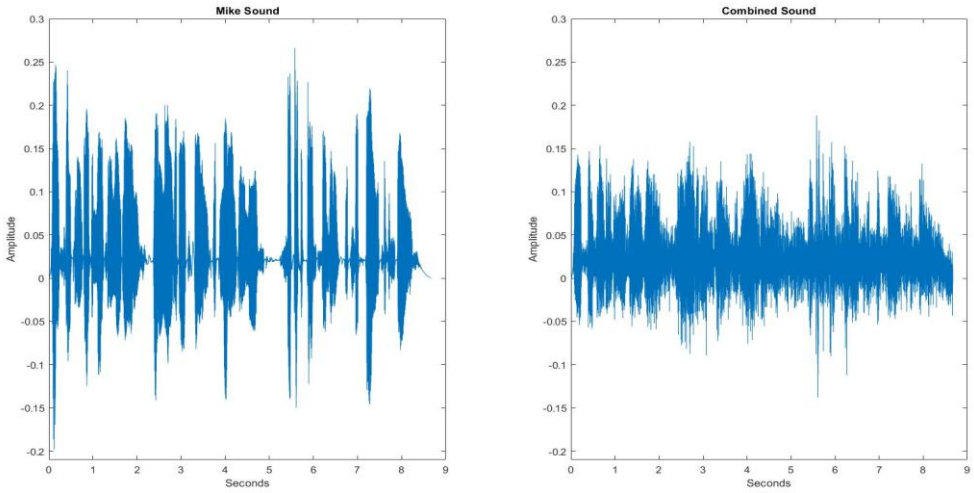

Figure 4: Time Domain Representation (Filtered)

SNR Value = 10.9709

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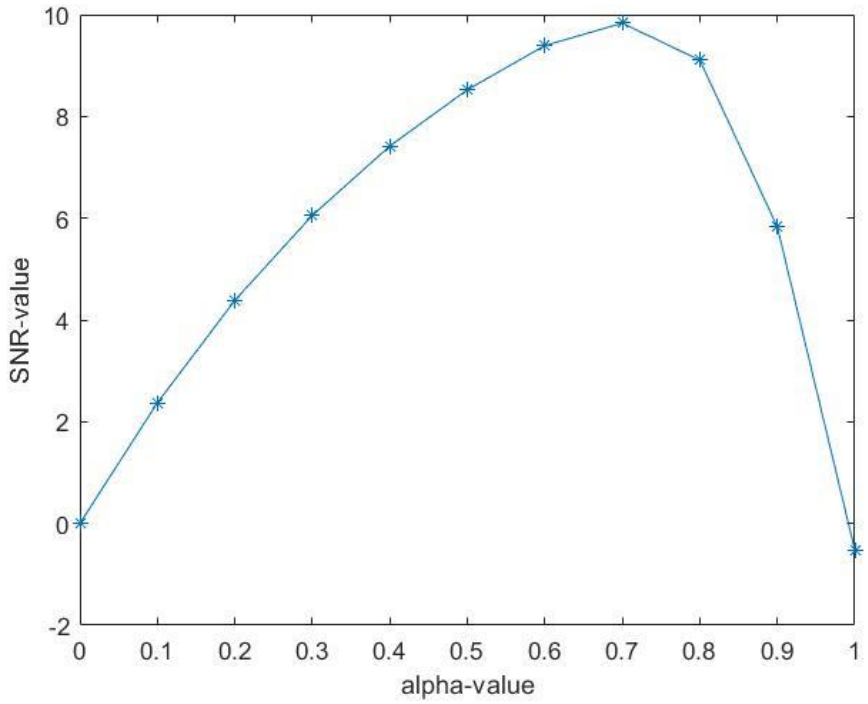
2) ClapDifferantiate.m

From the beginning of the algorithm, it first takes clap.wav and snap.wav as a training set and train itself. In those files their mean frequencies: clap is 1k where snap is 6k. I recorded 6 more claps and snaps and see the result like clap lies between 1k - 2k and snap lies between 3k-6k. So i decided to put a treshold at 2.5k. So from the training set, i took their mean frequencies, sum them up and diveded into 3 so i can get 7.8k/3 = 2.6 as treshold value.

In the test part, the algorithm takes input as string such as 'unkown.wav' inside that directory and says clap if it's mean frequency smaller than the treshold. Otherwise it says snap.

3) NTapFilter.m

In the figure below, N=5, K=0.1 and alpha changes through 0 to 1 with ascending value 0.1. There are 11 snr values. The highest value is on alpha=0.7 as we can see from the figure.



SNRAlpha = 0.0002 2.3707 4.3842 6.0548 7.4176 8.5245 9.3917 9.8331 9.1040 5.8278 -0.5208

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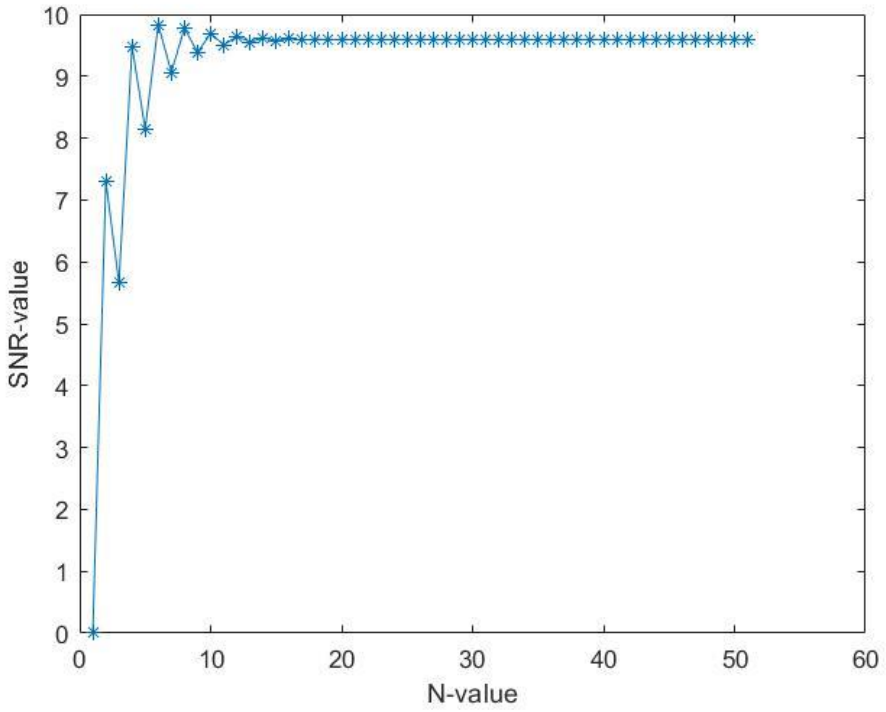
In the figure below, N changes from 1 to 50 where K=0.1 and alpha=0.7 are constants. After 6 tap filter, we can see that there is not much change in the figure. So that there are no need to put more taps on the system. We can catch the highest value about 6-10 tap filters.



SNRNTap = 0.0002 7.3000 5.6640 9.4775 8.1491 9.8331 9.0649 9.7780 9.3850 9.6927 9.5057 9.6443 9.5554 9.6192 9.5764 9.6068 9.5859 9.6005 9.5906 9.5974 9.5927 9.5960 9.5937 9.5953 9.5941 9.5950 9.5944 9.5948 9.5945 9.5947 9.5946 9.5947 9.5946 9.5947 9.5946 9.5946 9.5946 9.5946 9.5946 9.5946 9.5946 9.5946 9.5946 9.5946 9.5946 9.5946 9.5946 9.5946 9.5946 9.5946 9.5946 9.5946

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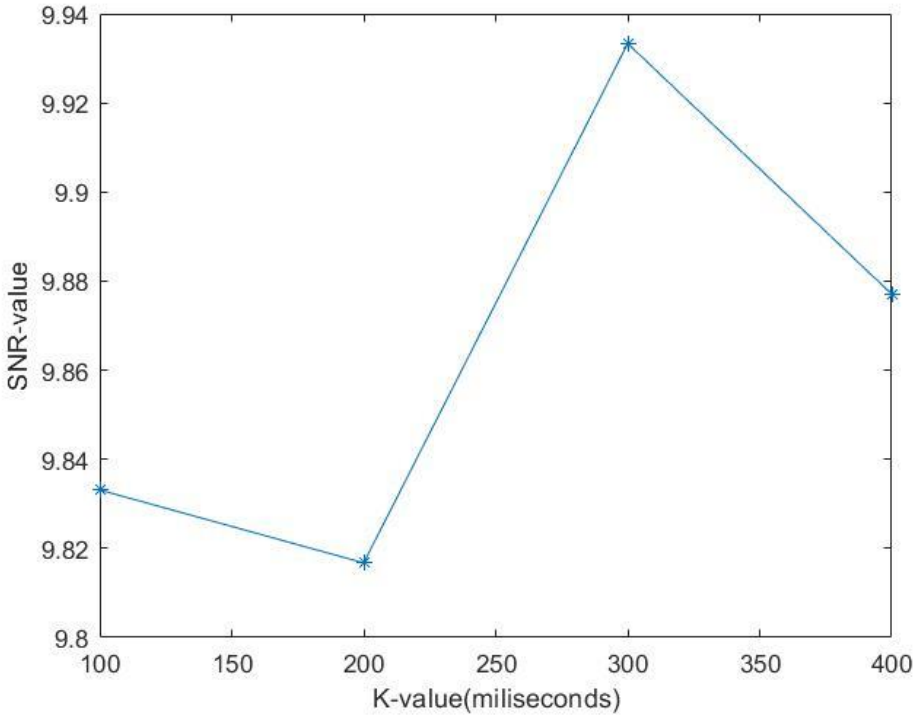
In the last figure below, alpha=0.7, N=5 and k is changing from 0.1 seconds to 0.4 seconds. As k changes, the SNR value change little. I tried k=1sec to 4 sec to be able to understand and i see from the result that, SNR value also increases as the k gets bigger.



SNRDelay = 9.8331 9.8167 9.9333 9.8771