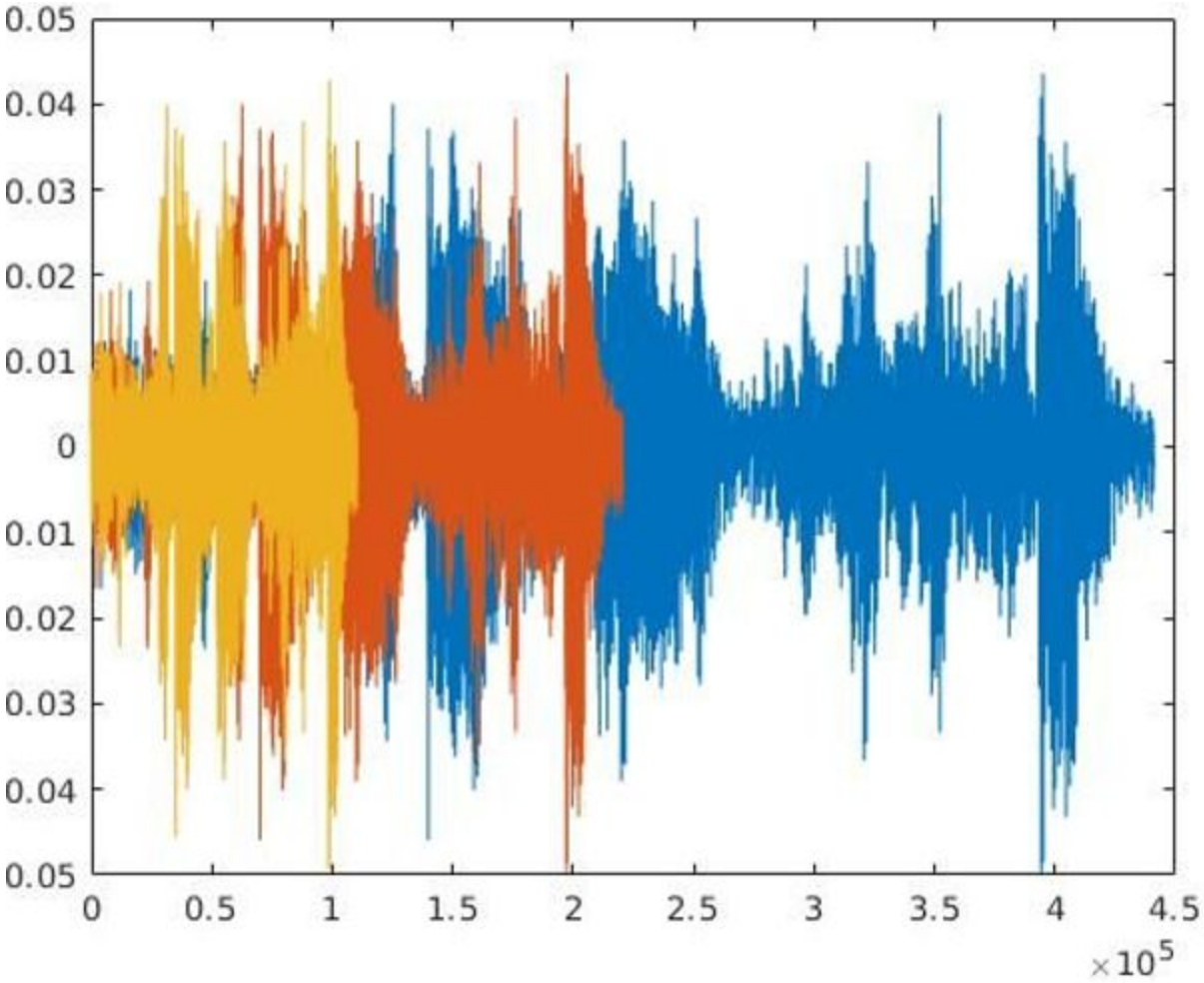
REPORT DSAA ASSIGNMENT
1 20171122

Question 1.

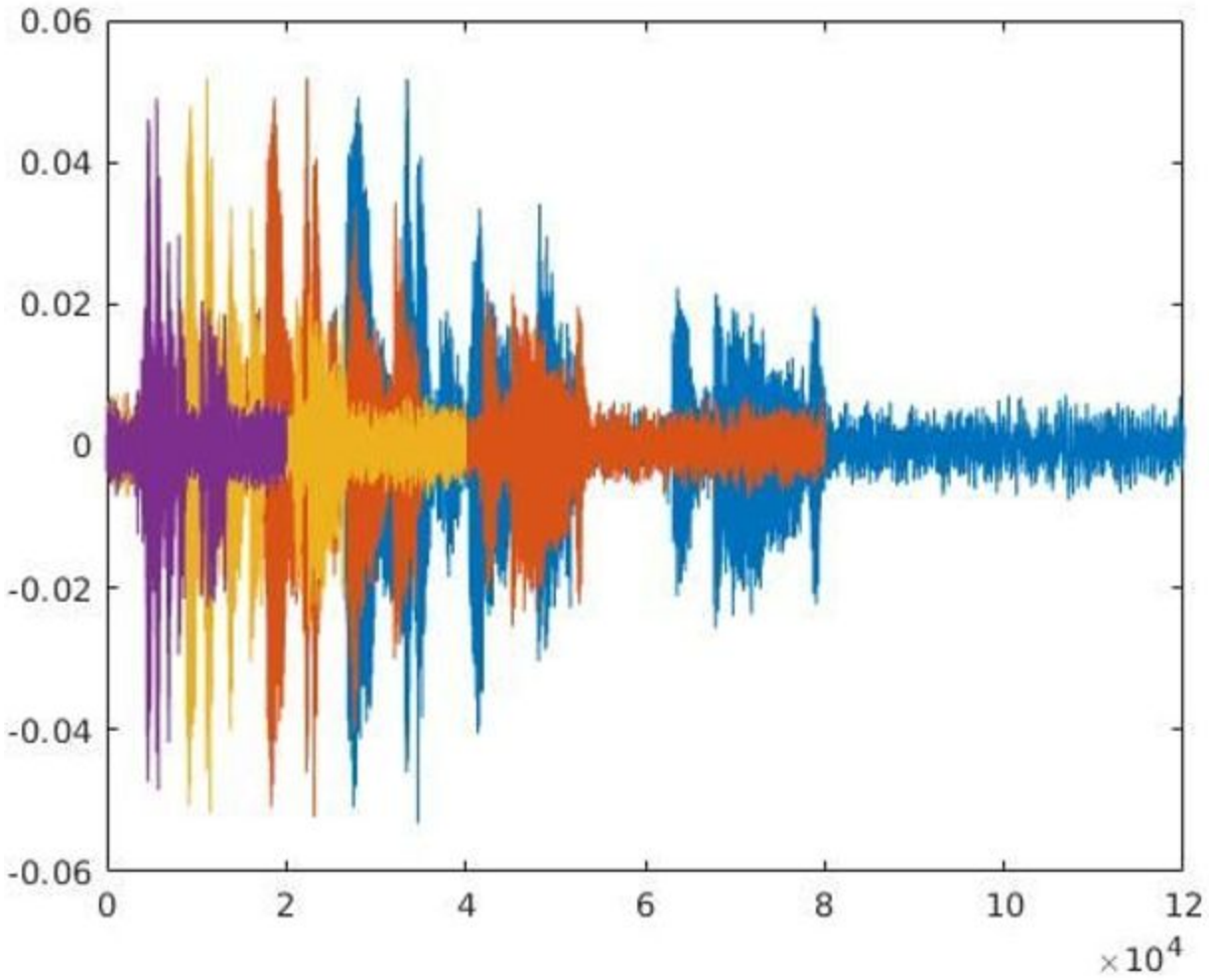
Used Audio recorder to record audio at 44100 frequency and then resampled with new frequency(either double or half) using resample func



This is the plot at different resampling rate. Red color is the original sound Yellow color is the sound two times faster and sampled at half Blue color is the sound two times slow and sampled at double

Question 2.

recorded audio(initially at 44.1kHz) using audio recorder then changed the frequency of the recorded audio using resampling function with a ratio of p/q, where q is the previous frequency and and p is the new frequency we want



This is the plot of signal at various frequencies.

Then to play audio at various environments we will perform convulation of input audio and impulse responses of various places. This will give us how audio will play in that medium.

Question 3.

In this question we have used normalized correlation which basically measures similarity of two series of functions. The point/part which had the brightest spot or basically has the greatest value is chosen

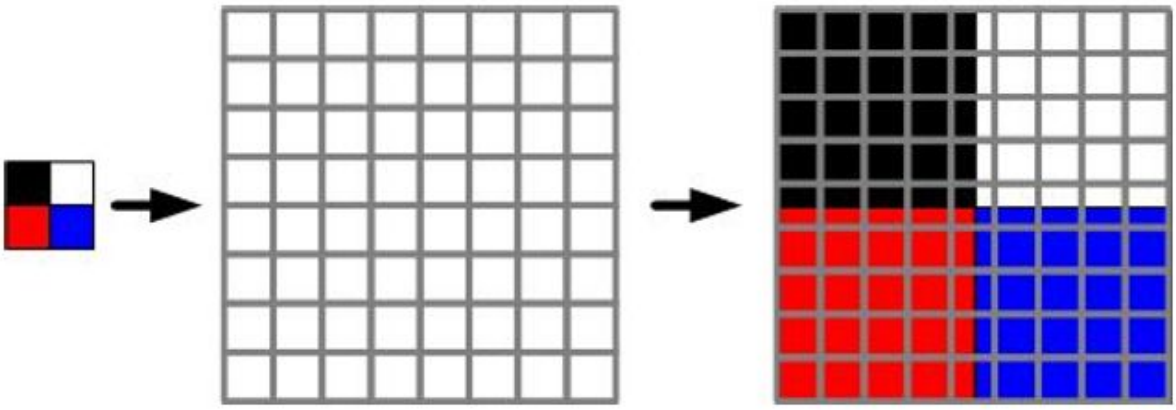
Since F1 is more sharper it has more correlation value than F2(i.e. F2 is more noisy).
If images are more noisy than it may be possible that detection may not be correct.

We can improve the accuracy by sharpning the images for which we can use various filters like Gaussian(and averaging also) or functions like smoothdata or imnoise.

Question 4.

in this question we have implemented we have implemented two interpolations Nearest Neighbour and Bilinear Interpolation.

-Nearest neighbour interpolation is the simplest approach to interpolation. Rather than calculate an average value by some weighting criteria or generate an intermediate value based on complicated rules, this method simply determines the “nearest” neighbouring pixel, and assumes the intensity value of it.

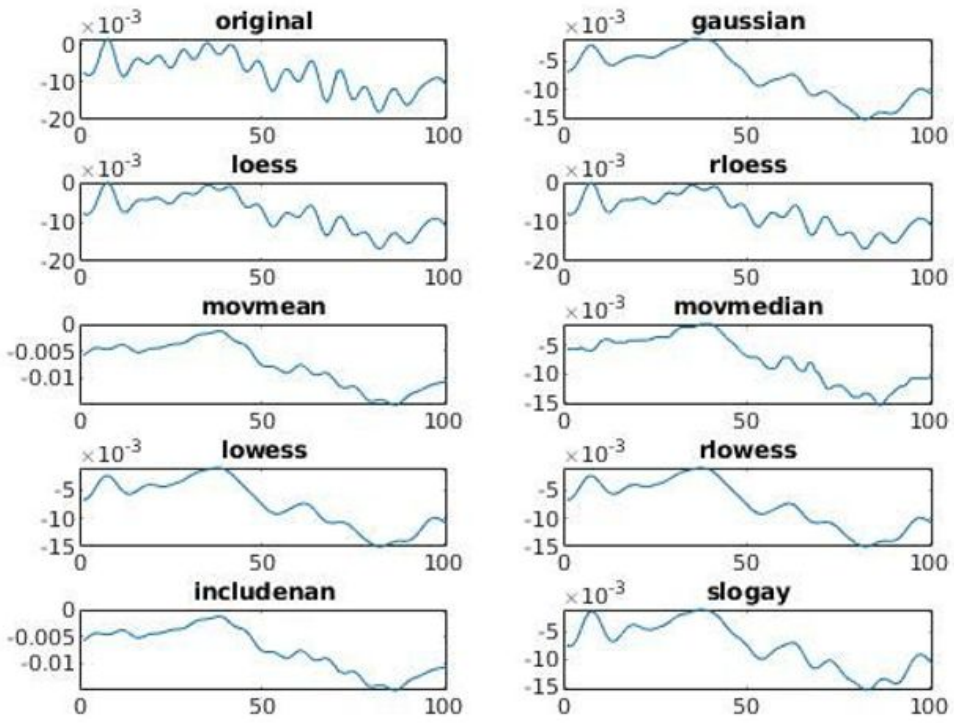


-The key idea is to perform linear interpolation first in one direction, and then again in the other direction. Although each step is linear in the sampled values and in the position, the interpolation as a whole is not linear but rather quadratic in the sample location.

QUESTION 5.

`B = smoothdata(A,method)` returns a moving average of the elements of a vector using a fixed window length that is determined heuristically. The window slides down the length of the vector, computing an average over the elements within each window.

We can specify various methods in this. Each method is a filter like gaussian or lowess or sgolay.



Since the original graph looks like quadratic so Slogay or ***Savitzky-Golay*** algorithm will give best result as it gives bests result on quadratic functions.

The smoothing effect of the Savitzky-Golay algorithm is not so aggressive as in the case of the moving average and the loss and/or distortion of vital information is comparatively limited. However, it should be stressed that both algorithms are "lossy", i.e. part of the original information is lost or distorded. This type of smoothing has only cosmetic value.