ASSIGNMENT 4

By Anmol Monga
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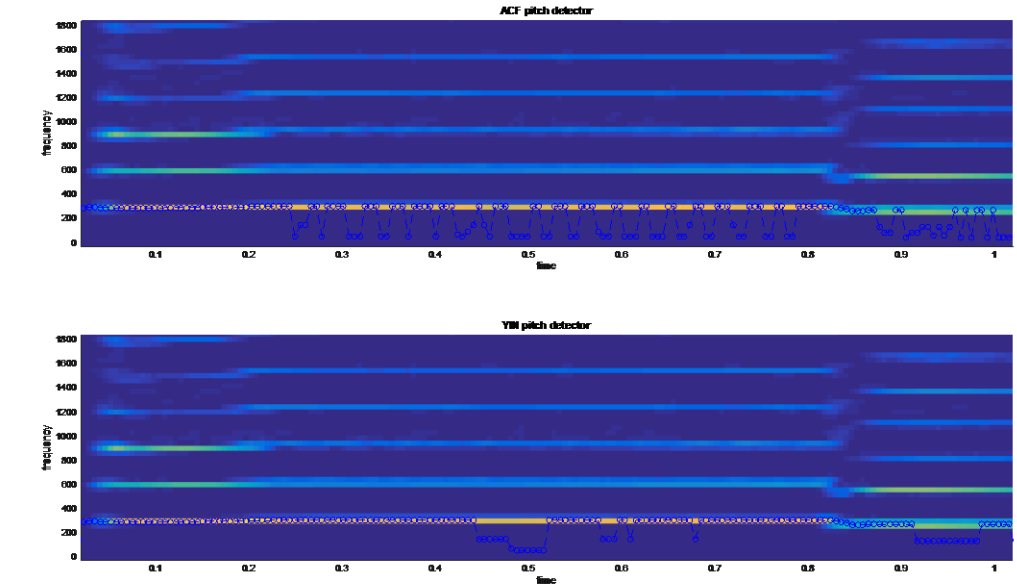
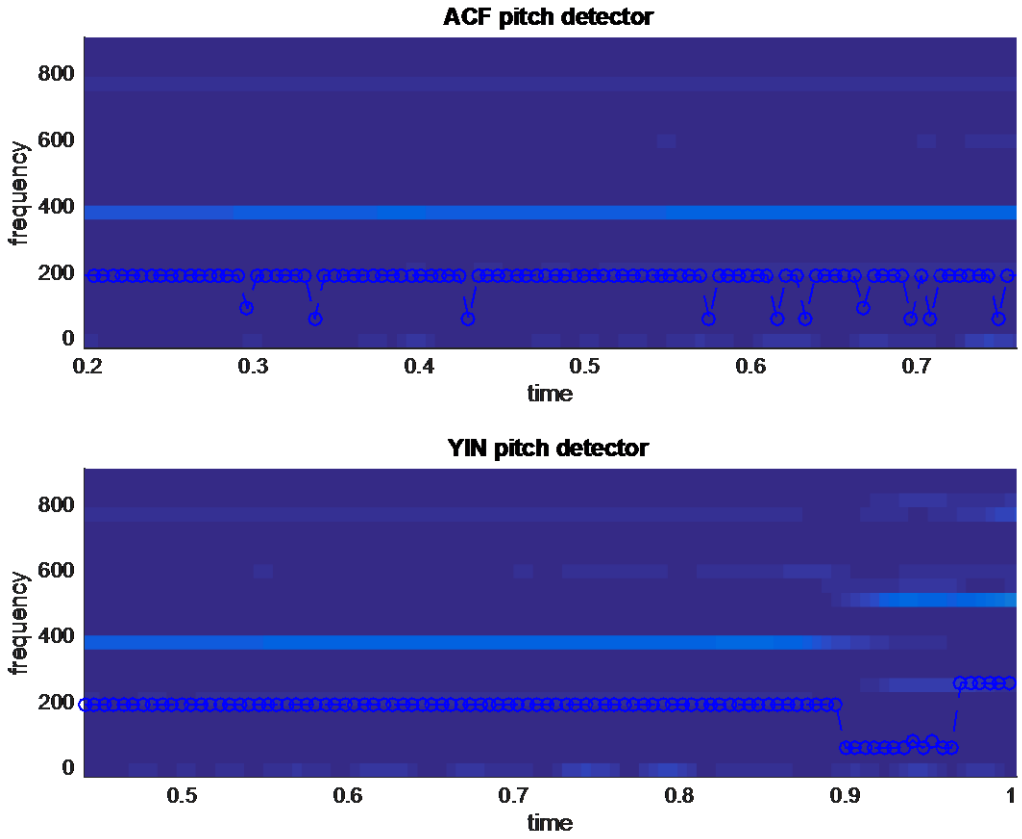
Q1.

jazz2REF.wav



T08-violin.wav



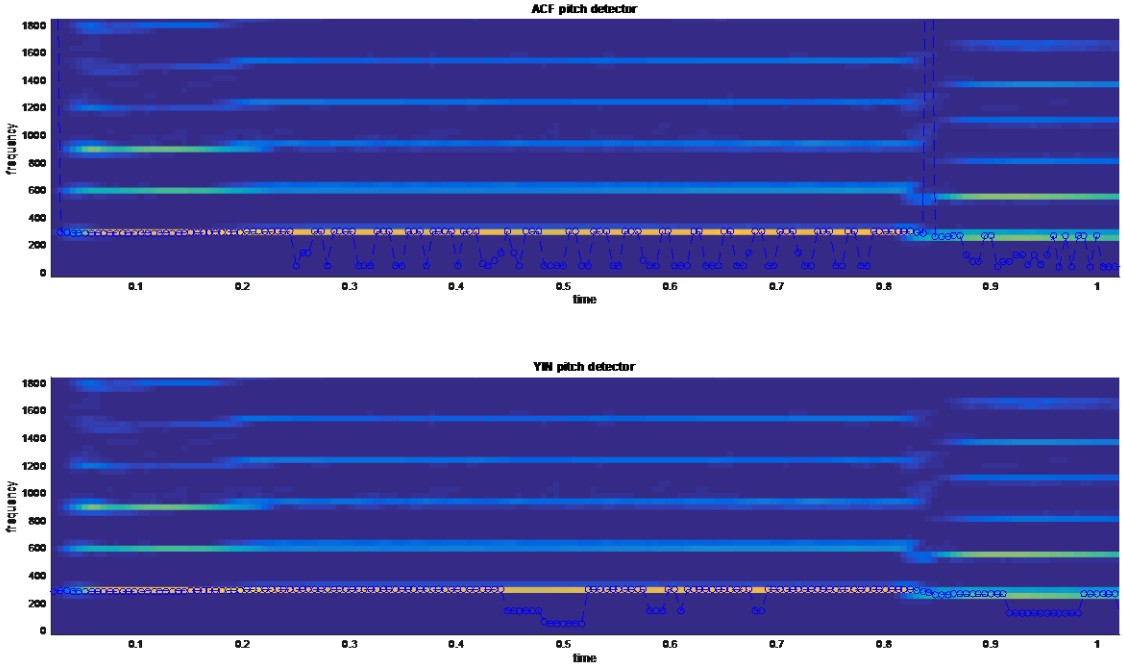
Q2.

The auto correlation function based pitch detector. Use the property that signal cyclically repeats itself, hence the auto correlation function will be high at lag equal to the multiples of period of the signal. The YIN based pitch detector also use the periodicity of the signal but instead of calculation the autocorrelation function calculates the difference in energy of the signal and lagging signal over various range of the lag. The YIN based pitch detectors are better than ACF based because the YIN based pitch detector are less sensitive to the the amplitude of the signal.

Q3

Min_lag = 10 Max_lag = 800

jazz2REF.wav



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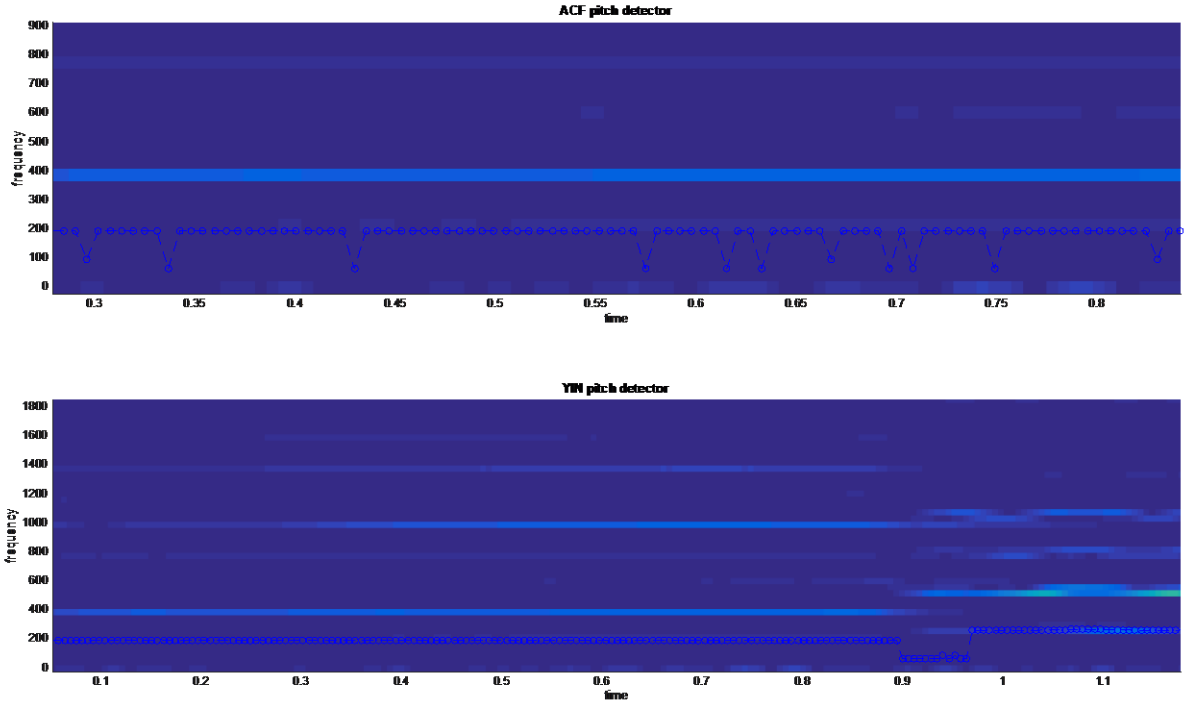
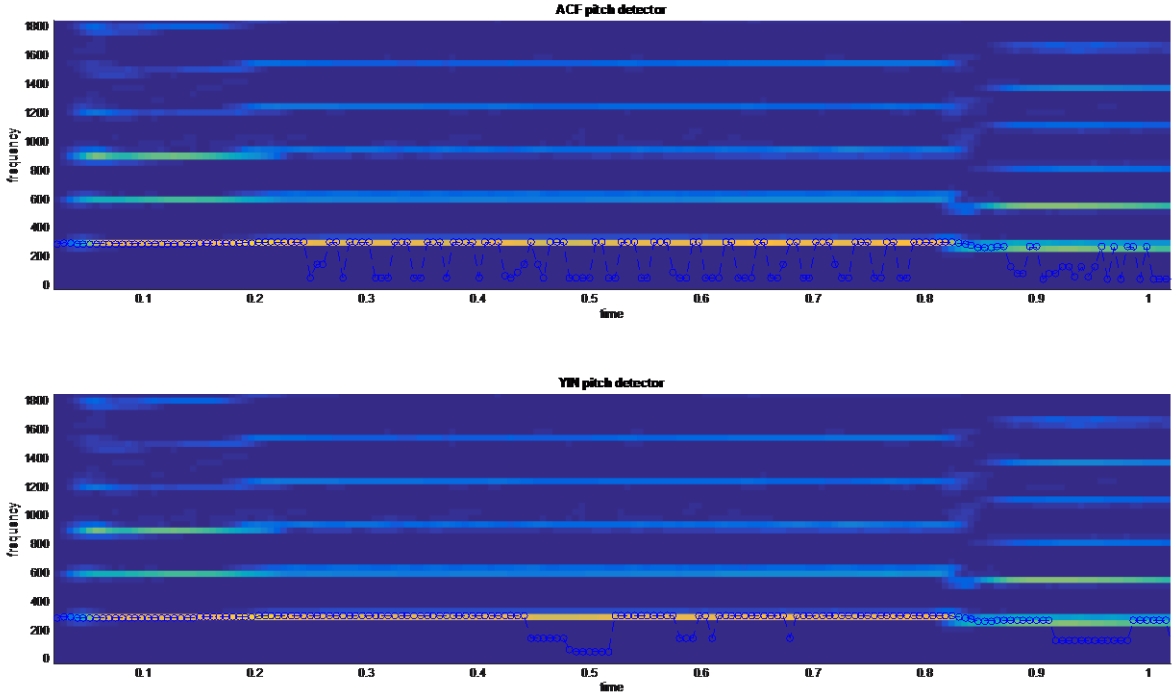


Min_lag = 20, Max_lag = 800

jazz2REF.wav



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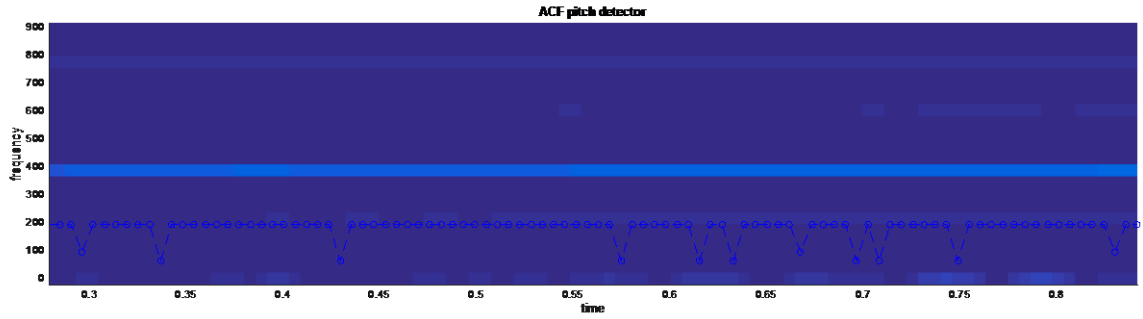
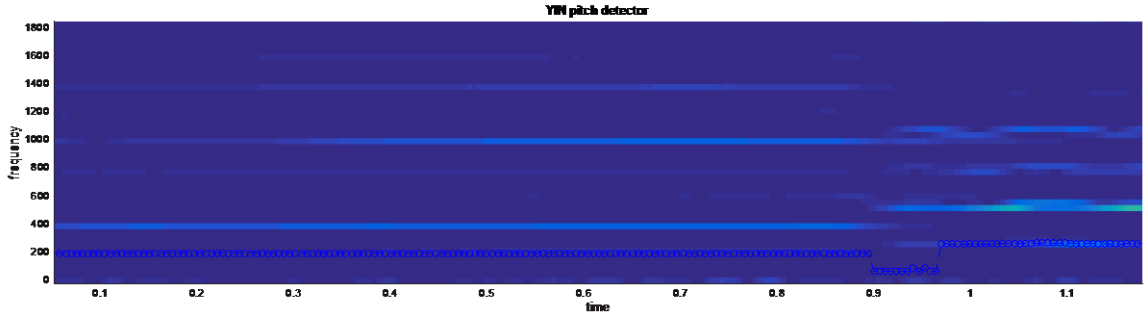
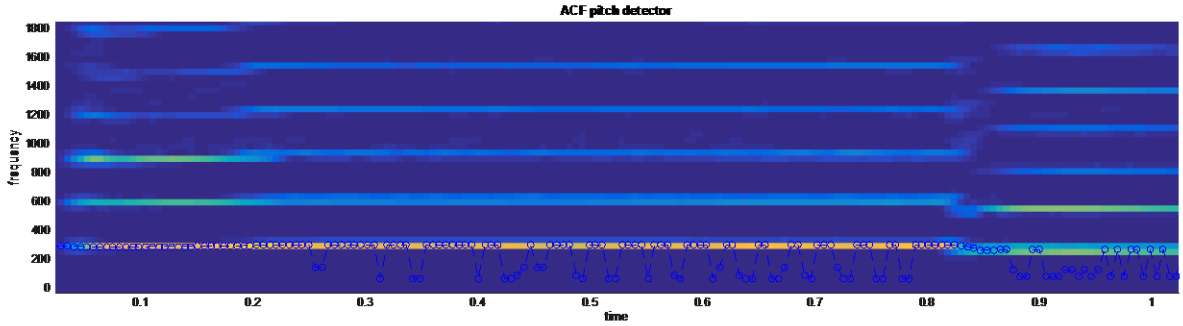
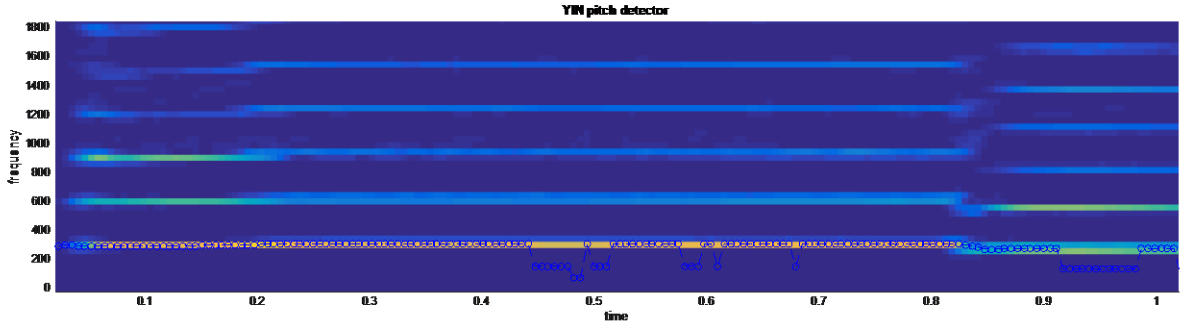


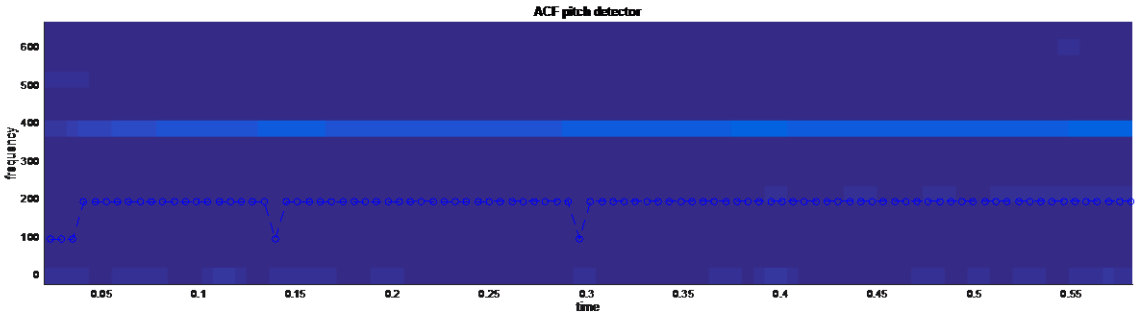


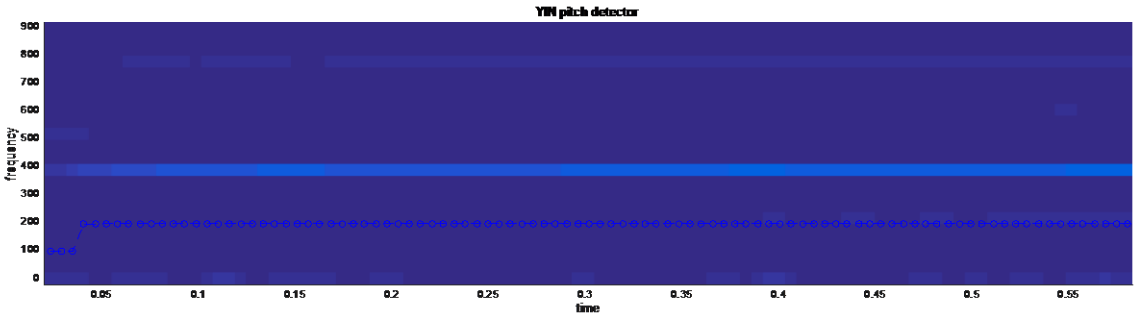
Min_lag = 15, Max_lag = 600
jazz2REF.wav



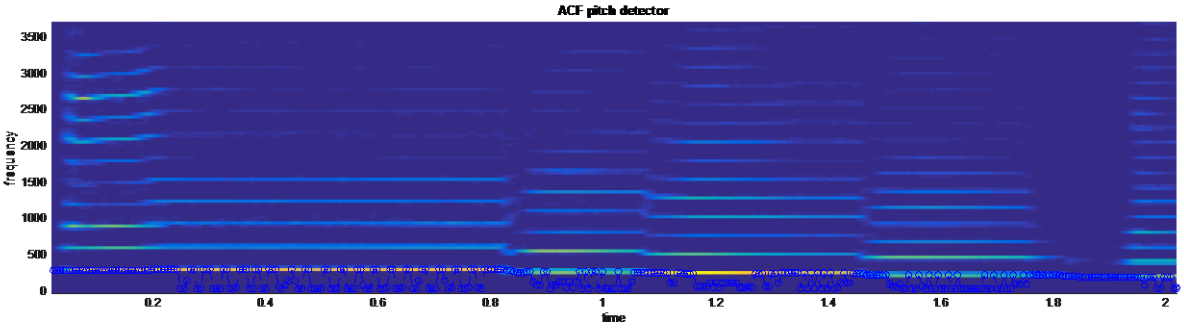


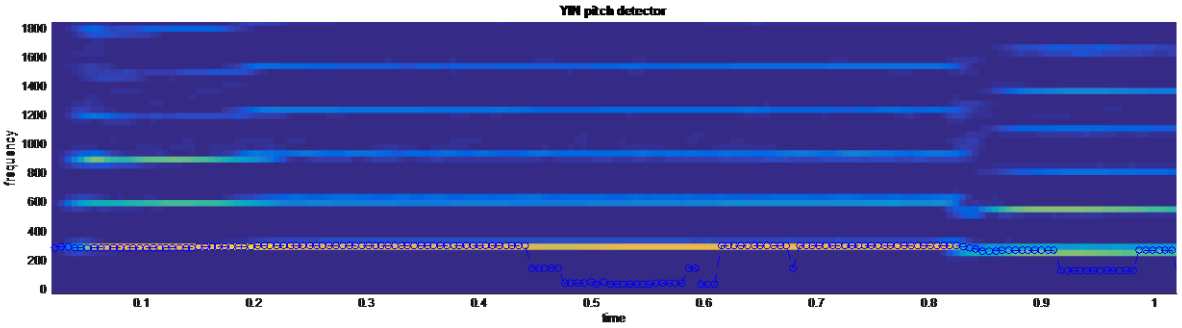
T08-violin.wav





Min_lag = 15, Max_lag = 1000
jazz2REF.wav





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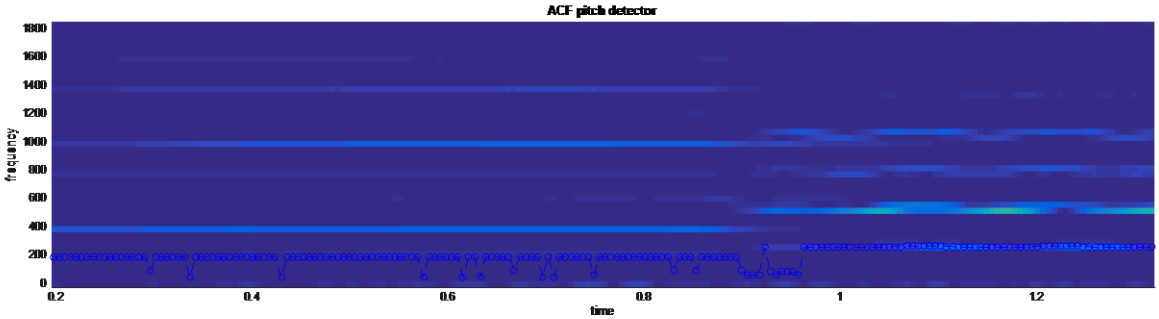

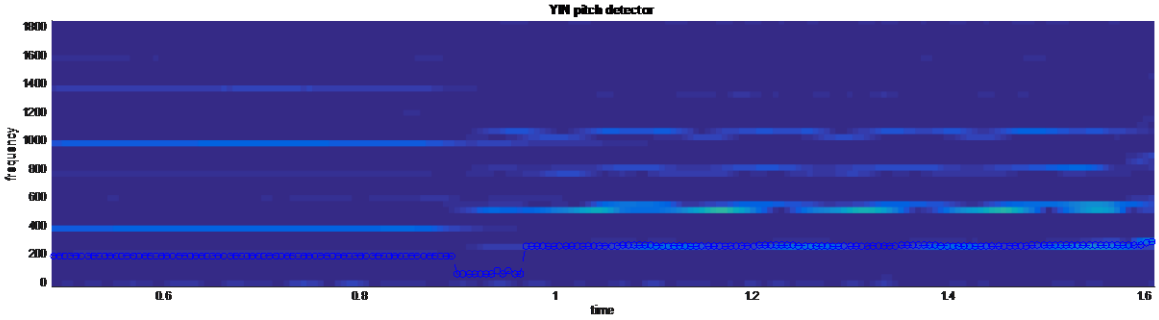

In the above diagrams, I have shown the comparison between the plots obtained by varying the min_lag and max_lag variables. In both ACF and YIN based pitch detectors the frequency noise captured in the signal are subharmonics and hence we generally capture frequency lower than the actual pitch of the signal. We can limit the increase in the lower limits of the frequency captured thereby reducing the subharmonic signal captured by decreasing the max_lag variable, as we can see from the diagram as the max_lag of the signal is decreased we loose a large amount of the noisy subharmonics. But reducing the max_lag of the signal should'nt cut of the fundamental frequency. The min_lag controls the upper frequency limit of the pitch detection and hence we see a lot of change in the signal captured when we vary the min_lag.