Ex 1 | Intro To Sound Proccessing 208230474

Time Stretch

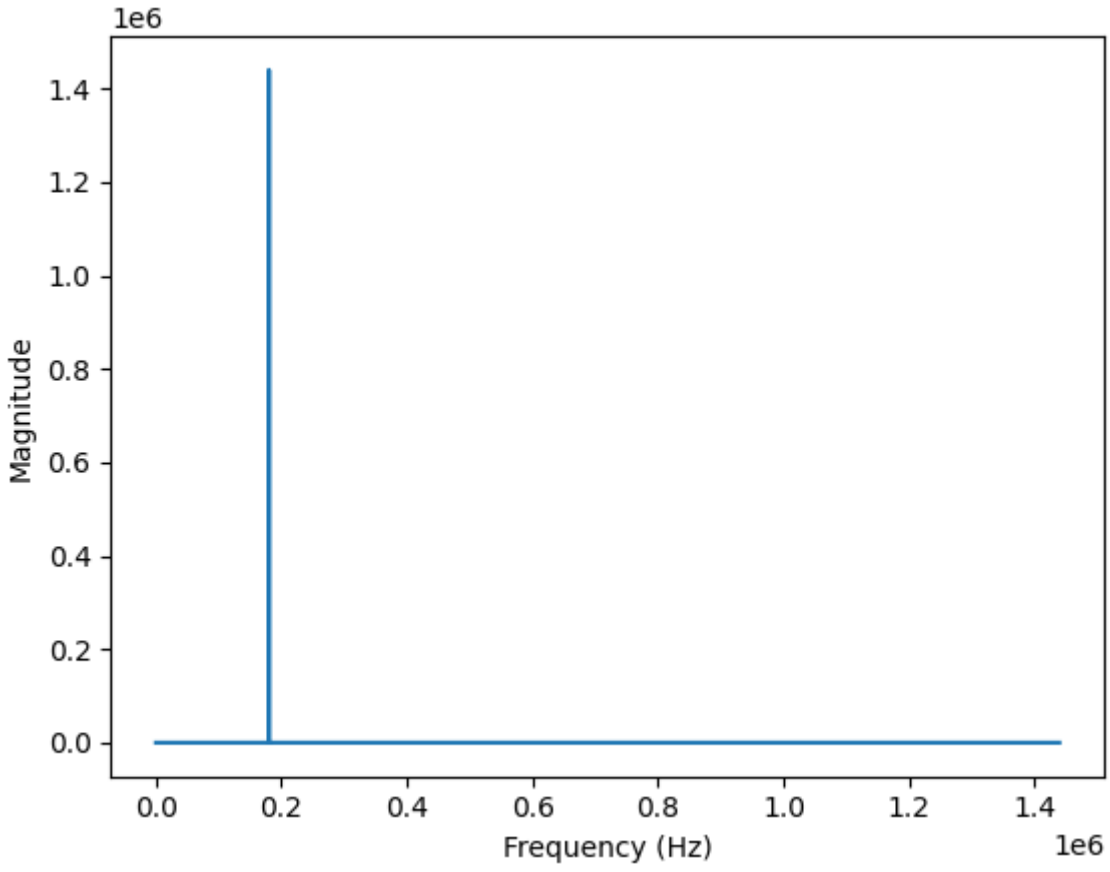
I encountered an issue when using the `naive_time_stretch_stft` function to stretch the sound in the time domain. The output sounds incorrect when I try to stretch the time with a factor of 0.8, as the voices sound higher than the original. Similarly, when I stretch it with a factor of 1.2, the voices sound lower. This can be explained by the fact that stretching the signal in the time domain does not take into consideration the frequency dimensions, resulting in a disruption of the harmonic structure of the sound and destroying the frequencies.

However, when I stretch the signal with `naive_time_stretch_stft` in its frequency domain, even though we play it faster and slower, since we didn't break the harmonic structure of the frequencies, the signal sounds the same with the same frequencies, just with a different rhythm.

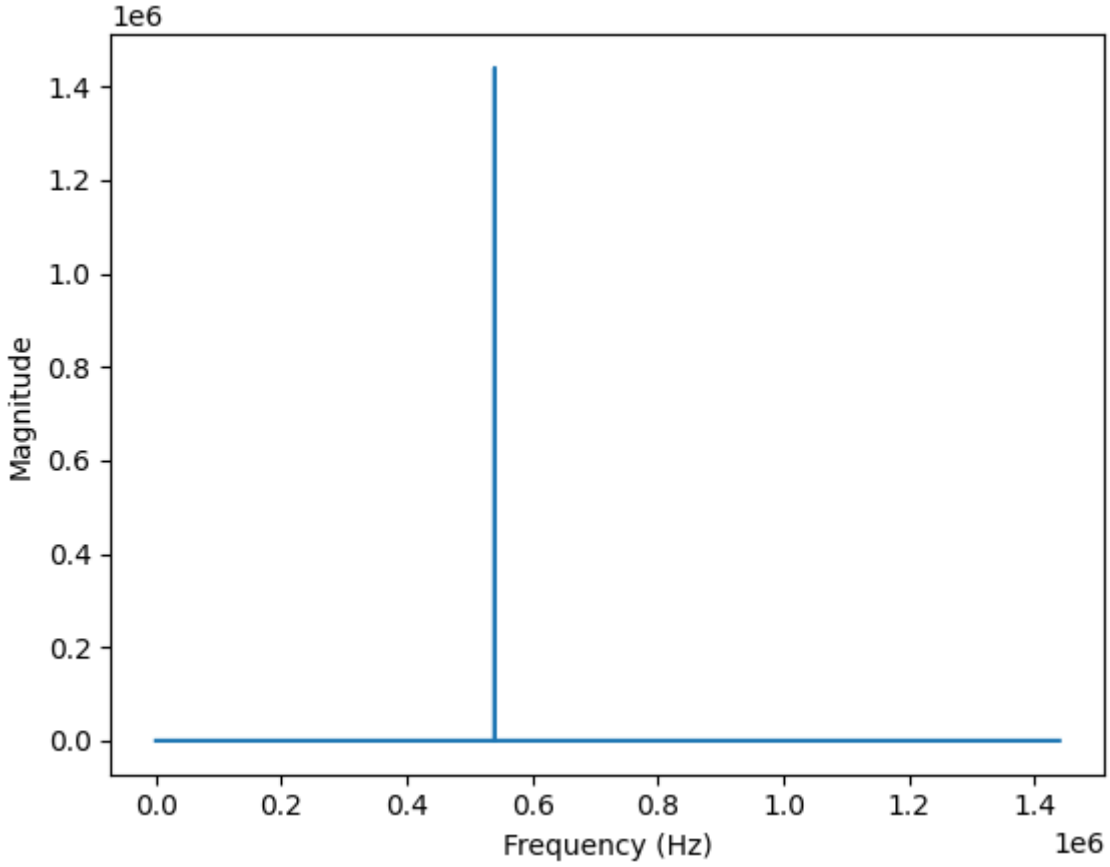
Self Check FFT

when I run a simpale test on my 'self_check_fft_stft' function. i've generate 1KHz sine wave and 3KHz sine wave and i plot them together

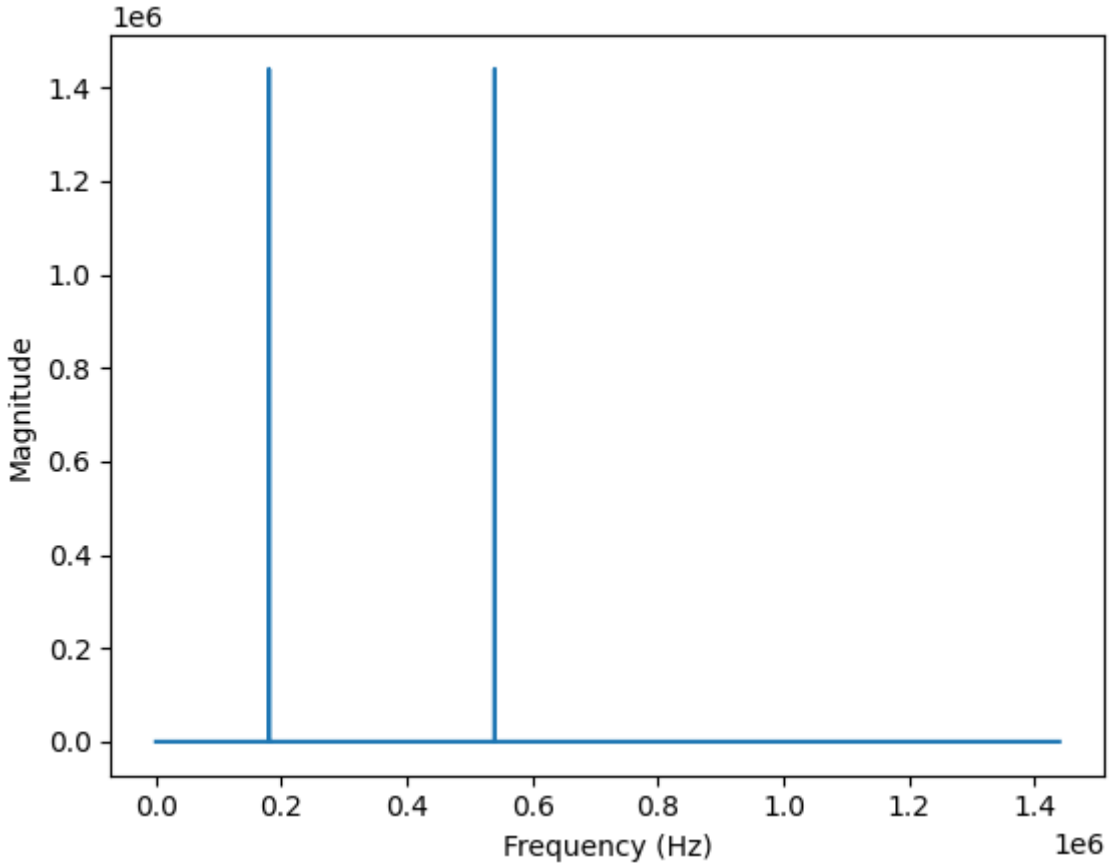
1KHz sine wave fft



3KHz sine wave fft

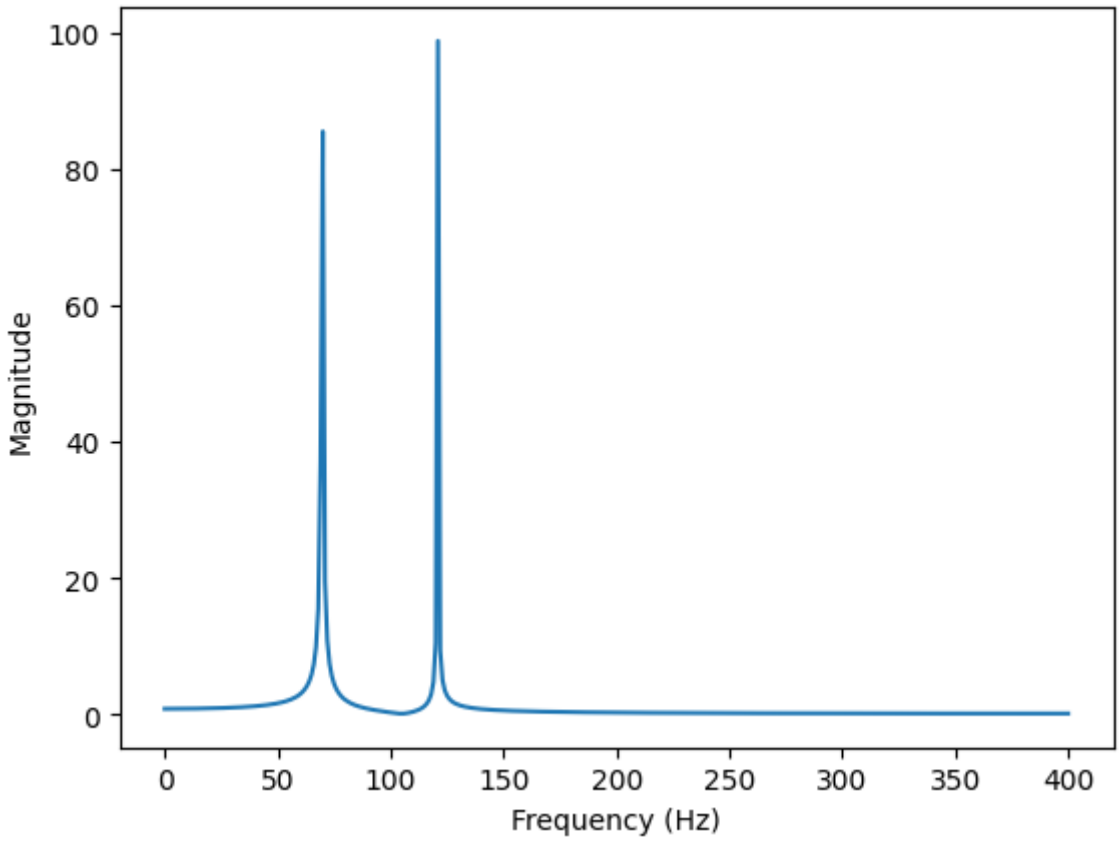


1KHz+3KHz sine wave fft

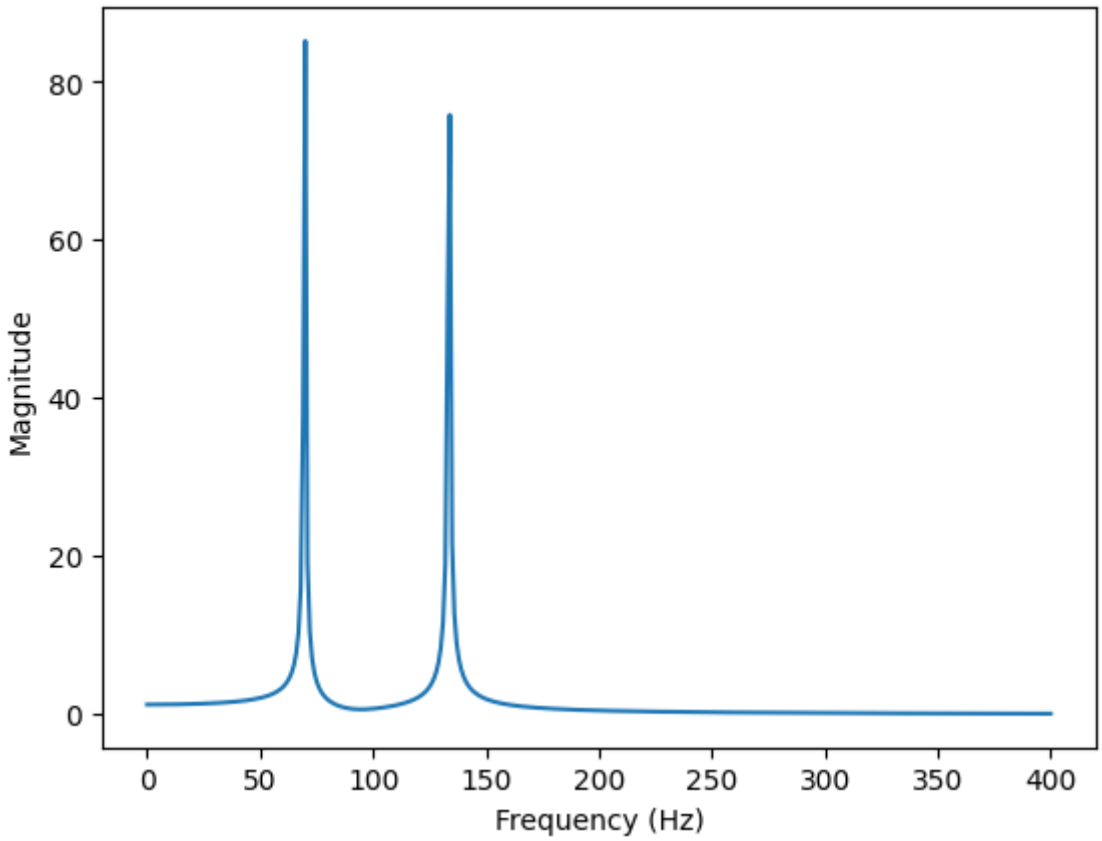


Digit Classifier Pard B

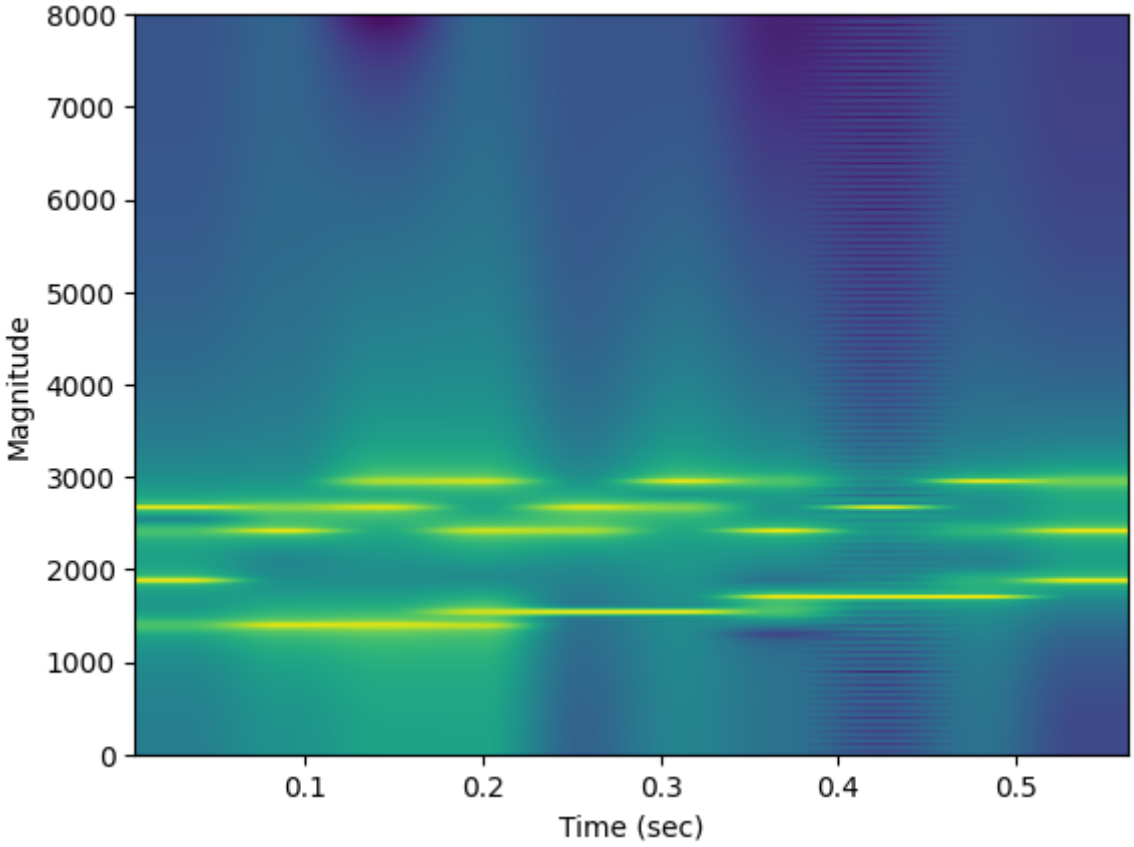
phone_1.wav fft



phone_2.wave fft



all digits on a specto


8000
7000
6000
5000
4000
3000
2000
1000
0
Magnitude
0.1
0.2
0.3
0.4
0.5
Time (sec)