MUSI6201 Assignment 3

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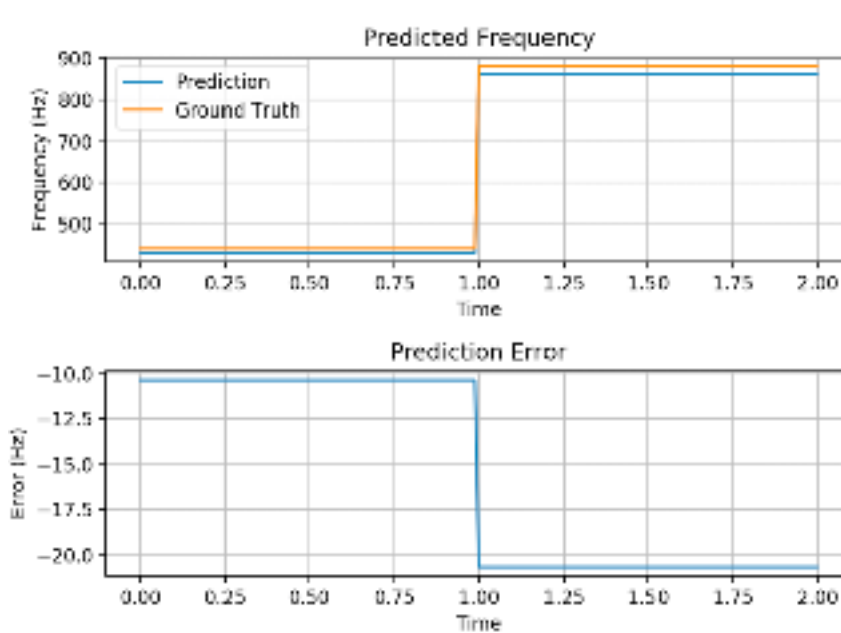
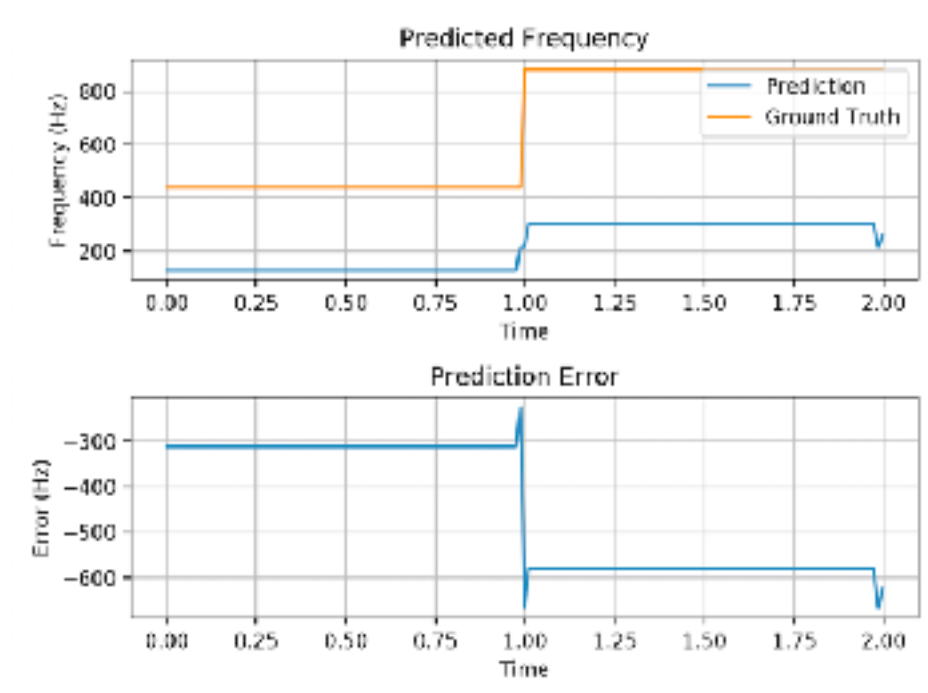## A. Maximum Spectral Peak Based Pitch Tracker

Part 3.

If the block size is 1024 and the sampling frequency is 44100, the resolution of the pitch

tracker would be equal to $\dfrac{f_s}{N}$. In this case, the resolution would be equal to approximately 43

Hz. A method to improve the frequency resolution without changing the block size or sampling frequency would be to implement zero padding. Even if the block size remains the same, zero padding can increase the number of points and therefore increase the resolution of the fft.

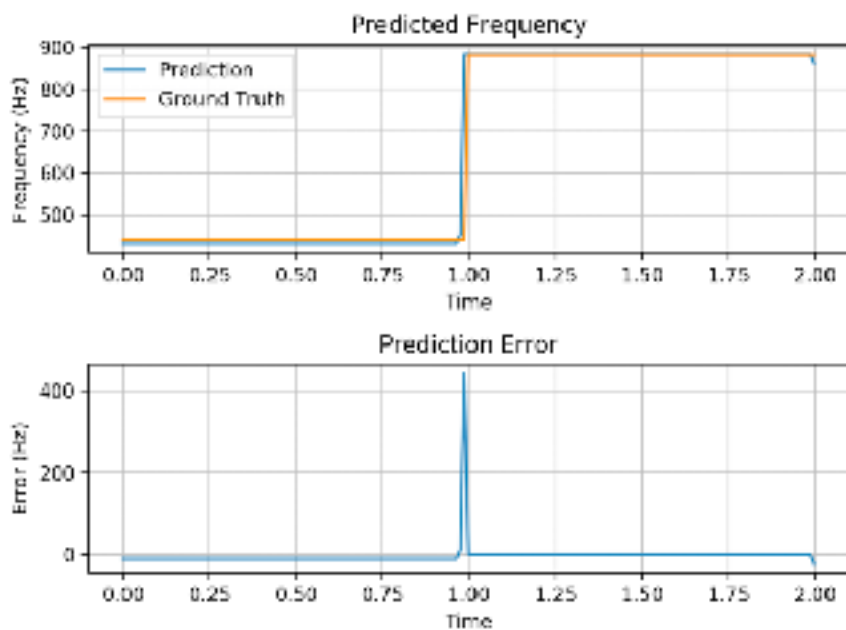## E. Evaluation

Part 1.

Absolute error per block for fftmax

Absolute error per block for hps

The hps system fails with the sine wave system since a sine wave has no harmonic content and so it disappears from the result after being multiplied by a zero magnitude since hps relies on pure multiplication weighting.

Part 2.

Absolute error per block for fftmax
with block size = 2048

Clearly, having a block size of 2048 as opposed to 1024 improves performance of fftmax. The reason is because the frequency resolution increases

Part 3.

Average performance metrics using 'Max':

errorCentRms = 1916.40

False positive = 8.09

False negative = 0.0037

Part 4.

Average performance metrics using 'Hps':

errorCentRms = 605.33

False positive = 7.47

False negative = 0.036

Part 5 & 6.

Using masking:

Average performance metrics using 'Acf' for threshold = -40:

errorCentRms = 613.61

False positive = 7.63

False negative = 0.0067

Average performance metrics using 'Hps' for threshold = -40:

errorCentRms = 604.05

False positive = 7.34

False negative = 0.037

Average performance metrics using 'Max' for threshold = -40:

errorCentRms = 1913.67

False positive = 7.61

False negative = 0.0081

Average performance metrics using 'Acf' for threshold -20:

errorCentRms = 509.12

False positive = 4.88

False negative = 0.35

Average performance metrics using 'Hps' for threshold -20:

errorCentRms = 660.47

False positive = 4.83

False negative = 0.355

Average performance metrics using 'Max' for threshold -20:

Avg for thresh -20: [1859.15 4.88 0.347]

errorCentRms = 1859.15

False positive = 4.88

False negative =   0.347