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CS-6323-DF1

Assignment 1

Included in my deliverable are the following files:

1. fourier\_transform.py
2. high\_pitch.wav
3. piano\_c\_3\_major.wav

To run the program please follow the following steps (on Windows machine)

1. Install python3 here: <https://www.python.org/downloads/>
   1. note : leave option to install pip checked during setup wizard
2. Place all provided files in the same directory
3. Open command prompt in directory with files
4. Run the following commands to install dependencies
   1. pip install ffmpeg
   2. pip install numpy
   3. pip install scipy
   4. pip install librosa
   5. pip install pydub
5. Run this command to execute the program
   1. python -W ignore fourier\_transform.py

During my experiment I tested too scenarios:

1. Removing a loud noise from the background of an audio file with me speaking in it.
   1. For this experiment I started by first only allowing frequencies of 4000 Hz and below to remain after fourier transformation and inverse transformation. However, the high pitch noise persisted. I kept lower the frequencies allowed to stay by increments of 500 hundred, until I could no longer hear the high pitched noise. The number I reached was 3000 Hz. Further experimenting found that any lower and my voice would sound too muffled.
2. Removing the higher harmonics from an audio file containing a C major scale.
   1. For this experiment I started by first removing any frequencies above 2000 Hz. This seemed to have no effect. I decremented the frequency by 100 Hz until I reached 300 Hz, listening to the result each time. As the frequency was decreased, I could still make out the distinct notes, but they seemed more muted or muffled. I couldn’t hear the sounds ring out or resonate as much. Once I reached 300 Hz and below, there was no more sound. I assume this must be the frequency for the main chord.