

Real Time Harmonizer and Mixer

Elizabeth Hass, Chris Chen

November 2, 2010

We would like to create a harmonizer with effects by doing both real time and post processing of audio signals. Our program will use a fast Fourier transform (FFT) module to process an audio input, preferably a voice. It will use 18th century counterpoint rules to create a counterpoint melody that will be played along with the singer. This will require a module capable of performing a FFT quickly and accurately in order to determine the note a singer is singing on a standard Western scale. After the singer ends a recording, our program will post-process the song, change the counterpoint to meet any counterpoint rules the real-time analysis could not handle correctly, and add a series of possible effects to the two melodic lines, like reverb, equalization, fixed and variable delay, and overdrive. Ideally, the program will play the counterpoint in real time as a modulation of the input audio signal. If this is not possible in real time, our program will implement the pitch shifting function in our post processing. If time permits, we would also like to implement an autotune function that allows our program to shift the original audio slightly upon playback to ensure it plays an exact note, ensuring the counterpoint and melody sound correct together. If time permits, our program will be able to provide instrumental accompaniment rather than pitch shifted vocal accompaniment as well.