Music 158A Final Writeup

11 December, 2018

Project Description
A QuNeo controlled autotune, harmonization, and voice modulator engine.

Members
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Project Objective
Our central idea for this project was to take an input audio - live recording or preloaded recording - and manipulate it in various ways. We decided to perform three different tasks: autotuning, harmonizing, and modulating the input and automating it using the QuNeo to carry out these tasks. Throughout our project, we learned and utilized various Maxpat functions to return an altered, new sound to output.

Subparts
Brian worked on the retune patch and set up the QuNeo mappings to manipulate these sounds to tune to the twelve tone scale, and was able to then also tune to multiple notes at once (such as various scales) and transpose the root note of the scale. This is done by using the pregiven retune~ patch, and with this we take in an audio input (which could be an adc~ input or an audio based file recording). We can use the QuNeo buttons using buttons 5-16 to tune the pitches to notes on the 12 tone scale (C to B). We are able to overlap the buttons being activated to allow for multiple pitch tuning (ex: pressing down buttons 2 and 4 tunes the notes to the closest pitch whether that be closer to the note assigned to 2 or the note assigned to 4. In addition, buttons 2-4 automatically tunes the voice to a preset scale (major, minor, pentatonic) and the first vertical slider allows the scale to transpose to all 12 different root notes.

Niket worked on the harmony patch. For the harmony patch, the goal was to take our retuned sound output, turn it into a chord, and manipulate the harmonized sound with the Quneo. This was achieved via the “transposer” patch which can take input sound and shift it by the desired amount of cents. Considering that 100 cents is a semitone and an octave consists of 1200 cents, we were able to calculate out the harmony. Using four of these transposers I was able to create a structure of root, 3rd, 5th, and 7th to create our chord. There are four options for the 7th chord: dominant, major, minor, and harmonic, and they can be chosen via the second horizontal slider. We can also bend the pitch of the entire chord as one unit (within an octave) using the second vertical slider. This harmony interface can be turned off and on using the first horizontal slider.

(Zachary’s Part) The “live_audio” patch (final_project patch => postprocessing subpatch => live_audio) transforms the timbre of the autotuned and harmonized sound outputted from testing_retune_harmony. It consists of seven modules, applied to the input sound in the order

they are listed in the following table. Each module can be activated and deactivated using the indicated Quneo button. Additionally the parameters passed into each module can be controlled by drawing a function on their corresponding Quneo pad (implemented in function_pad patch). The rate at which these functions are traversed can be controlled using the right rotary dial on the Quneo. Presentation mode in the live_audio patch allows the performer to view all the active modules and parameter functions on one screen.

Module Name	**Activation / Deactivation Button**	**Parameters and their Quneo Mappings**
Crossfade w/ Sine Tone	Horizontal Left Arrow 1	Fraction Voice: Pad 01
FM Synthesis	Horizontal Left Arrow 2	FM Index: Pad 02 FM “Intensity”: Pad 03
Am Synthesis	Horizontal Left Arrow 3	AM Index: Pad 04
Filter	Horizontal Left Arrow 4	Center Frequency: Pad 05 Peak Amplitude: Pad 06 Shape: Pad 07
Reverb (Delay & Feedback Engine)	Horizontal Right Arrow 1	Delay: Pad 08 Echo Volume: Pad 09 Feedback: Pad 10
Beat Frequency Generator	Horizontal Right Arrow 2	Frequency: Pad 11
Granular Synthesis	Horizontal Right Arrow 3	Grain: - Playback Rate: Pad 12 - Length: Pad 13 - Playback Speed: Pad 14 - Relative Location: Pad 15 - Envelope: Pad 16