Phase Vocoder / Pitch Shifter

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Description

We will implement a pitch shifter which takes in a signal and increases each of the frequencies in that signal by a certain amount (such as an octave), hopefully in real time. In implementing a pitch shifter, we will probably need a phase vocoder. This algorithm breaks up the signal into overlapping segments with the short-time Fourier Transform (STFT) and uses the ISTFT to stretch the signal, then resamples it.

Deliverables

- Simple Goal
  - Software implementation of a phase vocoder in Python
  - Not real-time, audio must be recorded before algorithm runs
  - Audio doesn't really need to "sound good" but should be identifiable.
- Extension
  - Pitch shifter can run in real time on the computer
  - Audio sounds pretty good
- Stretch Goal
  - Runs on embedded hardware.

Schedule

- 4/13: Proposal Due
- 4/16: Literature review done, and technique understood
- 4/20: Simple Goal completed (software-only implementation)
- 4/23: Extension of Simple Goal completed, Stretch Goal started
- 4/27: Write-up completed, Stretch Goal completed (optional)