EE 321 - Fall 2020
Project 1: Audio Effects, Due Date: September 18, 2020

This project introduces three simple audio effects for implementation in software: delay, echo, and reverberation. Submit a project report that includes a brief description of what you did, and provide the deliverables listed in each of the sections below. Make sure the report is clearly organized with all figures clearly numbered and labeled. Each figure should be referred to in the text and should describe the takeaways from the figure. Remember that the project grade depends on both the deliverables and the quality of the project report.

To get started, first record and load into the programming environment, a short piece of audio (approx 1 second).

1 Delay

To generate this effect, introduce a delay by embedding a sequence of zeros before the audio file.

Deliverables for this section:

- Code.
- The original audio file.
- Audio files with three delays. Each output should have a different delay.
- Graph of the original audio file.
- Three graphs - one for each output.
- How many zeros do you need to create one second of delay? How is that related to the sampling rate of the file? You can obtain the sampling rate by using the audioread function (read the documentation on how).

2 Echo

In this exercise, use looping to generate an echo effect. This effect is shown in Figure 1. Generate an output file that contains (1) the original audio; and (2) copies of the original audio, with each copy having gain slightly lower than the preceding copy. Make sure each echo is clearly audible - do not overlap sounds.

Deliverables for this section:

- Code.
- The original audio file.
- Audio files with three echo outputs. Each echo output should have a different number of echoes.
- Graph of the original audio file.
- Three graphs - one for each echo output.

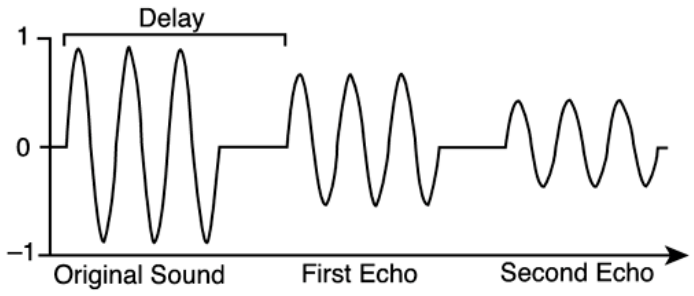

Figure 1: The echo effect.

3 Reverberation

Reverberation is similar to echo. The difference between the two is that in reverberation, the copies overlap with each other. Modify your code from Section 2 to convert echo to reverberation.

Deliverables for this section:

- Code.
- The original audio file.
- Audio files with three reverberation outputs. Each output should have a different number of copies embedded.
- Graph of the original audio file.
- Three graphs - one for each reverberation output.