CS/INFO 1305 Programming Lab 5

In this lab exercise, you will use MATLAB to play and manipulate sound files (wav files). In addition to enjoying the sounds, you'll get to practice working with vectors!

1. Download one or two short wav files from a website that offers wav files. Example files are on the course website, but you can use any search engines to search for wav files. One site that has a collection of "notable" quotes from movies is `http://www.moviesoundscentral.com/`. We do not endorse any of the sites, and please exhibit judgment and good taste when selecting wav files—do not download files that contain offensive language. (Not all wav files will work in MATLAB; you may need to try a few before you find one that works.)

2. Read, play and plot your selected wav file in MATLAB. Consult your lecture notes for syntax. Save these commands in a script. Try playing the sound at a sampling rate different from the recording sampling rate. For example, if the recording sampling rate was f, what happens if you play back the sound at $f/2$? How does it sound if you play back at $2f$?

3. Perform some splicing operations of your choice to manipulate the sound data. For example, remove a word, add a word from another wav file, change the volume of part of the speech, etc. You can experiment freely in the Command Window, but once you have found the appropriate locations to perform the operations, add the statements to your script. Be sure to practice the following maneuvers: extracting subvectors, building vectors, and using a loop to move through some cells in a vector.

4. One would expect that the sound quality would decrease if we lose some of the data of a sound file. In your script, write code to remove *every other* data point of your sound data of interest—lose half the data. Use a loop to do this and store the result in another vector (don't overwrite the original). Dropping half the data points this way is the same as sampling the sound at half the original frequency. Play this "sparse" data at half the original sampling frequency. What is the quality of the sound now?

5. Can we attempt to recover the data? Recovering would mean inserting a data point between neighboring data points. The simplest recovery is to just copy the value from one neighbor into the new inserted point. Another recovery method is to interpolate between two neighboring values to estimate the value at the inserted point. Try one of these two recovery methods and then play the "recovered" sound at its original sampling frequency. Did the recovery work well?