Speech Processing Lab 2
Analysing sound in *Praat*

Summary

Examining sounds with *Praat*. Looking at signals in both the frequency and time domains, filtering signals.

Introduction

Finding the files

This lab uses the same files as lab 1. To go into the directory you created last time:

> bash$ `cd`

> bash$ `cd lab1`

> bash$ `ls`

If you don't have the files, go back to the instructions for lab 1 and copy the files again.

Today we are going to use another speech analysis program to look at waveforms. This program is called *Praat*. *Praat* and *Wavesurfer* (which you used in lab 1) share many of the same functions, but sometimes one does particular things better than the other; *Praat* does a lot of things that *Wavesurfer* can't.

Starting *Praat*

> bash$ `open -a Praat`

Praat will open two windows on the screen, one called **praat objects** and one called **praat picture**. You can immediately close the **praat picture** window: it is not needed for this lab.

The main *Praat* window shows a list of loaded objects (currently an empty list), and a list of action buttons that can be used to manipulate objects.

To load a file into *Praat* click on the `read` menu and select `read from file`. Load in the file `kdt_001.wav`. You should now have an object in the object list called **Sound kdt_001**. Click on the `play` button to play it.

If you want to view the waveform click the `edit` button. This opens a window containing the speech and an f0 trace. Work out how to zoom in and out, like you did with Wavesurfer. Notice that you can play selected parts of the waveform by dragging to select and then clicking on the 'button' that appears under the selection. You can add a spectrogram, by selecting the `spectrum` menu and clicking `show spectrogram`.

You can generate a spectrum of a portion of speech by first dragging to select some speech and then clicking on the `spectrum` menu and selecting `view spectral slice`.

Praat lets you do some interesting things with the spectrum. You can select a range of frequencies by dragging the mouse over part of the spectral slice, and then play just those frequencies. Try it by selecting a large portion of the speech file, creating a spectral slice, selecting different frequency ranges and playing them.

Other exercises

1. Load the 300Hz square wave, select a section from the middle of the waveform about 1 second in length, and generate a spectral slice of this portion.

   You should see a spectrum showing the component frequencies for the waveform. Try playing individual peaks or groups of peaks. Compare the pitch and timbre of your selections.

2. Load the file sweep.wav. Examine spectral slices at different points in the file.

   In the `praat objects` window select the `sound sweep` object and click on the `filter` button and select `filter one formant`. In the box that opens, set a frequency of 2500Hz and a bandwidth of 300Hz, and click OK.

   You should now have a new object in the list called **Sound sweep_filt**. Compare the waveform and spectrum of this object to the original object.

3. Try the above filtering process on the speech waveform. Try filter frequencies in the typical range of speech formants, and narrow bandwidths of about 50Hz.