EE6641 Analysis and Synthesis of Audio Signals

Lab5 : Find your pitch

Due Nov. 10, 2015

Brought to you by Yi-Wen Liu

Objectives: In this lab, we will use at least two basic methods to find pitch. Such a task is also known as “pitch detection” or “pitch estimation”, which is popular in music information research domain. After finishing this job, you may also know how high you can sing.

Tasking description:

1. You are given several pieces of starter code to begin with. First, we will use a straightforward method. We intuitively transform the time domain signal into the frequency domain. Then, the largest amplitude (i.e. a peak having the largest magnitude) among those peaks found in a spectrum is regarded as the desired pitch.

2. The second method is called the autocorrelation function method (ACF). We have talked about this concept during the course. By assuming the input signal is periodical, such method may yield some desired results.

3. How do you choose the length of the window? How high is the frequency of your sound? Is it reasonable?

4. Because noises inevitably exist everywhere. You are asked to use any technique to avoid the situation. Moreover, you can also make the detected frequency more accurate (e.g. parabolic interpolation).

5. (Optional) you can also use other methods to implement pitch estimation. (e.g. cepstrum …)

Things to turn in on LMS:

Please turn in the implemented code and a file including brief answers to the questions above.

A further question leaving for you:

Does phase response have any significant affection? What can we utilize the phase response to estimate the pitch?