

EC380 Mini Project 6 – Song Detection

Please work alone for this mini project. You are free to discuss ideas with others. This MATLAB project will be part of your special problem grade for the course, and is part of a sequence of mini projects leading up to a simple communication system.

Background:

For this mini project you will write a simple MATLAB function that listens to a wav file of a simple song and identifies the notes being played. The wav files in the `G:\ee\ece380\Mini Projects\06 SongDetection` have some simple songs on which you can practice. The range of notes in these files is restricted to the range used in the previous mini project.

Approach

Read the song wav file into one large vector. Then break it into many smaller, equal length, *segments*. Each segment should be around 50-100 ms. This is easily done with MATLAB's `reshape` command. Enter `helpwin reshape` for more info. Play with `reshape` until you are sure it works the way you think.

Next set up a for loop and loop for each of the input segments. For example:

```
yy = reshape(.....);

for ii = 1:segments
    [noteNum, max] = toneDetect(yy(:,ii), fs, threshold);

    disp(sprintf('%d is note %d, max=%d', ii, noteNum, max));
end
```

Notice `toneDetect` is called for each segment and it returns the note it heard for that segment. You need to add a `silence threshold` parameter to `toneDetect`. If the power of the loudest note is below the threshold, assume the input is silence and return a `noteNum` and `max` value that means silence (`noteNum=-1` and `max = 0` work).

Grading

If you are able to show me an output that lists the note for each segment your grade will be as much as 8/10. Here is a sample of such an output:

```
notes =
Columns 1 through 28
-1 -1 -1 -1 -1 -1 0 0 0 -1 -1 -1 -1 -1 0 0 0 0 0 0 -1 -1 7 -1 -1
Columns 29 through 56
-1 -1 -1 -1 -1 7 7 7 7 7 7 7 -1 -1 9 -1 -1 -1 -1 -1 9 9 -1 -1 -1 -1
```

If you can make your output more compact and only show the notes that were played you will get more credit. For example:

```
notes=
Columns 1 through 6
0 0 7 7 9 9 7
```

In this example, note 0 was played, then note 0 again, then note 7, and so on. You don't have to have perfect output, but it needs to be pretty close.

Due Date:

This assignment is due Tuesday 13-May-2003 at the start of class.

What is due:

1. One page memo describing what you did. Show your output for the song **Twinkle.wav**. Highlight any **extras** you did.
2. Your MATLAB code.

Print (don't email) your memo and MATLAB code and hand it in class.