February 12th 2016

P0: Project Proposal

CS 489 001: Computational Audio

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Project Overview

For my project, I am interested in looking deeper into matching audio clips to one another. Specifically, I want to further learn how to take audio input, "fingerprint" or cataegorize the audio clip, and match it to existing audio in a database. To reach this goal, I would like to create a program that tries to match bird calls to specific birds. I would do this by first implementing a fingerprinting algorithm such as the one mentioned in the attached article or an algorithm that uses the spectrogram of a signal. I would then create a database of bird calls fingerprints by running my algorithm. Then, I would create a simple program that takes any bird call input, fingerprints it, and tries to match the call to one already in the database.

Goals

Clearly, this is a large project to take on and as such I have created some project goals that I will try to meet. Hopefully, I can meet all of my goals, but if I cannot, the project will still be one that is a building block of my final goal.

1) Implement a basic algorithm that is able to create a fingerprint of a sound with no concern to the time domain or factors and then use it to try and match two of the same bird calls together. Essentially, use the DFT of one bird call and try to match its DFT (within a reasonable error bound) to another DFT of the same bird call.
2) Do goal 1 but with more concern to error bounds and not a perfect matching
3) Do goal 2 but with focus on the time domain
4) Finalize the fingerprinting algorithm and create one bird call fingerprint to use for comparison on all other inputs
5) Create a program that takes any bird call input and uses the fingerprinting algo to try and match it to the stored fingerprinted bird call. Essentially the program will be "Is this bird call a (type of bird) call?"
6) Update program so that it will take in any input, not just bird calls
7) Create the database with multiple bird calls using different bird call audio inputs
8) Implement an efficient search algorithm to match a fingerprint to the database
9) Entire project has been completed

Resources Overview:

Currently, I just have a general idea and knowledge about how to implement the fingerprint algorithm. I have access to one article that explains it and have a few more that I want to follow up on. I will be getting the bird calls to test and put into my database from the Avisoft website.

Resource Links:

http://avisoft.com/

http://www.toptal.com/algorithms/shazam-it-music-processing-fingerprinting-and-recognition