Journal Report 6
10/07/19-10/11/19
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Daily Log

Monday October 7

Last week when I tried to convert songs from MP3 or M4A to WAV, I kept getting an error saying that my files couldn't be found or they didn't exist. I got to the bottom of that issue today: my Python program and the song files were in different directories. Apparently I had 2 of the same folder because I copied my Senior Research folder and kept the original copy that wasn't in use anymore. I moved all my new files into the new Senior Research folder on my computer and deleted the old one so my code wouldn't get confused anymore when searching for files.

Tuesday October 8

While I was calculating MFCC for some sample songs I've downloaded, I noticed that the MFCC value for the MP3 version of the song and the value for the WAV version of the song were always very slightly different. I did some research into the differences between MP3 and WAV files and it turns out a WAV file is raw, uncompressed audio. WAV files are essentially lossless and, as such, are pretty much exact copies of original sound recordings. MP3 files, on the other hand, are compressed to save space, so they're lossy and not as accurate representations of a sound/audio sample as a WAV file might be. Now I have to decide which format to use for my project, because even though WAV probably gives a more accurate MFCC, WAV files take up a ton of space since they're uncompressed. As such, it takes slightly longer for my program to calculate MFCC using a WAV file.

Thursday October 10

I plotted MFCC on a graph today. I needed to install the Matplotlib library, which is a Python library that allows for 2D plotting of functions. I followed the instructions in the Librosa library documentation and produced MFCC plots for several of the songs I have downloaded, one of which I've included in this journal. It's pretty cool to see it graphically represented. Now I just need to develop a better understanding of how MFCC works. I have a pretty basic understanding of it right now: MFCC represents the frequencies present in an audio sample. A lot of the math is still murky to me, and while I could just use it in my project without taking the time to understand it, I know having an in-deph understanding will help me a lot in my research. I'm still learning more about it every day.

Timeline

Date	Goal	Met
9/23/19-9/27/19	Build a logistic curve that takes features of several popular songs to plot another song's potential popularity on the curve (I'll be comparing a few different methods of supervised learning before I integrate MFCC)	No, first I have to figure out how to obtain MFCC from a song on the Hot 100 playlist with librosa
9/30/19-10/04/19	Learn how to extract MFCC data using the Librosa Python library	Yes, but I need to convert the MP3 song files I've collected into WAV files before I can calculate MFCC with them
10/07/19-10/11/19	Convert mp3 files into WAV and calculate MFCC from converted files	Yes
10/14/19-10/18/19	Begin building neural network using MFCC and song features as inputs	In progress
10/21/19-10/25/19	Continue work on neural net	In progress

Reflection

I've finally completed the building blocks of my project. I have all the tools I need to start building my neural network and logistic curve: song audio features from Spotify, MP3 and WAV audio files, and a way to calculate and plot MFCC for any song. Now I can work towards my final goal of predicting song popularity. It'll be a challenge for sure; I still need a way to qualitatively measure the popularity of a song, but I have some ideas I'll talk about in one of my next journals. This next phase of my project should be interesting, since I'll be learning about a lot of things I've never done before.

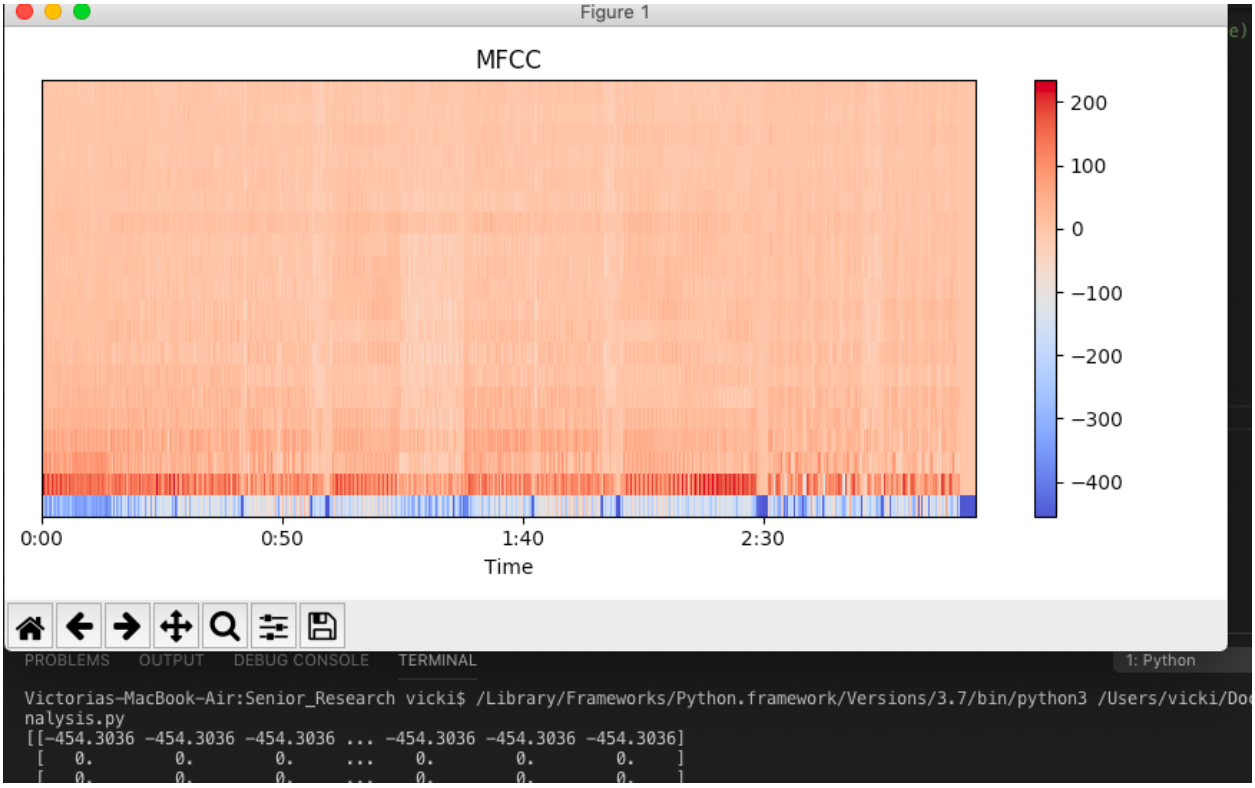

Figure 1: Graphical representation of song MFCC.