CS320-103: Software Engineering, Spring Semester 2022
Individual Project Proposal
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<Songify - Song Identifier and Suggester>

Summary: For my individual project I will be creating an application designed to recognized music it hears, identify its title and artist and suggest similar songs based on previous song it has heard. The software will use audio recognition to identify songs and save them for future use. After listening to a song, the program will compare it to other songs it will have saved in a database. The comparisons the software makes will then be used to suggest similar songs based on attributes such as tempo. The initial database will contain information on a set number of songs such as tempo, artist, lyrics, and potentially a spectrogram of a song. After listening to a section of a song, the software should save as much of the previously listed attributes as possible and register it to the database. I intend to also create a function allowing the software to generate playlists based on the comparisons it makes. It should be noted that the program will not be able to play the songs it contains, it will simply suggest other songs for users to listen to.

I came up with the idea for this project trying to combine my passion for music with my interest in machine learning. There is a lot of music out there, so, when I want to expand my musical library, a program that can find songs similar to those I like would be useful. Although the program may only start with a handful of songs to work with, I hope to expand it into a more powerful application.

Technologies: Much of the development for this project will be done with TensorFlow/ TensorFlow.js. TensorFlow has many sample models related to the different functions I will need, which should greatly assist my learning experience. Since I will be working closely with TensorFlow, much of my project should be structured around javascript. The TensorFlow system also works well on Mac, my personal device, which serves as an added bonus. I hope to

complete most of the work on my MacBook since it is capable of running most, if not all, the software I require. I will go about acquiring other devices if it becomes necessary.

Development Plan: Since there are several different components of this project, I will be segmenting the production effort. I will begin by teaching myself the basics of javascript, which should not be a difficult task, since I already understand java. I intend to learn more of javascript the further I go in to this project. TensorFlow's tutorials, sample models, and demos will also be used to familiarize myself with the TensorFlow environment. Beyond TensorFlow and javascript, I also intend to do some research on audio recognition and similar applications to ensure I use the best strategies. From here, I will begin building up the database of song information. I am planning on starting with a small sample size from one artist to start. Once I have a steady foundation to my program, I will add more to the database. After having a collection of songs set up, I will then work on developing the base application with basic ui. Next, I will set up the audio recognition software with TensorFlow. I am expecting its' early form to only recognize lyrics based off voice recognition, but I will expand it to recognize melody. After I am able to have the audio recognition pick up on songs, I will begin create the suggestion software using TensorFlow. If time allows, I will use the suggestion software to create a playlist builder.

Challenges: I expect this entire project to be extremely challenging, which is its purpose. Personally, I think implementing the audio recognition software to recognize more than words will be fairly difficult. I have not worked with audio recognition before, however, I believe it's achievable as I have seen other online set up similar programs. The database of song information will most likely be the easier part of the project. However, if I take the route of using spectrograms for melodic recognition, I believe it will be difficult to create and set up these elements. Compiling each element of the project is also a challenge I expect to face. I have not worked on a project of this size before, so this will be a new experience. Many things in this project are new to me, but I believe I have the resources to learn and develop everything I will need to within a timely manner.