Term Project Proposal: Random Music Generator Based on User Input
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When I found out that I would be required to take this course, I immediately asked all of my older friends about this class, workload, and advice for doing well in the course. Almost everyone stated that the term project will be one of the most valuable things done in your CMU career, as long as you make it special and interesting to you. Considering that I am currently pursuing a double major in Electrical and Computer Engineering along with Music and Technology, I knew that I wanted to create a project related to digital music.

From a very young age, I have been working with MIDI input. I have always found it amazing that digital machines are able to replicate musical qualities by just a combination of many 1's and 0's. This should mean that there are very few things that live sound creators can do that digital machines are unable to. For a long time, I assumed musical composition was one of these things. Then, this class' term project presented itself with an opportunity to challenge that.

For my 15-112 Term Project, I would like to challenge the commonly accepted notion that digital machines cannot compose as well as musicians. I want to create an algorithm that takes in musical data from the user (in a MIDI format) and then returns a longer MIDI file that will be randomly generated but dependent on that input. This algorithm will be analyzing the input for tonality, key, tempo, time signature, cadence patterns, and other important features that will be used in determining the final outcome. I have studied a lot of music theory in the past, which will become necessary to develop the processes and calculations that will be needed in order to determine certain properties. This algorithm will be one step closer to finding out if machines can automate the process of composing music.

In order to create this algorithm, I will first need to determine how to get the user input. The idea I have now is creating a virtual keyboard through Tkinter that will store the data for the algorithm to use. For the actual algorithm, I am planning to use pyAudio or music21, but have many modules that I may also use for very specific functions (below is a list of all the modules I may be using, which will be updated as the project continues). I also have code from last semester's 15-110 sound lab, which may be useful when designing the virtual keyboard. I have many resources that I can use to implement this.

In addition, when formulating this project, I have talked to a few experts in this field when determining how exactly the project would work. My most important contact, and will continue to be in this project if allowed, is Professor Roger Dannenburg. Since he is the professor that heads the CMU Computer Music Research Group, he is very proficient at combining the two fields of Music and Computer Science. He also teaches several Computer Music classes, like 15-322, that are aimed at using computer science for music applications. The students in this class have also been helpful resources in leading me to find various modules that will help me when designing this algorithm. I hope that I am able to take full advantage of this valuable resources as I do want the best to come out of this project. I am completely invested in this project, and I believe that many people can benefit from this finished project, musicians or not.

I am really excited to work on this project that is geared towards my strengths and helps answer a question I have had from a very young age. I hope that this project is also challenging enough so that I do appreciate the work and effort needed to create algorithms that solve musical problems. I also believe that those who get to work with the final product see the value in music-creating algorithms and how it enables anyone to become a composer. I am very grateful for this opportunity, and I hope that I serve the term project well.