CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)
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Project Number
35701

Project Title
What Does Music Look Like?

Abstract

Objectives/Goals
The objective was to determine what different genres of music look and feel like.

Methods/Materials
Data was obtained by using a decibel meter to record the volume data and mathematical calculations using Excel to determine the beat frequencies per second. This data was then imported into Matlab (a multi-paradigm numerical computing environment) in order to conduct regression analysis through triangulation of the three parts of the data: time, frequency and decibels. These data sets were assigned to the x,y and z axes of a three dimensional graph. Time was assigned to the x-axis, frequency to the y-axis, and decibels to the z-axis. A 3D graphical model was then created of the surface structure for the array of points. Data was then converted to a .stl file in order to be accepted by a 3D printer. The models were then printed using a 3D printer.

Results
The finished plots both on screen and in tactile form produced non-uniform data models. The genre of classical was the most complex in that it had the most folds in the 3D surface. The genre of jazz and pop had much more simple structures and in turn smoother prints. My results enabled me to feel and see music in a new way that was perhaps never possible before. In the end I obtained my objective of seeing and feeling music.

Conclusions/Discussion
These results prove my hypothesis was correct in stating that classical music will have more complex structural surfaces. In the end I was able to attain my objective of seeing and feeling music. The information from this project furthers our knowledge into the subjects of not only computer science and programming but also into the physics of music and the quickly growing industry of 3D printing. The outcome of the models also suggests the potential complexity and emergent behavior found in music when modeled in space. The models from this project could potentially be applicable to people unable to hear who may not otherwise be able to hear music but could potentially learn to feel and see music. The results from this project could also be applicable in the architecture industry. To further my project I would like to reverse the outcome of my results by 3D scanning an object and composing my own piece of music with the data.

Summary Statement
This project focuses on creating a visual and tactile representation of music through three-dimensional data representation.

Help Received
None