15112F17 Project Proposal

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Problem Statement

Music and painting are both powerful mediums for expression. While an auditory person finds it easier to grasp the emotions carried in the notes, a visual person can better comprehend lines and colours in a painting. Colourful Notes helps artists better communicate with the audience by translating music into paintings.

Detailed Description of Solution

Colourful Notes is a website. The user records or uploads his/her music, and then get a painting based on the music.

The translation works by the following steps:

1. Records the user's audio to a .wav file or receive a .wav file directly
2. Analyzes each chunk's pitch, strength.
   - Detect pitch by performing Fast Fourier Transform on the time function of amplitude
   - Detect strength by finding the amplitude
3. Analysis of all chunks to further detects chords and tempo.
4. Use a function that matches notes and chords to colour, strength to area of colouring, and tempo to brightness. The function also matches the waveform of the audio to a line pattern.
5. Output a .png file based on the result of analysis

Theoretically, the translation should also works in the painting to music way, if I use image processing module and generate a MIDI file. However, it is more challenging, because while abstract arts can be almost generated randomly, random notes can sound bad.

If I have time, I would also like to:

1. Translate backwards (probably by matching painting characteristics to chords and tempo)
2. Make the program run on cloud and host it with a website.

Modules and Technologies

1. Audio Analysis: Pyaudio, matplotlib, numpy, portAudio
2. Website: HTML5, CSS3, JS, Django, webAudio
3. Deployment: Google Cloud