**Project Description**

As the name suggests, this project processes music and represents it in a garment. Specifically, as a piece of music plays, the frequencies are detected and interpreted into colors that are represented by RGB L.E.D.s sewed onto the garment.

The module used in the project include PyAudio, NumPy, PySerial, Arduino, Math, Visual, and Wx. PyAudio, time, and NumPy can be used to record as well as play audio, and for this project, it is used for the recording in order to detect audio frequencies and loudness, and generating audio at frequencies the user sets. NumPy is used to find frequencies and loudness detected as well as synthesizing audio. PySerial, Arduino, and Math are used to convert the frequencies into colors of the L.E.D’s. PySerial can read data from Arduino, as well as write data to Arduino. For the purpose of this project, the frequencies, converted into RGB strings, are sent to Arduino, which then turns on the RGB L.E.D.s according to the RGB code they receive. As for converting frequency data into RGB strings, frequencies in Hz are first converted into Midi notes. Then the module “math” is implemented to calculate the red, green, and blue RGB codes of a Midi note. A high frequency corresponds to large blue and green RGB codes and a low frequency corresponds to a small red RGB code.

3D displays of the garment, and the contribution of red, green, and blue to a certain color drawn with 3D boxes, are shown using visual. The louder the sound detected, the less opaque the red, green, and blue bars, but the more LEDs on the garment turn on. 3D displays of the garment, and the contribution of red, green, and blue to a certain color drawn with 3D boxes, are shown using the visual module. The louder the sound detected, the less opaque the red, green, and blue bars, but the more LEDs on the garment turn on. The displays are within a x window. Audio detection and analysis begin with the user clicking on buttons in the window. The L.E.D.s are sewed onto a white garment (for easy visualization of color change) with the arduino board, to which the wires connect L.E.D.s, sewed onto the back. The garment can then be worn by a dancer, whose dancing brings music to life in terms of movement and visualization. It can also be worn by a singer, whose singing offers aural, as well as visual pleasure to the audience.