Emotion Association within Color and Music

Maya Kelly, Ania Jordan, Jacob Meyers
Georgia Institute of Technology

Abstract

Film master Tim Burton takes influence from whimsical authors like Dr. Suess and Ronald Dahl and even gothic poets such as Edgar Alan Poe. Burton's style is to take something and make it dark while keeping it fanciful. For example, Edward Scissorhands (1990) is influenced by James Whale's Frankenstein (1931) – an American horror monster film, yet there is a modern perkiness to the plot that is displayed through Edward's innocent personality.

The film has a dark and almost colorless setting - accompanied with somber audio- for Edward and the mansion in which he lives, yet the town surrounding his home is bright and filled with wonder. This inferred emotional juxtaposition is implemented through Tim Burton's use of music and color. He directly using these creative tools for the purpose of changing the audience's perspectives to each scene within all of his masterpieces.

Will a few computer programs be able to spot these artistic inferences that are visible to the human eye? Will color and music have correlating data? What aspects of color and music independently evoke certain emotion? In an attempt to answer these question, we further explore how color and soundscapes codependently impact emotion in film, particularly Tim Burton films.

Methodology

We utilized Essentia- an audio analysis program, Scene Detect - a video scene cut detection and analysis tool, some frame making python code and Colorific- an automatic color palette detector.

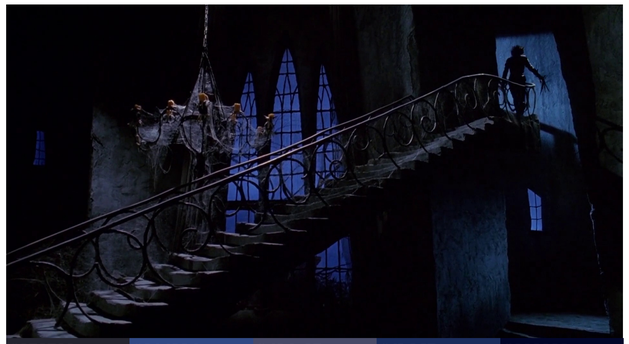
The Colorific code has been optimized to create a excel file with the five main color from each frame and three emotion options associated with each color mentioned.

The freesound extractor - a sound extractor used for audio that is not necessarily music. The categories returned using the film's audio as input are Low-level- signal processing, Rhythm- beats per minute, and Tonal - rate of chord changes.

The Scene detect program supplies clips of each scene from a film and dirFrame then takes those clips and returns frames of each clip in separate directories.

Results

Colorific seems to be a fine detector of the main color within a frame. However most frames have small pops of color that would normally be striking to humans, are not apparent to the program. The emotions paired with each color are assigned using the color-emotion association tables listed in a dissertation by Mikael Brunberg, titled "The Weight of Color".



#252530	#314984	#484a67	#1b2d5c	#020629
darkslategrey	darkslateblue	darkslategrey	midnightblue	black
-mourning -detached -content	-sad -content -ominous	-mourning -detached -content	-sad -content -ominous	-danger -sad -anxious

Essentia's rate of chord change and beats per minute categories seem to be the best descriptors of emotion within the program.

The rate that a chord progresses can affect the mood of a piece of music, causing it to range from ominous, tense, and sullen to optimistic and cheerful. Beats per minute, describes the temp or pace of a piece and can create various emotional atmospheres during a scene such as slow and solemn or even agitated.

Rate of Chord Change	Beats Per Minute
0.027	67

Conclusion

By implementing the programs Essentia and Colorific, it was noted that psychological color-emotional theories are heavily correlated with music-emotion theories. Scenes with bright, highly saturated colors emote intense feelings and such feelings can be demonstrated by similarly intense music with features like high beats per minute (bpm). On the other hand, calmer scenes with weaker color contrast and saturation establish softer feelings were accompanied by music that seemed tranquil and lower tempoed sounds.

Moving forward, color comparisons can be improved by modifying the code in Colorific that identifies the closest colors. This will help in instances were certain colors to the naked eye, for instance #fff0f2, might seem to be light pink but to a computer algorithm it is a variation of white. By adjusting this code, the color analysis will be more coherent regarding how colors seen by the human eye. Better soundscaping is also needed for the future. Due to a movie having music and dialog, Essentia also anlyazed the human speech when reviewing audio files.

References

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