

Lyrical and Melodic Emotional Effects In Songs

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Abstract

The emotions of a song can be determined by many different factors, the rhythm, the words in the song, what chords are used, even the simple patterns in the notes can carry some meaning for what emotions are produced. All these factors can be divided into two main components, the melodic (musical) component of the song, and the lyrical component. In order to understand the impact of each part, songs can be looked by two different algorithms that determine the emotions of each.

Lyrical Methods

In order to look at the lyrical components of a song, the first step was to create a survey to determine the emotional attribution of different words. Sixty words were chosen for this survey, with half* of the words having a musical component. The lyrics for the top songs¹ from the 90's, 00's, and 10's were analyzed using a python program that compiled lyrics based on frequency to determine the most commonly used words.

The survey was then sent out to people between the age 18-24.

Future Work

With the framework being set up to determine the emotions of each part of a song, the next step is to improve the neural net that classifies the lyrical input with a higher accuracy. The melodic components can also be plugged into a different neural net that can take in a chord or set of chords and outputs the emotions of those chords.

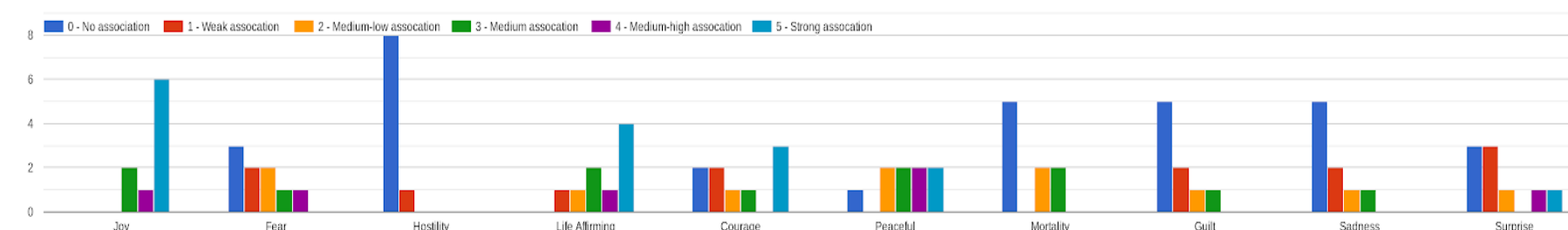
Once the neural nets are complete, the final steps will be to combine the results of each component. There may be a necessity to place a weight on either the lyrical or melodic component when determining the overall emotions the song produces. In order to visualize the final results of the algorithms, a double sided Sankey Diagram would be used, with the lyrical components and their emotional results on one side, the melodic components and their results on the other, and an organized chart of each emotion in the middle.

Melodic Methods

In order to understand the emotions produced by the melodic component of music, research on what melodic factors existed and how they might impact a song had to first be done. Key, chords, pitch, beats per minute (bpm), and rhythm have the strongest effect on the emotions that a song that can cause.

Because musical data is typically stored as sheet music, which cannot be read into a program, the sheet music for the song had to be converted into XML format, specifically a musicXML file. The file was then parsed into each individual note's data, which contained the measure, pitch, octave, duration, and whether or not this note was a part of a chord. This data was stored as a Note class, which could then be used to categorize the emotions of the song.

Rate the emotions you associate with "love"



Survey Results

For the 60 words in the survey, each was classified on a scale of 0-5 for 10 emotions, which were chosen based on the PANAS-X survey.² Each word is then stored as a vector containing the average response for each of the 10 emotional associations. These vectors were then fed into a Neural Net which categorizes them into an emotion.

Survey responses were received from 10 individuals, 60% of which were female and all were within the ages of 18-24.

References

¹Leight, Elias. "Top 20 Billboard Hot 100 Hits of the 1990's"
<https://www.billboard.com/articles/news/6297023/billboard-hot-100-1990>

²Watson, David and Clark, Lee Anna. The PANAS-X, Manual for the Positive and Negative Affect Schedule- Expanded Form. 1994

*The other 30 were chosen by Victoria Quin, who's research was based on Reddit data and emotions.