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Modernizing Links Between Text and Music: Connecting the Sentiment Properties of Text with Those of Spectral Music

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Modernizing links between text and music: Connecting the sentiment properties of text with those of spectral music

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Introduction

Standardizing the sentiment of words

- Analysis of sentiment associated with different words has long been used as a compositional tool
- Interpretation of words followed loosely accepted notions, but no overall standardization
- Evaluative Lexicon 2.0 (Rocklage, Rucker & Nordgren, 2017) provides a quantitative ranking of words in terms of properties concerning sentiment (See Fig. 1)

Figure 1

Word	Valence	Extremity	Emotionality
Awesome	8.57	4.07	6.34
Awesomeness	8.46	3.96	6.72
Best	8.45	3.95	4.07

Each word is ranked from 1- 1,451 based on its overall valence. Figure 1 shows the first 3 words on this list accompanied by its Valence, Extremity and Emotionality numbers.

Research Questions

- Can music be made to reflect the emotions that a Twitter user is conveying through their posted tweets through the use of sentiment analysis?
- Can analysis of sentiment be used to standardize the link between text and music providing a compositional tool?

Initial experiment

- Create software using Cycling '74's Max 7 that connects these sentiment properties with those of spectral music

Input:

- 20 most recent tweets from user @realdonaldtrump
- Each tweet is cross-referenced with Evaluative Lexicon 2.0

Output:

- Electronic sounds, 1 chord (grouping of frequencies) per tweet

Method

- Based on a median split, each word is classified as positive or negative on:
 - Valence, Emotionality and Extremity
- Tweet values on all three dimensions are equal to:
 - $n = \bar{x}_{pos} - \bar{x}_{neg}$
- Four aspects of an electronic sound:
 - Pitch - The musical note or frequency (Hz)
 - Velocity - Loudness of the sound
 - Sound envelope - Attack/decay of sound
 - Duration - How long the sound lasts
- Both the sentiment analysis of text and the spectra of sound are mathematical in nature
 - How do we connect the two?

Figure 2

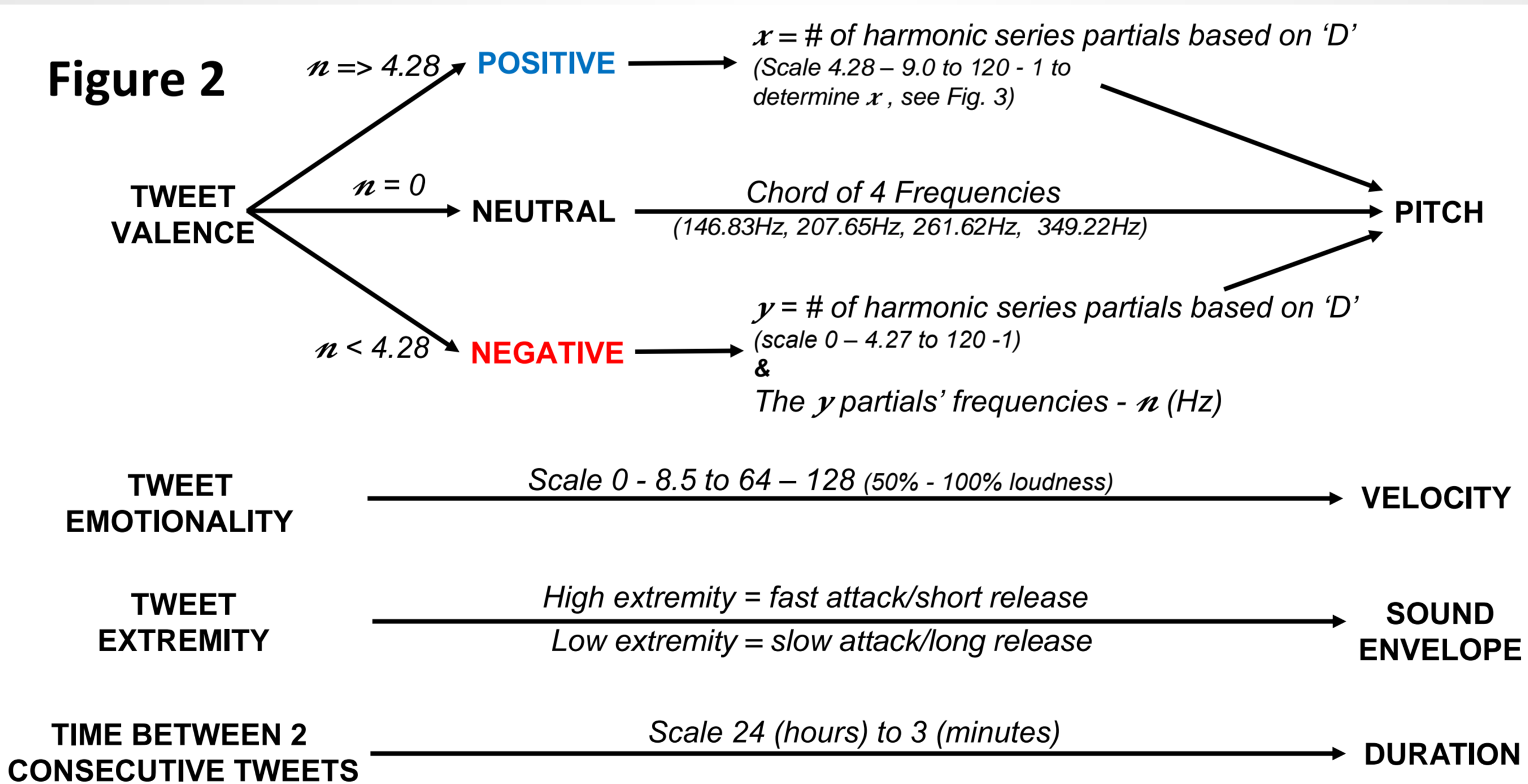
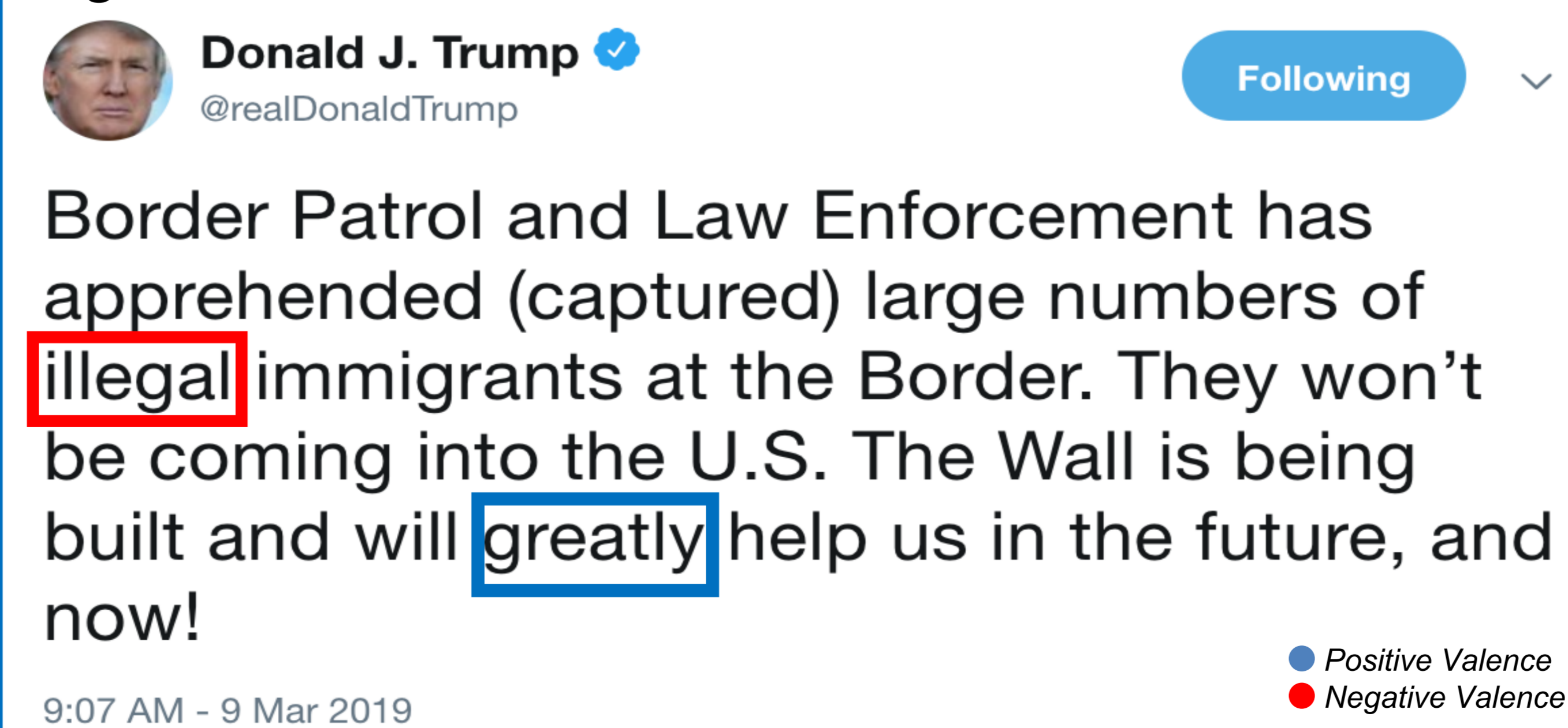
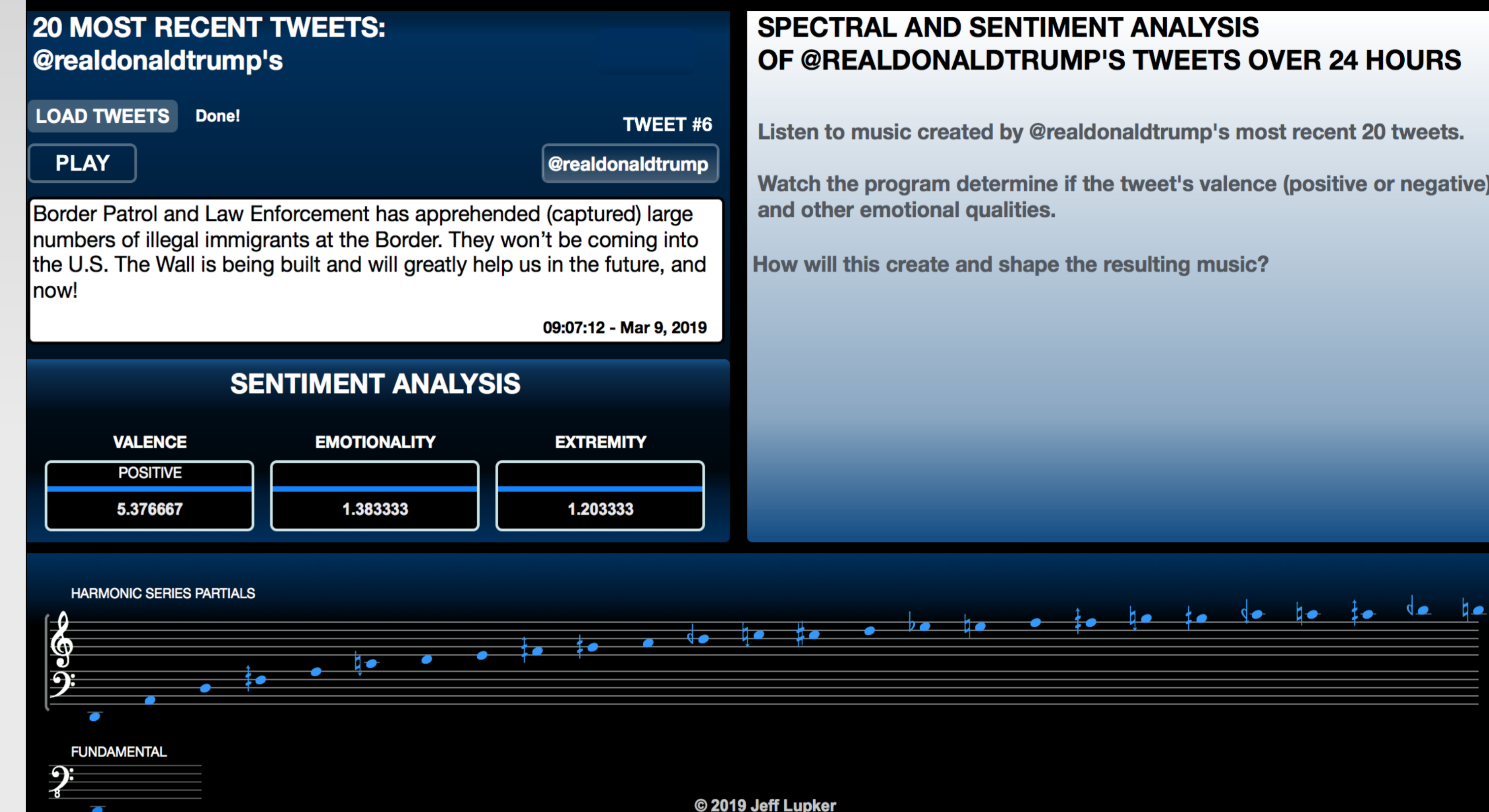


Figure 3



Highlighted words are the only 2 identified to hold valence. "Greatly" has been identified to have a valence of 7.79 and "illegal" has 2.41. Overall valence is therefore 5.37, classifying the tweet as being positive.

Figure 4



Tweets are loaded into the program and when play is pressed, the resulting music will sound for the duration of the 20 tweets.

Above is a representation of the chord that was produced based on Trump's March 9th tweet.

The valence ranking of 5.37 is scaled to 92, thus 92 partials of the harmonic series will sound above the fundamental note of 'D'

Results and Discussion

- This procedure produces a multimedia musical composition allowing the observer to listen to the sounds that are intrinsically linked the words viewed in real time
- Since valence is ranked according to words, certain aspects such as sarcasm are not analyzed properly
- Posting a tweet in all capital letters or using punctuation does not affect sentiment analysis in this setting
- Might it be better to use totals instead of \bar{x} for mappings?

References

- Rocklage, M. D., Rucker D. D., and Nordgren L. F. "The Evaluative Lexicon 2.0: The measurement of emotionality, extremity, and valence in language." *Behavior Research Methods* 50 4 (2018): 1327-1344 .
- Yamamoto, Y. *Twitter4j* (2007)
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