

# Text Visualization of Song Lyrics

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## Problem

Looking up song lyrics is a commonly performed task for musicians and non-musicians alike. Currently, song lyrics are displayed in plain text (often broken into stanzas like poems). It is quite difficult to tell how the lyrics actually fit in with the musical elements, and what the resulting perceptual experience is for hearing the song.

## Goal

Create a clean<sup>1</sup> and expressive<sup>2</sup> visualization\* of song lyrics.

1. Does not hinder performance on the primary use case by outputting **clean, readable** song lyrics
2. Offer useful hints to key elements in the music to maximally convey the song as  $(\text{linguistic features})_{\text{lyrics}} + (\text{musical features})_{\text{tune}}$

\* It is *not* my goal to encapsulate the entire musical score into the visualization

## Motivation & Related Work

1. **Cantillation Signs:** example- וְנֹאמַר אֱלֹהִים יְקַוֶּה הַמַּיִם serve syntactic, phonetic, and musical functions
2. **Tag Clouds:** map features of interest to font type, size, and color
3. **Typography Motion Graphics:** animated text art displayed with music
4. Martin Wattenberge's **Shape of Song:** visualize musical structure using arc diagram
5. Edward Tufte's **Sparklines:** create a musical summary sparkline

## Approach

### Linguistic Features:

Embed key phonetic and salient semantic elements in the text (as in "Cantillation Signs")

### Musical Features:

Summarize pitch contour, metric/ rhythmic info, harmonic progression, and nuanced expressions in a sparkline above the text

### Context & Overall Form:

Show the song structure using a vertical timeline with time stamps for major sections

## Results

*Implementation:* using Protovis (browser compatibility: Firefox, Safari, Chrome)

### Linguistic Features:

italicize accented syllables (phonetics), bold content words (semantics), size to convey relative words frequency (for tag cloud generation only)

### Musical Features:

melodic pitch contour as a step chart  
harmonic progression (guitar chords) by function as baseline color  
metric information (i.e. quarter notes in 4/4 in the example) as ticks

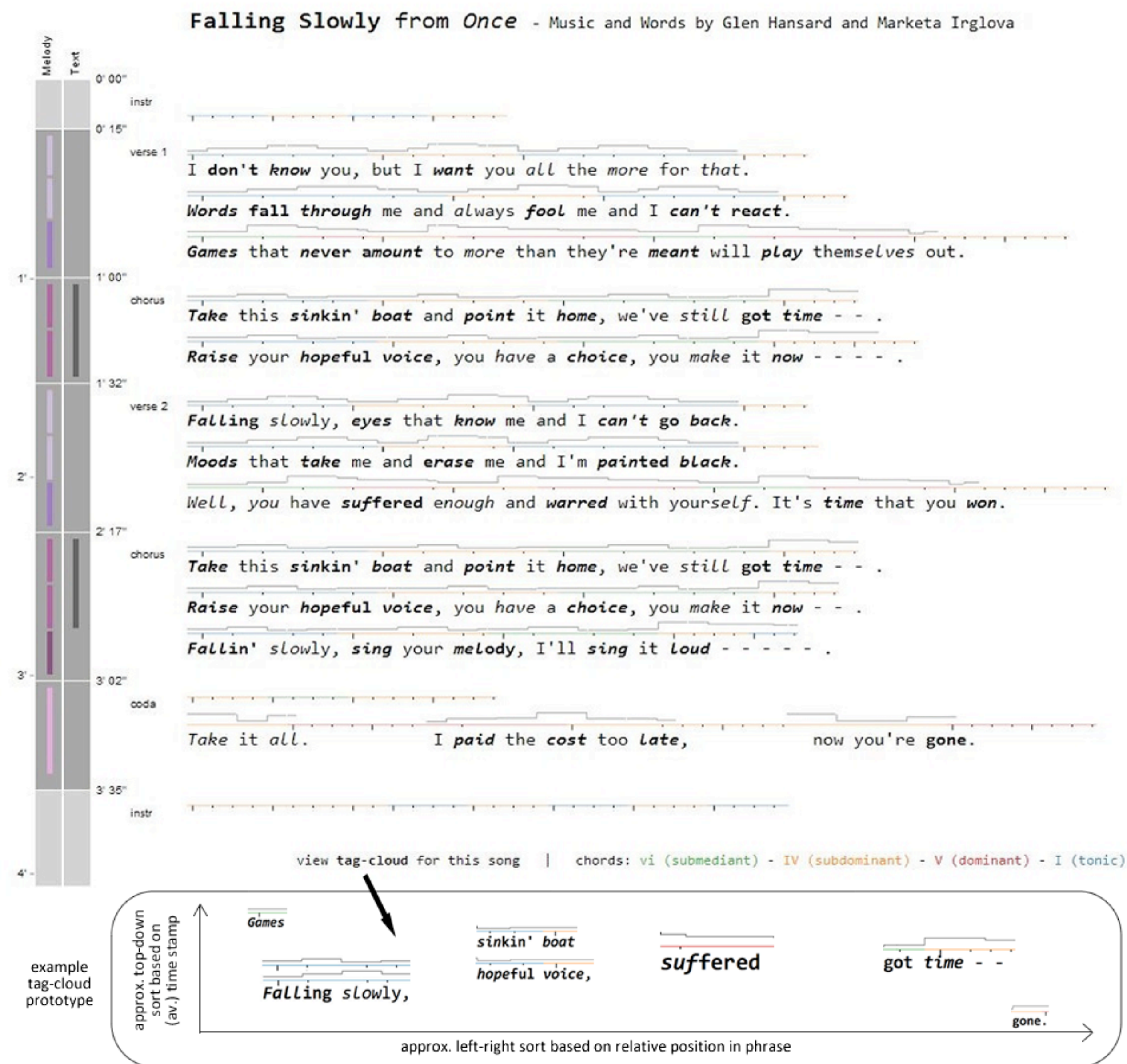
### Context & Overall Form:

song structure with time stamps with accurate encoding of relative durations  
shows repetitions in melody and text as equal-color bars

*All parts are horizontal- and vertical-aligned by pixel values*

## Future Work

- Automatic creation of data file given either (1) MIDI file with lyrics events or (2) music score that can be converted to MIDI/ MusicXML using Music OCR
- Linking with phonetic transcriptors and dictionaries for automatic inclusion of linguistic elements.
- Automated tag-cloud generation from the main visualization by segmenting the line of text into individual words
- Inclusion of features beyond beats, pitch contour, and harmonic progression (i.e. dynamics, instrumentation, articulations, phrasing) into the sparkline



## Evaluation

### Pros:

- lossless encoding of relative pitch contours, harmonic functions, and metric beats in a small space (using sparklines of height ~12 pixels, compared with an actual music score of 6 pages), to offer the necessary information of how the text fits with the music
- space alignment capability of (1) vertically between text with sparklines and (2) horizontally between focused content (text + sparklines) with structural context (vertical timeline)
- no distortion of horizontal spaces for lyrics font, as well as use of single color (black), to maximize readability

### Cons:

- potential information crowding ("too much ink")
- currently much of the data-creation and space-alignment processes have not yet been automated