

BEATLESFC: HARMONIC FUNCTION ANNOTATIONS OF ISOPHONICS' THE BEATLES DATASET

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ABSTRACT

This paper presents BeatlesFC, a set of harmonic function annotations for Isophonics' The Beatles dataset. Harmonic function annotations characterize chord labels as stable (tonic) or unstable (predominant, dominant). They operate at the level of musical phrases, serving as a link between chord labels and higher-level formal structures.

1. INTRODUCTION

The Isophonics' reference annotations¹ feature a multi-layered labeling system [1] that includes both lower-level analyses, such as individual chords and beat types, and higher-level analyses, such as key and song structure. We present BeatlesFC, a set of harmonic function annotations for Isophonics' The Beatles dataset, to provide a link between these levels. Although the harmonic function analysis has been included in symbolic music datasets of Western art music (e.g., [2–4]), it has yet to be widely included in audio-based popular music datasets.

2. ANALYTICAL APPROACH

2.1 Nobile's Function Circuit Approach

The harmonic function annotations in Beatles FC are based on Nobile's concept of the functional circuit in rock music [5]. The fundamental assumption of this analytic approach is that harmonies in rock typically move from stable, tonic (T), to unstable, predominant (PD) or dominant (D), harmonies, and back to stable ones. It is rooted in Schenkerian analysis of Western art music, where the large-scale harmonic structure serves as the foundation from which smaller progressions emerge. However Nobile's function circuit approach is designed for rock music rather than Western art music. For example, while in Western art music it is common for the dominant function to be tied

to the dominant chord (V), the dominant function in the function circuit approach allows for various chords to fill a dominant function, reflecting the unique harmonic practices in rock music. Function circuit analyses demonstrate how sequence of chords operates together as a larger single harmonic unit, specifically through the use of prolongation techniques like neighboring chords and back-related chords.

2.2 The Beatles Dataset

The Beatles' songs are particularly well suited for function circuit approach because they are structured either in the strophic or AABA form with clear cadences, which is characteristic of the rock music of the early- and mid-1960s.

3. ANNOTATION PROCESS

Two PhD-level music theory students created the annotations. Each annotator has several years of experience teaching harmonic analysis and has taken one or more theory courses on popular music. This background ensures a shared understanding of functional circuit analysis. The annotators divided the songs between them (Annotator A analyzed 126 songs and Annotator B analyzed 79 songs), and double-checked the quality of annotations by inter-annotating two songs in each album (26 of the above counts were cross-checked). Sonic Visualizer was used to listen to the audio in relation to the original Isophonics chord label annotations. A function label (T, PD or D) was assigned for each chord label in the original annotations in order to maintain the same onset and offset as the chord labels. In addition to chord labels from the original dataset, the annotators considered the Isophonics key and structural segment labels to interpret the chord labels within the broader harmonic context of each song.

4. FUNCTION ANNOTATIONS

In total, 179 harmonic function annotations were created out of the 180 total songs in Isophonics' A discernible key is necessary as the pop chord labels are interpreted with respect to key in order to assess their harmonic function. In cases of modulation, the annotators considered the Isophonics key labels as a local key and analyzed the function label in the key area. The Beatles dataset. One song

¹ <http://www.isophonics.org/datasets>



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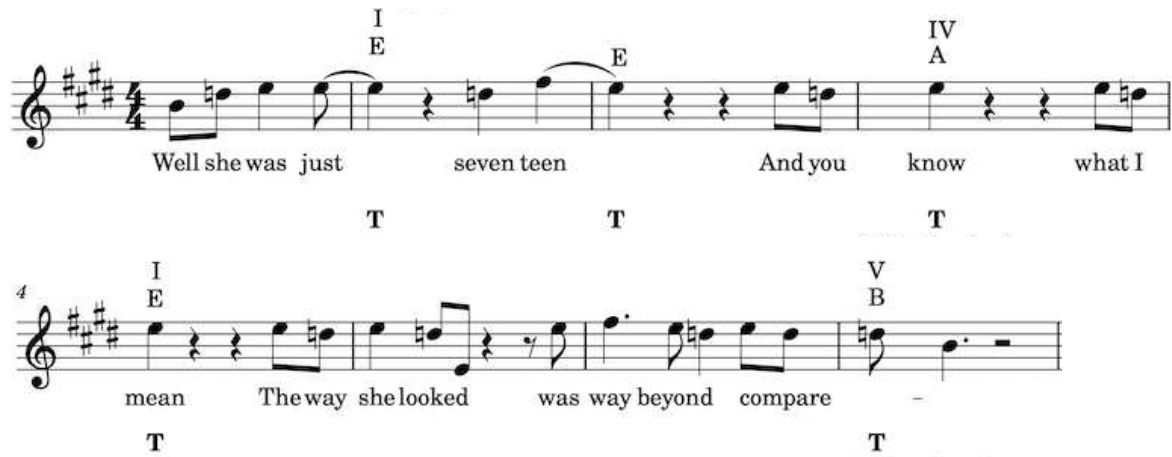


Figure 1. An analysis example from an excerpt of “I Saw Her Standing There” by The Beatles. The pop chord symbols are the original Isophonics chord annotations, the Roman numerals are calculated from the Isophonics chord and key annotations, and the harmonic function labels are the new contribution of this dataset.

“Revolution 9” from *The Beatles* album was excluded, as it lacks any discernible key. We, however, opted to annotate the three raga-influenced songs, “Love to You”, “I Want to Tell You”, and “Within You Without You”, despite the likely issues with applying the function circuit theory these songs, in order to examine where the utility of this analytic method can break down.

Occasionally, the annotators disagreed on the functions. We have preserved the separate annotations for researchers interested in examining persistent points of disagreement (an example of this is discussed in Section 4.2 below). Each completed function-label analysis was saved as a .lab file with the start and stop times (in seconds) of each harmonic function. The complete dataset is available for download from GitHub².

4.1 Statistics

Out of the 14,132 labels in the 179 songs, the T function appears most frequently, with 9,941 occurrences, accounting for approximately 70.3% of the total number of labels. The PD function is the second most common, with 2,326 occurrences (16.5%), and the D function is the least common, with 1,865 occurrences (13.2%). The underlying assumption in the function circuit analysis is that rock harmonies transition from stable chords (T) to unstable ones (PD and D) and then return to more stable chords (T). The T labels occurring at roughly twice the frequency of the combined predominant and dominant function labels demonstrate that the The Beatles’ songs reflect rock’s harmonic syntax of the functional circuit.

4.2 Analytical Example

Figure 1 shows an analytical excerpt from “I Saw Her Standing There” from The Beatles’ first album *Please Please Me*. In “I Saw Her Standing There”, the 16-bar blues progression consists of the verse, which is built upon

the three small subsections: statement, departure, and cadence. The excerpt exhibits one of the verse’s subsections called a statement. The statement of the 16-bar blues progression can be interpreted as maintaining the tonic [6]. The first chord E shows a T function and it lasts until measure 8, which is the end of the statement. Throughout the 8 measures, chords maintain a T function using prolongation techniques that reflect rock harmonic practice. In measure 3, the A chord prolongs the T function as a neighboring chord between two E tonic chords instead of establishing a new subdominant function. The B chord in measure 8 also can be seen as a tonic prolongation chord with a back-related V rather than displaying a dominant function. This excerpt also serves as example of inter-annotator disagreement as the second annotator saw the V in measure 8 as a tonic prolongation with the back-related V chord. The differing interpretations have been preserved in the ‘-A’ and ‘-B’ versions of the annotations in the repository.

5. CONCLUSION

This paper has introduced BeatlesFC, which we believe to be the first harmonic function annotations for popular music. Harmonic function annotations provide a link between lower-level annotations, such as chord, and higher-level annotations, such as key and song structure. We annotated harmonic function in Isophonics’ The Beatles dataset because it contains annotations at both the lower- and higher-levels and because the music of The Beatles is particularly well suited for the function circuit analytic approach we employed.

6. ACKNOWLEDGMENTS

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²<https://github.com/jcdevaney/beatlesFC>

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