1. Music Cognition and Analysis:
2. reconstruct a tree structure of music, based on considering half-cadence and accentual retention

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1. 1. Background

In the research of reduction of music structure, we already have time-span tree based on stability, rhythm, beat etc., which can show much of the information of the music but there has something missed in this way.

Sometimes the more stable note is not the structural accent, just depend on “stable note” would lead to incorrect segmentation in its structure analysis. And time-span reduction can neither show anything about how music flows across its segments nor express the “psychological” effect—movement toward tension or relaxation.

My research is trying to find structural accent—the dominant (chord V) and mark it , its a part of a research which supposed to form prolongation tree of music and integrate it into its existing time-span tree.

1. 2. Recent investigation

Basically, I studied the time-span reduction from the GTTM[1], I got the feature of this theory, and check the missing part of music information in this method. I read the paper about Context Dependency[3] to understand the function and inside contradictions of time-span reduction and prolongation reduction, and got the idea about how to combine these two reduction theories.

I try to analyze chord from MusicXML. The first step is to recognize a chord. Chord is show in two ways: columnar chord or arpeggio. Columnar chord means several notes sound together, its obvious in score; but arpeggio looks like melody, each notes of it is scattered, even is separated by bar line. This recognition is still on researching.

I read the TPS[4], it given a way to check the relationship of notes and chord. It supposes the chord in its basic space, and give them weight, then calculate the distance of each chord and then get the relationship. It's a possible way to find dominant.

1. 3. Current state of research

According to TPS, I have simulated the basic space in computer program, and use the given algorithm to calculate the distance of two chords.

On the other hand, I am making program to recognize the arpeggios. It's in a processing.

1. 4. To do

Complementing the full version including regional distance:currently, my program can calculate any chord in the same regional(the same key), it should be increased to all the keys.

Splitting a chord name into harmonic chords: I have two designs on it: to calculate harmonic chord dynamically or just to use a static table(list).

Processing seventh chord, ninth chord etc: currently, my program only processes triad(3 notes), it should be increased to complex chord.

Analyzing a group of pitch is a chord or just a piece of melody.

1. 5. Reference

[1] F.Lerdahl and R.Jacendoff, A Generative Theory o f Tonal Music, MIT Press, 1983

[2] H.Schenker, Derfreie Satz. Universal Edition, 1935. Published in English as Free Composition,

translated and edited by E. Oster, Longman, 1979.

[3] F.Lerdahl, Tonal Pitch Space, Oxford University Press, 2001.

[4] Alan Marsden and Keiji Hirata and Satoshi Tojo, Towards computable procedures for deiving tree

structures in music: context dependency in GTTM and SCHENKERIAN Theory, SMC2013.

[5] Shouki Sakamoto, Satoshi Tojo. Harmony Analysis of Music in Tonal Pitch Space.

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