The Chinese University of Hong Kong

Department of Computer Science and Engineering

2017-18 Fall

Final Year Project

Planning Report

KY1701 Automatic Piano Reduction - backend (chord Identification)

Project Goal

Our main goal of this project would be piano reduction. Reduction is a process that transforms complicated score into simpler score, and piano reduction is a process where an orchestral score would be reduced to piano score. The project aims to implement multiple features and algorithms to do piano reduction quickly and precisely on computers, as well as developing a software with a graphical UI that is user-friendly. Thus, the project has been divided into two parts: frontend part and backend part. Our group will mainly focus on the one of the backend parts, specifically, chord identification.

Significance of the Project

Music is always considered as one of the greatest arts in the world, it provides both recreational and spiritual comforts to human beings. Throughout the history, thousands of millions of musical masterpieces are created by musicians. However, one cannot always find all parts or all instruments that are used by the composer originally, especially when it comes to orchestral arrangement, where dozens of uncommon instruments used in a whole music piece. Therefore, performing reduction on complicated music pieces becomes a crucial topic.

However, reduction requires a lot of musical and mathematical analysis in the original score. Different musicians may hold different opinions on how the reduction should be processed. Thus, reduction is not a simple and unidimensional task that is easy to be dealt with.

Yet recently, machine learning technology has been improved and developed quickly, it becomes to be applied to almost every aspect in our daily life. Reduction using computational algorithms by learning musicians' reduction pattern becomes realistic. Obviously, reduction performed by machine learning method would be much less time-consuming compared with traditional human calculation, and, if optimal algorithms are applied, it would be even more precise than traditional methods.

Problem Statement

From the traditional work of reductions that we examined, it is obvious that piano reduction is a subjective work as there are always differences in the arrangement by different musicians. On the other hand, pianists have different preference while choosing a reduced piece. Thus, it is hard to have unified rules that can produce satisfying results for all different pianists.

Works of the previous years mainly focus on reduction of string quartet, of which the texture of music and approach of composing them are different from that of orchestral works. Apart from the instrumentation, different period of composing and genre are also needed to be considered. Therefore, it is hard to have a unique algorithm to reduce all types of pieces.

Proposed Solutions

This year, we will continue the works of the previous years, collaborating with the front-end team and machine learning team on developing a chord identification application. The main focus of our team is to improve the accuracy and develop a more general reduction method that can suit more types of pieces.

Proposed Timelines

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| --- | --- |
| **Date** | **Target** |
| 31 Oct | Chord identification components |
| 30 Nov | Integrating with machine learning components |
| 31 Dec | Integrating with front end |
| 30 Feb | Optimizing identification |
| 31 Mar | Optimizing post processing |