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Literarily Dependent Chinese Music: A Cross-Culture Research of Chinese and Western Musical Score Based on Automatically Interpretation

Rongfeng Li,[*1] Yelei Ding[*2], Wenxin Li[*3], Minghui Bi [#4]

[*] *Key Laboratory of Machine Perception (Ministry of Education), Peking University*
[#] *School of Arts, Peking University*
rongfeng, dingyelei, lwx, biminghui@pku.edu.cn

ABSTRACT

Background

The evolvement of Western and Chinese musical score is quite different. Firstly, Chinese musical score depends greatly on literary while with a common view, Western music is comparatively independent on literary. Specially, in Chinese musical score, the melody is evolve from the tones of *shi* and *ci*(Chinese poetry). A Gongchepu sample of Chinese poetic songs entitled 天净沙 Tian-jin-sha is shown in Figure1. The other difference is in rhythmic rule. Compare to the strictly regulated Western music, *gongchepu* uses a flexible rhythmic rule, which only denotes *ban* (downbeat) and *yan* (upbeat), and the duration of each note is improvised by musicians. Does this mean that the rhythm in Chinese music is not important as Sachs (1943) suggested in his studies of the rhythms of world music? Yang (1962) corrects this misconception with the view that in order to perform the music in a proper way, the improvisations should have a certain fixed pattern.

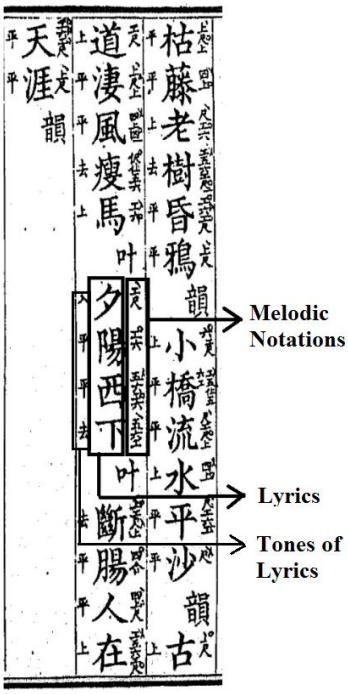

Figure 1. ***Gongchepu*** **of** ***Tian-jing-sha***

Aims

This paper aims to automatically interpret *gongchepu*-the Chinese traditional musical score. Based on the interpreting, we analysis and compare the evolvement of Western and Chinese musical score and find two main differences. we study the rhythmic improvisation pattern of Chinese music using the rhythmic mode of Western music based on "Interpretation of Suijin cipu" (in which the notation of gongchepu is used) written by Qian (2006), and implement an automatically interpretation of gongchepu to staff.

Main Contribution

First of all, we formulate the interpretation problem. Using the rhythmic rules of *gongchepu*, the notes within a beat can be specified. Thus the rhythmic improvisation of each beat can be denoted with the rhythmic mode using in staff. Then the interpretation is transformed into a sequence tagging problem which can be solved by natural language processing approaches.

Then, the Hidden Markov Model is introduced to rhythm inference based on the melodic feature. We find that, although the tone of lyrics is unknown (for the ancient dialect is lost), the up and down tune of the melody (which is decided by the tone of lyrics) and the position of lyrics are more relative to the rhythmic improvisation, compared to the other features(e.g., pitch interval).

After that, we implement an automatically interpretation based on Hidden Markov Model using the two feature. Finally, we achieved 90.392% precision and 83.2% OOV precision.

Implications

Our work is very helpful for reading and singing the Chinese poetic songs noted in *gongchepu*. Furthermore, our work will have positive influence on the protection of the ancient Chinese traditional culture, for the number of the experts who are able to read *gongchepu* is decreasing and the way of singing Chinese traditional poetic songs will most likely fade in the following generations.

Keywords

Musical score, *Gongchepu*, interpretation, nature language processing, Hidden Markov Model

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