

Using Knowledge Discovery to Generate Melodies for New Chinese Lyrics

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Introduction

Music is a tool for expressing feelings.

Composing good songs is not easy. It requires a basic knowledge of music, a good personal style, a music instrument and creativity. Normally, most people who are interested in composing good songs face difficulties.

Unlike Western songs, the lyrics of Mandarin or Cantonese songs already sounds rhythmical and melodic without mixing them with any music. Thus, Chinese songs have strong correlations between the melodies and the normal spoken tones of the lyrics. Composing good Chinese pop music can be a more challenging task than composing Western pop music.

Therefore, we aim to provide a system that uses knowledge discovery to help people generate sweet songs melodies for Chinese lyrics.

Dorkjumpar
Hong
andolin
白玉蘭花 一陣清香 花鮮人愛
蝴蝶翩翩 成雙成對 飛去飛來 一片潔白無比新鮮
人人愛妳 我採一朵 白玉蘭花 來送給她帶
她帶上了這玉蘭花 更加可愛

Fig.1: A sample sheet music

Features

- Support both Mandarin and Cantonese lyrics.
- Edit the rhythms and notes freely upon melody generation.
- Set the style of melody through groups of songs.
- Detail information show in user interface.
- Design for both light users and advance users.

Melody Generator
File Edit
New Ctrl+N
Open... Ctrl+O
Save Ctrl+S
Import Midi Ctrl+I
Export Midi Ctrl+E
Close
Exit
Language: Cantonese
Key Signature: C Major
Time Signature: 4/4
Similarity: Show Graph
Frequent Patterns: Show Patterns
MIDI: Export
00:16.835 / 01:22.500
Melody
Key Signature: C Major
Tempo: 120 BPM
Export Lyrics
Export Lyrics (With Tones)

Fig.2: User Interface of Melody Generator



Fig.3: Interface of information input

Melody Generation Platform

Generating a melody requires 4 steps.

1. Input the song information.
(The language and the title of the song.)
2. Input the lyrics.
3. Edit the character tones of the lyrics.
4. Choose a cluster to perform music generation.

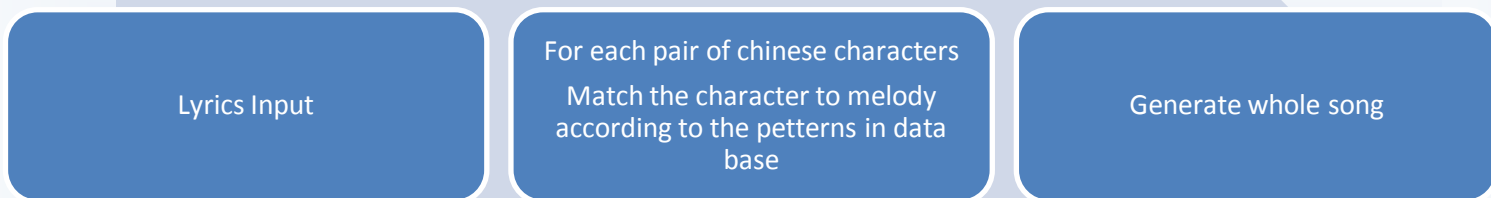


Fig.4: Basic flow of Melody generator

Working Principle

The project was divided into three main tasks:

Finding patterns (melody v.s. lyrics)

The database of patterns is based on the current existing Chinese songs. Matched patterns are saved.

Finding frequent patterns

According to patterns found in Task1, the frequent patterns were found according to the existing times for each pattern. The infrequent patterns were ignored.

Mapping the lyric to melody

The melody of a Chinese song is generated by mapping the user input (lyric) to the melody according to the frequent patterns found. HMM model is used in the generation process.

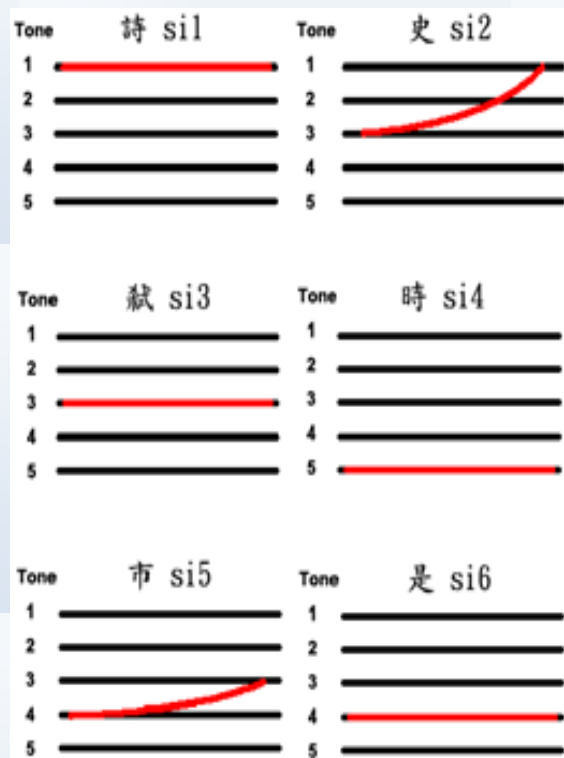


Fig.5: First six tones in Cantonese

Implementation

The Melody Generator was developed under java platform. We analyzed around 500 Midi files in total for the frequent pattern database.

We also grouped similar pattern though clustering. It helps distinguishes the feelings when user generates songs.

Also,Hidden Markov Model (HMM) was used in melody generation. To improve the accuracy of generating melody, we make use of multiple-ordered HMM.

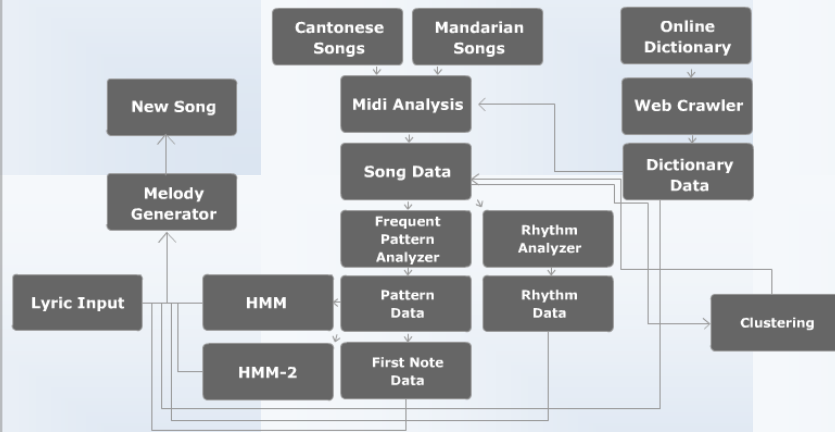


Fig.6: Design of the application

Evaluation

In normal length of song (around 200-300 words), it gives around 0.25 similarity between lyrics and melody

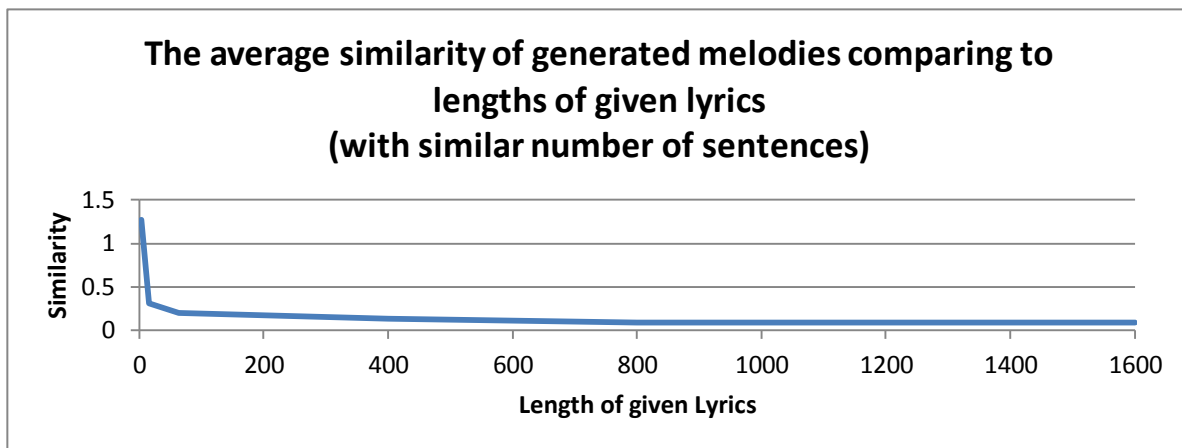


Fig.7: Result of the similarity according to the lengths of lyrics

Result

The quality of the melodies generated by our program is generally good. Although several methods have been carried out to improve the quality, the lyrics would play an important role in determining the quality of the melodies. We found that the more coherent the lyrics are, the sweeter the melodies are.

