Voice Creation and the Chinese Folk Music

Shuilin Liu
Culture Bureau of Fu-Zhou Region
Lin Chuan City
JiangXi, 344000 China
gongli@ hotmail.com

Juping Gong
Metro One Database Software Division
660 Fairport Office Center
Fairport, NY 14450, U.S.A.
jgong@db-one.com

Keywords: Chinese Traditional Music, Voice Modification, Normal MIDI Equipment

Abstract

In any cases it has always no limits for musicians to pursue voice at all costs, no matter what the simulations to traditions, or sedulously striving creativity for perfection. We, based on the successful combinations of regular MIDI technology and Chinese folk music, try to show people our approach of voice modification, its huge power and broad prospects in MIDI creations.

I. Introduction

In this paper, we will present how to make Chinese folk music completely by regular MIDI equipment. As we know, the MIDI technology is originate in western with its major market. Currently there is no MIDI equipment available to contain or cover the basic tone hierarchy of Chinese traditional instrument orchestra. Then how can we produce the voice of folk instruments such as Erhu, JingHu, Suona, Dizi, Pipa, etc?

One way is called ”MIDI plus human performance", which is widely used in business. But we don’t think it is good to make folk music, actually it shows the MIDI equipment have no alternative. The other way is "sampling & playing back". It is a good way theoretically, however, that is too expensive and tanglesome in technology.

We present our way, ”voice modification", which is without expensive equipment and without technical difficulties. We can make full use of the available MIDI tone generators, just make some kinds of refinement and reformation to certain tones with some normal technology, and change them to be our ideal folk voice. That is, although the MIDI is designed for western musical instrument, it still can produce our folk music, even true to life. Our paper will discuss it in detail as follows:

II. Three Steps

First, "Fuzzy match". We can find some similar tone from current MIDI equipment to match some Chinese traditional instruments. For example, the GM voice of No.75 Recorder and No.76 Pan Flute is similar to the voice of DiZi; No.110 Bag Pipe is similar to Suona; No.111 Fiddle and No.42 Viola are similar to ErHu; No.108 Koto and Guitar are similar to Chinese plucked strings (such as Pipa).

Next, we need to compare their voice carefully. The frequency and acoustics of voice will be analyzed in order to find their different characteristics. Then, we can use some MIDI software to edit, modify and adjust, so that the reformed voice will be close to what we need in Chinese folk instruments. Usually we can do as:

- adjustment by Digital Filter, including cutoff frequency, resonance, frequency characteristic;
• adjustment by Low Frequency Oscillator (LFO), including the rate, depth and delay of Vibrato and Tremolo;
• adjustment by Envelope Generator (EG), including volume EG, pitch EG, attack, release, decay, pitch EG initial level, pitch EG attack time, pitch EG release level, pitch EG release time, etc.
• adjustment by pitch and volume, including pitch detune, balance, band;
• EQ Equalizer: frequency gain;
• effects: selection and tune of reverb, chorus, variation and distortion.

Different equipment has different parameters. After we master all the functions of equipment, we can make a full use of them and get better parameters.

Finally come decomposition and composition. For some instruments, we need to decompose some features of target voice, and distribute some characteristics to several different modified voice, then to compose these voice together, so that all characteristics of target voice will be acquired with certain satisfied effects. In "the Water of River"(Jiang He Shui), we use two tone generators and three tracks, and then combine them together to get the tone of ErHu solo.

III. Example

For example: if we want to produce the tone of ZhongHu (alto ErHu), we can select Fiddle tone from the GM tone list. After changing the following parameters, we will get the following table, described by the control way of XG format MIDI controller:

<table>
<thead>
<tr>
<th>Controller No.</th>
<th>Parameter</th>
<th>Controller Function</th>
<th>Adjustment Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>74</td>
<td>0</td>
<td>Cutoff frequency, Brightness</td>
<td>to make voice lower and deeper</td>
</tr>
<tr>
<td>71</td>
<td>109</td>
<td>Resonance, Harmonic Content</td>
<td>to make voice bold and vigorous</td>
</tr>
<tr>
<td>73</td>
<td>2</td>
<td>Attack Time</td>
<td>to make voice head clear</td>
</tr>
<tr>
<td>72</td>
<td>63</td>
<td>Release Time</td>
<td>to make voice end faster</td>
</tr>
<tr>
<td>99</td>
<td>1</td>
<td></td>
<td>Vibrato rate</td>
</tr>
<tr>
<td>98</td>
<td>8</td>
<td></td>
<td>Vibrato depth</td>
</tr>
<tr>
<td>6</td>
<td>70</td>
<td></td>
<td>make vibrato close to Chinese strings</td>
</tr>
<tr>
<td>99</td>
<td>1</td>
<td></td>
<td>Vibrato delay</td>
</tr>
<tr>
<td>98</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>99</td>
<td>1</td>
<td></td>
<td>Pitch bend sensitivity</td>
</tr>
<tr>
<td>98</td>
<td>10</td>
<td></td>
<td>close to Pitch bend of Chinese folk music</td>
</tr>
<tr>
<td>6</td>
<td>80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>101</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>91</td>
<td>40</td>
<td></td>
<td>Reverb effects depth</td>
</tr>
<tr>
<td>7</td>
<td>110</td>
<td></td>
<td>to make voice clearer</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td></td>
<td>Volume</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td></td>
<td>volume after balance adjusted</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td></td>
<td>(a set of EQ parameters, to meet frequency response features of ZhongHu's valid range)</td>
</tr>
</tbody>
</table>

In this way, the former Fiddle tone has been changed completely, however, that is exactly like the tone of ZhongHu.

What's more, we should be able to be good at wisely adapting the normal MIDI techniques to exactly express the unique style and skills for each instrument.

---

ICMC Proceedings 1999
Several pieces of Chinese folk music will be demonstrated significantly to support our success. They are played by the instruments of:

- JingHu, Peking opera fiddle
- ErHu, two-stringed Chinese Fiddles
- ZhongHu, alto ErHu
- GaoHu, treble ErHu
- DiZi, bamboo flute
- SuoNa, a wind instrument
- Sheng, a reed pipe instrument
- PiPa, a plucked string instrument with a fretted fingerboard
- liuQin, treble PiPa
- YangQin, multi-stringed striking instrument
- SanXian, a three-stringed plucked instrument
- ZhongRuan, a four-stringed plucked instrument
- plus the drums part of 15 different percussion instruments of Peking opera.

IV. Conclusion

What we describe here is the widely-used classic approach in MIDI application, which can also applied to make the folk music in other countries and for some unique instruments. It is a quite interesting exploration on style modeling for Chinese music under the regular MIDI equipment. We believe it brings musicians new ideas for music composition and tone creativity. Three pieces of Chinese traditional music in demo significantly support our success.

V. Reference

1. MU80 Owner's Manual
2. MU80 Voice List & MIDI Data
3. VL70-m Owner's Manual
4. VL70-m List Book