Study on Jiangsu Folk Melody Forms Using the Visual Spectrum

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There are more than twenty different types of the local operas remaining in Jiangsu, China, such as Kun Opera, Yang Opera and Huai Opera. The aria style of each genre is mainly affected by the local region, and of course, along with other aspects, which lead to the variety of the opera styles. Tones-creating is the key to the development of contemporary operas. With the appearance of the computer technology, the visualization of Jiangsu opera can be realized through the digital techniques combined with the unique characteristic of the tones-creating itself. In this paper, wavelet analysis and neural network are used to achieve the visualization of the tones-creating, which provides a certain reference for the opera practice.

Keywords: Jiangsu opera, tones-creating, visual spectrum, wavelet neural network

Introduction

Under the global appealing of the “intangible cultural heritage protection”, the academic community paid much more attention to the research of traditional music in China. Jiangsu opera, the treasure of the traditional Chinese music, should be inherited and developed. Shi illustrated that the future direction for research is to follow the unique law of opera singing development and to absorb the rich artistic experience which accumulated during its formation and development. Du also explained that the quality of the sound can be clearly seen by using visual sound spectrum. By using scientific instruments to visualize and compare the sounds, invisible sounds can be visualized. The system of tones-creating is improved through in-depth field study, communicating with the folk artists, oral demonstration, collecting and sorting out the information of tones-creating which has not been listed, and combining with the visual sound spectrum. This kind of research in China is mostly based on the historical data. Using literature research methods, without integrating scientific and technological methods to process the obtained data. Therefore, this paper innovatively integrated the visual sound spectrum technology into the research of the folktones-creating and systematically studied the Jiangsu folk melody forms objectively.
The Art of the Tones-creating in Jiangsu Opera

Regional Distribution and Current Situation of Jiangsu Opera

Generally speaking, Jiangsu local operas are formed on the basis of absorbing and learning from other genres. Regional cultural variances make the folk language, tune, structure and instruments different. Understanding the regional distribution and the current situation of the Jiangsu opera is the basis of its tones-creating study.

Wu demonstrated that the spatial distribution and spread of local operas in Jiangsu Province have the obvious characteristics as “core radiation”. For example, Huai Opera is centered on Huai’an and Yangzhou. The two Jianghuai Operas interact with each other and then spread its form out to the surrounding areas, thus coexisted and affected the development of opera in Shanghai and Anhui. Yang Opera originated in Yangzhou City, been further developed through absorbing Huagu Opera and Xianghuo Operain Shanghai.

Due to the collisions and conflicts between various operas, which makes up for the lack of operas styles, thus, a mature opera form often shows the characteristics of multiple operas. Under the pressure of the appearance of the digital media, the art performance of traditional Chinese opera is in urgent need of breakthrough and development, considering its shrinking market and brain drain. Therefore, the research on the singing innovation of traditional Chinese opera is called the tones-creating which is critical for its survival and evolution.

The Tone Characteristic of the Jiangsu Opera

Zhou Laida put forward that “The so-called ability of tones-creating mainly refers to the ability of actors to create, design singing melody and perform in the second creation” in A New Theory of Yue Opera Music in A Hundred Years. Therefore, tones-creating is not random but based on being familiar with the tunes of various operas.

First type is the operas in Wu dialect area in the Southern Jiangsu Province, its representative operas are Kun Opera, Xi opera and Su opera. “Its music is a blend of Southern Jiangsu folk art music. In terms of singing, even though there are many Kun Opera tunes, some of the northern operas are still vigorous and unrestrained.” Generally speaking, the above-mentioned operas are similar to the ancient Wu songs whose style is graceful and elegant.

The second type is Tong Opera, Huai Opera and Yang Opera, which are popular in Tonghai and Jianghuai areas. Most of these operas are not very broad in vocal range, but they have a high pitched and the beginning tone, which is quite simple and rough in style.

The third type is Liuqin Opera and Huaihai Opera, which belong to the soul-pulling tune. They are mainly developed from Xiaoqu Opera originated to dynasty of Ming and Qing, and mainly spread in the Jianghuai and Xuhuai areas. The tone of this type is developed into quite vast difference compared to the ones in the Wu dialect region.

Common Techniques and Specific Analysis of Tones-creating in Jiangsu Opera

In fact, opera singing is the same as the creation of all kinds of music works. From the overall conception to the final draft, this whole process reflects the composer’s understanding of the works, so as to determine what style, genre and performance techniques to adopt, which is often called “thinking principle”. Different types of works have different thinking principles. The creation of opera singing, mainly tune writing, should
explore its monophonic thinking. To explore the thinking method of opera singing, it must combine the thinking methods of diffusion type and cluster type, and analyze, synthesize, compare and summarize the singing of representative operas in each vocal system, so as to find the thinking principle of Opera singing design.

In accordance with the four principles: structure, plate changing, tune changing and tone changing, the most common technique of tones-creating in traditional Chinese opera is composing according to the lyrics, this not only means concentrating on the composition, but also refers to the singing. Through the evolution of the singing techniques, the melody and rhythm changes.

In traditional operas, the singing of Tune style music is often performed following a series of patterns such as the number of words, structure, sentence pattern, rhyme, four tones and so on.

The most typical melody in Tune is called the main tune, which is used repeatedly or in combination to form a complete and unified structure. Corresponding changes can be made in word and tune style to create a new one, but it must adopt the main tune to maintain the integrity of the structure and the artistic style. There are five ways of reproduction: prototype, shift, variant, retrograde and tone sandhi. Fig.1 shows the fragment of the Kun Opera Greeting the Immortal Guest, consisting of two main tunes: main tune a and b, which is “GFE” and “DCE”, respectively. The “GDE” in singing is the conversion of the “GED” Three Tone group. “GED” is the change of seven tones into five tones in “GFE”. This is a variant reproduction technique.

In addition to the above three common techniques of tones-creating, there are Divertimento, Jiqu, plate type change, palace tune change, multi tone combination and so on. Artists always adopt different tones-creating methods according to the different types of opera.

Shown in Fig. 2 is a fragment of Three women grabbing the board of Huai Opera, a famous drama form in Jiangsu Province, which inherits the plain and rough style of Huai Opera. From the comparison between the original version and Chen Hande’s version, shown in Fig. 3, it has made great changes in melody, rhythm,
diminution and other aspects. The use of “gliding tone” and the technique of continuous breathing make the singing more melodic, emotional up-downs, and more euphemistic, which makes the tragic mood of the protagonist more realistic and touching.

![Figure 2. Kun Opera melody “Three women grabbing the board”](image2)

Moreover, Kun Opera is famous for its elegant lyrics, tactful tune and exquisite performance. It is known as the “ancestor of all kinds of operas”. Fig. 4 shows a sentence in the interpretation of Yangguan in the Zichai Ji. Apart from the obvious differences in Yin, Yang, Shang and Qu tones, there are also differences in pitch, length and momentum. One of the inherent and commonly used techniques of creating a tune in traditional Chinese opera is to imitate it with notes according to the tone of the characters.

![Figure 4. Kun Opera melody “Zichai Ji”](image3)

The idea of the opera tones-creating is a relatively conceptual. This paper proposes a method combining wavelet analysis and neural network to realize the visualization of opera creation, which can further abstract and inject new vitality into opera art.

The Application of Visual Sound Spectrum Technology in Traditional Chinese Opera

The Significance of Visual Analysis of Jiangsu Opera Art

Opera is a systematic subject which covers a wide range of subjects. In terms of music, it includes the singing and rhyme of vocal music, as well as the opening and passing music and instrumental accompaniment. To
present the performing art of traditional Chinese opera perfectly, singing is an important standard of evaluation, but as a virtual standard, it is difficult to have an objective evaluation. Through computer technology, the visualization of sound parameters has three meanings: In terms of teaching, the voice in singing can be visualized through the Three-dimensional Spectral Plot, so that teachers and singers can find and correct problems in time. In terms of artistic creation, the tune, intonation and timbre of opera works can be finalized only after constant modification. Excellent works often need to go through a lot of repeated modifications and a long creation cycle. Using visualization technology, a large number of different timbres and intonation can be made into demos, and the best scheme can be obtained through scientific classification and analysis. This not only reduces the creation cycle, but also ensures the quality of works. In terms of the combination of art and technology, as Flaubert said “Art and science always meet at the top of the mountain.” By using computer science, opera singing can be visualized, making opera art have a steady stream of vitality. Art also gives inspiration to science and promotes its multi-directional development.

**Design of the System**

Visualization means the use of computer graphics and image processing technology to convert the data into images and display them on the screen that can be observed by the human eyes, so as to achieve interactive purpose. Therefore, the essence of visualization is to turn sound into graphics. Based on the characteristics of different timbre and intonation of the tones-creating, this paper proposes a method of visualization using wavelet transform and neural network.

Wavelet is a tool for the signal analysis, it can focus on the signal details through signal processing. Neural network is a mathematical model for distributed parallel information processing. This model depends on the complexity of the system, and achieves the purpose of information processing and classification by adjusting the relationship between a large number of internal nodes. In this paper, these two methods are combined to design the visualization system of tones-creating. Firstly, a classifier is constructed by using the collected signal of the tones-creating, and then the visual display of the tones-creating is realized by the classifier.

The specific steps are as follows.

A. Design of classifier

1. The data of tones-creating were collected and summarized. And the data of the tones-creating will be collected to form a digital signal.
2. The collected digital signal samples are divided, and each section of the signal is divided into several parts. Each part is processed by wavelet to extract the detail information of the signal. The detail information represents the characteristics of each part.
3. The detailed information of each signal is used as the eigenvector to train the neural network and design the classifier. In the training process, given each input a corresponding output (the output can correspond to different needs) to design the classifier. The design structure is shown in Fig. 5.
B. Visualization of tones-creating

The classifier is used to realize the visualization of tones-creating signal. The sound signal of the tones-creating is transformed into digital signal in real time by the equipment. The signal is input into the classifier after wavelet processing, and the output is processed by the classifier to realize the visualization. The process is shown in Fig. 6.

Figure 6. Visual output.

Through the combination of wavelet and neural network method to design the visualization system, in practical application, we can identify the content of singing in time. The system can be applied to teaching and demonstration.

Conclusion

The whole history of Jiangsu opera is constantly changing and developing, no kind can survive without development. But to develop, it must be inherited at first. In conclusion, combining wavelet analysis and neural network to realize the visualization of opera creation can make opera lovers and researchers “see” the dynamic change process of each parameter of opera creation. For researchers, the corresponding calculation and statistical techniques can be adopted. Thus, the use of this technology can be a more comprehensive and objective analysis of Jiangsu opera tone, bringing a steady stream of vitality for Jiangsu opera.
References


