Use Computer Audio Technology to Compare Piano Singing and Legato Based on "Particle" Playing Method

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Abstract. This paper first introduces the basic concepts of playing and legato, and discusses the importance and difference of playing and legato. Then computer audio technology is used for audio contrast analysis. This paper expounds the connotation of piano singing in order to provide reference for piano learners and piano teachers.

Keywords: Granular Playing, Piano Singing Performance, Legato, Computer Audio Technology

1. Introduction
In piano performance, allegro rhythm music is often encountered. How to express it quickly, evenly and is a major difficulty in piano performance and also a major difficulty in piano teaching[1]. The so-called "graininess" in piano playing is non-legato. Non-legato is widely application in the piano works, many training finger etudes, music in the keyboard arrangement of difficult pass sentence, fingertips and orchestra section, as well as those designed for showing the fingertips of the endless "infinite" music, and so on, all need to play with a legato playing method[2-3]. Because this kind of fast finger technique occupies a special important position in the piano performance technique, but also because from the perspective of training, the finger fast running technique has a special difficulty[4]. Therefore, since the 19th century, many composers and piano educators have written a large number of etudes for the training of finger independence, flexibility, clarity and uniformity, as well as a variety of finger foundation exercises[5]. These contents basically need to use the non-legato method to practice and play. The wide application of non-legato in piano works and the important meaning of playing skills require us to pay special attention to it[6]. Start from the foundation to solve the problem of finger skill carefully and meticulously, need to work hard for a long time to achieve good results.

2. Basic concepts of legato and vocal playing

2.1. Legato
The piano is played in three basic ways: staccato, Non-Legato, and Legato. From three movements, the most fundamental difference is due to the different direction of the force caused by the different sound acoustics. Staccato and non-legato are longitudinal forces, which are represented by vertical keystrokes on the keys from the fingertips to the shoulders. Legato, on the other hand, is a horizontal force, which is manifested as the body's center of gravity driving the fingers and arms to move...
horizontally towards the left and right directions of the keyboard. The sound is caused by the downward force of gravity on the body and arms, which is constantly transmitted between fingers to produce sounds and phrases. How gravity is generated is divided into body gravity; Hand upper arm gravity; Hand forearm gravity; Palm gravity; Finger gravity and so on. On the touch keys, legato requires more use of fingers, stick keys, use medium speed (due to overtones, too fast or too slow speed is not suitable to form legato), so that the sound issued round, soft. In this sense, legato use is usually limited by the speed of play.

Thus, it can be seen that the relatively deep key touch mode can make the two-tone sound at least easier to fuse in volume and close the relationship between the sound, which is also conducive to the acquisition of singing expression. (Figure 1)

![Figure 1](image)

**Figure 1.** The schematic diagram of different situations about touching keys

Besides, to make legato play a beautiful timbre, it is also necessary for the player to control the tightness of the first joint of the finger with sensitivity, which often requires keen hearing and the ability to predict the direction of the coming sound to determine the tightness of the first joint.

Through the above analysis of legato, we find that legato is an instantaneous movement state in terms of finger height, speed, movement mode, key touch, and pronunciation, etc., which is reflected by the specific body, finger and arm movements. It emphasizes that through a series of technical means, to the maximum extent (the piano is a percussion instrument in terms of pronunciation principle, and the musical sentences produced by it cannot be as coherent as strings and wind music) to achieve the uninterrupted sound.

2.2. Singing and playing.
Generally speaking, the lyrics, tunes, and accompaniment of the three-body, together constitute a complete reflection of the musical image of the "song". It contains the deep emotional meaning of the human heart.

As we all know, the emotional expression is part of man's spiritual attribute, as a carrier for the expression of the lyrics is also needed to uphold the human nature. It has access to the "song" in language form and the emotion connotation, making the communication become a reality. It's unique semantic in text, through the exquisite language, to generalize the thoughts and feelings of the people, and make people enjoying the beauty of the language at the same time. Also, it is the language behind the great spiritual force impressed. Since the birth of "song", the lyrics have been linked with the changes of human thoughts and feelings, constantly showing and enriching the spiritual life of mankind.

The role of accompaniment is to make "song" this art form, in the emotional expression of more complete. There are mainly solo instruments, such as piano, violin, dulcimer, etc. There are also some "songs" without accompaniment, such as a cappella. This form has multiple parts due to its formation, and the artistic effect of accompaniment has been contained in the harmony effect formed within the "song", which aims to show the audience the atmosphere and situation created by the harmony beauty.
3. Piano performance

3.1. The connotation of singing in piano performance
It is that people are singing at the same time realize the kind of aesthetic feeling, emotion, mood, mentality when we use the inner sense of singing to the piano, and can put this feeling into the corresponding performance through the fingers, and can reasonably use of technology and art means to realize the human voice to reach of the complex, diverse singing of piano performance.

The singing of piano performance includes two meanings: one is the singing in a broad sense, which may include almost all the piano music. Because any piano performance is inseparable from melody, syntax, breathing and other factors closely related to singing; One is the narrow sense of singing, which refers to "such as songs" "lyricism" of this kind of piano music, or some passages in the piano music, at this time, the piano music tune is the closest to the voice of the song, it sounds like no lyrics of the song.

3.2. The importance of singing in piano performance
Singing is the soul of piano playing. Whether it is singing in a broad sense or a narrow sense, to experience, understand and appreciate the singing of piano music and to show the beauty of singing is the common goal pursued by Bach, Chopin, Anton Rubenstein and the piano masters of all ages.

Singing plays an important role in the musical performance of piano performance. It is the most important task in piano performance. It can be said that it is the fundamental task to master the piano instrument.

Figure 2. Characteristics and hierarchical relationship of melody in piano playing

3.3. Characteristics of piano performance
Piano singing skills training is also very difficult, in the process of playing is to touch the keys with the fingers, fingers after the force of the hammer finally hit the strings to produce a sound. This kind of pronunciation principle is similar to the principle that percussion music USES the mechanics to produce the force, has some difficulty to the singing, unlike vocal music, string music, wind music such as the sound is easy to sing. The pronunciation of the piano is more difficult because the piano itself is percussion.

The key to the training of piano singing performance: first, the training of good pronunciation; The second is the training of musical phrases and the use of pedals; The third is the study of music background material and style. Fourth, the analysis of musical language elements and forms and the cultivation of the ability to integrate musical works; Fifth, the cultivation of inner singing, inner hearing, the singing performance of aesthetic taste and musical performance are very important.

4. Conclusion
In summary, to obtain the vocal expression of piano, not only the key touching technique of legato is needed as the basis for performance, but also the good music analysis ability, including the technical analysis ability of composition and musicology. Also, the diversity of the interrelation between notes are needed.

Through the research of piano playing, we could find the ways and means to guide the piano
learner to find the music work mood, style, ideology, cultural connotation of feeling and understanding, letting improve the level of their expression of music and cultivate their ability of music appreciation and evaluation, which is to cultivate qualified piano playing and teaching talent the way.

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