Research on the construction and use of a choral conducting learning platform based on the context of big data research

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Abstract. Based on the choral learning background research secondary school choir choral education work is the core content of the systematic construction work, trinity systematic construction, it can be said that the formation of the management and team operation of the good construction is to provide a more solid foundation for the development of choral education practice, the construction of choral education is more decisive and critical. Choral education encompasses choral teaching and holistic education, including the practice of teaching professional technique, the practice of teaching musicianship, the practice of teaching musical perception, the practice of supervising cultural learning, the practice of shaping good character, and the practice of cultivating competence. This paper combines the support of the big data background, the choral conducting platform for the combination of research and exploration, on the basis of the platform construction of the choral learning platform for the optimisation of research and exploration.

Keywords: Big Data Context; Algorithmic support; Choral Platform; Platform building;

1   Introduction

Chorus must be aware of the education and teaching of students not only need to pay attention to the professional growth of students, but also need to always supervise the students' coursework learning situation, to help students balance learning and choral life, to overcome the difficulties of the coursework, and to correct the learning mentality, specifically can be required to students in the regiment to regularly submit a report on the learning situation as well as the establishment of a learning support group, in addition to the activities require students to use the free time to seize the time to complete assignments, so that students use fragmented time to study habits are one of the practical ways of cultural learning supervision [1].

2   Exploring the Path of Choral Education Practice

"If you want to feel the chest resonance, you can put your hand on your chest and learn the cow's moo, open your throat and learn the tiger's whistling wow, feel the tension in your throat and learn the sheep's trembling baa, and to practice the high notes, you can imagine that the sound is on the top of your head and learn the rooster's crowing. The example of the opening voice is very unique [2]. As show in figure 1.
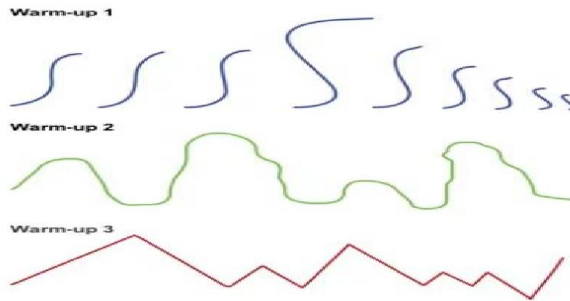

Fig. 1. Example of a method of opening the voice by Elise Bradley, Artistic Director of the Toronto Children's Choir, Canada

The conductor of the Shanghai Rainbow Choir, Jin Chengzhi, once performed the emotional treatment of the song "Sunset Burning" for the Admiralty Choir in an exchange rehearsal activity, conveying the mood and emotion of the song to the students in the way of "shooting MV", comparing the different scenarios described in the lyrics to the operation of the camera and the switching of lenses in the shooting of the MV, with a field full of sugarcane, swaying windows, little sisters shaking fans, children eating melons, egrets flying by while the green hills remain unchanged by the clouds. Sugar cane in the field, the windows swaying, the little sister shaking the fan, the children eating melon, the egrets flying by and the green hills not moving and the clouds remaining the same, one scene after another leapt onto the paper, after he so mobilised, the children immediately comprehended all the emotional changes in the song [3].

Comprehensive analysis of the above domestic and foreign outstanding choirs, choral conductors and singers in the breath, vocal and musical expression of different ways of training can be obtained, they all have a common feature - easy to understand, after a large number of comparative study, the author believes that, to make the "gas, voice and emotion" professional teaching needs to be done. After a lot of comparative research, the author believes that to make the professional teaching of "qi, voice and emotion" easy to understand, it is necessary to do.

2.1   Specific teaching requirements

It means that the abstract singing requirements in professional teaching can be made concrete and understandable, and the teaching requirements can be concretised by means of interesting descriptions and intuitive and correct singing demonstrations [4].

2.1.1 A graphic and interesting way of describing.

For example, in the daily professional training, we repeatedly emphasise that singing should be delivered, high position, emotion, such a description is too abstract, we can try to describe the requirements of singing in a graphic and interesting language, such as in the previous article, Liu used "blowing poop" to describe the fullness of the voice state, Gong Linna used the animal's cry to describe the characteristics and cavity use of different types of vocal characteristics, Elise Bradley used lines to make students understand the direction of the voice, these teaching language are very interesting and can effectively materialise the singing requirements [5]. For example, Liu used "blowing poi" to describe the fullness of the voice, Gong Linna used animal calls to describe the different types of vocal characteristics and the use of the cavity, and Elise Bradley used the direction of the line to make students understand the direction of the voice, all of these teaching languages are very visual and interesting, and can effectively materialise the singing requirements.

2.1.2 Intuitive and correct singing demonstration.

Demonstration of singing can make the singing requirements become more intuitive and clearer, members (students) can intuitively feel the breath send or not send, fullness of tone or not, the right or wrong emotion, there is no difference, if they are unable to make a demonstration due to the conditions of their own demonstration of a certain aspect, but also through the playback of the audio-video way of demonstration, which will be able to quickly group members (students) clear specific singing requirements.

2.2   Enhanced Learning Experience

Rich and profound learning experience can make students really understand and remember the correct teaching requirements, the use of different methods to make students feel the real feeling, can effectively mobilise the internal learning motivation of students, always maintain a high degree of participation in the learning process, to strengthen the learning experience of the factors are: 1, real strong physiological experience, 2, in line with the rules of the body rhythm, 3, rich in the challenge of the music game.

3   Design and Optimisation of Personalised Learning Path Recommendation Algorithms

3.1   Nonlinear factor i_s.

The size of the sticky weights i_s affects the ability of the algorithm to be explored and developed. When the value of i_s is larger, it improves the flip probability of the particle, which is conducive to exploration; when the value of i_s is smaller, it reduces the flip probability of the particle, which is conducive to exploitation and avoids falling into local optimality. The SBPSO algorithm employs a typical linearly decreasing strategy to change the value of the sticky weights [6][7].

Therefore, this paper proposes a nonlinear i_s Factor (NF), as shown in Equation (1), to balance the exploration and development capabilities of the algorithm. The nonlinear i_s plot is shown in Figure 2 [8].

$$i_s = i_{s_l} + \left(i_{s_u} - i_{s_l}\right) \times \exp\left(-20 \times \left(\frac{t}{T}\right)^6\right)$$
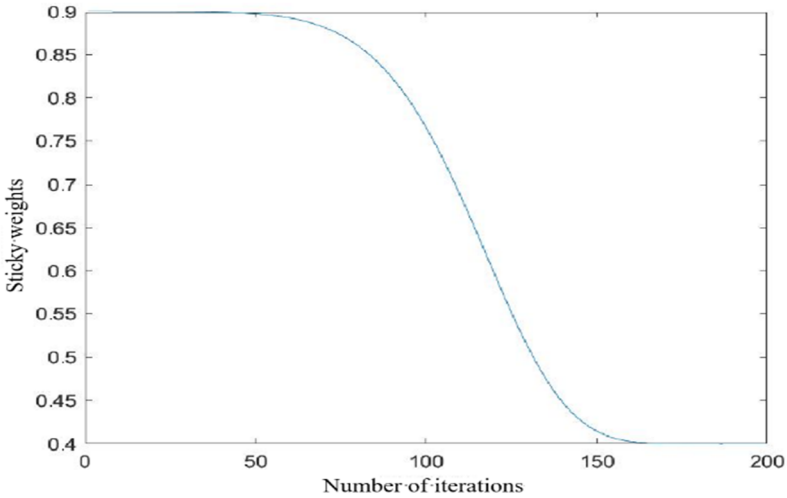(1)

Fig. 2. Non-linear viscous weight variation curve

As can be seen from Fig. 2, when the maximum number of iterations is 200, i_s can be kept near the maximum value during the first 50 iterations for better global search, and near the minimum value during the last 50 iterations for a good balance between the global search capability at the pre iteration stage and the local search capability at the post iteration stage [9] [10].

3.2   Chaotic initialisation strategy.

In order to improve the quality of the population, the NFSBPSO algorithm uses Logistic mapping for chaotic initialisation as shown in equation (2).

$$x_{t+1} = \mu x_t(1 - x_t), x_t \in (0,1)$$
(2)

Where μ denotes the degree of chaos, the larger the value of μ, the higher the degree of chaos; experimentally, it is concluded that the system is in the best chaotic state when $\mu = 4$. During the mapping process, if $x_t \geq 0.5, x_t = 1; as\ x_t < 0.5, x_t = 0$.

3.3   Worst Particle Update Strategy.

In the particle swarm algorithm, it has been adhering to the survival law of "survival of the fittest", in order to improve the quality of the worst particles, in the iterative process

of its update operation. The worst particle update strategy is to improve the worst adapted particles in the population with the aim of increasing the diversity of the population and hence the search capability. The worst fitness particle improvement formulas are shown in Eqs. (3), (4), and (5).

$$x_{worst(t)} = argmax\left(fit(x_1(t)), fit(x_2(t)) \cdots fit(x_N(t))\right) \qquad (3)$$

$$Eworst(t) = x_i(t) + rand\left(x_j(t) + x_k(t)\right)(i \neq j \neq k \in 1, \cdots, N) \quad (4)$$

$$x_{worst(t)} = \begin{cases} Eworst(t), if(fit(Eworst) < sit(x\_worst) \\ x_{worst(t)}, otherwise \end{cases} \qquad (5)$$

where x_worst denotes the position of the worst adapted particle among the N particles; Eworst in Eq. (4) denotes the updated particles, i.e., three different particles are randomly selected for updating after each iteration is completed. Equation (5) indicates that if the fitness value of the updated particle is less than the worst particle, the worst particle is updated to Eworst; conversely the worst particle is retained.

3.4   **Optimal particle perturbation strategy.**

The formulas for determining the degree of population aggregation are shown in equations (6) and (7).

$$avg\_x(j) = \frac{1}{N}\sum_{i=1}^{N} x[i][j] \qquad (6)$$

$$avg\_r = \frac{1}{N}\sum_{i=1}^{N} |x_i - avg\_x| \qquad (7)$$

where avg_x denotes the centre position of the N particles and avg_r denotes the average distance from the N particles in the population to avg_x.

4   Conclusion

In this paper, firstly, the solution process of the learning path recommendation problem based on the two-dimensional feature model is described; secondly, the SBPSO algorithm is improved from two aspects, namely, the initialisation of the population and the change strategy of the viscous weights, and the viscous binary particle swarm algorithm with nonlinear factors (NFSBPSO) is proposed as an algorithm for the learning path recommendation; lastly, by combining the NFSBPSO algorithm with the learning path recommendation model, a A learning path recommendation algorithm based on two-dimensional feature model is proposed to analyse the feasibility and effectiveness of TDFM-LP in terms of both the optimization ac-curacy and the optimization process. Applying in practice the successful experience of the Admiralty Choir and the implementation of the systematic construction of secondary school choirs may be limited by objective conditions, so that the choir builders can not practice according to their subjective wishes, or because of the builders' lack of knowledge and understanding of the

situation of blind appropriation, directly copying the situation, either way, it is not conducive to the systematic construction of the choir. Either way, it is not conducive to the systematic construction of the choir. Therefore, in the last chapter of this topic, the author researched the practice of systematic construction of secondary school choirs, explored the practice of formation management, the practice of team operation and the practice of choral education, respectively, made a conceptual analysis of the practice of the different construction work in the three parts, and explored the methodology, steps, programmes and models of the practice of the different construction work. The exploration results in this paper have a strong universality, and put forward the conception of the practice of different construction work while considering the construction environment under different situations and conditions, and also try to put forward alternative practice concepts and ideas in the face of more extreme construction environments, so that the exploration conception obtained can basically be adapted to most of the needs of the constructors.

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