Artificial Intelligence-driven Training and Improvement Methods for College Students' Line Dancing

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***Abstract*—With the advancement of computer technology, artificial intelligence technology has gradually become a research focus, and the thinking of relevant researchers has gradually transferred from the computer to the interaction between computers and humans. Artificial intelligence has begun to appear in various industries. With its rigorous computing logic and efficient computing speed, artificial intelligence technology begins to replace high-precision or highly repetitive work in work gradually. However, no specific data supports the specific work efficiency and output. In this context, this essay studies the methods of AI in the training and improvement of college students' line dancing levels. Virtual reality technology mainly undertakes functions such as virtual space modeling, sound positioning, sensory feedback, voice interaction, visual and spatial tracking, to ensure accurate positioning during choreography and motion capture. In this case, mechanical capture devices are used for motion capture in virtual reality space. This article uses intelligent capture technology based on virtual reality technology and artificial intelligence algorithms to capture and analyze the dance posture, generate analysis reports in a timely manner, and provide correction and suggestions for the dance posture. The final results show that AI can improve the training efficiency of line dancing of college students and can increase the innovation degree and method of dance posture by 7% to 13% compared with pure artificial. It shows that artificial intelligence technology plays a good role in college students' overall line dance training. At the same time, this paper also argues that artificial intelligence technology can effectively improve the overall productivity of traditional industries.**

Keywords*—Motion capture; artificial intelligence technology; virtual reality; college students' line dance training; dance ascension

I. INTRODUCTION

Traditional row dance training usually adopts the method of teacher demonstration and student imitation, which may be difficult for some students with poor foundations to keep up and lack innovation and diversity. Traditional row dance training often focuses only on teaching dance steps, while neglecting training in music rhythm, body posture, dance expression, and other aspects, resulting in insufficient dance expression of students. In line dance training, teachers need to spend a lot of time demonstrating and correcting, and students also need to practice repeatedly to master, resulting in relatively low training efficiency. At present, the line dance training of college students in China mainly relies on traditional teaching methods, such as teaching in accordance with textbooks or traditional chalk blackboards for pen presentations or wall charts, contrast training, and other methods. A common feature of these methods requires teachers or training leaders to demonstrate actions [1]. With the advancement of digital multimedia technology, the current teaching means gradually changing from traditional offline to online multimedia teaching. For example, common multimedia teaching means include video PPT display or other interactive ways of image and text. Multimedia teaching means can effectively save the energy of teachers or trainers. At the same time, the standard system of dance posture is established, which enriches teaching resources and plays a certain role in optimizing the whole teaching process [2]. But influenced by traditional teaching, many teachers do not like to use existing multimedia equipment in the course of line dance training. This is because multimedia equipment is a new teaching method compared with traditional teaching, and many teachers, especially older teachers, are unwilling to spend more energy or time preparing relevant learning materials. At the same time, there are some unfamiliar problems in the application and operation of the new equipment, which may lead to mistakes in the teaching process, thus reducing the teaching enthusiasm of teachers [3]. Schools or related personnel do not attach enough importance to multimedia teaching, coupled with the complexity of multimedia equipment, resulting in teachers' low enthusiasm for multimedia equipment teaching. On the other hand, when teachers use multimedia teaching, they replace the content of traditional blackboard writing with electronic information. At the same time, they still ignore students' enthusiasm in real classroom teaching or after-class training, resulting in students' passive acceptance of relevant knowledge. The relevant teaching technology based on artificial intelligence can effectively compensate for the above two points. First, the algorithm represented by artificial intelligence neural network can far surpass human eye recognition in the recognition and training standards of the accuracy of dance pose in the process of college students' line dancing and save a lot of manpower. At the same time, the technology represented by artificial intelligence virtual reality can transform two-dimensional classrooms into three-dimensional classrooms so that students can feel and learn from the scene and effectively improve their enthusiasm. Therefore, it is necessary to reform teaching methods from traditional dictation to two-dimensional blackboard writing and then to two-dimensional electronic information, and the transformation from two-dimensional classroom to

three-dimensional classroom can be called leapfrog progress, which is also the only way to reform teaching methods [4].

Artificial intelligence can provide personalized choreography training suggestions to students by analyzing their learning habits and levels, helping them better master dance techniques. Based on students' dance videos and action data, artificial intelligence can analyze their shortcomings and provide targeted training suggestions. Artificial intelligence can automatically analyze and evaluate students' dance videos, helping them quickly identify their shortcomings, thereby reducing repetitive practice time and improving training efficiency. Meanwhile, students can practice anytime and anywhere through smart devices, without being limited by time and location. Compared with China, foreign VR technology has been popularized and applied in all aspects of life, especially in the education industry. Virtual reality technology has been popularized in normal classroom education as a new multimedia technology in foreign classrooms. For example, Walmart in the U.S. used virtual reality technology to train 150,000 employees on basic professional operation requirements in 2017. They mainly use virtual reality technology to simulate a virtual trading scenario, then let employees simulate and practice it. India's Future Education 3.0 program already uses virtual reality to teach aviation courses. Based on the above information, the application of virtual reality is primarily seen in the education industry for simulating virtual scenes. With the simulation of a virtual scene, virtual reality technology can help the trainers train for the upcoming operation or scene earlier [5]. At the same time, virtual reality technology can also help us rehearse in advance the scenarios that cannot be simulated in practice, such as the simulation of aviation courses. By introducing AI technology into college dance training, we have the potential to overcome the limitations of traditional training methods and achieve a more personalized, efficient, and interesting training experience. However, we should also pay attention to and address the challenges and problems that come with it. Based on student feedback and performance, continuously optimize AI recommendation algorithms to improve the level of personalized guidance. Improve the real-time analysis and feedback capabilities of AI systems to ensure that students can promptly understand their own problems and make improvements. Combine the humanistic care of teachers, emotional communication, and objective data analysis of AI to form a more comprehensive and effective guidance method.

II. Related Work

At present, the research on the level of training and improvement methods of line dancing of college students based on AI technology is mainly based on two aspects: on the one hand, the new artificial intelligence technology represented by virtual reality, and on the other hand, the motion capture algorithm based on neural network. Virtual reality technology originated in the United States in the 1850s. It can be said that the Virtual reality technology in the United States represents the overall level of virtual reality technology in the world. Virtual reality technology was first applied in the military field. So far, VIRTUAL reality technology in the United States has been used in all aspects of life, but the United States pays particular attention to its application in education [6]. Zhang and others based on virtual reality technology in the view of cognitive psychology to study the influence of the paper; he thinks that virtual reality technology teaching means through multiple senses for the instruction of learning knowledge, so enhances students' impressions when compared to traditional teaching methods, at the same time, cultivate the habit of students' autonomous learning and the search for knowledge and desire. Slatel et al. found through experimental studies that virtual reality technology can be closely combined with real sports to improve people's living standards while exercising [7]. Compared with the United States, the research on virtual reality technology in China was carried out later. Although the technology was introduced into China shortly after its birth, it did not get enough attention and attention at that time. However, in the early 1990s, the country and relevant researchers realized the importance of this technology. Since then, China's virtual reality technology has been developing in full swing [8]. Guo Xiaoming et al. first studied virtual reality glasses and ordinary glasses based on software Settings and analyzed the characteristics, functions, and structure of virtual reality glasses in detail, providing a theoretical basis for the subsequent generalization of virtual reality equipment. Song Da et al. introduced VR technology into education for the first time. He believed that virtual reality technology could serve as a new knowledge carrier, and students could reconstruct knowledge systems in an immersive state to cultivate students' ability for independent learning and exploration [9]. Overall, virtual reality technology research in China is still developing. On the one hand, virtual reality research requires expensive technical equipment, which limits the topic selection of relevant researchers regarding hardware. On the other hand, virtual reality is still a new technology in China, and most researchers are still skeptical about its role. Therefore, relevant researchers will deliberately avoid this topic in subjective topic selection. However, with the arrival of the information age, artificial intelligence represented by virtual reality has received more and more attention, and relevant research has gradually received strong support [10]. China's ninth Five-Year Plan and national Advanced Technology Development Strategy have repeatedly listed artificial intelligence technology represented by virtual reality as a key development project. As the frontier of scientific research, universities have gradually produced landmark achievements.

However, training line dancing level college students cannot play a practical role, only relying on virtual reality. The motion capture technology is also used to capture and analyze the relevant motion track to evaluate the actual motion and reverse output results, such as the accuracy of the motion, forming a training closed loop driven by artificial intelligence technology. Compared with virtual reality technology, motion capture technology develops later. It can be divided into motion capture methods, practical applications, and the analysis of motion data, posture, and other motion capture information [11]. Currently, motion capture technology combined with virtual reality technology has been gradually applied in intangible heritage protection, film and television production, game animation, medical rehabilitation engineering, and other aspects. For example, Qiu Wangbiao et al., based on virtual reality technology and motion capture algorithm, conducted data collection of different ethnic dances

and created relevant databases, which played a protective role in Chinese ethnic dance culture [12]. Kim et al. extracted individual walking characteristics based on a motion capture algorithm applied them to a humanoid biped robot, and analyzed their walking rules, step length, weight, and other data by recording them. Finally, the problem of walking friction individuals face in the rehabilitation process is effectively solved, and it can automatically recognize human walking posture and correct wrong posture in time [13]. Numerous studies have been conducted on motion capture technology in international sports education. For example, Wallance et al. carried out motion capture on the movement data of professional golfers in competitions and conducted professional analysis through the motion analysis system. Data captured in real-time through athletes' swing action, hitting posture, etc., provide theoretical support for subsequent athletes' further development and training direction [14]. Covaci et al. applied motion capture technology to volleyball training. Through data experimental analysis, they created a self-training shooting machine with virtual reality technology. It can not only analyze the posture of athletes, such as serving and receiving but also put forward optimization suggestions to athletes from angles and dynamics, which not only improves the training quality of volleyball class but also improves the training level of students [15]. Although artificial intelligence methods can provide personalized training suggestions and real-time feedback, they cannot replace the emotional communication and humanistic care of teachers. The words, deeds, encouragement, and care of teachers are of great significance for the growth and development of students. The update speed of artificial intelligence technology is very fast, and new algorithms and technologies are constantly emerging. In order to maintain the progressiveness and effectiveness of technology, it is necessary to constantly upgrade and update the AI system, which requires a lot of human and material resources. Existing research mainly focuses on the feasibility of AI technology, while there is relatively little research on its practical effectiveness and long-term impact. Secondly, there is still insufficient research on how to combine the humanistic care of teachers with objective data analysis of AI to form more comprehensive and effective guidance methods. Finally, there is a lack of in-depth exploration on the acceptance and response of different students to AI assisted training.

III. METHOD

To sum up, there are few application cases of virtual reality technology for classroom teaching with high accuracy. For instance, virtual reality technology is limited to VR instructional videos. It is speculated that this is because, for the training of related sports movements, the virtual reality technology needs to capture and analyze the relevant movements in the virtual scene to improve the real training level. However, the movement of the human body is a complex system involving the precise movement of multiple nodes or muscles. The current development of artificial intelligence algorithms is not enough to accurately and reasonably analyze human movement. However, suppose artificial intelligence technology based on virtual reality can be applied in sports training. In that case, it can not only improve the quality of physical education but also give students an immersive experience to ensure students' enthusiasm and training results in the process of training. Therefore, this paper takes the training and improvement methods of line dancing level of college students as an illustration to carry out pertinent artificial intelligence research represented by virtual reality. The research ideas of this paper are shown in Fig. 1.

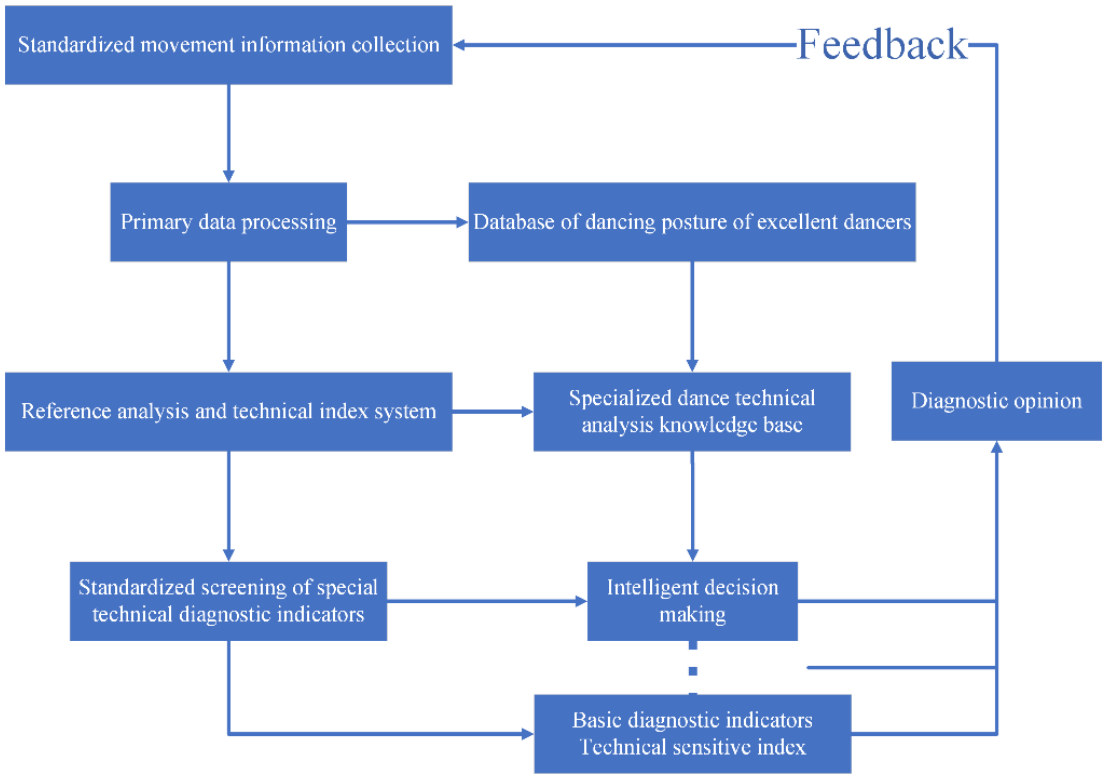

Fig. 1. Research idea based on artificial intelligence technology driving line dance training of college students.

From Fig. 1, it can be seen the key to improving the level of line dance training of college students, which is also the data basis of this study, is to capture information on human posture during line dance training of college students through motion capture technology. Because multiple dancers are involved in the training process of line dancing, each dancer's movements may be different. Still, each slight movement may affect the overall performance of line dancing, so the requirements for movement capture are more accurate. Human body posture is mainly completed through joint muscles and other common performances. Each part has a general movement posture, but there are slight differences because dance movements for the whole body coordination requirements are relatively high. In the past, there was mainly attitude analysis based on simulated annealing particle swarm optimization, model-based motion attitude analysis, and feature-based motion attitude analysis for the human body. The pose analysis based on the simulated annealing particle swarm optimization algorithm is mainly for motion capture of human arm movement; a particle-wave algorithm is used to measure the conditional density of sampling points, and the random weight parameters are updated using the Monte Carlo method. Finally, the arm movement state of the human body is judged by the random particle movement. The specific algorithm is shown in Formula 1.

$$E(y_t, x_t) = S \times \left((1-\beta) \frac{B_t}{B_t + Y_t} + \beta \frac{R_t}{R_t + Y_t} \right) \quad (1)$$

The capture of human body pose by model-based motion attitude analysis is mainly by establishing a model in advance, mapping the standard parameter model to the actual captured trajectory of human body pose, and calculating the difference between them by function to determine the deformation degree of the two to judge the human body pose. Therefore, the accuracy of model-based motion attitude analysis results depends more on the model's standard degree and the function's fitting effect. The fitting method is usually the least square method, and the polynomial coefficients of the curve fitting are used to approximately represent the rules of human movement. The specific functions are shown in Formula 2.

$$s(t) = a_0 \varphi_0 t + a_1 \varphi_1 t + \cdots + a_n \varphi_n t \quad (2)$$

The feature-based motion pose analysis algorithm does not need to build a model as a whole but can directly determine the position of the human body's changing pose through the comparison of human pose features. For example, points, lines, planes, nodes, and other more complex features are used for comparison and reference.

The line dance training of college students to be explored in this paper involves many individuals, and the feature reference is extremely complex. If the feature motion pose analysis algorithm is used alone, the accuracy of pose change cannot be guaranteed. However, if the annealing particle swarm optimization algorithm is used to predict each individual's changing characteristics in the line dancing process. In that case, many operations will be produced, and the efficiency of computer operations will be seriously affected. Therefore, after comprehensively considering the balance between accuracy and efficiency, the model-based motion pose analysis algorithm can be chosen as this paper's main motion capture algorithm. Nevertheless, the function fitting algorithm utilizes the least square method, requiring us to identify the optimal function parameters within the system space expectation to guarantee the precision of the fitting. The expression of spatial expectation is shown in Formula 3.

$$\phi = span\{\varphi_0 t, \varphi_1 t, \ldots, \varphi_n t\} \quad (3)$$

However, in the actual least square method fitting process, It was discovered that the sum of squares generated by the fitting increased as the number of iterations increased, indicating that the accuracy of the fitting became lower and lower as the number of iterations increased, as shown in Fig. 2. It is speculated that this is because the complexity of dance movements leads to more and more errors in the traditional least square fitting. Therefore, the traditional least square fitting method cannot be applied to the line dance training of college students studied in this paper. More precise fitting methods are required.

Therefore, an artificial intelligence-based neural network algorithm is introduced here. Currently, commonly used neural networks are mainly separated into two groups -- convolutional neural networks (CNN) and cyclic neural networks. The basic algorithm structure of the two algorithms is the same. The algorithm structure is divided into an input layer, an output layer, and a hidden layer. The input and output layers are the algorithm layers of initial data input and final result output at the beginning of the operation. However, the two have different logic in the hidden layer. CNN does not participate in the cycle during the training of the hidden layer, so the concept of timing is not considered, and the algorithm does not have the logical ability to relate to the context. However, the cyclic neural network will carry out cyclic training simultaneously in the hidden layer algorithm training so that the cyclic neural network will consider the time sequence in the training process. Normally, the convolutional neural network is used for image or image recognition because the input value is directly related to the output value in the recognition algorithm, and the influence of the output result of the previous neuron is not considered when the output neuron is generated in the next result. However, the recurrent neural network is usually used to generate natural language because it considers the temporal influence, that is, the influence of the output result of the last neuron. Therefore, the convolutional neural network is mainly introduced in this paper. In the traditional least square fitting process, the error value increases as the number of iterations increases, which is called a gradient explosion problem in the realm of AI and corresponds to a gradient attenuation problem. Both refer to the problem that the original algorithm is invalid and the fitting is out of order because the operation exceeds the threshold value. The artificial intelligence concept of a control gate is introduced to solve this problem. Specifically, it refers to adding two propagation control domain restrictions in artificial intelligence's hidden and input layers, called the update and reset gates. The specific expressions are shown in Formula 4 and 5.

$$r_t = \sigma(W_r * [h_{t-1}, x_t]) \quad (4)$$

$$z_t = \sigma(W_z * [h_{t-1}, x_t]) \quad (5)$$

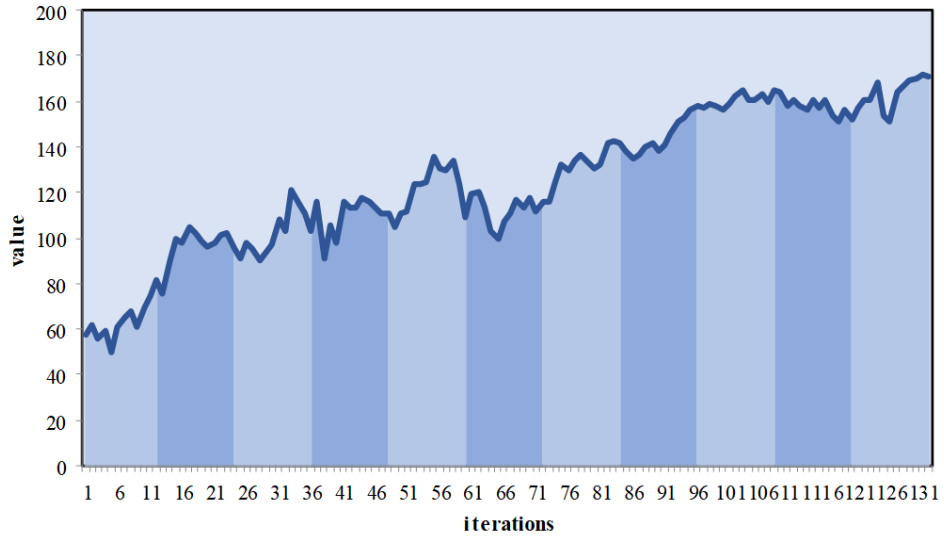

Fig. 2. The traditional least square method is used to fit the curve.

The function of the update gate is to control the proportion of information output from the previous neuron to the current neuron. When the value of the update gate is set larger, it means that the output information of the previous neuron is input to the current neuron at a larger proportion. The function of the reset gate is to ignore the information input to the current neuron again. The smaller the reset gate value is, the more the current input content is ignored. The overall control gate follows the law of forward propagation. At the same time, the training network's loss function must be computed after passing the control gate each time, which also corresponds to the many-to-many or one-to-one model of a convolutional neural network. See Formulas 6 to 8 for specific propagation modes. The fitting results before and after the control was added are shown in Fig. 3.

$$h_t' = tanh(W_{h'} * [r_1 * h_{t-1}, x_t]) \quad (6)$$

$$h_t = (1 - z_t) * h_{t-1} + z_t * h' \quad (7)$$

$$y_t = \sigma(W_o * h_t) \quad (8)$$

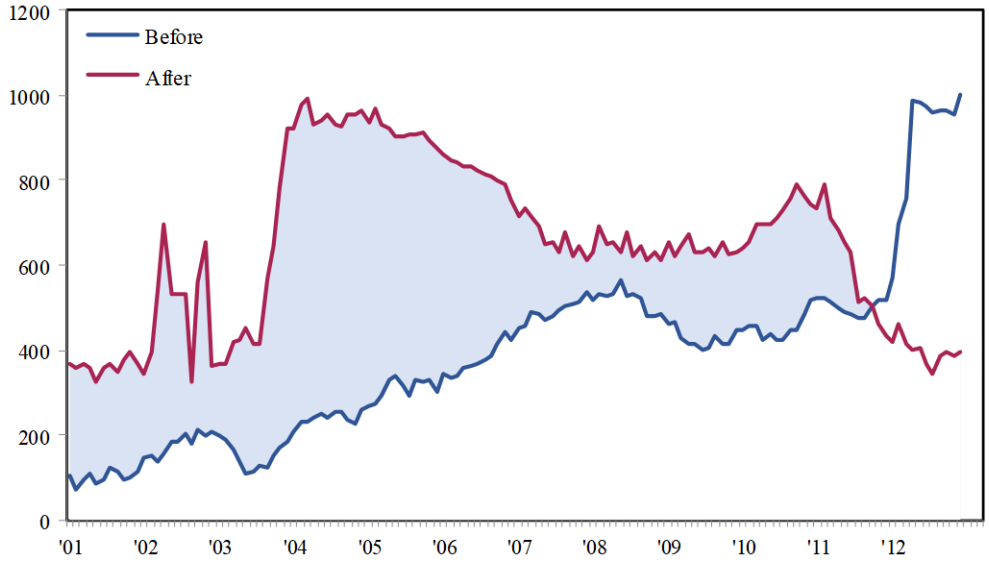

Fig. 3. The results of the least square method fitting are introduced.

It can be seen from Fig. 3 that before adjustment, the sum of squares in different series of fitting processes increased with the increase of fitting series. In contrast, after control gate adjustment, the fitted sum of squares showed an increasing and decreasing trend. This is considered because the content of acceptable information is large at the beginning due to the computer's large amount of free memory, so the control gate does not play a role for the time being. The square deviation of

the fitting keeps increasing before filtering out some invalid information. However, as the number of fitting iterations increases, the computing load of the computer becomes larger and larger. At this time, the control gate starts to operate and continuously reduces the input information of the previous neuron by updating the gate. Meanwhile, the invalid input information is ignored by resetting the gate to control the volume and effectiveness of the fitting information. Finally, the square deviation of the least square method is reduced, and the gradient explosion problem is avoided effectively.

After determining the fitting method, the algorithm of human pose recognition, the core of motion capture began to improve. The traditional pose recognition algorithm mainly refers to the 3d model similarity matching algorithm to measure the pose difference or similarity between different human bodies. It first carries on the special point identification to the human posture to be recognized. It calculates the change difference before and after the identification point through the Euclidean distance when it changes during the human body's line dance training to preliminarily determine the motion trajectory. The calculation method is shown in Formulas 9 to 10.

$$D = sqrt((x_1 - x_2)^2 + (y_1 - y_2)^2) \quad (9)$$

$$D = sqrt((x_1 - x_2)^2 + (y_1 - y_2)^2 + (z_1 - z_2)^2) \quad (10)$$

The principle of similarity matching algorithm for different 3D models based on Euclidean distance is to compare two object representation points on the motion trajectory, get the corresponding distance difference through comparison, and get the corresponding human body posture by matching with the pre-set track-attitude comparison table. However, this algorithm has some shortcomings. First, identifying the point comparing method due to the human body posture is usually completed jointly by multiple joints and muscles, so to ensure the accuracy of the attitude to capture, it needs to set up multiple identification points to action and compare multiple points to identify at the same time, the amount of calculation is too big. Secondly, there is a certain stubbornness in determining attitude according to the scale method. In the line dance training of college students, dancers of different heights and weights have different changes in the identification points on their bodies when performing the same movement demonstration. However, there is a certain error in attitude comparison and confirmation according to the same scale at this time. The comparison of the movement track of the same identification point in a unilateral upward direction is shown in Fig. 4.

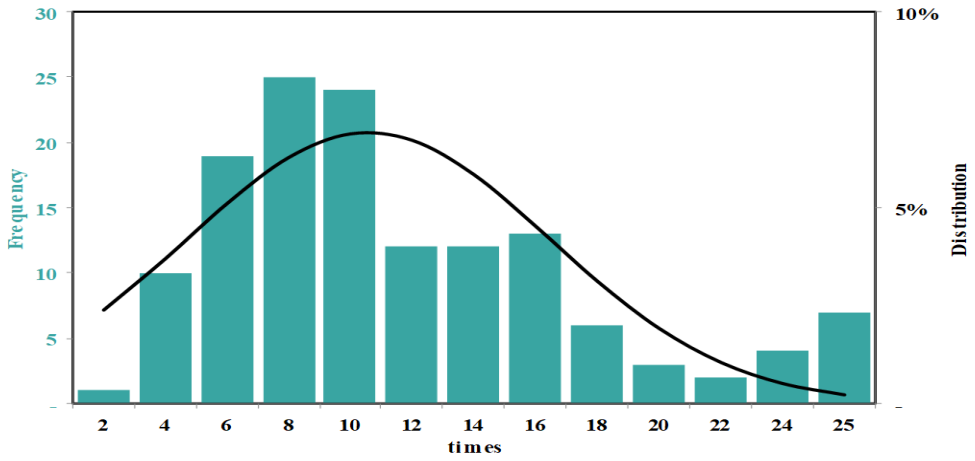

Fig. 4. A single identity between unilateral upward motion path.

It can be seen from Fig. 4 that the single-direction motion trajectory between single marker points is normally distributed over time. It indicates that with the increase of time, the Euclidean distance begins to lose regularity in the identification of marker locus, and only the irregular discrete marker locus changes with time will present normal distribution. In line dancing of college students, more individual pose recognition will be involved. Compared with the analysis of individual pose recognition, the computation amount of this method increases exponentially. Therefore, finally, abandoning the traditional algorithm and adopting the similarity calculation algorithm of feature plane matching has been decided.

The feature plane matching algorithm first extracts the skeleton model of the human body by motion capture technology, takes the extracted skeleton model as the basic computing plane, and marks all important parts of the human body, such as joints. The feature plane matching algorithm differs from the traditional Euclidean distance algorithm in that the individual feature plane normal vector judges the attitude change. At the same time, the Angle between Eigen plane edge vectors is introduced to further judge the local normalization of motion attitude. The specific calculation method is from Formula 11 to Formula 13. According to this algorithm, the standard included Angle parameters of each comparison point of human joints can be obtained, as shown in Fig. 5.

$$similarity(V_i, V_j) = \frac{v_i \times v_j}{\sqrt{v_i^2} \times \sqrt{(v_j)^2}} \quad (11)$$

$$\theta_{\langle i,j \rangle} = arccos\left(similarity(V_i, V_j)\right) \quad (12)$$

$$Corr(\theta_{\langle i,j \rangle}) = 1 - \left(\frac{arccos(similarity(V_i V_j))}{\pi}\right) \quad (13)$$

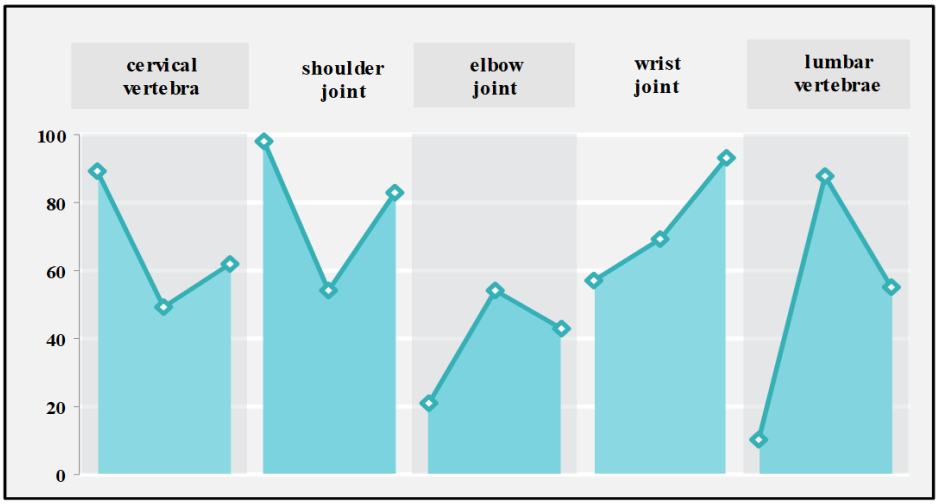

Fig. 5. Each joint of the human body corresponds to the bending angle.

The matching results of each joint's bending Angle and plane feature show that there are still some errors between the predicted difference and the actual difference of some joints. These errors are the fundamental cause of inaccurate attitude analysis. After specific analysis, it was found that in the process of plane Angle comparison, the included Angle relation between limbs and trunk in the vertical direction was not taken into account, which led to the error in the mapping of the local relation between limbs and trunk, which led to the phenomenon of error increase. Therefore, a binary group is introduced here as a calculation model for locally fitting the similarity between limbs and trunk. Through the determination and output of relevant parameters, errors caused by the inherent characteristics of the human body are effectively solved. The specific expressions are shown in Formula 14 to Formula 15. Fig. 6 displays the outcome. The algorithm suggested in this paper reduces computational complexity and improves the efficiency and improvement method of AI-based university students' line dancing level training.

$$R^{(uv)} = \begin{bmatrix} R_{b_{w,b_v}} & \cdots & R_{b_{w,b_{v+1}}} \\ \vdots & \ddots & \vdots \\ R_{bu+1,b_v} & \cdots & R_{bu,b_{v+1}} \end{bmatrix} \quad (14)$$

$$S_{u,v} = \frac{Q_{max}^{(uv)}}{min(l_u, l_v)} \quad (15)$$

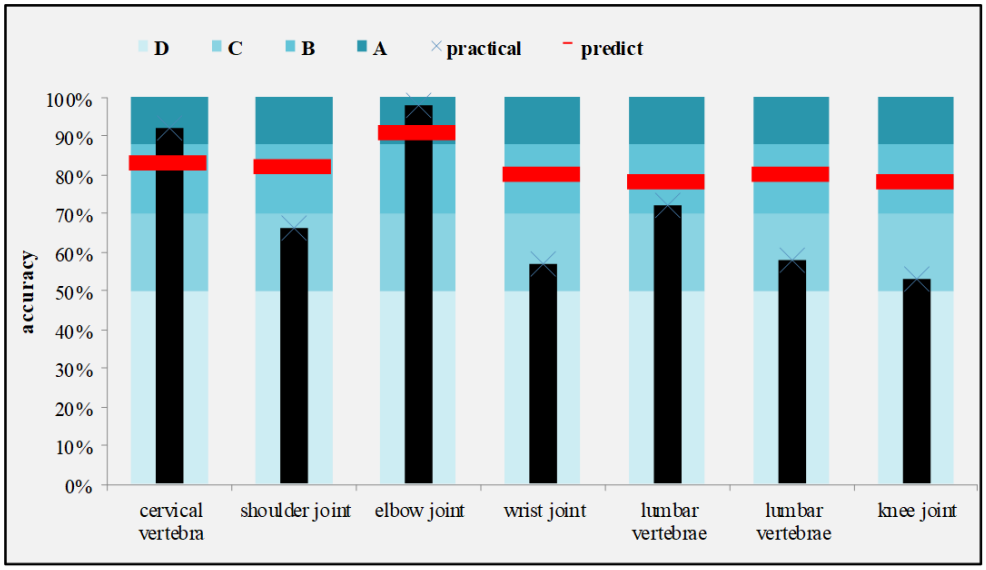

Fig. 6. The actual and predicted values of different mapping angles are displayed.

IV. Result Analysis

In our research, we found that significantly improved row dance performances are mainly manifested in the following aspects:

Accuracy and fluency of actions: Students who have undergone AI assisted training have significantly improved their accuracy and fluency of actions. The AI system can accurately identify subtle deviations in movements and provide immediate feedback and correction suggestions by analyzing

students' dance videos in real-time. This enables students to correct errors in a timely manner during the training process, gradually improving the accuracy and fluency of their movements.

Rhythm and music coordination: AI assisted training not only focuses on the accuracy and skills of movements, but also focuses on cultivating students' sense of rhythm and music coordination ability. Through precise analysis of music rhythm through AI systems, students can better understand the coordination between dance and music, and improve their performance in rhythm changes and complex rhythm types.

Creativity and expressiveness: AI technology not only provides traditional training methods and guidance, but also stimulates students' creativity and expressiveness through data analysis. For example, AI systems can analyze students' dance movements, generate personalized dance choreography suggestions, and help students explore different dance styles and forms of expression.

The fundamental procedure and algorithm of artificial intelligence technology powering the level training and enhancement approach of line dancing for college students have been validated and tested above. Next, the algorithm will be verified through the practical operation and the output of the final results. The need to introduce virtual reality devices; virtual reality technology here mainly undertakes virtual space modeling, sound localization, sensory feedback, voice interaction, visual and space tracking, and other functions to ensure accurate positioning in the process of line dance and motion capture, in this instance, mechanical capture devices are used for motion capture in virtual reality space. The captured data is analyzed for action, as shown in Fig. 7.

To ensure the objectivity and effectiveness of the experiment, training personnel were randomly divided into two parts before the beginning of the line dance training. One part still adopts the traditional line dance training method; the teacher teaches offline, and the students do not use any artificial intelligence equipment or methods for training. Others use artificial intelligence to train for line dancing. On the one hand, the virtual reality equipment is used for unlimited time and place training in the virtual scene; on the other hand, the intelligent capture technology based on an AI algorithm is used to capture and analyze the line dance posture and timely produce analysis reports for correction and suggestions on dance posture. After one month of such training, each student's dance posture is evaluated again - and the evaluation results are shown in Fig. 8.

Fig. 7. An example of motion capture in a virtual reality scene based on artificial intelligence technology.

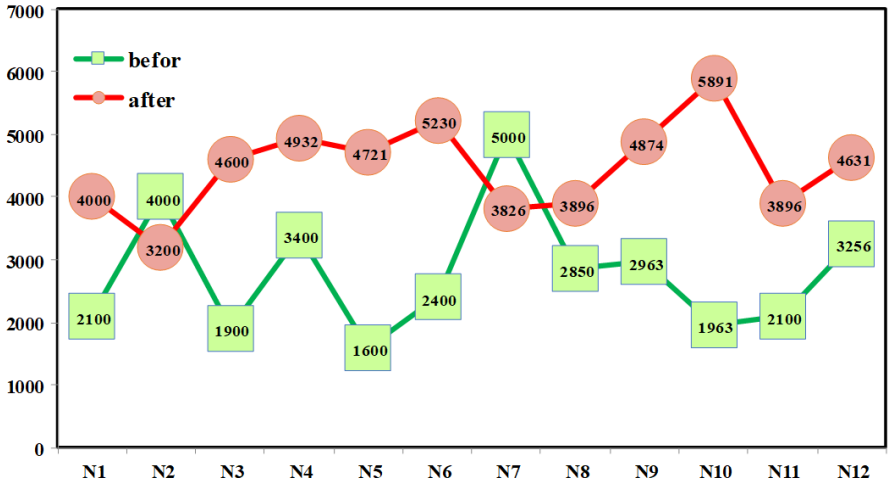

Fig. 8. The score of the same trainer before and after the training using artificial intelligence.

First, the level of the students who used artificial intelligence technology for line dancing training before and after the training has been compared. Six teachers have been invited as judges to conduct a manual evaluation and score the dancing posture of the students who used artificial intelligence technology for line dancing training before and after the training. It can be seen from Fig. 8 that the scores of students before and after training are generally higher than those before training. Through calculation, it can roughly be concluded that the line dancing level of the students who use artificial intelligence technology for line dancing training has improved by about 20% on average. However, this result does not mean that adopting AI technology causes all students to improve their training. Even without external forces' help, there is only an improvement effect through their practice. Therefore, the level test of students before and after training was conducted to eliminate the impact of individual objective elements without the aid of AI equipment, and the results showed that the level of these students only improved by about 10%, which, in our opinion, was the increase of individual natural level without the help of equipment. Therefore, artificial intelligence technology has an effect of 7%~13% on improving the level of line dancing training of college students.

Finally, to get everyone to the proposed artificial intelligence technology drive line dance training level college students to improve the algorithm's true feelings, whether to accept the technology popularization and application in the classroom and the benefits of the technology are two basic problems for everyone, the results showed the 51 people welcome the introduction of the technology in education, It is considered that this technology plays a positive role in promoting students' innovation and autonomy, as shown in Fig. 9.

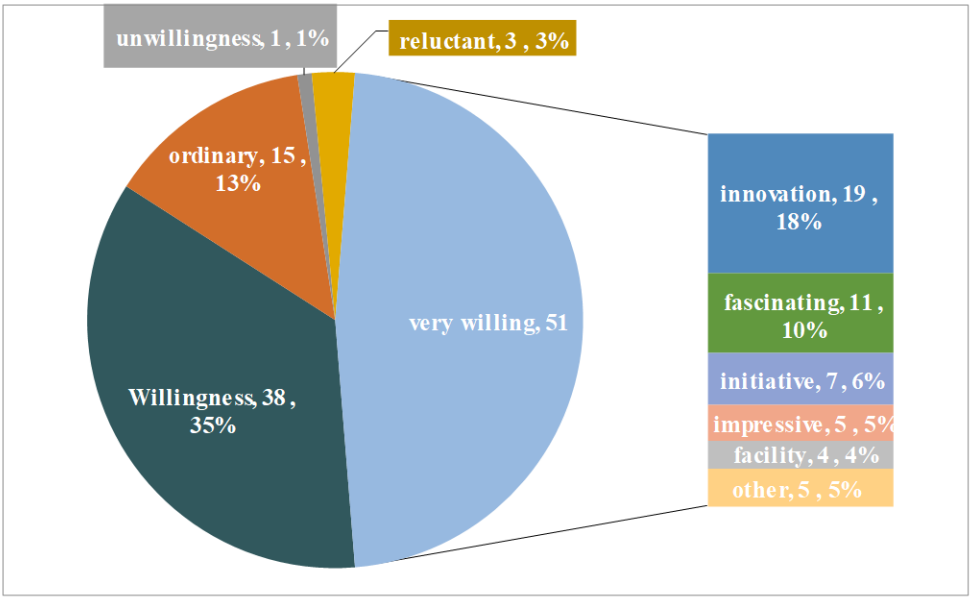

Fig. 9. Artificial intelligence technology drives acoustic feedback of line dance training for college students.

V. Discussion

The accuracy of body posture and dance movements is a key factor in the quality of performance. Through artificial intelligence methods, we can accurately analyze student movement data and identify subtle but key improvements such as posture stability, movement fluency, and coordination. This specific feedback information can help students more accurately understand their shortcomings and make targeted improvements.

Secondly, the sense of musical rhythm is an important component of line dance performance. Artificial intelligence can provide feedback on rhythm control and coordination between dance and music by analyzing music rhythms and student dance movements. This helps students improve their understanding and expressive power of music, further enhancing the overall dance effect.

As for the analysis of variability, preliminary studies have shown that there is a certain degree of variability in the reactions of different students to artificial intelligence assisted training. Some students have shown a high degree of acceptance and active cooperation towards new technologies, believing that artificial intelligence provides personalized and efficient training methods; some students, on the other hand, rely more on traditional training methods and hold a reserved attitude towards artificial intelligence. This variability may be related to students' technological acceptance, learning style, and habits.

VI. Conclusion

The research mentioned above reveals that artificial intelligence technology is being used in education but is not popular. Still, in any sports teaching or training research, it is inseparable from the motion capture system to record and examine the posture of the human body if the scene is needed simultaneously with the help of virtual reality technology to build the virtual scene. So, this article for the college student's level of line dance training and the promotion of the research is based on the idea of method, first through the motion capture

system in the process of line dance teaching and training for college students in data capture and analysis, according to the certain algorithm to calculate its standard and accuracy, at the same time on the place of the action is not standard tag and automatically in the course of the next training initiative to remind. In this way, the level of line dancing training can be improved. In the virtual scene constructed by VR technology, the innovation of a new dance pose can be simulated at will, and the effect can be watched synchronously. Therefore, it is theoretically expected that the improvement of training levels and innovation of training methods and systems regarding the impact of AI technology on the line dance training of college students. The final results show that AI can improve the training efficiency of line dancing of college students and can increase the innovation degree and method of dance posture by 7% to 13% compared with pure artificial.

COMPETING OF INTERESTS

The authors declare no competing of interests.

AUTHORSHIP CONTRIBUTION STATEMENT

Xiaohui Wang: Writing-Original draft preparation, Conceptualization, Supervision, Project administration.

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