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"Research on Music Emotion Analysis and Dance Creation Based on Neural Network"

JES Journal of Electrical Systems

Abstract: - The one-of-a-kind avenues for self-expression that dancing provides as a form of physical art. Movements of the body, both internal and external, and other forms of expression make up the bulk of a dancer's lexicon. Through passive observation, the viewer is able to catch up on the dancer's intended meaning through their body language. It's the one-of-a-kind way that each dancer finds to convey feeling and story through their body. In this piece, we intelligently oversee dance training and take on challenging nonlinear control problems by combining AI technology and the BP neural networks (BPNN) approach.In this study, the training dance teachers receive in dance language, talking music for dancing, and stage art was evaluated using the BPNN technique and the PCA-BPNN strategy. Median accuracy for the BPNN research model is 85.35 percent as age 80 approaches, whereas for the PCA-BPNN research model it is just 65.64 percent. This demonstrates that the BPNN grading model provides more precise results than the PCA-BPNN model. Using BPNN algorithm-based dancing performed within the context of artificial intelligence technology is one way to attain two goals: the spread and pleasure of beauty, and the harmonious combination of athletics and the arts. These two aims are not mutually exclusive.

Keywords: Dance Motion, Neural Network Model, Dance Teaching, Motion Analysis, Machine Learning, Movement Recognition

Introduction

Dance refers to a style of expressive movement in which the performer's body and its movements are used to represent the protagonist's or antagonist's mental and emotional state. Many believe that when people dance, they are most likely to express themselves in a free, vivid, and contagious way. Because the body is used as a sort of silent spoken language, the viewer immediately becomes aware, through their sense of vision, of the knowledge that is offered by the dance picture. This is the extraordinary power and significance of dancing as an art form. The aesthetics of dance education should be available to all students.

According to,(Z. Wang) [1] a person's physical and mental health are both improved by their level of psychological well-being. This includes the individual's knowledge, non-intellectual parts, creativity, mental health, and aesthetic psychological aptitude.

Contemporary customized, digitally-based, and empirical dance education reform is moving in a According to (Gujing et al.)[2], direction incompatible with conventional modes of dance training because of the arrival of a data-based society and the continual increase in student enrollment. This one-sided understanding turns the students' great gifts into what looks like spectacular acrobatics, robbing their dance of its expressiveness and aesthetic appeal. Because of this, it is not uncommon to witness an awkward scene: a beautiful stage setting, elaborate dance costumes, skillful dancers, and unresponsive and in different viewers. Let's cooperate on a strategy to teach Chinese dance which not only addresses the challenges we've identified but also makes the most of the possibilities we've identified. Instructors of dance can help their students develop a lifelong love of learning and the self-confidence necessary for success in the field by showing them how to apply classroom concepts to real-world scenarios. As a result, they develop a deeper appreciation for the value of a classical education and a more passionate dedication to the teaching profession.(Zeng) [3]

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In this research, we apply BPNN technique and AI technology to intelligently regulate dance class instruction. By adapting to changes in the external environment, smart control allows for the regulation of a large number of independent variables with no need for uniformity. Furthermore, it has the potential to address complex nonlinear control problems. According to, (Dong)[4] Artificial intelligence (AI) is now the most cutting-edge invention available and has been called the "fourth economic revolution." There will soon be a new era in which machines and human beings can coexist and work together, thanks to the widespread adoption of artificial intelligence, or AI, in a variety of fields. BP neural networks use a technique that has been shown to successfully ensure confidentiality of user information. Using encryption to prove that the system granted authorization to access the information, technologically restricting access to data, and providing data in a confidential manner are all viable options. (Qu) [5] For those in the know, "computational intelligence" refers to a suite of applications that take human intuition into account in addition to the BP algorithm's neural network. The BP algorithm is the result of combining these hints. After the data has been sorted or semi-structured, it is much simpler to read, analyze, and reread. Its primary use is in the solution of exceedingly difficult computer problems in a variety of scientific and technical disciplines. (Liang)[6]

4. Literature review;

Workouts that include digital components with more conventional types of exercise have seen explosive growth in popularity in recent years. It has been acknowledged as having importance not only as a form of self-expression but also as a form of exercising that could have positive impacts on one's health. One approach that has shown potential for improving people's physical health is to combine dancing with health education. According to (Suhaimi et al.)[7] Dance-based health education is one such approach. Dancing plays an important part in health education because it allows students to practice recognizing and analyzing movement. Using a back propagating (BP) neural network framework for responsive dance smart detection is the primary topic of this research project within the field of dance health education (Jiang)[8].Analysis of the Dance Movement Recognizability Dance recognition of motion and assessment has been explored by numerous industries, including medicine, the arts, and sports. For the purpose of motion detection in dance, it is necessary to collect, analyses, and analyze dancers' movements. Recording device motions and human annotation, as was done in previous systems, is time consuming and has limited practical applications. Neural networks, and more particularly deep learning architectures, have ushered in a period of revolutionary transformation in the fields of recognizing motion and analysis. One popular neural network architecture that has shown effective for tasks involving supervised learning is the back propagating (BP) neural network.

According to (Lei and Liu)[9], to close the discrepancy between the predicted and observed results, the network must be retrained to adapt to changing workloads over time. This approach has been used in a number of contexts, and it has shown potential in each of them, from image recognition and audio processing to, most recently, the analysis of dance motions.

The term "adaptive dance motion smart detection" is used to refer to a system's ability to dynamically modify its recognizing capabilities in response to new information and the needs of the user. What makes this possible is a phenomenon called "adaptive dancing motion smart detection." (H. Wang)[10]This approach recognizes the potential necessity for developing distinct detection algorithms to account for differences in dance genres, body types, and classroom settings. The adaptive part may involve adjusting the model's parameters, the topologies, or even incorporating user feedback to enhance detection accuracy and respond to changing environmental conditions. (Tang and Hyun-Joo)[11]

A class where participants are taught dance moves with the goal of strengthening their bodies. Schools, neighborhood centers, and dance studios are just a handful of the numerous possible locations for dance instruction. According to (Xue and Song) [12], the use of electronic devices enables the facilitation of individualized feedback, tracking of progress, and participation in dynamic learning activities in this context. A flexible dance motion recognition system that can provide real-time data to educators and students is required to optimize the classroom experience.

Future Planning in the Face of Persistent Difficulties Despite the promising potential of combining an adaptive dance motion detection strategy with a Probabilistic neural network model, there are still numerous challenges to be overcome. One of these is making sure the model works for different kinds of dance regardless of factors

like stage design and musical accompaniment. Furthermore, a large dataset that comprises numerous dancing motions and instructive scenarios related to health is required for rapidly building and assessing the model. (Wang and Zhao)[13]

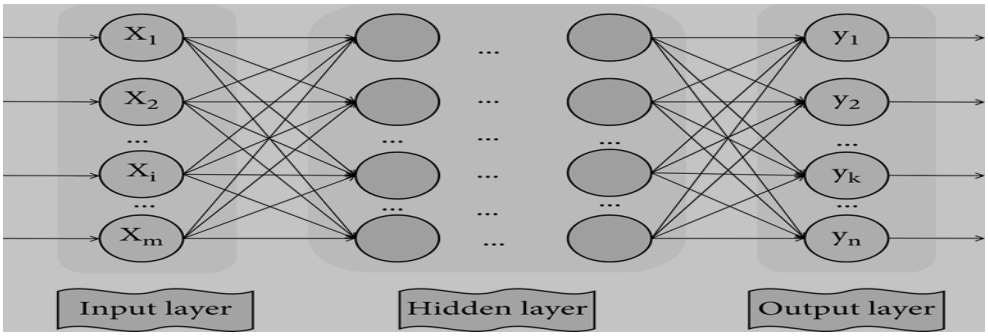
(Yang) [14], the aforementioned sources, it is difficult for scholars to training dance method using words and images alone because dance teaching puts an emphasis on teacher-led demonstrations, compared to other disciplines. So, I looked into the topic of AI-based dance education in great detail. The rapid development of AI makes it possible to experiment with new approaches to education. According to(Huang and Zhang) [15], Teachers can benefit greatly from utilizing AI to organize their lessons such that they are differentiated for each student, even in huge classes. Provide differentiated instruction for your student body. Solving real-world issues is essential practice for students learning the building blocks of applied mathematics. (Geng)[16]

According to (Jin)[17], through the statistical collection and study of vast statistics in dance education established on the use of AI technology, coaches can gain an real picture of their students' masters of dance abilities and hypothetical information learning. Data on students' learning behaviors must be recorded, monitored, and analyzed so that instruction can be tailored to each student's strengths and weaknesses. By doing so, a "learner portrait" is created that may be used by both educators and students in order to comprehend the unique habits and preferences of each learner.(Yao)[18]

5. Methodology:

With the introduction of computers came the beginning of the era of intelligence technology, and soon after, individuals began committing substantial funds to the investigation of this field. Positive changes in people's everyday lives are a direct result of the growing number of AI-powered tools available for use in a variety of contexts. Artificial intelligence (AI) is slowly starting to gain momentum in the classroom. Given the widespread adoption of this technology, its understandability is on par with that of neural networks. Because of this, the authors of this paper propose employing the BPNN technique in their investigation. In order to handle complex systems, the BPNN algorithm was recently developed. Since it is capable of processing and providing solutions in a way that no other technology can, it has a wide range of potential uses. A common type of mapping used in modeling nonlinear systems is the BP network, which maps inputs to outputs. A few hidden layers, an input layer, and an output layer make up the core elements of this structure. The number of hidden layer units is directly related to the problem's requirements and the number of inputs and outputs. Training of a neural network is extremely time-consuming when there are an abundance of hidden layer units, error management is challenging, and the network has low error tolerance. Figure 1 depicts the possible formation of the BPNN model

Figure 1 bpnn model:



Its neural structure is composed of hidden, input, and output layers respectively. There is full connection between the neurons that are on separate levels, but there is no among the neurons that are on the same layer. The input vector is processed and normalized by the input layer, which consists of:

EQUATIONS:

$$\mathbf{Y}_{ai=\exp\left[\frac{X^T X_{ai-1}}{\sigma 2}\right]}$$

Signifies activating function, which is a method for displaying the actions of neurons that is displayed by each unit in the system. This function is also known as the "squeezing function" due to the fact that it transfers a greater output spectrum to a smaller interval. The input of each unit in the input layer is identified by the function of activation.

$$S_j = \sum_{t=1}^{n} Wija_{i-\theta_j}$$

$$b_{j=\int (S_j)}$$

Problems with categorization and regression that crop up during data mining are the primary topic. It achieves this through a mechanism known as parallel processing, This allows it to mimic key aspects of human mind, such as the ability to learn reason, retain information in associative memory, and arrange its own information. The concept of labor is actually not that difficult to grasp.

$$L_{j=\sum_{j=1}^{t} Vijb_j-\gamma_j}$$

$$C_{t=\int (L_t)}$$

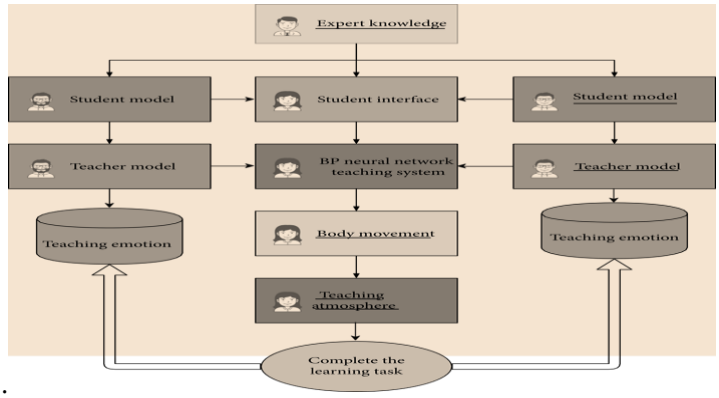
To make the most of their individual strengths and talents, and to carry out their assigned tasks effectively, members of an organization must follow predetermined procedures. This is the scientific consensus on how to describe work, and it is the term that will be adopted by scientists going forward. Everything from beginning to finish is performed manually.

$$d_{t=(y_t-c).c_t(1-c_1)}$$

Thanks to collaboration amongst disciplines as diverse as languages, mental health, information theory, math, computational science, and psychology, the cutting-edge field of artificial technology known as the BPNN algorithm is rapidly growing. For this and other reasons, it is at the forefront of its industry. The fundamental goal of its study is to create artificial systems that are capable of mimicking and acting out complex human behavior. Results have been seen in a number of fields after years of study, creation, and optimization. The BPNN algorithm can provide students with individualized learning materials that are appropriate for their individual needs. The availability of large amounts of data enables the development of model features that may be used to pair learners with the qualities that best suit them. Because of this, personalized education can be achieved in a practical and efficient way. BPNN provides students with individualized lesson plans that are created specifically for their needs as students. The availability of large amounts of data enables the development of model features that may be used to pair learners with the qualities that best suit them. As a result, effective individualized education is within reach. In order to effectively deploy individualized education, a smart system for learning is required. The structure of such a smart educational system is shown in

Figure 2. The BPNN intelligent teaching system:

Adopted by,hindwai.



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the number of examples of state mode that need to be educated, the teaching vectors of state-owned setting, and is a leveling factor; where,,, and are the parameters of the learning vector and the measurement of vector that needs to be categorized, respectively.

$$\int_{A\,(X)} = \frac{1}{2\pi\, q/2}$$

6. Result and discussion:

The School of Sports and Art administered 120 surveys to students in 30 dance lessons, 30 aerobics classes, and 30 rhythmical gymnastics classes; 119 were returned for a 96% recovery rate. All respondents were given the identical instructions and completed the survey at the exact same time. The outcomes of the experiments are presented in

Table1 List of distribution and recovery of students:

programs	Dance lesson	Aerobics lesson	Creative gym lesson	overall	Recovery amount%
Subject quantity	30	30	30	126	
Improved quantity	30	33	32	119	96

Following the conclusion of design of the questionnaire, the strength of the survey was evaluated using the skilled decision method. A total of six related study experts were recruited for the purpose of evaluating the reliability of the questionnaire. This number included four full-time professors and two assistant professors. Table 2 presents the findings of the evaluation carried out by experts in accordance with the findings of the evaluation.

Table 2 Skillful assessment results:

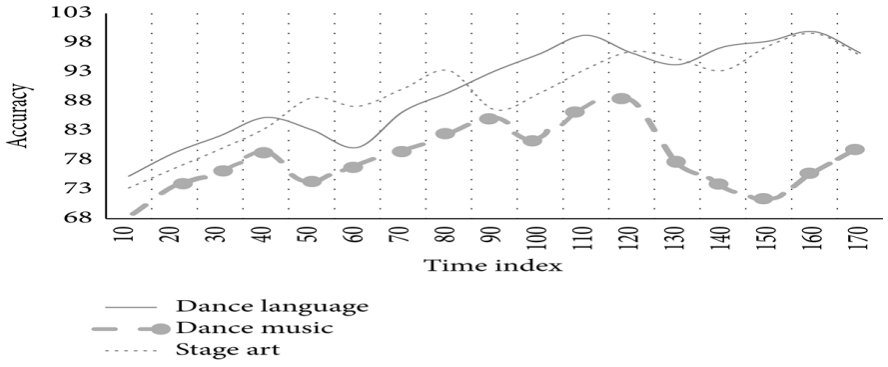
	In elevation rationality	Overall rationality	Small rationality	Be unacceptable
Meeting questionnaire	4	1	0	1
Scholar questionnaire	3	1	0	1

The fundamental components of music can be broken down into three categories: rhythm, melody, and harmony. Here are a few more crucial components involved. The results of this experiment, which ranks the fundamental components of music that have an impact on dance training, are presented in.

Figures 3 demonstrate in a dance training and instruction test of dance speech, music for dance, and stage art, the mean precision of the BPNN assessment model.

Figure3 Accuracy of evaluation of bpnn model:

Adopted by, hindwai.



7. Conclusion:

Ultimate objective of dance education should be the most complete integration of dance knowledge, abilities, and performance. Therefore, it is crucial to increase the learning materials that are derived from the students' actual life experiences. Free functioning, interaction with others, and practical experience are all instances of such learning contents. In the classroom, inactive teaching approaches. In this research, we look into how AI tools could be used in the field of dance education. In this article, we put the BPNN and PCA-BPNN algorithms to the test by analyzing how well they predict performance quality in dance classes. When time hits 80, the BPNN evaluation model has an average accuracy of 85.35 percent, while the PCA-BPNN evaluation model has an average accuracy of 65.64 percent. This proves that the BPNN assessment model is more precise than its PCA-BPNN counterpart. When instructing perform in a classroom with access to the internet and AI, it's important to focus not only on helping students develop transferable abilities in movement, but also on helping them develop an appreciation for the context in which those skills will be used, as well as on creating activities that are rich in visual detail and narrative intrigue. Students will get an appreciation for the complexity of dance as an art form beyond the simple acquisition of predetermined movement patterns. Improving one's practical application of one's skills and knowledge is vital, but it is not the sole important thing. Therefore, it is reasonable to conclude that incorporating machine learning into the field of dance education not only increases students' enthusiasm for learning about dance but also enhances the content of performing arts education, thereby providing the optimal conditions for relieving teachers' workloads, boosting dance classes' efficacy, and fostering students' all-around growth.

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