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Research Article

Basic Theory and Practice Teaching Method Based on the Cerebellar Model Articulation Controller Learning Algorithm

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With the continuous in-depth development of science and technology in my country, the field of artificial intelligence has also made considerable progress. For example, the comprehensiveness and operability of technology have been enhanced. Artificial intelligence, as a comprehensive and intersecting research field in the fields of computer science, information science, and mathematics, has also made a certain contribution to the progress of international students in colleges and universities. This article is aimed at studying the problems based on basic theories and time teaching methods, mainly through a comprehensive data analysis of artificial intelligence technology and fusion differential evolution algorithm, and then improving the learning ability of students and comprehensive quality. This paper proposes a swarm intelligence algorithm, K-means clustering algorithm, and vector machine algorithm and summarizes the process and application fields of the swarm intelligence algorithm. In addition, the CMAC learning algorithm is proposed, which shows that robots under the background of industrial intelligence and machine learning can organize themselves to form groups to perform complex tasks. The experimental results of this paper show that the communication range is between 0 and 1, which can enable more robots to communicate in order to improve the individual's social learning opportunities, thereby enhancing the individual's learning ability to improve the performance of learning behavior and improving the efficiency of practical teaching and research, making the efficiency reach 0.9.

1. Introduction

1.1. Background. In English teaching, frontline teachers are often troubled by the following problems:

(1) The polarization of students' comprehensive ability to use English is serious. With the increase in the content of learning and the deepening of the difficulty, the gap between the students' comprehensive ability to use English has become increasingly obvious, and the phenomenon of polarization has become serious

(2) Class time is limited, it is impossible to test students' mastery in full coverage in class, and it is impossible to mobilize students to actively participate in learning and discussion with high frequency

(3) Students are not good at listening and not good at cooperating and communicating, or cooperating and communicating are only limited to imitating example sentences or dialogues. They will not learn actively, actively explore, cooperate, and communicate, let alone creative learning

(4) Cooperative learning is only effective in the classroom. After class, the cooperation is terminated after the completion of specific learning tasks, and there is no continuity

(5) The evaluation model is relatively simple, mainly based on the one-way evaluation of the individual students by the teacher, there are few student evaluations, and it is more difficult to achieve instant evaluation and multiple evaluations

How to solve this series of problems has always plagued frontline teachers. Sato Xue believes, "The classroom is quietly changing. The desks and chairs are arranged in rows facing the blackboard and the podium. The teacher uses the

textbook as the center and uses the blackboard and chalk to explain. The teacher asks the students and answers—this is the scenery of the classroom that we are accustomed to. This kind of classroom scenery is entering museums in Europe and the United States." It can be seen that the traditional teacher "Yiyantang" teaching is no longer acceptable to Teachers must make changes and do everything possible to return the classroom to the real master: the learner. Teachers should strive to make classrooms enjoyable for students to learn and teachers to enjoy teaching and build classrooms into a learning community. However, in the process of building a learning community, we should also focus on understanding individual differences.

1.2. Significance. The development of service learning has been quite mature, and the implementation from system to management has reached the level of regularization and institutionalization. Based on a comprehensive understanding of the concept of service learning in many aspects, this research discussed the theoretical basis and functional characteristics of service learning and introduced the guarantee mechanism and organization related to service learning and the implementation process of service learning. The research of this paper takes the service-learning American university as the case study object, and the purpose is to experience the various links and details of service-learning, explore the role of various factors in the implementation and development of service learning, and have the opportunity to update our country. The content of practical teaching in higher education promotes the development of citizen participation in education. The implementation and application of service learning in American colleges and universities provide students with more opportunities for growth, which can enable college students to deeply experience and feel contemporary social development, cultivate college students' sense of social mission and national responsibility, and can study the service learning of American colleges and universities. It is conducive to exerting the functions of universities and affecting the related development of higher education in our country. Service learning is conducive to promoting the cultivation of critical thinking, so that students possess the spirit of questioning questions and have a deeper grasp of theories. Therefore, through the research on artificial intelligence learning in colleges and universities, reflecting on the status quo of the social practice education of Chinese college students, and trying to critically learn from the ideas and practices of artificial intelligence learning and learning in colleges and universities, it is conducive to solving the problems existing in the development of the social practice activities of college students in our country, so as to further strengthen the basic theoretical research of the social practice system of college students.

1.3. Related Work. In recent years, with the rapid development of big data and other technologies, artificial intelligence and machine learning algorithms have made great contributions to education. Jia and Zhang and Ramezani Mayiami et al. analyzed the application status of artificial intelligence technology in university psychology and pedagogy teaching mode and put forward a research on university psychology and pedagogy teaching mode based on artificial intelligence technology. This article conducted a survey and analysis of 290 teachers and students, and their recognition of artificial intelligence technology reached more than 90%. And after the application of artificial intelligence to psychology teaching, the satisfactory learning environment, learning methods, and learning effects were compared and analyzed, and the results were discussed and analyzed [1, 2]. Guo and Sun proposed that teaching effects need to be combined with artificial intelligence systems. In order to change the traditional teaching mode and improve the classroom detection effect, based on the open Internet of Things and cloud computing technology, the college classroom real-time monitoring system has been constructed, and a number of new improvement measures and algorithms have been proposed to provide automatic identity positioning in large scenes. The application provides a theoretical and technical basis. Field scenes are obtained through field image data collection and field data processing, and then the regional scenes are combined with field measured data to verify accuracy and trends and obtain student morphological characteristics [3]. In general, their analysis is in place. The only drawback is that the research process is not rigorous enough, which leads to differences in research results. Although these studies are related to artificial intelligence and machine learning algorithms, their research processes are complex and difficult to operate.

1.4. Innovation. The innovation of this article is as follows: (1) the first is the innovation of the method, which is mainly reflected in the new method that combines artificial intelligence and machine learning algorithms when conducting research in this paper; (2) the innovation of viewpoints, firstly elaborating and sorting out the connotation, characteristics and functions, and theoretical basis of service learning; secondly, further grasping the implementation situation of service learning from the operating mechanism and organization management of service learning and in-depth study of its service-learning practice inquiry; and finally, combined with the specific practice of service learning, sum up successful experience and put forward localization suggestions suitable for my country's higher education teaching reform; and (3) innovation in project practice. In recent years, with the rapid development of big data and other technologies, artificial intelligence has ushered in a turning point in its development. Artificial intelligence will become the world's most critical technology in the next two decades. Artificial intelligence can make human life better and more convenient.

2. Particle Swarm Optimization Algorithm

2.1. Theoretical Source of Service Learning in Universities

2.1.1. The Difference between Service Learning and Traditional Courses. As an experiential learning, service learning has many differences from traditional classrooms. We can use Table 1 to reflect the differences between traditional courses and service learning in several aspects.

Table 1: The difference between service learning and traditional courses.

	Traditional course	Service-learning process
Location	Classroom	Classroom and community
Teachers	Teacher	Teachers, supervisors, community mentors, learners, and peers
Ready to work	Designated readings, selected courses	Designated readings plus optional readings; selected courses Personal traits; access to service locations
Study	Writing, examination, understanding, short-term	Writing, examination, cognition, experience, short term, and long term
Evaluation	Teachers	Teachers, community supervision, and self-evaluation

The teaching and learning characteristics of traditional courses and service learning are also completely different. When implementing teaching activities in traditional courses, more attention is paid to theoretical teaching in the classroom. The teaching method is mainly based on teacher lectures, and the form is relatively rigid. Under the guidance of this teaching mode, students have a single way of thinking, thinking in a unitary thinking orientation, and there are many teachers. The teaching method of deductive reasoning is used to impart book knowledge. In terms of course evaluation, the teacher only makes the evaluation during the course or after the course. Generally speaking, it is a traditional negative learning method, while service learning pays more attention to practical teaching. With community service as the main form of learning, teachers and supervisors interact with academics in the form of training, so that students can learn by doing. This learning method reflects the characteristics of flexibility. Therefore, students can think in diversified ways. Orientation to divergent thinking and inductive methods are used to impart knowledge in the teaching process. In terms of course evaluation, service learning [4] can conduct current evaluation and reflection at any time during the course of the course.

2.1.2. Cooper's Empirical Learning Theory. Cooper proposed the ELM experience learning model theory in 1984 (see Figure 1). We can discover Cooper's experience learning. The model theory can be applied to almost all theories about service learning. Cooper believes that learners circulate in energy. The process of spiraling up the learning ability of learners is very similar to this ancient Chinese philosophy. This too Cheng started with specific experience, conducted continuous reflection and observation, formed abstract concepts [5] of specific problems and proposed solutions, and finally carried out practice and summary, as shown in Figure 2:

2.2. Theoretical Overview of Swarm Intelligence Algorithm

2.2.1. Bat Algorithm (BA). The bat algorithm is one of the closest algorithms to particle swarm optimization. In 2010, Dr. Yang from the University of Cambridge studied the bat algorithm, a new type of swarm intelligence optimization algorithm, by simulating the echolocation behavior of bats. Echolocation refers to animals such as bats that establish their cognition of the surrounding environment by echoing the sound they emit. Similar to all population-based stochastic optimization algorithms [3], the solution in each optimization problem is a bat in the search space, and the positions of all bats represent the fitness value of the problem. Each bat acts as a basic individual of the algorithm, and the entire group gradually changes from disorder to order in the problem-solving space by approaching the food; then the optimal solution is obtained. Every bat has to constantly adjust its own frequency, loudness, and pulse.

The firing rate [6] is to follow the bat with the highest fitness value to search in the solution space. In BA, bats fly to a new position by adjusting their speed, and the change of speed is obtained by obtaining the global optimal information. The updated formula of the speed V_t^b and position of bat t at time X_t^b is

$$f_b = f_{\min} + (f_{\max} - f_{\min})\beta, \tag{1}$$

$$v_t^{b+1} = v_t^b + \left(x_t^b - x_*\right) f_b, \tag{2}$$

$$x_t^{b+1} = x_t^b + v_t^{b+1}. \tag{3}$$

Through the above introduction to the bat algorithm, we can see the algorithm flow chart 2 as follows:

The gray wolf algorithm simulates the strict hierarchy of the gray wolf leadership, shaping four different roles, from low to high, namely α, β, δ, and ω. At the same time, α, β, and δ will also change each other's levels due to age and other issues. ω is the follower at the bottom, and the task is to balance the internal relations of the population. These four roles follow the strict social ruling class of gray wolves. In addition, group hunting is a very important group activity among gray wolves, including encircling prey, hunting, attacking, and searching. These activities are all considered in the GWO algorithm. Due to the mandatory and strict social ruling class [7], most members act as followers (ω) of the ruling class (α, β, and δ). The ruling class occupies the top three positions based on their performance. In GWO, the characters α, β, and δ will automatically change based on their current positions in each iteration. Social learning is adopted in GWO, and the position X_n^y of gray wolf t in the i-th iteration is updated to

$$x_b^{t+1} = \sum_1 \in (\alpha \times \beta \times \delta) xn/3, \tag{4}$$

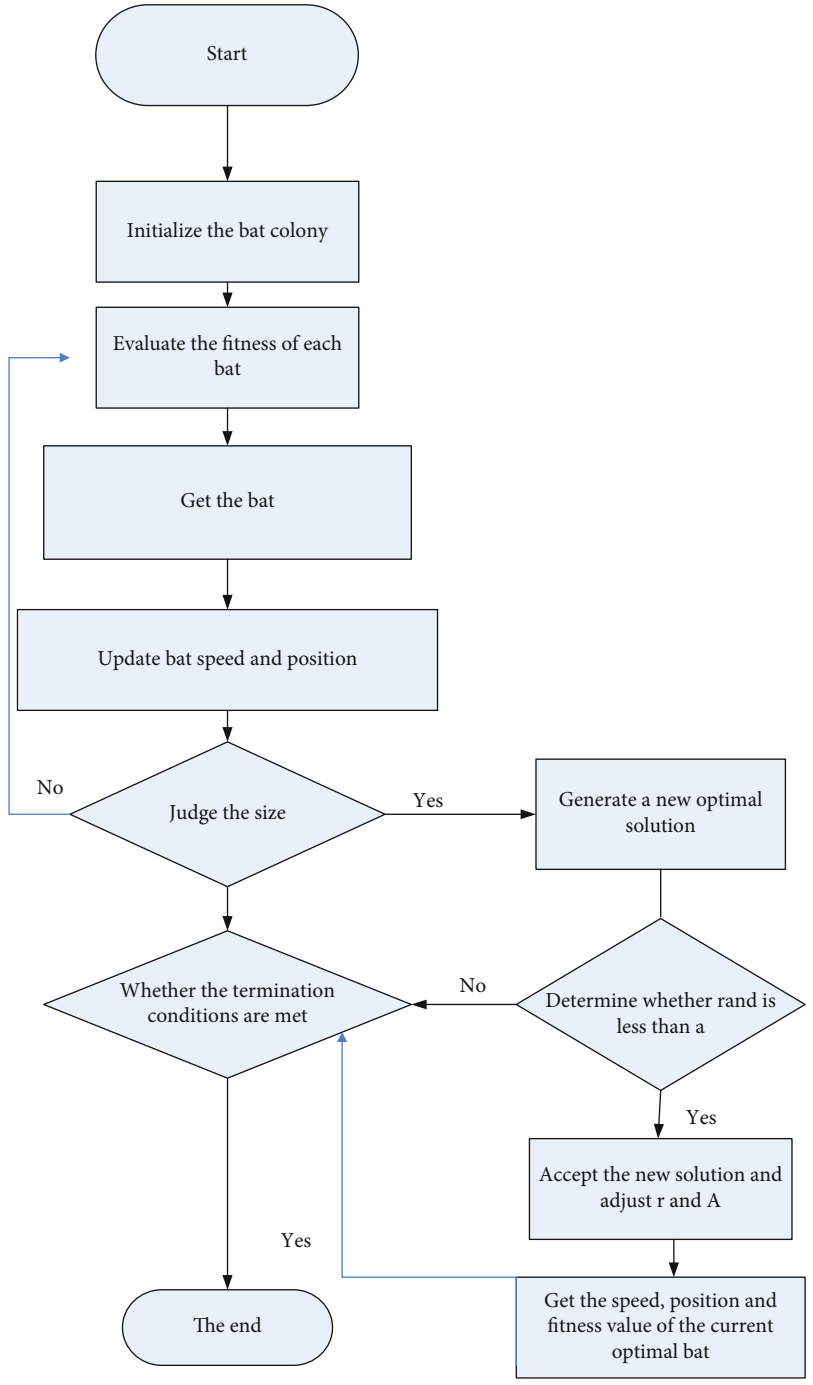

Figure 1: Flow chart of the BA algorithm.

$$x_u^{b+1} = x_u^b - (2 \times \alpha \times r_2 - \alpha) \times \left| 2 \times r_4 \times x_t^b - x_t^b \right|, u \in \{\alpha, \beta, \delta, \eta\}. \tag{5}$$

2.2.2. K-Means Clustering Algorithm. The clustering algorithm belongs to unsupervised learning [8], which mainly uses the learning of unlabeled samples to expose the inherent properties and laws of the data and provide a basis for further data analysis.

For sample set $C = (x_1, x_2, \cdots, x_m)$ and the cluster center set $D = (D_1, D_2, \cdots, D_m)$, obtained by the K-means algorithm after clustering, the minimized square error function can be expressed as follows:

$$E = \sum_{r=1}^{D} 7 \sum_{x \in C_i} \|x - u^q\|_3^3. \tag{6}$$

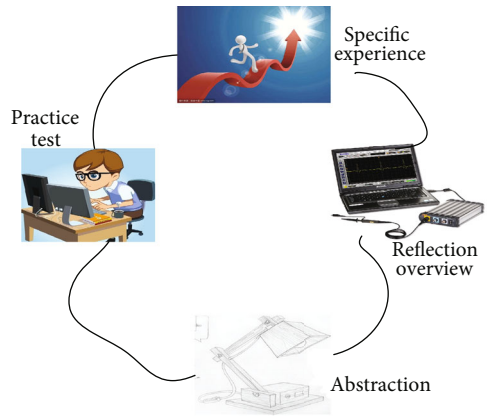

Figure 2: Cooper's ELM experience learning model cycle diagram.

2.2.3. Vector Machine Algorithm. For the training set $G = \{(x_1y_1), (x_2y_2), \cdots, (x_ky_k)\}, y_k = \{-1,+1\}$, the division result obtained in this way is the most robust and the best generalization performance. The above divided hyperplane can be expressed by the following linear equation:

$$j^A x + h = 0. \tag{7}$$

The basic formula of a support vector machine is

$$\min_{sd} \frac{1}{2}\|A\|^2. \tag{8}$$

When $D = (D_1, D_2, \cdots, D_m)$ is linear and inseparable for a given training sample set, there may not be a partitioning hyperplane that meets the requirements in the feature space of the sample. Let $\phi(x)$ denote the feature vector after mapping x, so

$$\text{s.t.} y_u\left(W^R X_Q + B\right) \geq 1, i = 1, 2, \cdots, m. \tag{9}$$

Given the training sample set $D = (D_1, D_2, \cdots, D_m)$, the loss function is as follows:

$$F(D, c\,; g, h) = \frac{1}{2}\|h_e(e) - i\|^2. \tag{10}$$

For data containing m samples, the overall cost function is

$$D(Q, c) = \left[\frac{1}{f}\sum_{i=1}^{p} W(E, b\,; x, y)\right] + \frac{\lambda}{4}\sum_{i=1}^{n_q-1}\sum_{i=1}^{g}\sum_{i=1}^{h_m+2}\left(D_{ji}^s\right)^2. \tag{11}$$

2.3. Countermeasures to Strengthen the Cultivation of the Subject Consciousness of Foreign Students in Colleges and Universities

2.3.1. Shaping the Independent Personality of International Students. Subjective consciousness requires people to have an independent personality and independent spirit. Independent personality manifests itself as not being dependent on others, not deliberately catering to others, not being able to obey others blindly, neglecting oneself, and losing dignity.

2.3.2. Cultivate the Innovative Consciousness of International Students. As the youngest and most energetic group of intellectuals, international students are more confident, are more self-reliant, are more enthusiastic about transforming the world, and have a stronger knowledge structure [9], have rational concepts, and have judgment and decision-making capabilities, whether they are both in life and in learning have demonstrated the innovative talents of female college students.

2.3.3. Reshape the Social Characteristics of International Students. The school is a student, a member of the society, and the initiative of the society in the society. It exerts its subjective initiative and assumes the responsibility to itself and the mission to the society. Instead of asking for it blindly from the society, you have to become the master of the society, and you have to pay and contribute to the society, so that you can truly find the value of life.

3. Comparative Research on Swarm Intelligence Algorithms

3.1. Experimental Data Based on the Improved CMAC Learning Algorithm. In order to verify the effectiveness of this learning algorithm and compare it with the conventional CMAC learning algorithm, we set up a comparison experiment here. One is the robot learning system based on the artificial emotion-based CMAC network learning algorithm, and the other is based on the conventional CMAC network algorithm. In the robot learning system [10], both algorithms have carried out 10 simulation experiments, and each test runs up to 100 times. This is done to ensure the generality and reliability of the resulting data. The learning speed of the robot is an important indicator of the learning algorithm. The faster the learning speed, the better it can adapt to changes in the environment and have better adaptability. Figure 3 shows the robot learning curve for the final comparison experiment.

It can be seen from Figure 3 that in this experiment with the drug, the changes in the number of runs and the number of survivals fluctuated greatly, and the changes between the two were basically consistent. The improved genetic algorithm [11] is applied to the simulation experiment, and for comparison, the traditional genetic algorithm is also applied to the experiment, a set of comparison experiments are performed, and the other basic parameters are the same. Finally, the corresponding simulation results are shown in Figures 4 and 5.

It can be seen from Figure 4 that the improved genetic algorithm has a strong learning performance. It can reach the goal of 5,000 survival times after it has evolved to about 23 generations, indicating that this improvement based on artificial emotion [12] is very effective. In addition, Figure 5 shows that the improved genetic algorithm has a higher optimal fitness value than the traditional genetic algorithm, and the speed of reaching the optimal fitness value is also faster. In other words, the learning speed is faster, the final learning effect is better, and the ability to adapt to the environment is stronger.

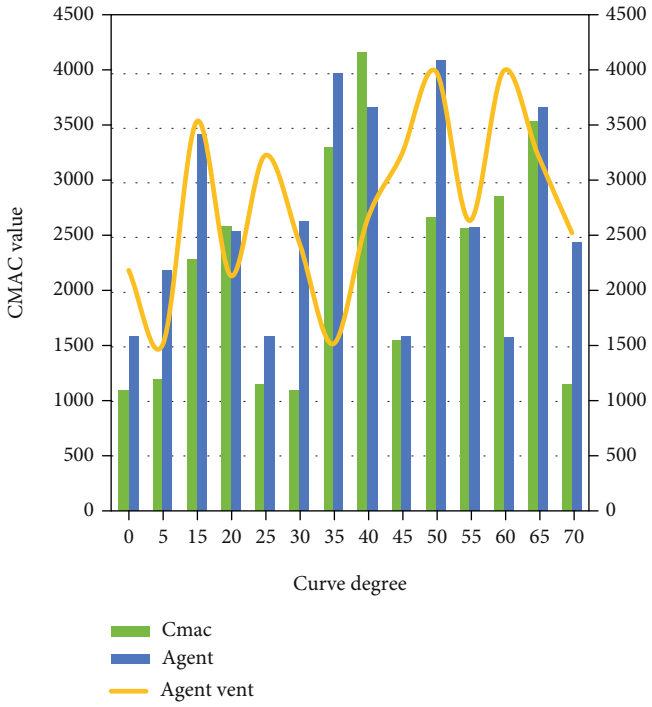

Figure 3: The number of trial runs of the agent—the number of survival curves.

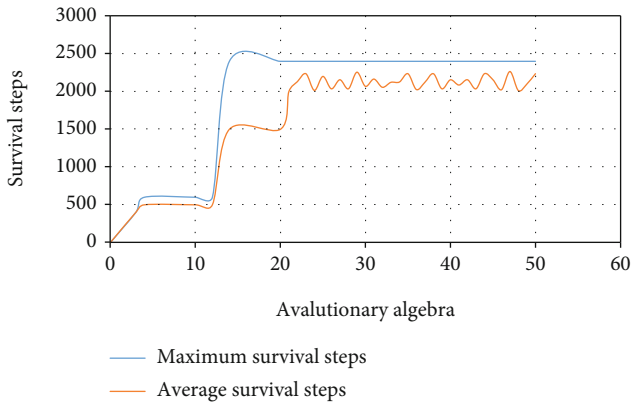

Figure 4: The number of survival steps of the improved genetic algorithm.

3.2. Construction of the Experimental Model. Firstly, according to the control principle of the two-wheeled robot, the required electrical system is divided into four parts: detection system [13], control system, power supply system, and execution system. The electrical system structure diagram is shown in Figure 6. Among them, the detection system is composed of the MTI attitude detection module to detect the robot attitude information; the control system receives and processes the signals provided by the detection system, sends instructions in real time, controls the robot to complete the corresponding actions, and finally calculates the output through the control algorithm [14], sent to the execution system; the power system is composed of a lithium battery, a power distribution board, and a switch, powered by

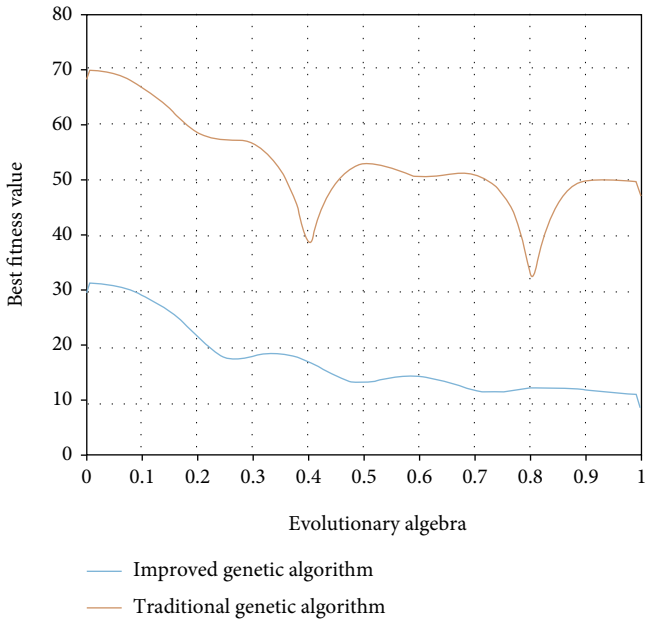

Figure 5: Convergence curves of the best fitness values of the two algorithms.

the lithium battery, the detection system and the control system obtain the required voltage through the power distribution board; the execution system drives the received command signal through the left and right wheel motors. The wheel rotates to realize the movement of the robot, as shown in Figure 6.

Mechanism modeling is to establish a mathematical model of the system according to the physical and chemical laws of the system's internal operation mechanism, material, and energy conservation [15]. The general steps are as follows:

(1) Determine the input and output according to the working principle of the system and its role in the control system

(2) Write down basic equations based on the relationship between the conservation of materials and energy

(3) Eliminate intermediate variables

(4) Obtain system dynamic model

(5) For a weakly nonlinear system, in order to simplify the model, it can be linearized at the operating point to obtain an approximate linearized model of the system

3.3. Simulation Experiment Data. The experiment selects standard test functions BTM1, BMT3, and BTMZ2 to evaluate the performance of the algorithm. They have different characteristics, such as nonconvexity and discontinuity, and can be used to test the optimization capabilities of different aspects of the algorithm [16]. The first two are the two-objective minimum problem, and BTMZ2 is the three-objective minimum problem. The definitions of these test functions are as follows:

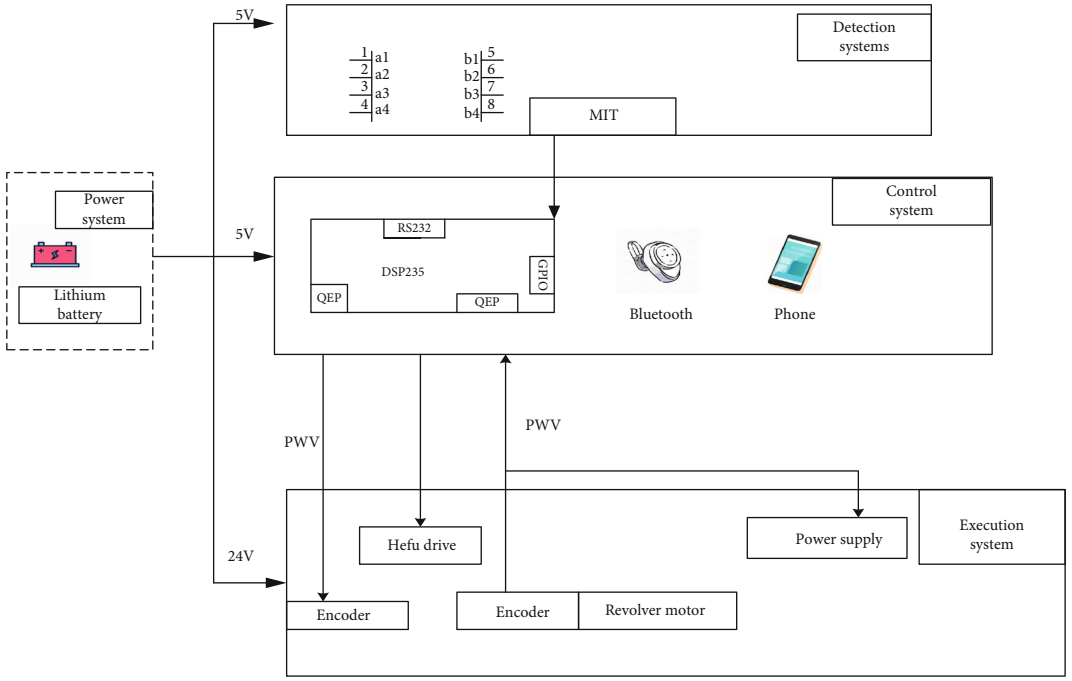

Figure 6: Two-wheeled robot electrical system structure diagram.

$$\begin{cases} \min\{f_2 = x_i\} \\ \min\{f_2 = g \times h\} \end{cases}, g = 2 + 9 \times \sum_{i=3}^{f} \frac{x_q}{j-1}, h = 1 - \sqrt{\frac{f_2}{g}}, \tag{12}$$

$$\begin{cases} \min\{f_2 = x_i\} \\ \min\{f_2 = g \times h\} \end{cases}, g = 2 + 9 \times \sum_{i=3}^{f} \frac{x_q}{j-1}, h = 1 - \sqrt{\frac{f_2}{g}} - \sqrt{\frac{f_2}{g}} - \left(\frac{f_1}{g}\right) \sin(10\pi f_1). \tag{13}$$

When $x_i = 0, i = 2, \cdots, m$, it corresponds to the true Pareto optimal frontier of the above two test functions: the most optimal frontier of ZDT1.

The optimal front is a convex front, and the optimal front that meets the two goals of $f_2 = 1 - \sqrt{f_1}$ ZDT3 is 5 segments of the discontinuous convex front.

$$\begin{aligned} \min f_1 &= \left\{(2+d)\cos\left(\frac{\pi x_2}{2}\right)\cos\frac{\pi x_2}{2}\right\} \\ \min f_2 &= \left\{(2+d)\cos\left(\frac{\pi x_2}{2}\right)\sin\frac{\pi x_2}{2}\right\} \\ \min f_3 &= \left\{(2+d)\sin\frac{\pi x_1}{2}\right\}. \end{aligned} \tag{14}$$

4. Results and Analysis

4.1. The Overall Analysis of the Distribution of Intelligence Characteristics of Foreign Students in Colleges and Universities. The student's "multiple intelligence questionnaire" is designed based on the questionnaire intelligence checklist compiled by Gardner [17] and the multiple intelligence questionnaire compiled by the United States Department of Education in Kentucky, combined with the cognitive level of the students. This intelligence questionnaire is designed. It focuses on the description and supplementary explanation of the seven intelligences with high learning relevance. The four descriptions in each part correspond to a kind of intelligence, namely verbal intelligence, spatial intelligence, body-motor intelligence, natural observation intelligence, interpersonal intelligence, introspective intelligence, and logical-mathematical intelligence; the data obtained from the survey is used to roughly analyze the distribution of individual students and the overall intelligence of the class and the intelligence development status, as a basis for determining the superior intelligence and intelligence differences of the class students, and at the same time for personalized teaching activities that provide guidance to a certain extent to help teachers develop reasonable strategies for teaching students in accordance with their aptitude [18]. According to the statistical data of the student's multiple intelligence survey summary table, the intelligence distribution statistics chart is drawn to visually display the intelligence distribution status of the students in the experimental class. The construction of geographic mental maps is related to multiple intelligences, and the development of geographic capabilities is mostly manifested as an extension of spatial intelligence. First, determine the distribution of intelligence for a specific student. Taking four students as an example, the students have outstanding performance in natural observation intelligence, spatial intelligence, and self-observation intelligence, as shown in Figure 7.

The students' self-cognitive intelligence, natural observation intelligence, and spatial intelligence development levels are higher, and the development level of sports intelligence is the lowest, followed by language intelligence and interpersonal intelligence, as shown in Figure 8.

Comprehensive analysis shows that the students in the experimental class are in the transitional stage from specific calculations to formal calculations [19], as Piaget said. Thinking mainly in images, logical thinking skills have

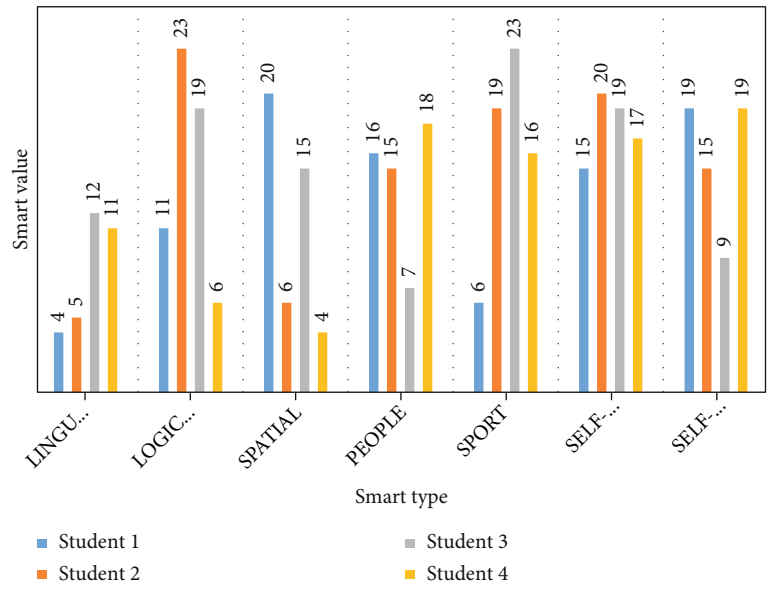

Figure 7: Intelligent distribution performance of the first four students in the experiment.

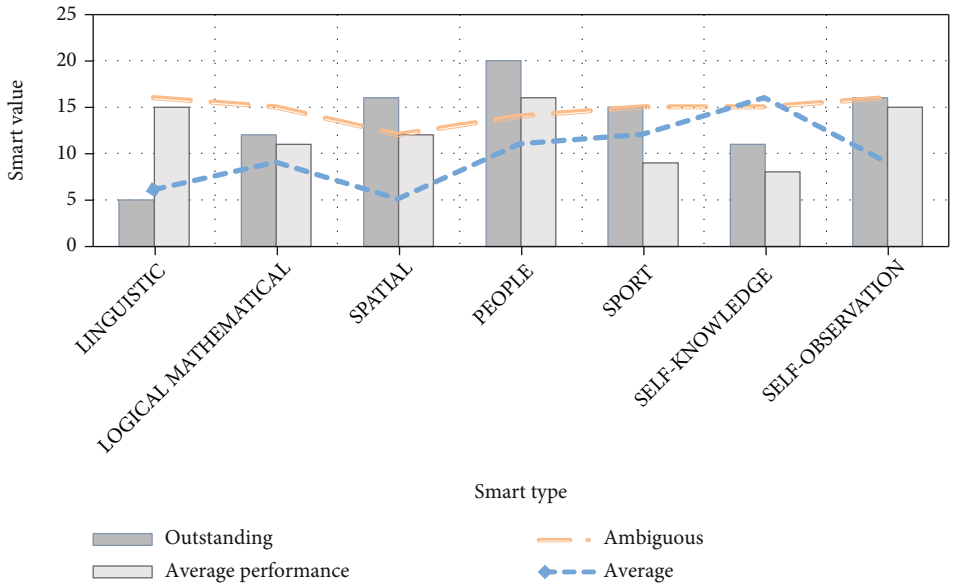

Figure 8: Overall intelligence distribution performance before the experiment.

developed to a certain extent, and they begin to have relatively strong self-introspection. And self-development awareness is generally concerned about the interaction with classmates and partners, but the perception of space is low. I have had a preliminary understanding of physical geographic phenomena, but there are relatively few direct or indirect perceptual understandings and a lack of active observation and thinking of various physical geographic phenomena in daily life, and students have great differences in the extension of knowledge. After the experiment, the number of students with outstanding overall spatial intelligence in the class rose from 13 to 21, while the average grade for these students dropped from 15 to 9. The number of fuzzy performance was significantly reduced, and the overall average level of spatial intelligence in the class improved, as shown in Table 2.

It can be seen from the above statistical chart that the total number of students in the experimental class who performed outstandingly in spatial intelligence after the experiment has increased by 7 people. The spatial intelligence of 14 people has improved significantly. The spatial intelligence of the students in the control class basically did not change after a semester of study. The experiment shows that the geography teaching strategy adopted from [20] obviously promotes the development of the overall spatial intelligence of the students in the experimental class. After the experiment, Wang's overall intelligence related to geography was measured, and it was

Table 2: Spatial intelligence performance before and after the experimental class and the control class.

Class	Spatial intelligence	Outstanding	Average performance	Ambiguous
Experimental class	Front side	13	14	6
	Back side	19	12	3
Control class	Front side	13	19	3
	Back side	14	19	2

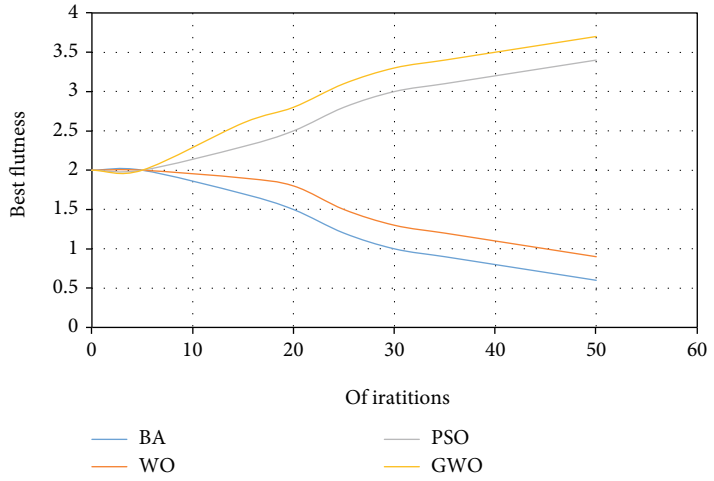

Figure 9: Convergence curves of BA, WO, PSO, and GWO.

found that in addition to the obvious improvement in spatial intelligence, his natural observation intelligence, language intelligence, logical-mathematical intelligence, interpersonal intelligence, self-cognition intelligence, and sports intelligence all correspond. The natural observational intelligence, in which Wang showed the most outstanding performance, has been maintained at a higher scoring position.

4.2. Experimental Results. Since the data obtained from the experiment in this paper is relatively large, it is necessary to review the purpose of the experiment and establish a learning community in order to extract the most useful data from the experimental results for analysis. The analysis of this experiment is divided into two parts:

(1) Adaptability analysis of swarm intelligence algorithm [21]. That is, the overall analysis of the results of the three swarm intelligence algorithms is carried out, and from a macro perspective, which algorithm has a better performance as a whole is compared. Including the general stable settings in the first subsection, by comparing the optimization results of the three algorithms and the optimization process as a whole to grasp the pros and cons of the three swarm intelligence algorithms. And in the second subsection, under different CR and NR combinations, a more detailed comparison of the different pros and cons shown by the three swarm intelligence algorithms

(2) Comparative analysis of swarm intelligence algorithms. That is to say, for each algorithm, we compare the learning performance of the algorithm in robot group obstacle avoidance under different parameter settings. Including the analysis of the changes in the performance results of each algorithm under different settings of CR in the third subsection. And in the fourth subsection, under different settings of NR, analyze the changes in the performance results of each algorithm. In addition, in order to avoid subjective assumptions and make the data analysis of experimental results more convincing and effective, we not only include box-plot analysis in each part of the detailed comparative analysis but also add t-test. The t-test is to infer the probability of the difference based on the t-distribution theory and then compare the two features that have significant differences [22]. In order to have a better understanding of the t-test results, we explain the test standards and test results of the t-test as follows (where A and B, respectively, represent the two test arrays in the t-test, and the symbols of the test results of A and B). The order of presentation is A first, then B

(1) When the p value in the t-test result is <0.05, we use the ">>" symbol to indicate that A is significantly better than B in this comparison

(2) When the p value in the t-test result is between 0.05 and 0.9, we use the ">" symbol to indicate that A is

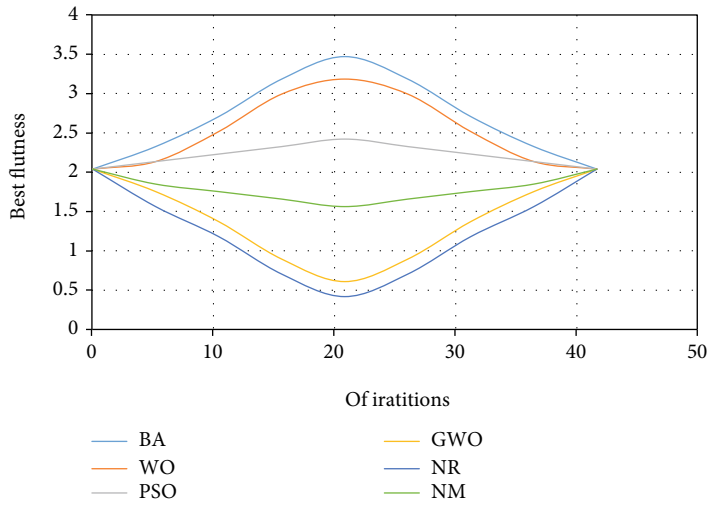

Figure 10: Convergence curves of BA, WO, PSO, GWO, NR, and NM.

Table 3: t-test results of each algorithm under varying CR.

Algorithm	NR	#1	#2	#3
BA	4	1.5 (>, >)	1.6 (>, >)	0.9
BA	15	0.3 (=, >)	0.4 (=, >)	0.9
WO	16	1.5 (>>, >>)	1.7 (>>, >>)	0.38
WO	12	1.5 (>, >>)	1.8 (>, >>)	0.2
PSO	5	1.5 (>, >>)	1.9 (>, >>)	0.3
PSO	12	0.3 (>, >)	0.2(>, >)	0.5
GWO	16	0.3 (>, >)	0.9 (>, >)	0.5
GWO	12	1.5 (>, >)	1.3 (>, >)	0.65

only better than B in this experiment, but it is not prominent

(3) When the p value > 0.90 in the t-test result, we use the "=" symbol to indicate that the performance between A and B is similar, and there is no difference

(4) In the t-test list, the two symbols in the "#1" column represent the comparison results of the t-test between A and B, and the symbols in the "#2" column represent the comparison results of the t-test between B and C.. (We assume that A, B, and C represent the experimental results of the three experimental groups, respectively, and the t-test is performed in two groups)

Next, we analyze and compare the optimization process. In order to avoid the influence of contingency on the analysis of the results, we arrange the optimal solutions of 30 experiments of each algorithm [23] in order from largest to smallest, select the 15th experiment, and compare the experimental process. That is, the 50 iterations of the optimization process of each population intelligence algorithm are compared, and the results are shown in the curves in Figures 9 and 10.

Similarly, in order to avoid the impact of subjective assumptions on the reliability of experimental data, we perform t-test on the experimental data of each algorithm under three different robot communication ranges. The t -test statistical analysis results are shown in Table 3.

Through the above analysis and comparison of the experimental data, we can make a summary of the analysis of the experimental results:

(1) For the GWO algorithm, the larger the NR, the better the performance of GWO

(2) When the communication range becomes larger, the performance of GWO is significantly improved. This is also because the iterative optimization of the GWO algorithm only relies on social learning capabilities. A larger communication range [24] can enable more robots to communicate to improve individual social learning opportunities, thereby enhancing individual learning capabilities to improve learning behavioral performance. It can be seen that the differences between the different algorithms are still quite obvious

5. Conclusions

This paper combines artificial intelligence and machine learning algorithms to conduct research on basic theoretical and practical teaching methods. After the study, we can clarify that the teaching of computers and artificial intelligence and the study of foreign students in colleges and universities have become an inevitable trend. In addition, the pressure of future employment competition will make the practice link more and more important in the whole teaching activities. How to set the content of practice teaching reasonably and effectively improve the students' comprehensive application ability of the knowledge is a problem that we must face and solve. The artificial intelligence teaching proposed in this article has been tried out for one year in the practical teaching process. The reliability of the key fusion differential evolution algorithm has also been studied, and the basic theory and practical teaching methods after the algorithm have also been improved to varying degrees. Although the workload of teachers has increased to a certain extent, the

feedback from students is very good. Therefore, we will share our experience with everyone and look forward to making progress together. However, the research in this paper also has some deficiencies, for example, the research method is still not innovative enough. We hope to get more suggestions and suggestions for improvement.

Data Availability

No data were used to support this study.

Conflicts of Interest

There is no potential conflict of interest in this study.

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