Design Swarm Intelligence Algorithm Based on Artificial Intelligence in Teaching Quality Evaluation Reform System in Colleges

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Abstract
The maturity of big data has led to the emergence of artificial intelligence technology (AIT), and AIT has also begun to become a hot spot for domestic and foreign experts and scholars. Today, artificial intelligence has been applied in many fields such as military, life, and work. This paper first introduces the basic concepts and theories of AIT, expands the swarm intelligence algorithm based on artificial intelligence (AI), then explores the swarm core algorithm intelligence algorithm, and discusses the problems existing in the current university teaching quality (TQ) evaluation system in my country. The application of AI group algorithm in TQ evaluation in colleges and universities. (C A U) The experiment shows that compared with the traditional T Q evaluation, the AI-based swarm intelligence algorithm is better in the C A U T Q evaluation system, which has played a positive role in promoting the C A U education evaluation system in my country.

Keywords: *A I, Swarm Intelligence Algorithm, T Q Evaluation System, Design Research*

1. INTRODUCTION

From the perspective of the influence of A I, A I has made a great contribution to the development of human society. No discipline can have an impact on all aspects of society like A I. With the current burst of various science and technology [4]. A I T has become a hotspot of research by scientists at home and abroad, and has been used in many aspects of society [1]. In the big family of science, A I and education have a close relationship, they promote mutual development, and applications in many fields have penetrated into our daily lives [7].

At present, the quality evaluation system of colleges that uses A I T to improve the group algorithm and is used for teaching has been quite mature and widely used in western developed countries. In foreign classrooms, school peer teachers, students, class teachers, administrators, etc. together constitute the main body of quality evaluation, and will also be recorded in the teaching files [2]. The most influential is the evaluation of administrators, students and peer teachers. Student evaluation is a common form of evaluation organization adopted by foreign universities. Our country's educational evaluation thought has a long history, and traces of its development can be found in ancient times . Among them, the rules for managing and evaluating students were first recorded in "Book of Rites·XueJi". Although our country's educational evaluation has a long history, it takes a relatively short time to evaluate the classroom T Q of relevant teachers in C A U At present, the main subjects who evaluate the quality of classroom teaching in China include: one is education experts, the other is school administrators, the third is class teachers, the fourth is peer teachers, the fifth is students, and the sixth is social media. Because different subjects have their own roles in teaching evaluation activities, in recent years, this has been the focus of my country's education sector [5].

This paper is intended to improve the quality of teachers in universities and universities, improve the nutritional system of teaching in universities and universities and promote the joint development of students and teachers. This paper examines the use of AI-based classification algorithms in the School Review System of the School and makes an accurate analysis of the reasons.

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2. RESEARCH ON THE APPLICATION OF GROUP ALGORITHM BASED ON ARTIFICIAL INTELLIGENCE IN THE REFORM SYSTEM OF TEACHING QUALITY EVALUATION IN COLLEGES

2.1. Swarm Intelligence Algorithm

2.1.1. Ant colony algorithm

Ant colony algorithms are inspired by the foraging behavior of real ants in the real world. To find food, the ants initially randomly scour the area around the nest. When the ant finds a food source, it makes a simple assessment of its size, and if it's too big, it takes a portion of it away, leaving a chemical scent as a marker along the way. When they return to the nest, they share with other ants and carry food with other ants. Over a period of time, the transport path becomes shorter and shorter. Over time, this path becomes the shortest path between the nest and the food source. When other changes occur along the path, the ants quickly adjust to find a new shortest path. Chemical odors, called pheromones, give the ants direction, but they evaporate over time. The ants sense the smell in their environment, and the smell stimulates a reaction and subsequently produces new odors of its own. The new odors produced can guide not only themselves but also other individuals in the whole population. Finally through this direct or indirect way of communication to communicate and cooperate, the formation of population communication. This cooperative mode has two significant characteristics. One is that each individual can modify the existing odor according to the environment by releasing new odor substances. Another is that odorous substances can only be perceived by nearby individuals visiting them.During foraging, the direction the ants choose is random when there are no pheromones around them or when the pheromone concentration is the same. When the pheromone concentration around the ant is different, the ant tends to follow the direction of the higher concentration, the longer the path, the longer the time, the more volatile the pheromone concentration is lower.

Construction method.In the standard definition of the ant colony algorithm, the ant colony is defined as a collection of ants, but Ant-Miner only uses a single ant method to construct the ant colony. Only one ant is used in an iteration, and the pheromone update is performed after the ant has completed the construction of the rules. Meyer developed GUI Ant-Miner, which is an upgraded version of Ant-Miner, and provides a graphical user interface. The difference between GUI Ant-Miner and Ant-Miner is that it uses multiple ants to build an ant colony, partly using the standard definition of ant colony, the method used by GUI Ant-Miner is to weigh the standard ant colony and single ant construction the compromise of the ant colony.

For ant colony algorithm, the selection of reasonable parameters not only affects the efficiency of the algorithm in the process of solving, but also may greatly affect the final results of the algorithm. Therefore, the selection of parameters is very important to the algorithm. When parameters are selected, it can be seen that although each parameter has a certain selection range, the cooperation between multiple parameters will lead to a huge combination selection. Because each parameter has a certain connection and influence, it will be a huge problem and challenge to select a reasonable combination of parameters.

2.1.2. Particle swarm algorithm

Step1 Calculate the fitness again, compare the individual particle and its fitness with the best past history, and update the better one as the current best position pbest.

Step2 Compare the particle individual and its fitness with the historical best of the population's global experience, and update the best position among them to the global best position gbest [3].

Step3: Jump out of the loop until the required accuracy is met, otherwise continue to loop and iterate until the conditions are met.

2.2. State Transition Rules

Traditional Ant-Miner is easy to select the attribute items in the rules that have been found when searching for the ant colony. Although the development capability is enhanced, it is easy to converge prematurely, and its attribute selection probability calculation method is also more complicated. In order to enhance the exploration ability of Ant-Miner, Ant-Miner3 proposed by Liu et al. uses the method shown in Algorithm 3.3 as the state transition rule. Among them, φ is a parameter whose value range is between 0 and 1, q 1 and q 2 are 2 random numbers, b ii is the number of all values in the value range of the i-th attribute, $PP\ iijj$ using the formula Calculation. Using the state transition rules of the algorithm, the result will not only depend on the pheromone and heuristic function, but also on a random number, which will increase the possibility of selecting unused items in the discovered rules.

2.3. Rule Pruning

When the basic Ant-Miner processes data sets with multi-attribute classification, the time complexity of pruning processing is very high. In order to improve the efficiency of Ant-Miner in processing multi-attribute classification data sets, Chan et al. proposed a fast

pruning processing method applied to Ant-Miner (Chan et al., 2006). This method is actually A rapid hybrid pruning processing technology. The basic idea of Chan's method is that if the rule to be pruned is a longer rule, the original pruning process of Ant-Miner is not used, and the pruning method based on information gain is adopted; otherwise, Ant-Miner is used. The original pruning method is used to prune the current rule, further reducing the length of the rule.

2.4. Particle Swarm Algorithm Based on Quantum Behavior

The particle swarm algorithm simulates the behavior of bird flocks flying and foraging, and makes the flock achieve its goals through collective cooperation and competition among birds. In the algorithm system, each candidate solution is called a "particle", and multiple particles coexist and cooperate to search for food. The algorithm first generates an initial population, that is, randomly initializes a group of particles in the feasible solution space, each particle is a feasible solution of the optimization problem, and the objective function determines a fitness value for it. Each particle will move in the solution space with a velocity that determines its direction and distance. Usually, the particle will follow the current optimal particle, and the optimal solution will be finally obtained through the generational search. In each iteration, the particle will track two extreme values, one is the optimal solution pbest found so far by the particle itself, and the other is the optimal solution gbest found so far by the entire population. The update formulas for its velocity and position are as follows:

$$vstep_{ij}^{t+1} = w * vstep_{ij}^{t} + c_1 rand_1 * (pbet_{ij}^{t} - x_{ij}^{t}) + c_2 rand_2 * (pbet_{ij}^{t} - x_{ij}^{t}) \quad (1)$$

$$x_{ij}^{t+1} = x_{ij}^{t} + vstep_{ij}^{t+1} \quad (2)$$

Among them: i=1,2,...,NP; j=1,2,...,D; c1, c2 are two learning factors, c1 is called cognitive learning factor, c2 is called social learning factor, All are non-negative constants, c1=c2=2. w is the inertia weight, which ranges from 0 to 1, reflecting the influence of the speed of the previous generation on the speed of this generation. The basic PSO algorithm can consider w equal to 1. In the early stage of particle iteration, we hope to have a strong global search ability, so a large speed can ensure a large step search in the global scope. At the later stage of the iteration, we hope that the particles can focus on the search near the optimal point, so the step size needs to be relatively small. We can do this by adjusting the size of the inertia weights. In order to achieve the speed from large to small, in the case that the social part and the cognitive part remain unchanged, the corresponding inertia weight is from large to small. Generally speaking, we adopt the strategy of linearly reducing the inertia weight. As the number of iterations increases, the inertia weight gradually decreases, and the particle speed gradually slows down, thus starting a more refined search near the optimal solution. Speeding up the convergence speed also improves the performance of the algorithm.

Particle swarm optimization based on quantum behavior is a classical particle swarm optimization algorithm, which is formed on the basis of improvement.The special calculation procedure is as follows:

$$\text{Mbest}(t+1)=\frac{1}{M}\sum_{i-1}^{M} p_i(t) = \{(\frac{1}{M})\sum_{i=1}^{M} p_{i1}(t), \left(\frac{1}{M}\right)\sum_{i=1}^{M} p_{i2}(t), (\frac{1}{M})\sum_{i=1}^{M} p_{iD}(t)\} \quad (3)$$

a (T) is a contraction and distribution factor, which is an important contraction variable. It is generally taken as follows:

$$a(t)=m-(m-n)*t/\text{MaxTimes} \quad (4)$$

3. EXPERIMENTAL RESEARCH ON ARTIFICIAL INTELLIGENCE-BASED GROUP ALGORITHM IN TEACHING QUALITY EVALUATION REFORM SYSTEM IN COLLEGES

3.1. Subjects

In order to make research results more scientific and effective, this experiment compares the quantum particle cluster optimization algorithm with the traditional particle cluster optimization algorithm to verify whether the improved cluster intelligence algorithm It's more effective.

This article goes deep into a local university and conducts a survey of students through questionnaire surveys. The students in this survey are all juniors or above, in order to ensure the objectivity of the evaluation of university T Q and make the experimental data more accurate and effective. The ten-point system is adopted this time, with 1 indicating disapproval and 10 indicating agreement. The collected data will be sorted and analyzed using the analytic hierarchy process [6].

3.2. Experimental Method

Booking methods. This paper has read a lot of the previous library and the results of the study by the relevant specialists and teachers and has collected most information on the study's progress. Þessar upplýsingar veita ekki aðeins fræðilega og gögn stuðning við valið efnis þessa pappírs heldur einnig tilraunarniðurstöður fyrir þetta pappír.

Questionnaire survey method. Through an interview with relevant experts, this paper establishes a targeted survey questionnaire. The purpose of this questionnaire is to make the results of the survey more reliable.

Investigations in the field. This paper goes deep into school, interviews teachers and students face to face, and talks and records results. This information is a reliable indication of the study size in this paper.

4. EXPERIMENTAL ANALYSIS OF GROUP ALGORITHM BASED ON ARTIFICIAL INTELLIGENCE IN THE TEACHING QUALITY EVALUATION REFORM SYSTEM OF COLLEGES

4.1. Comparative Analysis of Particle Swarm Algorithm

Quantum particle swarm optimization is a classic particle swarm optimization algorithm based on improved particle swarm optimization. It mainly modifies the method of "evolution" in conjunction with the idea of quantum physics. In this experiment, the particle cluster optimization algorithm is compared to the traditional particle cluster optimization algorithm. The data obtained are listed in Table 1.

Table1. Comparative analysis of particle swarm algorithm

	Number of parameters	Convergence to the global optimum	Robustness	convergence speed
Quantums	3	7	8	8
Traditional	9	2	4	3

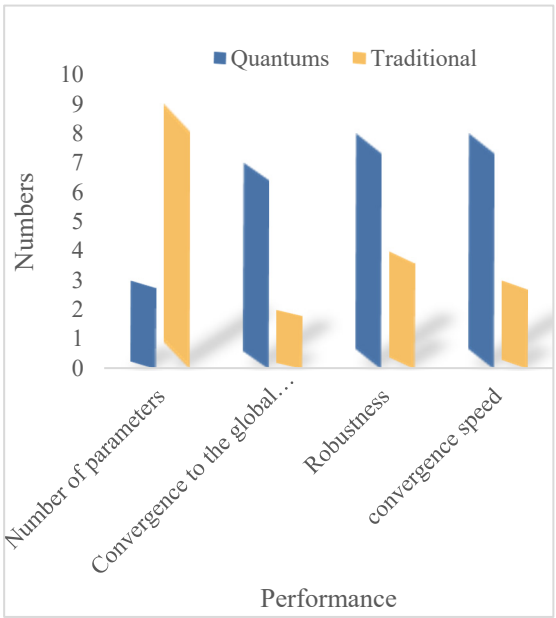

Figure1. Comparative analysis of particle swarm algorithm

As shown in Figure 1, the number of parameters of the quantum particle cluster optimization algorithm is almost twice as high as the traditional particle cluster optimization algorithm. It can be seen that the quantum particle swarm optimization algorithm significantly reduces the difficulty of program configuration, and the quantum particle swarm optimization algorithm can better converge in the global situation. Its best advantage is that it has fast convergence speed and good durability.

4.2. The Application of Intelligent Group Algorithm to The Analysis of College Teaching Quality System

In order to understand the application of the clustering algorithm based on artificial intelligence in the university's evaluation system, this paper conducts a questionnaire survey to students randomly, and the results are presented in Table 2.

Table2. Algorithm application analysis

	Economic feasibility	Technical feasibility	Operational feasibility	Others
Man	7	7	6	3
Woman	7	8	8	4

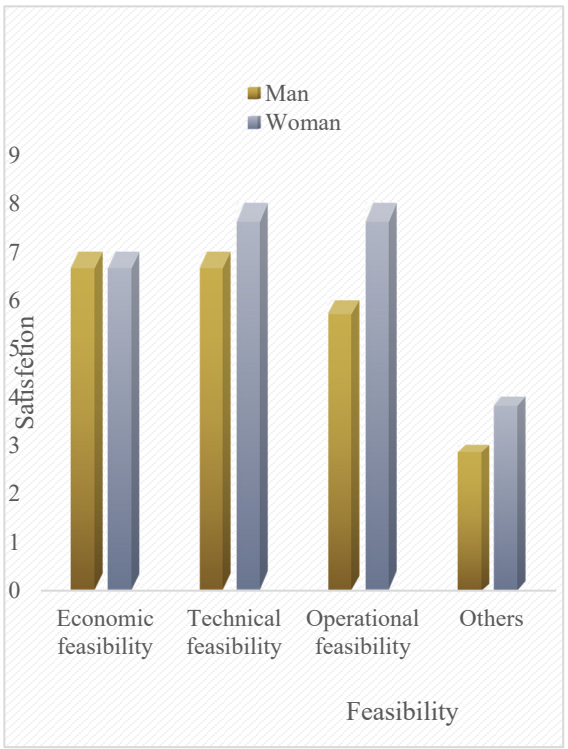

Figure2. Algorithm application analysis

It can be seen from Figure 2 that most people think that the group intelligence algorithm based on A I is necessary in the T Q evaluation system of C A U. Among them, those who think that the technology is feasible account for the majority, which confirms the group algorithm based on A I. The excellent performance of the T Q evaluation system in C A U.

5 CONCLUSION

The advantages of the swarm intelligence algorithm are faster convergence speed and stronger global convergence. In the process of optimizing the teaching evaluation system, the swarm intelligence algorithm opens up a new way for the design of the teaching evaluation system, and has high research value. Operational algebra and partial algebra not only make operational algebra related only to basic mathematical procedures, but also improve evaluation of the size of the algebra. Due to these characteristics, this paper will conduct an accurate study of the determining algorithm for the molecular discard operation and the determining algorithm for the quantum discard operation, which demonstrates the full potential and superiority of this paper.

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