Design of Teaching Assistance System for Ideological and Political Classrooms in Colleges and Universities Based on Multimedia Technology

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Abstract. In modern society, with the rapid development of artificial intelligence technology, what we can understand is that a series of complex disciplines that exist in this way will be slowly introduced into university classrooms. Ant colony algorithm is a kind of algorithm that simulates the behavior of wild ants and evolves into a new type of algorithm, which is observed according to their living behavior. With artificial intelligence technology, there can be better development and progress, and it will be closely integrated with our life and genetic algorithms. Ant colony intelligence algorithms so far only have ant colony algorithm, particle swarm algorithm and fish swarm algorithm. Of course, the most used one is the ant colony algorithm. In the university courses, we will learn that the ant colony algorithm can have many applications in logistics distribution and automation, artificial intelligence and so on. Ant colony algorithm is an algorithm based on artificial intelligence and neural network. After that, there are algorithms applied to problems such as combinatorial optimization, which can achieve great results in system identification. The development of computer will promote the development of our learning and education, and make us reform and innovate in the teaching mode. In the function of the auxiliary teaching system, a practical and solvable solution will be proposed for some problems, and an auxiliary function of the teaching system will be designed for the experimental management of the open computer room. Lin Mao analyzed the problems through multimedia application in making web pages in teaching, and proposed to design a computer-aided teaching system based on Web, mainly for the use of multimedia tools [1].

Keywords: Ant Colony Algorithm · Teaching Aid System · Traveling Salesman Problem · Teaching Demonstration

1 Introduction

When we start from the actual teaching, we can analyze the design and implementation of the teaching assistance system of the ant colony algorithm. Among some complex algorithms, for the requirements of teaching assistance systems, researchers have delved into and overcome the TSP problem, so that teachers can better achieve the highest value

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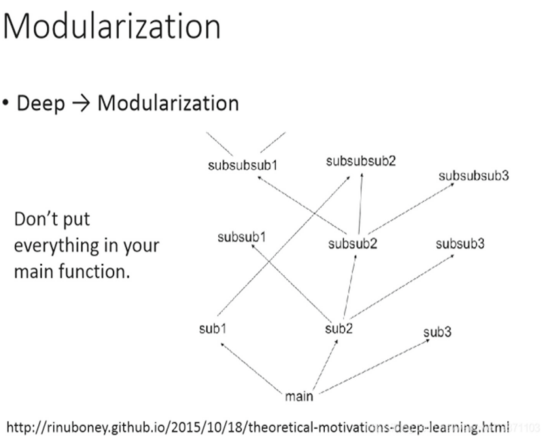

Fig. 1. Schematic diagram of the TSP model

in teaching. To this end, it can also simplify a series of difficult problems brought by TSP, reduce the difficulty of teaching, and bring two new ideas to the teaching of intelligent algorithms. To this end, it can also study and guide students' enthusiasm for learning [2].

Based on the results of our auxiliary teaching research, we can conduct further teaching analysis on the ant colony algorithm of the swarm intelligence algorithm, conduct further analysis and research on the basis of TSP, demonstrate separately, and also design the ant path diagram. The demonstration effect is based on the shortest path of each generation, and considering the use of teaching, it is also possible to develop a better platform interface and other operational means. Using the teaching assistance system involved in this paper can further reduce the difficulty of ant colony algorithm and the quality of teaching. As shown in Fig. 1 [3].

2 System Design

2.1 Analysis of the System

From the perspective of user needs, many teaching auxiliary systems are aimed at schools and exist between teachers and students. Therefore, the establishment of teaching auxiliary systems should follow all the teaching and students' learning. This system will satisfy teachers' teaching requirements so that teachers can better use the whole system and complete the teaching mode. In addition, multimedia teaching technology can be used to achieve unfamiliarity with beginners, reduce the difficulty of learning, and simplify the algorithm in an easy-to-use and easy-to-understand way [4].

In order for users to get better system quality problems and levels, we can get more basic course research in the teaching courses of colleges and universities, and combine teaching and learning and use them. All the designed systems can fully demonstrate the teaching requirements of the ant colony algorithm, and present two demonstrations of the demonstrated algorithm modes. In our comprehensive demonstration, we will

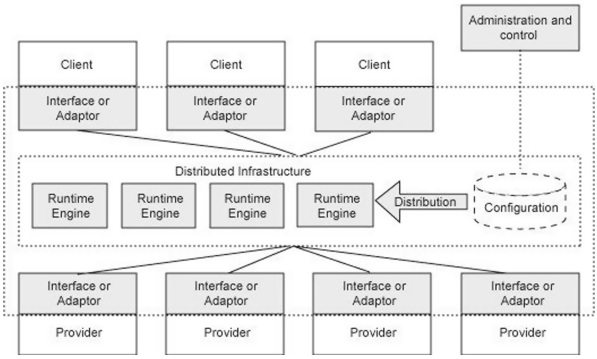

Fig. 2. Functional diagram of the software

use the ant colony algorithm mainly to solve the problem, and then demonstrate from a comprehensive perspective, confirm the function combined with the statistics of the data, and distinguish all the advantages and disadvantages. The distribution demonstration starts from an algorithmic point of view and then refines it to show optimization and feasibility at each step. In addition, and also make teachers less troublesome in the process of teaching, and easily solve presentation difficulties. The software structure diagram is shown in Fig. 2 [5].

2.2 Software Auxiliary Functions

The software auxiliary function is mainly to provide users with convenience, and to be able to use the software system faster, and to understand the main functions and connotations of the algorithm, mainly in the following aspects: [6].

(1) Introduction to the algorithm. In the basic principles of ant colony algorithm, students can have a general understanding and understanding of the function and function of ant colony algorithm. Carry out simple rules in different aspects, so that you can run implementation methods from simple to complex.
(2) Parameter explanation. The parameters of the ant colony algorithm mainly include ant values, probability parameters, concentration, etc. For example, the parameters are used to express the update method of the information cable, and all ant parameters are allocated by the system. If not, the initial parameter of the ant is the first of the data.
(3) Code sharing. The main reason is that students can master the code of the ant colony algorithm. There will be corresponding pages for the application of some codes, and certain explanations and designs will be given in the code.

3 Implementation of TSP Algorithm Based on Ant Colony Algorithm

TSP can lead the team from an original place to another place to visit, and then return to the original place after the visit, looking for shortcuts on the way. Testing the TSP

can optimize the known results, and only by comparing the known and feasible up and down can we know which is more difficult. The ant colony's search process can be very similar to the TSP algorithm. If: Zij(t) represents the number of ants located in city i at time t; r(t) represents the number of information on the path (i, j) at time t; n is the total number of cities; m is the total number of ants; F = {rd (t)Icf, C}, is the city element in the set C at time t, which can better solve the access information of the ants, and the ants in the algorithm will not repeatedly arrive at a place. The formula is as follows: [7]

$$x = \sum_{x} ij \frac{\lceil (T|t) \rceil \pm (\epsilon(t))}{\tau \tau_{is}}$$

For the distance that ants start from city i and go to city j, in addition, there will be more information ants lost in the distance they are looking for, so the method with better information value is adopted.

After analyzing the above experimental results, the basic steps of the algorithm are as follows:

Step 1: Initialize the parameters of the ant system, such as being able to clearly understand the initial pheromone.
Step 2: The number of cycles + 1.
Step 3: Quote k = 1 for the table.
Step 4: Number of ants.
Step 5: The individual ant chooses the city according to the formula, and moves forward, J ∈ {C-Tab.}.
Step 6: Modify the pointer of the taboo table, and allow the ants to be successfully selected through the taboo table to pass, and let the ants move to a new city.
Step 7: If the cities in the set C are not universal, go to Step 4; otherwise, go to Step 8.
Step 8: Select information according to the formula.
Step 9: Determine the loop termination condition N ≥ IV. Whether it is established, if so, the loop is terminated; otherwise, go to Step 2.

For a better and more convenient demonstration, choose on the original algorithm, add some loop conditions and then make variables. As shown in Fig. 3.

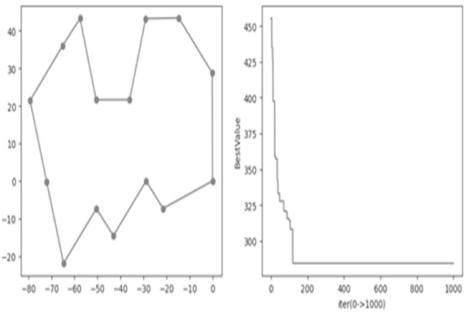

Fig. 3. TSP algorithm

4 Demonstration of the System

During the demonstration process of the algorithm, the core of the entire software system will evolve the software system design separately, and it needs to be solved according to the city and graph of the TSP [8].

Selection module of parameter graphics. This part is to demonstrate the service of the system, which can be perfected with basic parameters. During the period, many choices are made for the purpose of demonstrating the service. The calculation examples are selected from different model cities, and are designed according to the ant colony algorithm for teaching demonstration. Use, which allows for more efficient analysis. As shown in Fig. 4 [9].

Modules of a comprehensive demonstration system. It mainly takes pheromone concentration and computer control as the main part, and the pheromone concentration shows the distribution of urban concentration. Computer control is the best path in the calculation and solution, which can better highlight the coordinate value setting system of the city, and can also change with the change of coordinates. As shown in Fig. 5 [10].

(3) Distribution demonstration. After the comprehensive demonstration is completed, it will return to the previous step, enter the parameter and graphics selection page, and then perform a step-by-step demonstration to enter the demonstration interface. When the demo starts, there will be a lot of code, click the next generation to calculate the generation. Otherwise, it will not be calculated, and this method is conducive to the convenience clicking on the next generation. In order to face the traces of ants' pathfinding in the future, continuous calculation can be designed, which can be calculated continuously and quickly as many times as comprehensive calculation. In this page, you can click the step-by-step demonstration of ant movement from the second to the 899th generation of each ant, and click the button to enter the demonstration page of single ant pathfinding. On this page, you can know the operation path of each ant. In an experiment, for example, when the eighth ant is selected, clicking on the display will display the first path of the ant, and clicking

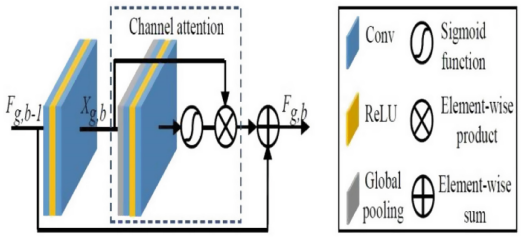

Fig. 4. Residual channel attention block (RCAB)

Fig. 4. Schematic diagram of basic parameters

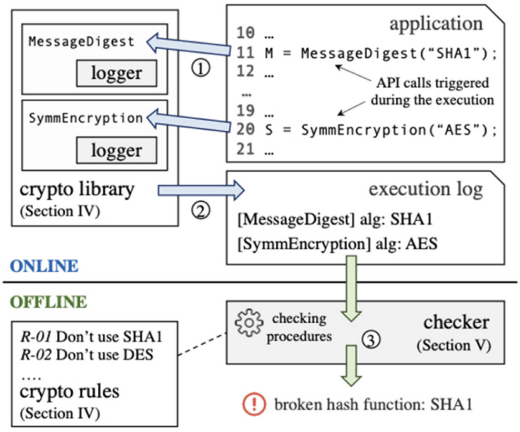

Fig. 5. Schematic diagram of city selection

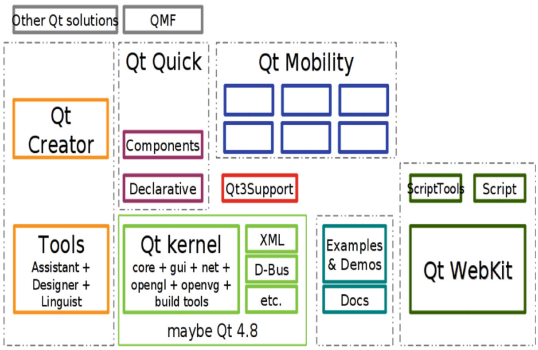

Fig. 6. Schematic diagram of step-by-step demonstration

the next step continuously, the ant will select and click the probability of this path according to the transition probability, as shown in Fig. 6 [11].

Teaching practice shows that by applying the ant colony algorithm to classroom teaching, the structure of teaching is optimized, the knowledge capacity of the classroom is increased, the students' interest in learning can be stimulated, and the teaching effect and efficiency of the classroom can be improved. Therefore, it can help to cultivate students' comprehensive quality, help to improve students' independent thinking, [12] independent learning ability and acquisition of knowledge, and of course, it can also help to further improve students' in-depth research and long-term teaching practice [13].

5 Conclusion

Many workers who teach from ant colony algorithm currently do not have a complete teaching assistance system, and algorithm demonstration has always been very difficult.

The combination of the overall and local algorithms can form a very complete system with good coherence and switching performance. For the teaching needs of the ant colony algorithm, a system can be jointly developed with the help of the VB platform to help users who need auxiliary teaching [14]. This paper analyzes the Ade characteristics of the ant colony algorithm, and then involves auxiliary tools from the design and implementation of the system to meet the needs of teaching requirements. There is great development and research for the auxiliary teaching system in the future. In the future auxiliary teaching system, the frequency of use will be more and more, it is necessary to optimize the running program of the algorithm, update the rules and consider new factors. The proposed ant colony algorithm model has certain reference value for the optimization problems of similar teaching [15].

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