Research Article

Construction of Dynamic Multiparallel Foreign Language Teaching Model Based on Multicore Processor

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Heterogeneous multicore processor systems, as one of the highlights of multicore processor systems, are widely loved by people for their high efficiency and low cost, and they have also become the most commonly used processor systems in embedded systems. In the process of research on heterogeneous multicore processor systems, system task scheduling is particularly important. A good task scheduling algorithm can give full play to system performance. In this paper, the intelligent approximation algorithm is applied to the task scheduling problem of heterogeneous multicore processor system, and the heterogeneous multicore processor system is obtained as a highlight in the multicore processor system. Relying on the characteristics of high efficiency and low cost, it is widely loved by people, and at the same time, it has become the most commonly used processor system in embedded systems. In the process of research on heterogeneous multicore processor systems, the system task scheduling problem is particularly important. A good task scheduling algorithm can give full play to system performance. Some commonly used heuristic task scheduling algorithms are insufficient in solving such problems. This paper combines the granularity-based wavefront parallel decoding algorithm and the fast fusion loop filter algorithm to apply pipeline parallel technology between pixels. Decoding reconstruction module and fast loop filter module realize the fusion of multilevel parallel decoding. Based on the multicore platform, a dynamic multiparallel scheduling algorithm is designed to realize two-way video real-time parallel high-speed decoding, which improves the core resource utilization rate and decoding execution efficiency of the multicore processing platform. This paper also designs an indicator collector, a read-write hit collector, and a cache block priority determiner to implement a dynamic generation strategy with low hardware overhead. Multimodal teaching has certain feasibility and effectiveness and can have a positive impact on the English reading motivation and English reading comprehension ability of university students. Multimodal teaching improves students' English reading comprehension ability, deepens students' understanding and memory of words, and broadens the scope of knowledge, which has a significant promoting effect. The research results show that multimodality can be applied to college English teaching, and it can achieve better results than traditional teaching methods. By comparing the test results before and after the test, there are obvious differences between the experimental class and the control class. Whether it is the paired sample T-test of the experimental class or the independent sample T-test of two teaching methods in two classes, it proves that the scores under the multimodal English teaching mode are higher than the traditional teaching mode. Multimodal classrooms provide students with many opportunities to participate in classroom activities and form a competitive learning atmosphere. This competitive learning atmosphere has become a driving force to promote student learning. Multimodal teaching methods help to cultivate students' independent and cooperative learning. In a multimodal classroom, many activities require cooperation and discussion among students. When they encounter difficulties, they can help each other, discuss with each other, and cooperate to complete tasks. Therefore, the multimodal teaching method will stimulate students' interest in learning, give full play to students' initiative, and improve students' English ability.

1. Introduction

In today's world, the rapid development of computer technology and network information technology not only provides multimodal means, platforms, and spaces for English teaching but also creates more opportunities for mutual communication, prompting teachers and students to access more information resources and communication channels [1]. The development of information technology has even promoted innovation and change in English teaching philosophy, teaching methods, and educational procedures. Therefore, English teaching and learning has undergone great changes in methodological paths, and multimodal teaching has become a general trend. As far as English reading teaching is concerned, computer technology and information network technology provide rich multimodal discourse resources that can help students integrate into situations and contexts and gain more opportunities for language learning and language use. However, since the process of reading comprehension is an act of inner activity, teaching reading has always been a challenge in English language teaching. By combining multimodal pedagogy with English vocabulary instruction at a university for over four months, this paper hopes to provide relevant references and lessons for teaching English at a university. For teachers, this study can provide some empirical evidence for teachers in the process of implementing multimodal teaching in the future and help university teachers to change their traditional thinking and way of teaching vocabulary [2]. For students, it aims to use multimodal teaching methods to improve university students' interest and ability in English vocabulary learning and has some practical significance in terms of the development and reform of students' English vocabulary learning style.

In addition, with the increasing transistor density on modern processors, the resulting excessive power density also exposes heterogeneous multicore processor systems to severe heat dissipation problems, where the temperature rise may not only exceed the cooling capacity of the system but also affect the reliability and performance of the multicore system, bringing the soft error and dark silicon phenomena to the fore, and the power consumption of processors has thus gained more and more researchers' attention. Since the energy consumption of the processing unit in the processor mainly contains two parts: static power consumption and dynamic power consumption, where the dynamic power consumption and the voltage and frequency of the processing unit have a close relationship, and the power consumption of the processing unit can be significantly reduced by reducing the voltage and frequency at the expense of some performance [3]. Therefore, to further reduce the power consumption of the processor and improve energy efficiency, most modern processors are also equipped with Dynamic Voltage and Frequency Scaling (DVFS) technology. It can dynamically adjust the voltage and frequency according to the application's computing needs while meeting the application's computing needs to achieve the purpose of energy-saving, which has become an important means of power optimization in current multicore processors [4].

Taking multimodal theory and systematic functional linguistics theory as the theoretical basis of the study, this paper combines multimodal teaching method and university English vocabulary teaching, aiming to investigate whether multimodal teaching method can promote the learning of breadth and depth of English vocabulary knowledge of university students through multimodal vocabulary teaching experiments, questionnaires, interviews, and other research methods, to make some contribution. This study has some theoretical significance. Based on the theory of multimodal discourse analysis, this paper explores and analyses the effects of the multimodal teaching method on the breadth and depth of English vocabulary knowledge and learning attitudes of university students through an empirical study of multimodal teaching in university, which can provide some reference values for the research of pedagogy theory and English vocabulary teaching while enriching and improving the theory of multimodal teaching.

2. Related Works

Nine competency standards for knowing words are proposed, mainly including the need to know the spoken and written forms of words, to be able to spell and recall words correctly, to be able to relate words to appropriate objects and concepts, and to be able to use words inappropriate combinations [5]. From the different insights of the above scholars on the content of vocabulary, students should focus on not only the accumulation of vocabulary quantity but also qualitative learning; that is, teachers should pay attention to the development of students' vocabulary cognition and use when teaching them vocabulary [6]. The vocabulary learning of preschool children was studied, and the findings showed that rich explanations, initial second language vocabulary, and the frequency of reading at home contribute to the vocabulary learning of preschool children [7]. Memory research based on cognitive psychology explores the role of associative memory, prototype theory, and the context in optimizing vocabulary instruction. A corpus-based study was conducted to analyse the vocabulary richness in English writing for college English majors. A corpus linguistic perspective emphasizes that phrase teaching should be treated as the focus of vocabulary teaching, points out the problems that arise in current phrase teaching, and further explores the merits of the value of collocation structure and collocation [8].

The principles of designing and using interactive whiteboards in the classroom are discussed, and the relationship between multimodal teaching and modern media technology is also discussed. To help teachers create an interactive and effective English classroom, multimodal scaffolding is used in the classroom, and it is hoped that this will help students to improve their ability to use multimodal access to information [9]. How university students use the different symbolic functions of ICT to learn course content was explored, and findings such as that students are becoming active designers of learning because they have access to new modes and media and that students have developed different levels of multimodal digital literacy were noted [7].

A Kahn process network was used to model applications in a heterogeneous multicore processor system, and the practical effectiveness of two heuristics, including genetic algorithms, in solving this class of design space exploration problems was experimentally evaluated [10]. With the optimization goal of reducing the overall execution time of applications on multicore processors, a combination of simulated annealing algorithms and pruning strategies is proposed to search for the optimal mapping between application to platform resources [11].

A reliable resource manager design method for heterogeneous multicore processor systems that combines offline application analysis and discrete controller synthesis techniques in formal methods is proposed for highly reliable embedded systems running secure applications, and the correctness of the controller functions is verified by functional simulation of the automatically constructed controllers in subsequent experiments with relevant verification tools. Closely linking the theory of multimodal discourse analysis with research in the field of English education, this study attempts to construct a multimodal reading teaching model based on the theory of multimodal discourse analysis and the comprehensibility input hypothesis, which has some theoretical implications for the study of English reading instruction. It is a breakthrough and attempt for university English reading teaching, which is innovative and practical in teaching, by using multimodal resources to guide students to study the discourse in-depth, broaden students' knowledge, effectively mobilize students' initiative and enthusiasm, stimulate students' interest and enthusiasm to participate in interactive communication, positively change students' English reading motivation, improve students' English reading comprehension ability, and promote the effective implementation of English reading teaching, which has certain practical significance for English reading teaching.

3. Analysis of Multimodal Foreign Language Teaching Models for Multicore Processors

3.1. Heterogeneous Multicore Processor System Design. Heterogeneous multicore processor systems have gained much attention as an ideal choice for both high performance and low-power consumption, and their architectures are becoming increasingly complex to meet the actual needs of various application scenarios [12]. Since the method proposed in this paper is aimed at embedded systems running security applications, in addition to using a formal design method to ensure the reliability of the resource manager's control behaviour, the quality of service or the deadline of the application itself in the platform must also be strictly controlled. However, the on-chip resources of processors are ultimately limited, and in the face of the different resource requirements of various applications, how to effectively manage these limited system resources to meet the target requirements of various application scenarios becomes a resource management problem for heterogeneous multicore processor systems. For example, in systems running security applications, resource management needs to ensure that the resource requirements of the applications are strictly met to ensure the reliability of the system operation, while for systems running nonsecurity critical applications, it can allow the resource requirements of some applications to be unmet and on this basis improve the overall performance of the system as much as possible.

The three-dimensional multicore processor mainly consists of three parts, which are the processor core, the on-chip network interconnects structure, and the cache. Therefore, in this paper, when mathematically modelling the power consumption of the 3D multicore processor, the total power consumption is P_{totol}, divided into the power consumption of the processor layer P_{totol}, the power consumption of the cache layer P_{hieracy}, and the power consumption of the on-chip network interconnect structure $P_{\text{intertion}}$, as shown in

$$P_{\text{totol}} \geq p_{\text{coredt}} - P_{\text{hieracy}} + P_{\text{intertion}}. \tag{1}$$

In a multicore processor, each core is utilized differently, each core has different access characteristics to cache and memory, and the power overhead of each core is relatively independent. The power consumption generated by the i-th core is thus predefined as p_i^{coredt}, and if a multicore processor has N cores, then its total core power consumption is

$$P_{\text{coredt}} = \sum_{j=1}^{N} p_i^{\text{coredt}}. \tag{2}$$

The power consumption generated by a core p_i^{coredt} can be divided into static power consumption P_L and dynamic power consumption P_D, as shown in equation (3). The static power consumption is h_1 affected P_L by the current ambient temperature T_1 and the leakage power coefficient, as shown in equation (4), where the leakage power coefficient h_1 can be considered as a constant value [13]. The dynamic power consumption is proportional P_D to the square of the operating frequency of the core, as shown in equation (5), which denotes the P_{max} rated power consumption of the core and the f_{max} maximum operating frequency of the core.

$$P_i^{\text{coredt}} = P_L - P_D, \tag{3}$$

$$P_L = T_{\text{max}} \cdot h_i^2, \tag{4}$$

$$P_D = p_{\text{min}} \times \frac{f_{\text{max}}}{f_d^2}. \tag{5}$$

From equations (4) and (5), reducing the system operating temperature and operating frequency can reduce the power consumption of the processing core. The CC-GLL simulation model mainly includes the CC-GLL description system file and the description system file and dynamic link library system-related files in the component system model so that the modelling is successful.

Through the research and analysis of many intelligent optimization algorithms and comparison, it is found that particle swarm algorithms can be a good solution to the disadvantages of many extremes and large computation and

better for finding extremes and finding the best. But the particle swarm algorithm also has many defects and shortcomings when compared with the genetic algorithm. When the number of sampling points is large and sufficient, then we can build the simulation model more accurately by default. In this case, if we only need to find an optimal value, then we can use a genetic algorithm to complete the experiment or do it by manual testing [14]. However, when there are fewer data points, more extreme values and the range of the search process should be narrowed, then the genetic algorithm cannot be used, and the particle swarm algorithm is needed. By setting parameters to find the extremes, a comprehensive search is done for all the extremes. Particle swarm algorithm in the process of finding the optimal value can be manually adjusted test, independent choice, and a wider range of applications, and the design of optimization methods is more convenient and fast as well as flexible and versatile, as shown in Figure 1.

Most of the current heterogeneous multicore processors are static heterogeneous multicore processors; that is, the structure of the processor is fixed after the design is completed and no architectural changes can be made, and the heterogeneous multicore processors described above are of this type. In recent years, to solve the contradiction between the growing diversity of applications on the processor and the solidification of the processor architecture, some research work has proposed a class of heterogeneous multicore architectures that can achieve the dynamic configuration of processing cores, called dynamic heterogeneous multicore processors. This class of processor design is a new technique for implementing dynamically heterogeneous architectures while keeping the processor microarchitecture design unchanged. The posttest reading comprehension test paper is the same as the pretest reading comprehension test paper. After the test, the scores of the two classes' reading comprehension test paper are collected and arranged as posttest data. It enables the flexible configuration of each processing core on the processor to achieve higher processor performance by freely combining two or more processing cores into a single high-performance processing core supporting larger cache, higher instruction level, or thread-level parallelism, but the cost of its flexible configuration is an extremely complex design and implementation, making it still in the experimental research stage. Figure 1 shows the architecture of the Core Fusion architecture with a dynamic heterogeneous design, which is equipped with eight homogeneous basic processing cores, while the basic processing cores in the dashed box can be fused into more powerful processing cores consisting of four and two basic processing cores, respectively.

$$V_{ik}^{d+1} = W_{ik}^d + p_{ik}^d \cdot C_1 r_1, \tag{6}$$

$$e_{ik}^d = \frac{f(p_i)}{m} \left(p_{ik}^d +_{ig} \right). \tag{7}$$

In (7), m represents the number of particles, $f()$ is an expression function that is used to calculate the fitness of the particle, and P_j represents the best position of the jth moving particle, and we can find that, according to the formula, the larger the $f(P_i)$ value of $f(P_j)$ and $e_{ik}^d | p_g$, the better the learning ability of the i-particle to the j-particle, and on the contrary, the larger and e_{ik}^d smaller values represent the poor learning ability of the i-particle to the j-particle. The learning ability of particle i to particle j is poor.

For the resource allocation problem of such complex heterogeneous multiprocessor systems, it is certainly more practical to use heuristic ideas or machine learning techniques to obtain a suitable resource allocation scheme quickly. In addition, resource allocation is another key issue in resource management; resource management methods for heterogeneous multiprocessor systems can also be classified into two categories based on this perspective: static resource management and dynamic resource management [15]. The mapping relationship between the application and computational resources in static resource management methods, once specified, will not be easily changed during operation, which makes the process of online computation simple but less flexible, thus making it difficult to achieve excellent resource management results, as shown in Figure 2.

This is a typical big. LITTLE architecture processor consisting of several clusters of processing cores, including two clusters of high-performance and two clusters of low-power processing cores, each with two identical processing cores, separate $L1$ caches and shared $L2$ caches for the processing cores within the cluster, and a memory MEM shared by all processing cores. Each cluster is equipped with the ability to adjust the intracluster voltage and frequency (DVFS) levels, and each cluster can be set to sleep mode when no cores are in use [16].

The resource management component designed in this paper requires application performance and power consumption information as a basis for resource allocation decisions, so a similar offline analysis step of application performance must be completed before modelling the behaviour of the application, and the performance and power consumption metrics of the application under different resource allocations must be obtained by trial runs. It should be noted that since the approach proposed in this paper is for embedded systems running secure applications, in addition to the formal design approach that ensures the reliability of the resource manager control behaviour, the quality of service or deadline of the application itself in the platform must also be strictly satisfied.

3.2. Multimodal Foreign Language Teaching Model Design.
The multimodal teaching method refers to mobilizing students' visual, auditory, tactile, motor, and other sensory organs to work together through multiple teaching channels, stimulating students' multiple associations in the real learning environment created, increasing students' interest in learning, and improving students' learning efficiency. And applying the multimodal teaching method to university English vocabulary teaching can improve to a certain extent the English vocabulary caused by the traditional single teaching method the disadvantages of teaching [17]. The
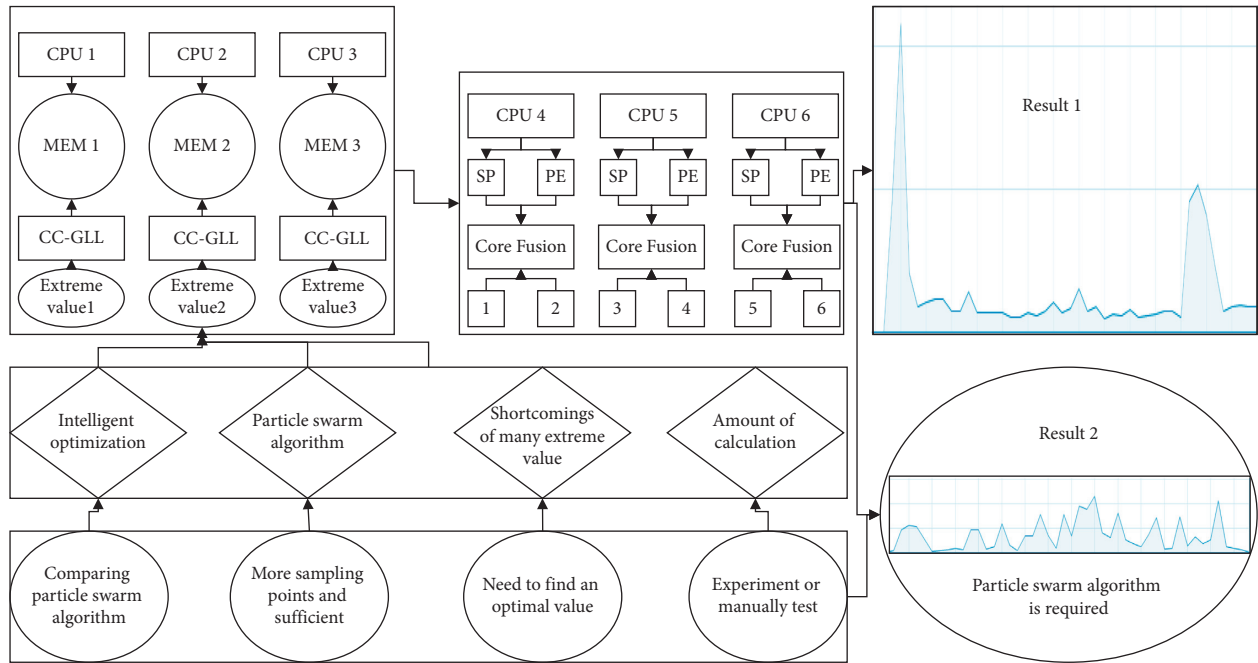
FIGURE 1: CPU-GPU heterogeneous multicore processor-based architecture.

author uses video display, picture presentation, font size, and colour changes to fully mobilize students' sensory systems and cooperate with various modes of vision, hearing, and speaking to teach. The multimodal teaching mode is not fixed, but a suitable multimodal teaching mode needs to be chosen with the specific teaching topic and teaching content.

The same method and steps were used as in the pretest. First, one class was randomly selected as the pilot class among the classes of the same grade and level except for the experimental control class, and the vocabulary knowledge breadth test and the vocabulary knowledge depth test were conducted in the pilot class at different times. The following results were analysed in the pilot experiment: the Cronbach coefficient of the posttest on vocabulary breadth was 0.893, and the Pearson correlation coefficient was 0.806, so the posttest on vocabulary breadth had high reliability and validity; the Cronbach coefficient of the posttest on vocabulary depth was 0.899, and the Pearson correlation coefficient was 0.756, indicating that the posttest on vocabulary depth had high reliability and validity.

Based on the multimodal discourse analysis theory and the comprehensible input hypothesis, this study divided the classroom steps into four stages according to the multimodal literacy development model and the process of reading instruction, as shown in Table 1.

Before the experiment began, the reading comprehension section was used as a reading comprehension test paper to test the students' English reading comprehension skills, the pretest was administered uniformly to the experimental and control classes, and the reading comprehension test paper scores were collected and collated as pretest data for both classes after the test. After the experiment, the researcher conducted a posttest in the experimental and control classes [18]. To ensure the reliability and validity of

the experimental results and to explore the effect of multimodal instruction on students' English reading comprehension, the posttest reading comprehension test paper was the same as the pretest reading comprehension test paper, and the reading comprehension test paper scores of the two classes were collected and collated after the test as the posttest data.

$$W = W_{\min} + \frac{\left(W_{\max} + W_{\min}/\text{iter}\right)}{\text{iter}},$$

$$W = W_{\min} - \frac{W_{\max} + W_{\min}}{\text{iter}_T + \text{iter}} \times \text{itre}_T. \tag{8}$$

From the above equation, we can find that W decreases with the increase of iter particle iteration times. The initial value of W is $W_{\min}$, and then W increases with the increase of iter iterations. The number of iterations increases, which enhances the ability of the algorithm to find the optimal result.

The postlesson phase focuses on getting students to reenforce what they have learned during the proceeding phases of the course. The teacher creates a multimodal postlesson review environment for students by having them watch videos for writing and arranging for them to use vocabulary learning software to review what they have learned (the Hundred Words vocabulary learning software helps students review the meaning, spelling, pronunciation, and use of vocabulary collocations), which helps them perceive the lesson's topic again and better grasp the vocabulary they have learned.

For example, in the multimodal information input stage, the teacher arranges reading tasks in the form of reading of parts of speech to help students learn vocabulary, which can help students practice their word guessing skills and through the learning of new vocabulary can help students better
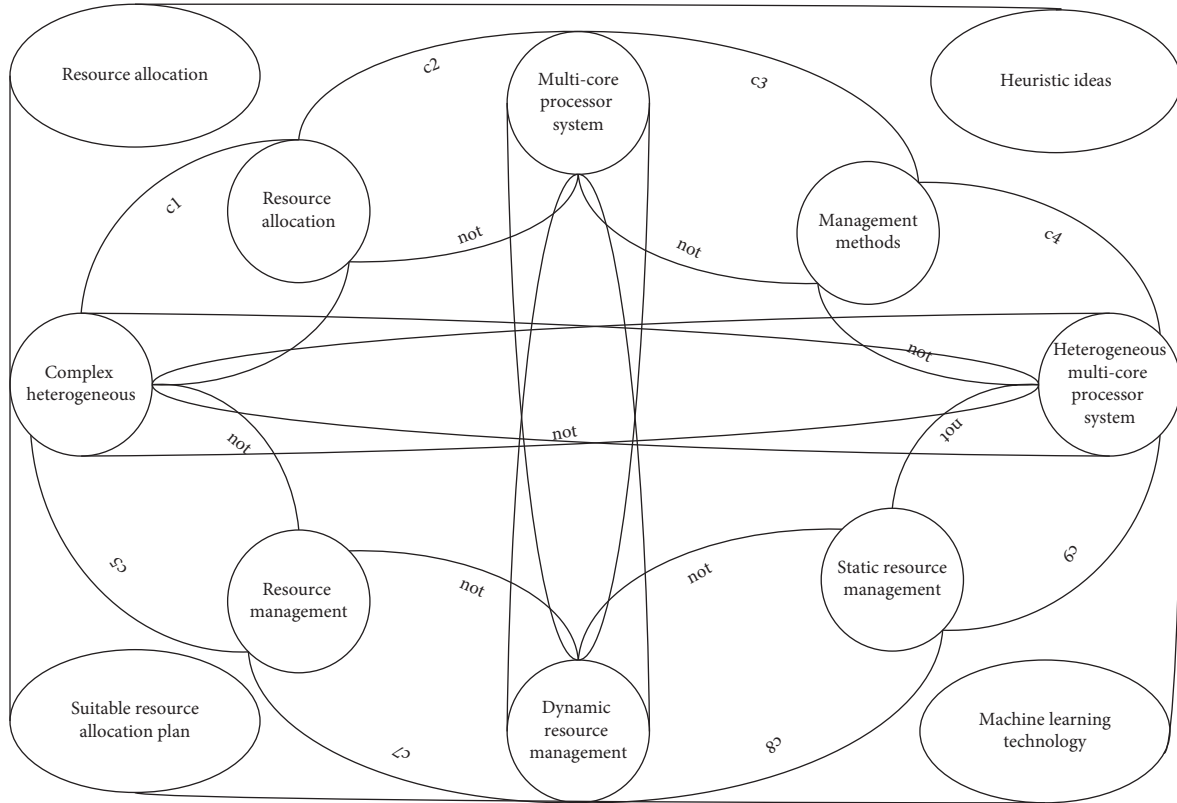
Figure 2: Model of macronuclear cluster behaviour.

Table 1: Multimodal reading instructional design.

Teaching steps	Teaching stage	Teaching activity
1	Lead-in: use GIF images and videos, combined with spoken, written, and action presentations, to create context, elicit questions, and introduce topics	Auditory modality: audio, music, and so on; visual modality: text, video, GIF image, animation, poster, and so on
2	Understand keywords and activate students' background knowledge and existing problem-solving cognition and experience	Language modes: spoken language (teacher's speech), written language (written language displayed on PPT), tone of voice, accent tone, and so on; body mode: gestures, actions, expressions, and so on
3	To form reading expectations	Auditory modes: audio, music, and so on
4	Fast reading: use pictures and videos to understand the topic, sort out the structure of the article, and prepare for obtaining and summarizing basic information	Visual modality: mind maps, text, videos, pictures, tables, animations, posters, and so on

understand the discourse so that students' reading skills can be practiced; in the multimodal information reinforcement output stage, the teacher arranges the vocabulary competition in the form of listening to the recording and filling in the vocabulary to help students practice. In the intensive multimodal information output stage, the teacher arranges the listening and filling in vocabulary activities in the vocabulary competition to help students' listening skills and the role-playing activities to improve students' oral expression skills; the teacher arranges the writing dialogues in the intensive multimodal information output stage and the writing assignments in the postlesson stage to help students' writing skills.

$$fsp = \frac{Num}{Time}, \tag{9}$$

where Num is the number of video sequence frames and Time is the decoding time. Multimodal discourse analysis theory provides ideas and theoretical support for classroom teaching conducted by multimodal teaching method, which is to integrate various external symbolic resources such as pictures, videos, and audios in the teaching process with the help of multimedia and other teaching tools, mobilize students' sensory system, adhere to the principle of the best effect of modality selection, realize the cooperation between different modalities to create a specific context, and help

promote the information. This helps students to learn through effective input, consolidation, and output. Therefore, multimodal discourse analysis theory provides a solid theoretical foundation for the multimodal teaching method, as shown in Figure 3.

Second, after the preliminary investigation, the author used the internship period at the internship school to experiment on teaching vocabulary to the selected experimental and control classes. The classes selected by the author, that is, Experimental A and Control B classes, had English vocabulary lessons on the same day, and each vocabulary lesson lasted 40 minutes. In the vocabulary teaching of the experimental A class, the author adopted the multimodal teaching method, and in the vocabulary teaching of the control B class, the author used the traditional vocabulary teaching method [19]. Since the BZR and ReaX tools are used to support the simultaneous definition of multiple system constraints and the overall controller synthesis, the evaluation experiment done in this paper is to combine the time overhead of the synthesis algorithm under the two objectives of logic control and optimal control at the same time. In the process of multimodal vocabulary teaching, the author used the presentation of videos, the presentation of pictures, the change of font size and colour, and so on to fully engage the students' sensory system and collaborate with the visual, auditory, and oral modalities to teach.

The first step to be done is to classify and organize the data information obtained during the experiments, where the entire content of the data preprocessing process includes proper filtering of the data variables and normalization of the data. The second stage is to properly reduce the scope of the model in the simulation optimization process, where the simulation model is a support element model of vectors, which is particularly suitable for small samples and provides a set of improved particle swarm algorithms that can find extreme values. The intention of adding this process is to search small regions step by step to avoid unnecessary waste in unconnected excitation regions and to speed up the search and improve the accuracy of the simulation model in a limited number of simulations.

To get the results of cache allocation, it is also necessary to know the application characteristics. Application characteristics are the access to the cache by a particular application, including the number of types of access to the cache block, the number of reading operations, the number of write operations, the number of hits, the number of misses, and the occupancy of the cache block. The allocation algorithm proposed in this paper will prerun the application once to get these application characteristic parameters before generating the cache. Finally, the allocation algorithm will derive the cache-specific allocation result, that is, a 0/1 matrix corresponding to the cache blocks in the cache layer (0 for off and 1 for on), to obtain the optimal cache block layout.

4. Results and Analysis

4.1. Heterogeneous Multicore Processor System Performance. Like other formal methods, including model checking, discrete controller synthesis techniques also ensure correctness and reliability of controller synthesis by traversing and checking all state spaces in the system, and thus another issue to consider for the approach proposed in this paper is the scalability of the synthesis algorithm (tool) used. Based on the model presented in the previous section, this section evaluates its scalability by increasing the number of processing cores of the multicore platform and the number of applications that will be executed in the system. Since the BZR and Relax tools are used to support the simultaneous definition of multiple system constraint objectives and overall controller synthesis, the evaluation experiments performed in this paper consider the time overhead of the synthesis algorithm for both logic control and optimal control objectives. In the early stage of the experiment, most of the students (more than 60%) were not interested in vocabulary classes and did not agree with the traditional vocabulary teaching methods.

To better test the communication rate performance of the CC-GLL experimental platform built in this paper, the number of cycles is increased to 4000, 6000, 8000, and 10000, and the test results are recorded. For the same parameters, the CC-GLL and Visual Studio 2010 are run separately to do experiments for comparison, and since the running process is affected by the environment, multiple tests are conducted for different platforms (Figure 4).

When running the same amount of data as the test, the CC-GLL platform built in this paper takes less time and has a faster communication rate. According to the graph, it can also be found that the time difference between the CC-GLL and Visual Studio 2010 runs becomes larger and larger as the number of cycles continues to increase, which means that the advantage of the CC-GLL experimental platform designed in this paper becomes larger and larger as the amount of data run continues to increase.

For memory testing, the test programs designed in this paper were run in CC-GLL and Visual Studio 2010, and the time data of memory allocation and release during the running process of both platforms were recorded. The performance of the platform is judged by comparing the duration of time. The test program divides the memory into five intervals, random numbers appear in each interval during the program's runtime, and memory blocks in the interval where the random numbers are generated are freed and allocated. Each of these groups is tested 200 times in the program and averaged, and the experimental comparison of the memory mechanisms of the two platforms is completed by calling the time calculation function to measure the release time and allocation time of the platform memory. Figure 5 shows the experimental comparison results of memory allocation and release for the two platforms.

The CC-GLL experimental platform designed in this paper consumes less time than Visual Studio 2010 in allocating and releasing memory during operation, which means that the memory management mechanism designed in this paper is faster than Visual Studio 2010 in releasing and allocating memory blocks and runs faster, which largely improves the performance of the multicore OS experimental. The performance of the memory management
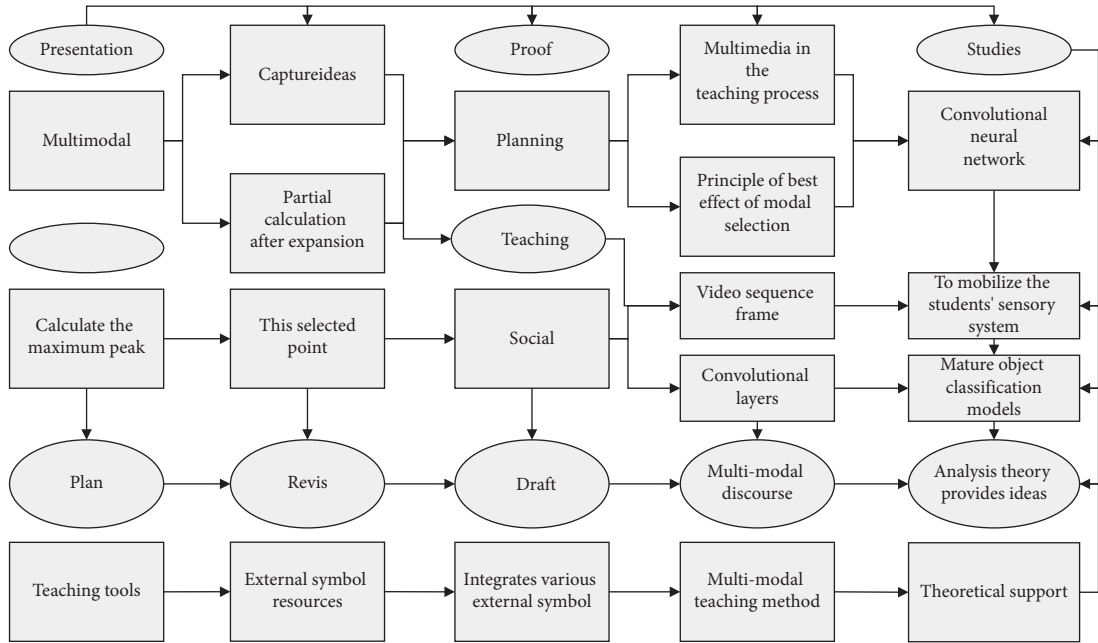
Figure 3: Steps of the multimodal teaching experiment.
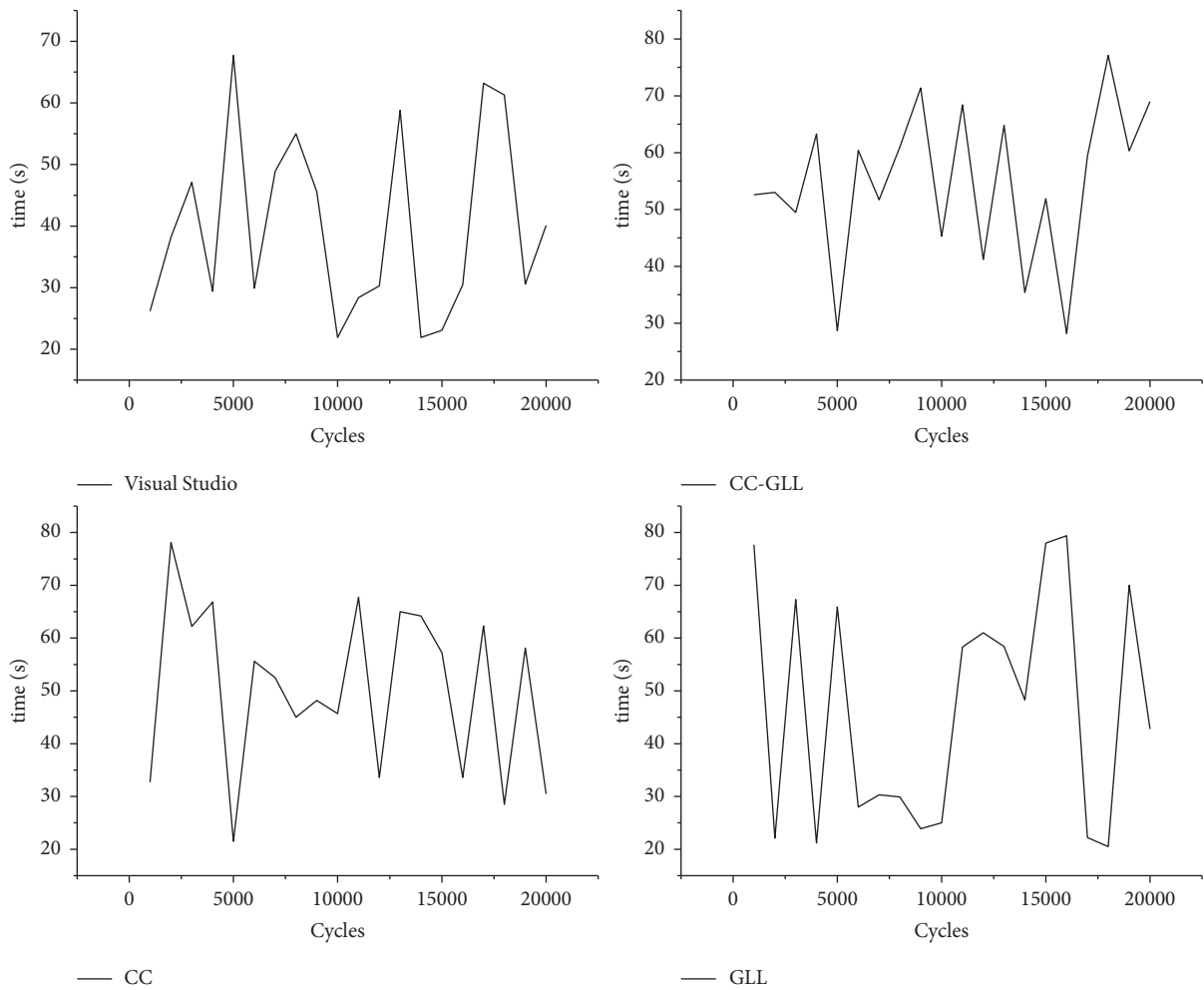

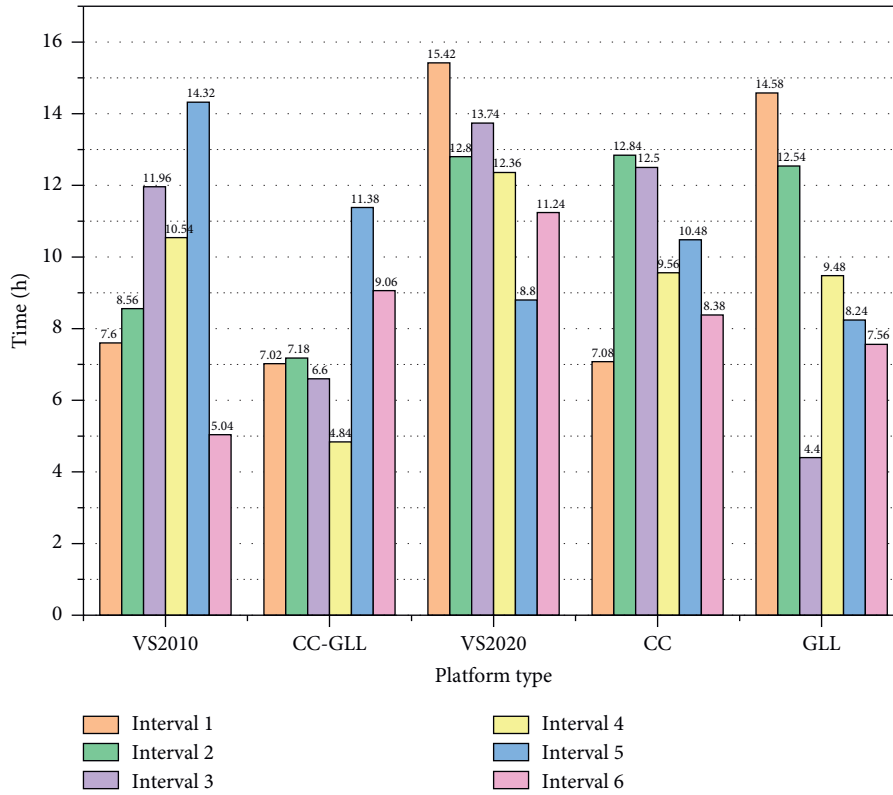Figure 4: Comparison of communication time.

FIGURE 5: Comparison of memory allocation and release times.

mechanism makes the platform more efficient in the running process.

The synthesis time of the comprehensive test of the controller in the experiments of multicore processor systems with different sizes is given, all on a computer with an Intel (R) Core (TM) I5 CPU and 16 GB of memory. As can be seen from the table, when the number of processing cores and applications is both 8, the number of state spaces of the system has reached 2.8×106, at which point the controller synthesis time takes more than 2 hours. To handle systems with a larger number of processing cores and applications and to improve the scalability of the methods in this paper, users can use more powerful computers and spend more time, in addition to using modular synthesis techniques and other ways to improve the efficiency of the synthesis algorithm.

During initialization, since the features of the application-phase performance predictor are partly dynamic features that are only available at runtime, this design, while making the predictor itself more reliable in terms of prediction accuracy, does not allow for performance prediction for the application before it runs. Therefore, the initialization mapping first assigns the scheduled application to the highest overall performance processing core type in the idle core on a trial basis to obtain its dynamic features for actual operation. Subsequently, the collected feature data is fed into the application performance predictor to obtain the predicted performance of the application on different types of processing cores, and the predicted performance is used as a basis for migrating the application to the processing core type with the best-predicted performance among the currently idle cores.

4.2. Results of the Teaching Experiment.

Before the experiment, that is, under the traditional vocabulary teaching approach, as shown by the percentage of Q6 (I currently like English vocabulary class) in Figure 6, more than 60% (not conform + not at all conform) of the students all said that they did not like the current vocabulary class; as shown by the percentage of Q8 (I like the current English vocabulary practice activities designed by the teacher), just under 10% (very conform + conform) of the students said that they liked the traditional vocabulary classroom activity design of the vocabulary teaching method. In addition, from the percentages of students' responses to the other questions "not conforming" and "not conforming at all," most students (more than 60%) were not interested in the vocabulary classroom and did not agree with the traditional vocabulary teaching method in the preexperimental period. This is also evidenced by the findings in Figure 6.

And after the experiment, that is, in the case of teaching students vocabulary with the multimodal teaching method, it is known from the percentage of Q6 (I currently like English vocabulary class) in Figure 6 that 80% (strongly conform + conform) of students like English vocabulary class, including 36% of students who say they like vocabulary class very much, and from the percentage of Q7–Q10, it is known that more than 80% (strongly conform + conform) of students like the multimodal approach to teaching vocabulary (including the way the teacher presents new vocabulary, the vocabulary classroom atmosphere created by the teacher, and the teacher's instructional design), especially in Q8 (I like the English vocabulary practice activities designed
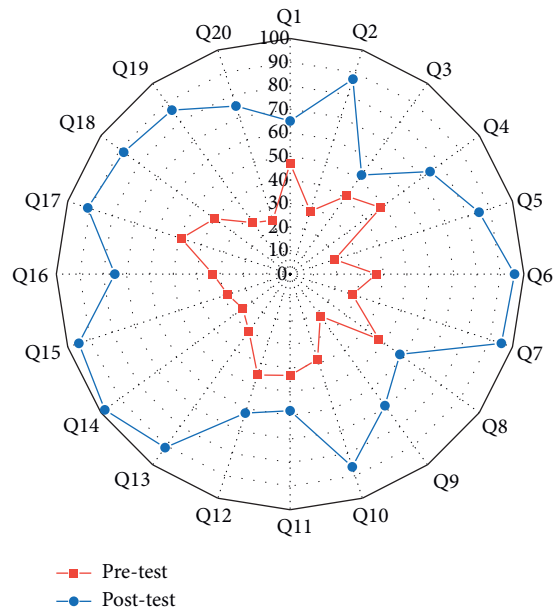
Figure 6: Students' attitudes towards English vocabulary teaching methods before and after the experiment.

by the current teacher); that is, students show more pronounced interest in terms of the vocabulary practice activities set by the teacher under the multimodal approach.

Thus, it can be known that most students have a positive attitude towards teachers' teaching vocabulary with multimodal teaching methods.

And after the experiment, that is, under the multimodal approach, more than 70% (strongly conform + conform) of the students' vocabulary learning initiatives have significantly improved; especially, the percentages of Q11 (I take notes in my current English vocabulary classroom) and Q12 (I actively participate in the vocabulary teaching activities arranged by the teacher in my current English vocabulary classroom) show that more than 80% (strongly conform + met) of the students reported being able to actively listen and participate in vocabulary classroom activities. So, it can be learned that, before the experiment, that is, under the traditional vocabulary teaching approach, students' initiative in vocabulary learning was not strong, and there was a lot of room for improvement, but after the experiment, that is, under the multimodal teaching approach, most of the students improved their initiative in vocabulary learning and were more willing to learn vocabulary as shown in Figure 7.

In the preexperimental period, that is, under the traditional vocabulary teaching approach, a significant number of students had a dislike for the teacher's teaching methods leading to a loss of interest in vocabulary learning, which further led to their poor proficiency in vocabulary meaning, spelling, and vocabulary use, resulting in a decrease in students' motivation and initiative to learn, among other outcomes. After the experiment, that is, under the multimodal approach, most students liked the vocabulary presentation method, vocabulary practice activities, teacher-student interaction style, and the atmosphere of the vocabulary classroom in the multimodal vocabulary classroom. Teachers teaching students vocabulary using the

multimodal approach were able to make students enjoy learning vocabulary more, increase their confidence in vocabulary learning, recall the meaning, spelling, and use of the vocabulary learned more easily, and help students become better at vocabulary learning.

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To detect the difference in the English reading achievement level and the change in English reading comprehension ability of the students in the two classes compared, the researcher used the same English reading
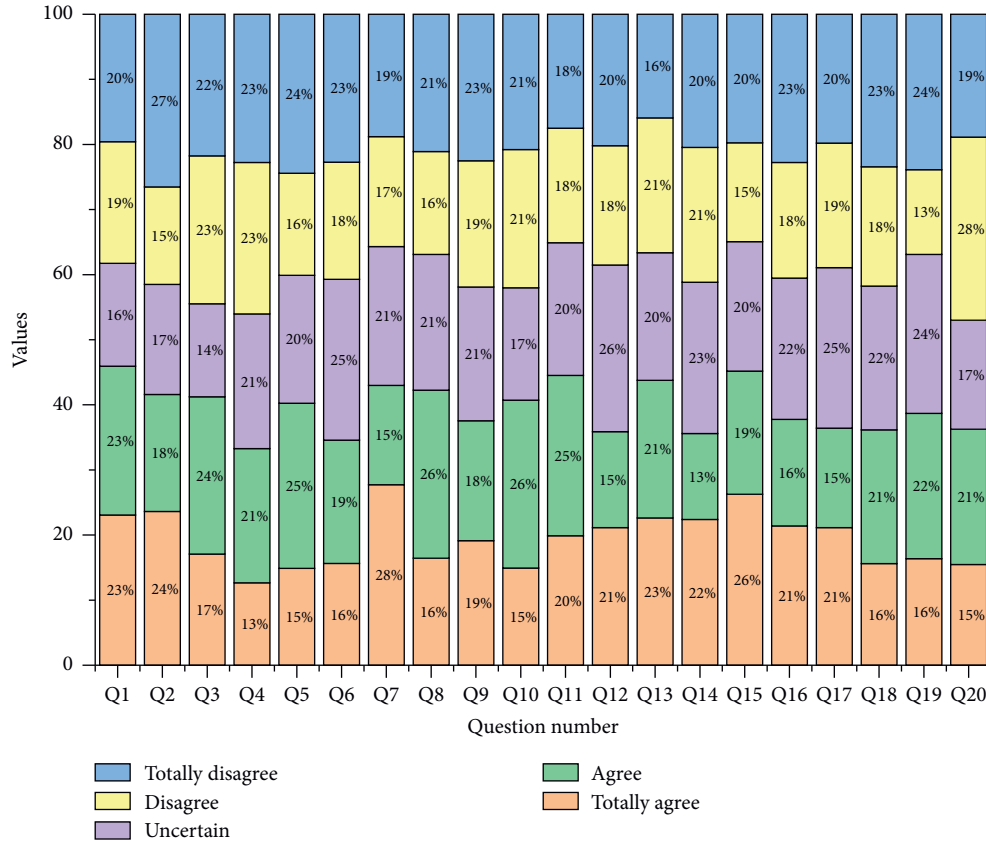
Figure 7: Results of the impact of self-efficacy and beliefs of students in the experimental class.

comprehension test paper for the reading posttest in the two classes and put forward the null hypothesis that there was no significant difference between the mean English reading posttest scores of the experimental and control classes. When the English reading comprehension test was administered again after the experimental and control classes completed the 16-week teaching experiment, as shown in Figure 7, the mean English reading posttest score of the experimental class was 27.818, with a 3.054-point increase in the mean score, while the mean English reading posttest score of the control class was 25.018, with only a 0.182-point increase in the mean score; in contrast, the English reading posttest score means of the experimental class was 2.872 points higher than the English reading posttest score means of the control class.

5. Conclusion

This study combines multimodal instruction and university English reading to investigate the effects of multimodal instruction on university students' English reading motivation and English reading comprehension skills. Firstly, a resource management method based on discrete controller synthesis technique is proposed, which applies a formal, discrete controller synthesis technique capable of automatically constructing management control components to the design of online resource management components for heterogeneous multicore systems, enabling the automatic generation of a management component directly from existing synthesis algorithms and tools based on system modelling; thus, resource manager reliability provides formal guarantees for scenarios with high-reliability requirements such as embedded systems running secure applications. This study begins by combing through the literature on multimodal instruction and provides a review of the current state of domestic and international research on multimodal reading instruction. The role of this dynamic generation policy is to improve the performance of the system by changing the architecture of the cache in real-time when the access characteristics of the applied load to the cache change. This dynamic generation policy first monitors the usage and hotness metrics of the cache blocks, compares the metrics with the corresponding thresholds, and adds the cache blocks to the candidate queue if the threshold constraints are satisfied. The cache blocks in the candidate queue are then sorted in order of priority from largest to smallest, and an open-close algorithm is executed to determine the final number of cache blocks opened and closed. Then, this study applies multimodal instruction in university English reading classrooms under the guidance of multimodal discourse analysis theory and comprehensible input hypothesis, which is very important for teaching English reading to university students.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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