

Retraction

Retracted: Remote English Teaching Resource Sharing Based on Internet O2O Model

Scientific Programming

Received 1 August 2023; Accepted 1 August 2023; Published 2 August 2023

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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- [1] Z. Hou, "Remote English Teaching Resource Sharing Based on Internet O2O Model," *Scientific Programming*, vol. 2022, Article ID 1217807, 10 pages, 2022.

Research Article

Remote English Teaching Resource Sharing Based on Internet O2O Model

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Received 8 November 2021; Revised 8 December 2021; Accepted 21 December 2021; Published 13 January 2022

Academic Editor: Baiyuan Ding

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Aiming at the problems of low success rate, delay, and high communication cost in distance English teaching resource sharing, this paper puts forward a method of distance English teaching resource sharing based on Internet O2O mode. Based on the model of distance English teaching resource sharing, this paper designs four processes: query, reply, resource substitution, and resource sharing optimization. Experimental results show that the proposed method can achieve high success rate of resource sharing, low latency, communication cost, and high transmission efficiency. Therefore, it is an effective method.

1. Introduction

English is a practical course. In Modern English teaching practice, we should not only keep and carry forward the advantages of traditional humanistic teaching, but also make full use of the media and network resources under the condition of modern educational technology, so as to ensure that English learners have active and full practice opportunities. With the continuous improvement of educational concepts and the rapid development of information technology, the traditional teaching model has been unable to meet the teaching needs; distance teaching model came into being [1–3]. Distance teaching is a new teaching mode which is based on the supplement or reformation of network technology to the traditional classroom teaching and learning [4]. English online learning platform has become an indispensable tool for autonomous learning and daily English teaching. Especially when the Internet is connected with the campus network, the role of the network has changed from the teaching assistant resource to the teaching platform, which makes the online learning become a brand-new learning method and realizes the interaction of English teaching under the network environment [5]. In the process of distance online learning, resource sharing can enhance the user's learning experience and promote the popularity of high-quality teaching resources. The contradiction between

the scarcity of high-quality teaching resources and the popularization of higher education restricts the improvement of the quality of higher education. Distance learning resources are not only inadequate in total quantity, but also unbalanced in structure. The main factors affecting the level and efficiency of distance education resource sharing are resource construction, design of resource sharing mechanism, and technical support of resource sharing. Resource sharing is a complex system engineering [6, 7]. At present, scholars have carried out the research on teaching resource sharing. Chen et al. [8], based on 5G and FPGA system, studied the sharing of martial arts teaching resources and realized the educational goal of the reform of martial arts teaching system. Yuan [9] puts forward an improved algorithm of neural network path sorting based on path sorting method and realized the sharing of network teaching resources through link prediction of online learning knowledge base. Yao et al. [10] found that, in the world of major public health emergencies, distance education and resource sharing platform building is becoming more and more urgent and important. Based on the teaching practice, the paper analyzes the main problems and development bottlenecks and shares the experience of distance teaching through practical application. In a paper by He et al. [11], the construction of the teaching resource database of vocational education and its popularization and application in other

relevant colleges and universities play an important role in promoting the sharing of high-quality teaching resources, speeding up the innovation of teaching methods and improving the service capability of vocational education industry. Although the above research has made some progress, the success rate of distance English teaching resource sharing is low, the delay and communication cost are high, and the distance English teaching resource sharing has limitations and cannot be widely popularized in practical application. Therefore, a distance English teaching resource sharing method based on Internet O2O mode is proposed.

O2O mode is the thinking mode that applies to commercial domain at first; namely, the entity part below the line and the Internet part on the line are integrated with each other. In recent years, O2O model has been widely used in education and teaching, "Internet plus education" is an effective combination of information technology and school teaching. It can effectively integrate network information resources and modern teaching, and it is an innovation to the traditional teaching mode.

2. Resource Sharing Model of Distance English Teaching

The "O2O model" is the most valuable and favored business model in the Internet era. With the development of Internet technology, the "O2O model" of online education has developed from 1.0 era to today's 3.0 era. In the 3.0 era of O2O model, online and offline collaboration, and gradually forming a complete teaching environment, teachers and students becoming more and more involved in information interaction, transmission and feedback, teacher-student, student-student exchange, inquiry, and cooperative learning will become a new normal.

In the distance English teaching resource sharing system, there are a total of N users (teachers, students), represented by a set of N users who search for and use Internet resources in their shared spaces according to their needs [12]. Each user is installed with a resource sharing system, which can provide each user with a unique ID, location, current time, and other information. In addition, each user's Internet client has a certain amount of computing power, storage capacity, and communication capacity. Teachers make teaching courseware, teaching media video, test paper, literature, and other teaching resources in their personal identity. Through the management module of system resource database, the data of various database manufacturers can upload batch resources. Each user's local storage stores some resources, which can be pictures, audio, video, etc. [13–15]. Each resource can be shared through the Internet "O2O mode" to users who need this resource. In the Internet, when a user needs a resource, if there is no such resource in the user's local memory, it generates a query message and sends the query message in the Internet. This user can be called the source user. For a query message, the source user sets a query message lifetime for it. After any other user receives this query message, if he finds that the local storage has the resource, he will reply the resource to the source user through the Internet to realize the resource

sharing. Resource sharing in the Internet, include how to query and how to reply. The O2O model stripped the browse-download-exchange link in the traditional resource sharing process chain and replaced one connection mode (online to offline) with another one (offline to offline). Then it is necessary to analyze the contract between resources and users. Establish the reply process under the new connection mode. Only in this way can the resource sharing in O2O mode ensure the minimum communication cost. In this mode, the Internet provides all the English skills resources, such as the fine course of English in listening, speaking, grammar part in accordance with the easy steps for video shooting or acquisition by video, and by importing the platform, users can select the corresponding course content in the course selection system for extended learning according to their own needs. The course selection system can link other teaching resources for users to use. In summary, the above is also the basis for the construction of this paper. Therefore, the model of distance English teaching resources sharing in Internet O2O mode is shown in Figure 1.

3. Distance English Teaching Resource Sharing Based on Internet O2O Model

3.1. Inquiry Strategies for Distance English Teaching Resources. According to the principles of interactivity, innovation ability training, and scientificity, the query strategy of distance English teaching resources is designed. The source user sends the query message according to this strategy. The principle of interactivity is to have good interactivity and give corresponding feedback to students' learning activities in time. The performance of English teaching knowledge should be operable, not the electronic relocation of English teaching resources. The cultivation principle of innovative ability is the ability of knowledge innovation and information acquisition, which is the core of contemporary quality education. Educational software should adopt a variety of teaching strategies, so as to fully reflect the role of students' cognitive subject and enable students to think actively in the learning process rather than passively accept knowledge, so as to play its due role in cultivating students' innovative ability and enhancing information cultural literacy. The principle of scientificity is that the knowledge to be expressed in distance English teaching resources should be scientific, the wording should be accurate, and the writing should be smooth, in line with the internal logical system of knowledge and students' cognitive structure. The goal of designing query strategy is to improve the success rate of resource sharing and reduce the latency and communication cost. The schematic design of the data query is shown in Figure 2.

When the source user needs a resource, if the resource is not in local storage, it generates a query message and sets a query message ID for the query message. The query message ID consists of the source user ID and the query ID, where the query ID can be generated in order of the source user query. The query message ID set in this way is globally unique. The content of the query message includes the query message ID, the query request to get the resource,

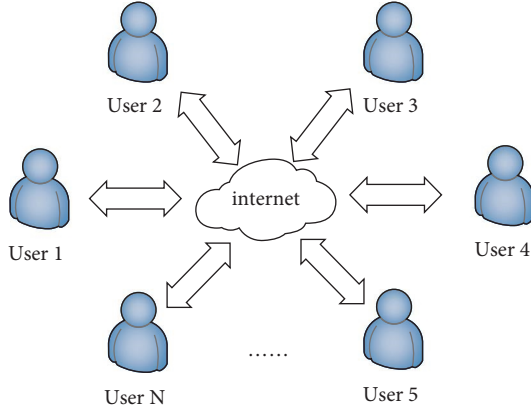


FIGURE 1: Distance English teaching resource sharing model.

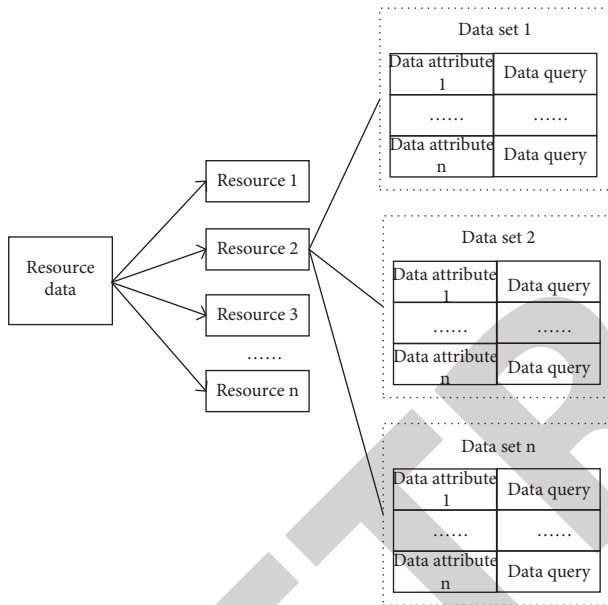


FIGURE 2: Schematic diagram of data query composition.

and the query message lifetime. In addition, in order to facilitate replying to the source user by the user who owns the resource, the content of the query message includes current time and location of the source user and source user's requirements resource information. Before the existing resource data in the Internet is shared, M is defined as a separate resource pool for resource request user i and c is a collection of users in a given Internet. M is divided by using the following formula:

$$M = \frac{i \times q}{c \times G_i(c)}, \quad (1)$$

where q represents the number of tasks expected by the job, and $G_i(c)$ represents the number of resource-sharing jobs.

In each resource pool of the Internet, resources are allocated using the following methods:

$$w = \sum_{i=1}^N (M_i \times J), \quad (2)$$

where J stands for the balance of tasks assigned to each job.

Assuming that l represents the task assignment priority constraint, g represents the query request, and Δw_i represents the communication energy consumption, the query results are as follows:

$$C_X = \sum_{i=1}^N [g - l(\Delta w_i)] \times w. \quad (3)$$

3.2. Methods for Responding to Distance English Teaching Resources. If each user forwards a resource along the network channel, there will be a very high communication cost. To reduce communication costs, distance-based forwarding strategy is adopted [16]. The advantages of designing the response method of distance English teaching resources are as follows.

3.2.1. Maximizing Resource Utilization. Distance English teaching is the modern expression of distance education. Based on network technology and combined with excellent educational resources of colleges and universities, it spreads the best teachers and teaching achievements of colleges and universities in all directions.

3.2.2. Flexible Learning Methods. Distance English learning is not limited by time and space. The response method of distance English teaching resources is generally a combination of online counseling and face-to-face teaching. Online counseling can teach and learn online through students and teachers. At the same time, it can communicate, answer questions, and complete homework and exams through the platform.

3.2.3. Individualization of Teaching Form. It is more conducive to the development of students to realize a complete system tracking record of each student's data, learning process, and stage, and put forward different personalized learning suggestions or plans according to the data of different students.

3.2.4. Teaching Management Automation. The response method of distance English teaching resources has the functions of automatic management and remote interactive processing. The whole process is automatically processed by a special management system, which makes up for the shortcomings of large amount of manual operation and low efficiency. Suppose the user of the forwarding resource is i , and other users of the forwarding resource i compute their waiting time t after i' forwards the resource.

$$t = \sum_{i=1}^N (d_1 - d_{ii'}) \times t_g. \quad (4)$$

In the formula, d_1 is the communication distance, $d_{ii'}$ is the distance between i and i' , and t_g stands for time granularity and can be set to several milliseconds (e.g., 1 ms).

The farther away from the user's i , the shorter the wait for forwarding. Therefore, the user farthest from the user i will first forward the resource. Other demanders can reduce communication costs by not forwarding resources when they hear that users have forwarded them [17]. If the Internet is not connected, that is, the user i cannot get any other user information and continues to forward the resource, and the user will adopt the store-port-forward strategy.

Therefore, the reply strategy of distance English teaching resources is designed to avoid the conflict between multi-users and make full use of remote online resources.

3.3. Establishment of an Internet Resource Data Replacement Storage Model. As a resource returns from the user who owns the resource to the source user along the routing path, some users who continue searching for the resource in the routing path receive the resource. In the Internet's existing storage mode, when a user receives a resource, even if the user does not need the resource, it stores the resource in the local storage for other users to query. As resources accumulate over time, you may run out of local storage space, so you need to delete some resources. This section designs a replacement strategy for a resource that deletes the resource when the local store runs out of space.

In the resource data substitution storage model, the effective scheduling of resource data is firstly carried out [18–20]. The specific methods are as follows:

- (1) A shared resource data scheduling model shall be established based on the different status types of the acquired resources:

$$S = \frac{\nu}{E} (t + 1), \quad (5)$$

where ν represents resource job tasks, and E represents dependencies between tasks.

- (2) Assuming that the computational capacity of the scheduling nodes in the model is proportional to the storage capacity, the nodes are divided into K levels according to the computational capacity level, which is expressed by the following formula:

$$l_p = S \sum_{i=1}^N \left(\frac{L}{\Delta w_i + E\rho} \right), \quad (6)$$

where ρ represents a constant factor greater than 1 and L represents the computational power level of the node.

Assuming that p_i represents the computing power of any node in the model, p_i is calculated using the following formula:

$$p_i = \frac{T_i \times N}{B'} \times l_p, \quad (7)$$

where B' represents the size of the data processed on the node i , N represents the number of nodes, and T_i represents the time taken by the node to process the data B' .

- (3) Scheduling tasks of shared resources is by using the method of upward ranking value, defining the average value of \bar{x}_i representation as the overhead of scheduling shared resource data in the Internet [21, 22], and calculating \bar{w}_i by using the following formula:

$$\bar{w}_i = \frac{\sum_{i=1}^N w_{i,j}}{P_i \times \bar{x}_i}, \quad (8)$$

where $w_{i,j}$ represents the estimated execution time of the task n_i on the processor p_j .

According to formula (8), the upward sorting value of each task in the scheduling of shared resource data in the Internet on different types of processors can be obtained. Use formula (9) to state the following:

$$F(n_i) = \frac{1}{|k|} \times \bar{w}_i, \quad (9)$$

where k stands for heterogeneous cluster characteristics.

- (4) Assume that $Q_{g,r}$ represents the X task set of the completed task g on the node with computational power of r level and T_x represents the completion time of the task $X_m(Q_{g,r})$ in the X set. Calculate the average completion time of the task using the following formula:

$$T_p = \frac{X_m(Q_{g,r}) \cdot T_x}{Q_{g,r}}. \quad (10)$$

- (5) The minimum completion time for assigning task n_i to a cluster is T_c , and T_c is calculated using the following formula:

$$T_c = \min \times \frac{T_p \cdot n_i}{X}. \quad (11)$$

Thus, the optimal scheduling of shared resource data in the Internet is accomplished effectively, and a resource value is calculated for each resource on the basis of sufficient scheduling. When a user's local memory space is less than a preset threshold (such as 100 MB), the user's local memory space is insufficient. When a user runs out of local storage space, the user deletes the least valuable resource in turn, based on the resource value of each resource, until the user's local storage space is greater than or equal to the threshold. One user calculates the resource value of a resource in local storage according to the following formula:

$$R = \frac{Q_V}{Q_S}, \quad (12)$$

where Q_V is the resource prevalence of this resource and Q_S is the storage space occupied by this resource. The initial value of resource popularity for any resource is 1. When a user replies to a resource that the source

user needs, the user adds 1 to his or her resource popularity with respect to the resource. From formula (12), it can be concluded that the resource value of a resource is proportional to its resource prevalence and inversely proportional to the storage space it occupies [23]. Therefore, the greater the resource popularity of a resource, or the smaller the storage space it occupies, the greater the resource value of that resource.

3.4. Remote Mapping of English Teaching Resources. In the process of optimizing the sharing of database resources, the method of principal component analysis is used to filter the components of data resources, retain the components of data resources with large variance and more information, build the interclass matrix and intraclass matrix of the attributes of data resources, and transform the original nonlinear data resources space into linear space with higher dimensions through a given linear mapping, and solve the various data distribution points in high-dimensional space through the calculation of Euclidean distance [24, 25]. The specific steps are detailed below.

Assuming that R_h represents the high-dimensional space of the database, Q_r represents the resource vector corresponding to the high-dimensional space of the database and satisfies the conditions of $Q_r = \{r_1, r_2, \dots, r_n\}^T$, and Q_l represents its low-dimensional space vector and satisfies the conditions of $Q_l = \{l_1, l_2, \dots, l_n\}^T$, then the resource components in distance English teaching are filtered by means of formula (13) combined with principal component analysis [26–28], and the data resource components with large variance and much information are retained:

$$R_i = \frac{G}{\gamma} \times \frac{R_h \times \delta}{Q_r^T} \times \frac{Q_l}{E_i \times L_i}, \quad (13)$$

where E_i represents the amount of component information contained in the original data resource, L_i represents the amount of principal component contained in the data resource, γ represents the probability of having the same principal component data, G represents the variable of the principal component data, and δ represents the contribution rate of variance of the sample data.

It is assumed that Z represents the covariance matrix of the normalized variables of each data resource, $c(j, f)$ represents the j component of the f attribute of c , N_j represents the number of samples of the j attribute, F_k represents the number of types of data attributes, η represents the distribution probability of different data resource attributes in all data of a heterogeneous data source, and R_q represents the set of neighboring points of data resources. The interclass matrix P_e and the intraclass matrix P_d of data resource attributes are constructed by using the following formulas:

$$P_e = Z \times \frac{N_j * F_k}{P_b \pm c(j, f)} \cdot \eta, \quad (14)$$

$$P_d = \frac{R_q \times P_e}{\eta}, \quad (15)$$

where P_b stands for quantified interclass optimization criteria.

Assuming that Q_c represents the nonlinear data resources of the original space and Q_R represents the linear space with higher dimensions, then formula (16) is used to transform the original nonlinear data resources space into the linear space with higher dimensions through a given linear mapping:

$$Q_k = \frac{Q_c}{c'} \times Q_R \cdot U_c, \quad (16)$$

where c' represents the number of times the attributes of data resources are superimposed and U_c represents the weight vector of different attributes of data resources.

Suppose that $Q_{zj'}$ represents the j' neighborhood data resources of z , and the distribution of each data resource point in the high-dimensional space is calculated by Euclidean distance:

$$Q_X = \frac{\{Q_{zj' ij} \times X_{\parallel Y}\}^{\theta}}{Q_k} \times Y, \quad (17)$$

where $X_{\parallel Y}$ represents the distribution of regular terms, Y represents the local weight matrix of data points, and θ represents the approximation of linear combination of data points.

To sum up, in the process of optimizing the sharing and access of English teaching resources, the method of principal component analysis is applied to filter the data resource components, to preserve the data resource components with large variance and more information, and to construct the interclass and intraclass matrices of the data resource attributes [29–31], to transform the original nonlinear spatial data resources into linear space with higher dimensions through a given linear mapping, and to calculate the distribution points of each data point in the high-dimensional space by Euclidean distance, which lays a foundation for optimizing the sharing and access of distance English teaching resources.

3.5. Optimization of Distance English Teaching Resources Sharing. In the process of optimizing distance English teaching resource sharing, the multidimensional state space of data resource structure is established based on the distribution point Q_X of data resource obtained in Section 3.4 and the theory of reconstruction of chaotic phase space, and the optimal time delay of the reconstruction of phase space of data resource structure is calculated. The probability distribution curve of the characteristics of data resource structure is obtained, the characteristics of chaotic correlation dimension of data resource structure are extracted, and the cluster center value of different data resource structure features is given [32–34]. The specific steps are detailed below.

Assuming that $\{t_1, t_2, \dots, t_n\}$ represents the time series of the distribution of each data resource in a resource, F_s represents the result of phase space reconstruction of each data resource structure, and ε represents the embedded

dimension, the multidimensional state space of data resource structure is established based on the distribution point Q_X of each data resource in high-dimensional space obtained in Section 3.4 and integrated into the theory of chaotic phase space reconstruction [35, 36]:

$$I_Y = \frac{Q_X \times \{t_1, t_2, \dots, t_n\}}{F \times \varepsilon \otimes O_p} \times_s t_c, \quad (18)$$

where O_p stands for delay time mutual information and t_c stands for optimal delay time.

Assuming that W_{O_p} represents the weight of mutual information of delay time and $d_{m\mu}$ represents the μ vector formed in m dimension phase space, formula (19) is used to calculate the optimal time delay t_c for reconstructing phase space of data resource structure:

$$t_c = \frac{W_{O_p} \times \kappa}{I_Y \pm d_{m\mu}}, \quad (19)$$

where κ represents the minimum embedding dimension of phase space reconstruction.

Assuming that $d(f)_{m\mu}$ represents the false nearest neighbor of $d_{m\mu}$ and $C_{s dj}$ represents the proportion curve of the false nearest neighbor, the probability distribution curve of the structural characteristics of data resources is obtained by using the following formula:

$$C_r = \frac{d(f)_{m\mu} \times t_c}{C_d} \times \kappa. \quad (20)$$

Assuming that N_p represents the characteristics of chaotic correlation dimension of data resource structure, R_k represents the logarithm of associated phase points, and G_μ represents the number of vector points in phase space reconstruction, formula (21) is used to calculate the characteristics of chaotic correlation dimension N_p of data resource structure:

$$N_p = R_k + \frac{G_\mu}{C_r}. \quad (21)$$

Assuming that the N_G represents the number of cluster centers selected from the sample, the optimal result of sharing characteristics of different data resources is given by using the following formula:

$$R_n = \frac{N_G \times N_p}{C_r}. \quad (22)$$

Based on the calculation results of formula (22), data resource sharing and optimization can be completed. The specific process is shown in Figure 3.

4. Simulation Experiment Section

In order to verify the effect and feasibility of distance English teaching resource sharing method based on Internet O2O mode, a simulation experiment is set, and the parameters required for the experiment are shown in Table 1.

The indicators of resource sharing include success rate, communication cost, and unit throughput. As an effective

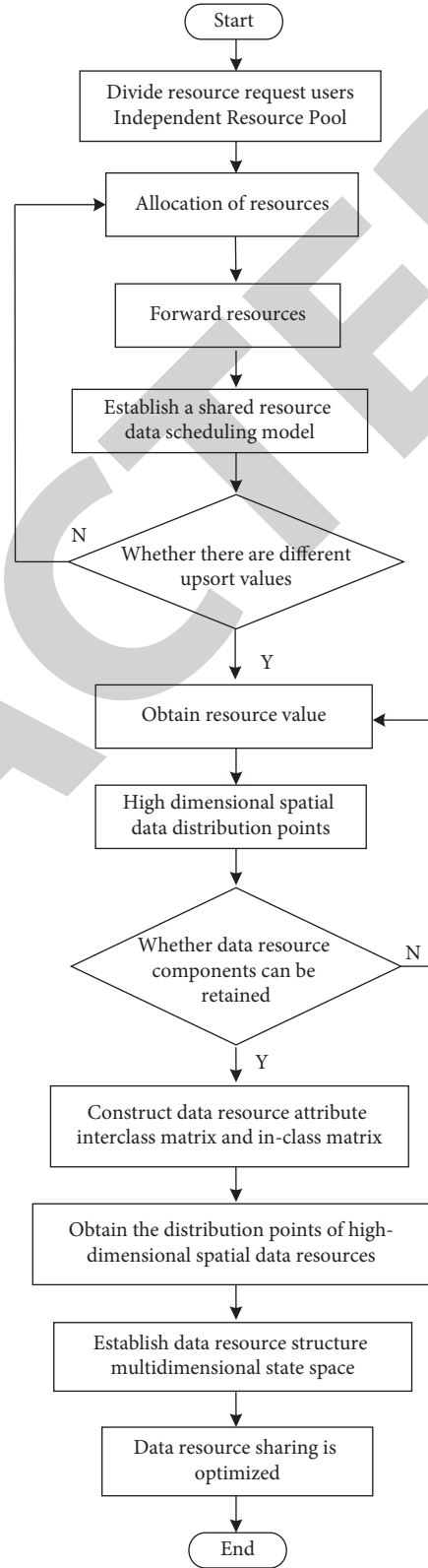


FIGURE 3: Detailed flowchart.

resource sharing method, we should achieve high success rate and low average delay as much as possible. In addition, lower communication cost and higher efficiency should be realized. Therefore, this method is compared with the

TABLE 1: List of simulation parameters.

Parameter name	Parameter value
Network layer protocol	WAVE short-message protocol
Range of communication	250 m
Number of query messages	500-1000
Size of each English teaching resource	10 MB
Number of nodes	20-100
Memory size	256 GB
Data transfer rate	100 Mbs

methods in literature [8, 9] to verify the performance of the designed method.

The implementation process of distance English teaching resource sharing method based on Internet O2O mode is shown in Figure 4.

According to the above process, the success rate, communication cost, and unit throughput of distance English teaching resource sharing method are set, and the results are as follows.

The success rate is defined as the number of resources successfully obtained by the source user, divided by the total number of query messages of the source user. The results of query message quantity and success rate of different methods are shown in Figure 5.

As can be seen from Figure 5, the success rate of the proposed method is higher than that of the two methods in the literature. In the proposed method, more than 90% of the resources are successfully obtained, which shows that the proposed method has a high query success rate and is more suitable for practical application.

The communication cost is defined as the total number of messages sent; efficiency is defined as the number of resources successfully obtained by the source user divided by the communication cost. The comparison results of communication costs of different methods are shown in Figure 6.

As can be seen from Figure 6, compared with the two methods in the literature, the method proposed in this paper has lower communication cost. It can be seen from the figure that the communication cost of the method in reference [9] is low, but combined with the average delay results in 3.2, it can be found that it cannot be used as a good resource sharing method.

Unit throughput refers to the average successful packets sent in the network per unit time after the experiment. Figure 7 shows the change of network unit throughput with the change of data volume in different data quantities.

As can be seen from Figure 7, with the increase of the amount of data, the average throughput in the network shows a decline in varying degrees, but the method proposed in this paper is always maintained at the top, indicating that the proposed method has more transmission processes with higher average transmission rate, so as to improve the total number of successful data packets shared by distance English teaching resources in the network.

To sum up, the designed remote English teaching resource sharing method based on Internet O2O mode has a high query success rate and low communication cost. With

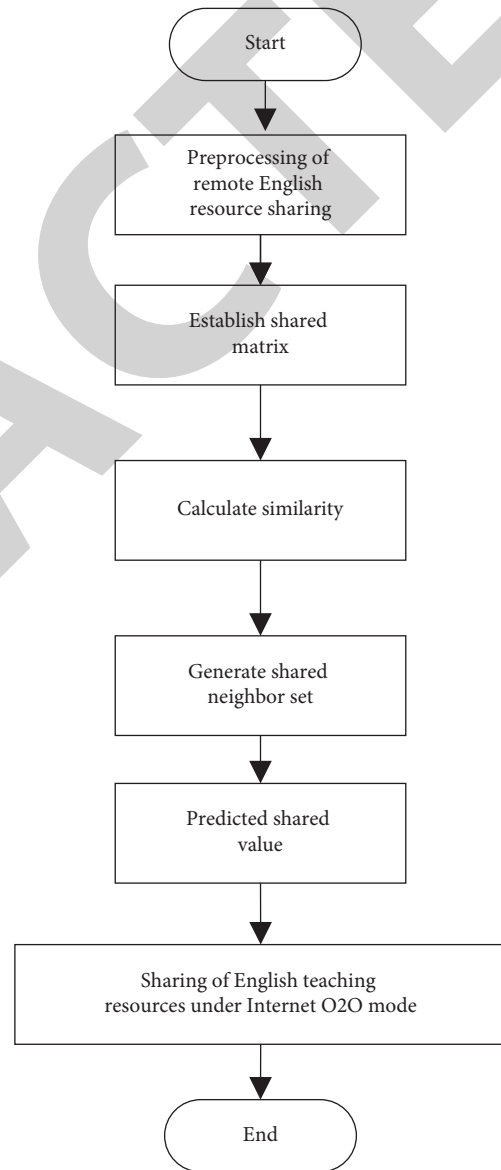


FIGURE 4: Implementation flowchart of distance English teaching resource sharing method.

the increase of the amount of data, the average throughput in the network shows a downward trend, which improves the total number of successful data packets of remote English teaching resource sharing and transmission in the network, and has a good effect.

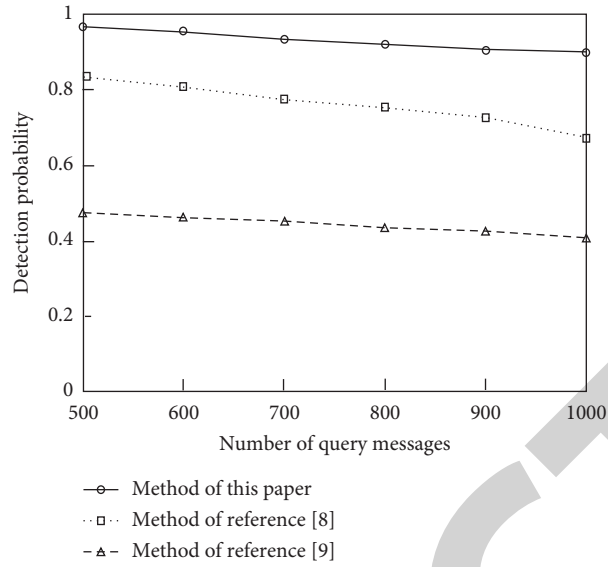


FIGURE 5: Comparison of success rates of different methods.

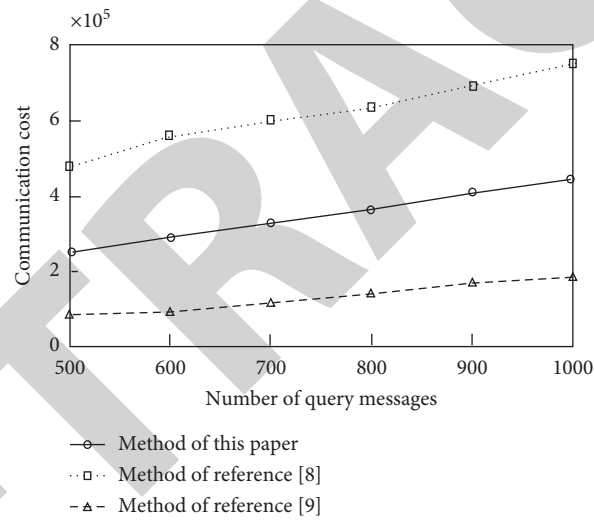


FIGURE 6: Comparison results of communication costs of different methods.

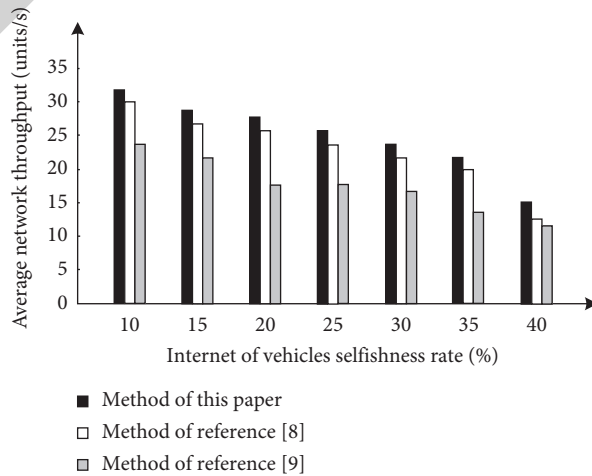


FIGURE 7: Average network throughput.

5. Conclusion

In order to solve the problems of low success rate, high delay, and high communication cost in Distance English teaching resource sharing, a distance English teaching resource sharing method based on Internet O2O mode is proposed. The experimental results are as follows:

- (1) The resource sharing method of distance English teaching based on Internet O2O mode can achieve high success rate of resource sharing and low communication cost
- (2) It can ensure that the sharing process has high sending efficiency and provides a certain reference for the sharing of distance English teaching resources

The sharing methods of distance English teaching resources are still developing, and various types of markets are gradually opened. The methods need to be optimized according to the development of Internet O2O mode, so as to truly and accurately provide the basis for the sharing of distance English teaching resources. In the following work, we study the security and omnipotence of sharing in order to further optimize the sharing performance of distance English teaching resources.

Data Availability

The raw data supporting the conclusions of this article will be made available by the author, without undue reservation.

Conflicts of Interest

The author declares no conflicts of interest regarding this work.

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