

Retraction

Retracted: Exploration of Using Modern Information Technology to Realize College English Distance Teaching

Scientific Programming

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1].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, "Exploration of Using Modern Information Technology to Realize College English Distance Teaching," *Scientific Programming*, vol. 2021, Article ID 3317549, 8 pages, 2021.

Research Article

Exploration of Using Modern Information Technology to Realize College English Distance Teaching

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China is gradually evolving to a knowledge-based society of computer information technology, knowledge economy, and learning. The modern information construction of college English is to realize the distance teaching of College English with the help of modern information technology, which is conducive to the continuous development of network education in China in the direction of modern information. This paper summarizes the research objectives and contents of college English modern information technology construction. We analyze the significance of implementing college English modern information technology and realize distance teaching. We put forward important measures for college English information technology to realize distance teaching, in order to bring some reference to relevant professionals. Finally, the sharing of high-quality educational resources will be realized, so as to provide reference for further improving the situation of rural English teaching.

1. Introduction

Realizing the modernization and informatization of English in colleges and universities is a long-term and complicated project, which requires a holistic grasp of various education, teaching, and management aspects. Firstly, the research content of modernized information technology construction of English in colleges and universities is mainly to implement the overall plan of English infrastructure construction and promote the construction of English education in China in the direction of internationalization and openness. Secondly, in the process of distance education design planning and implementation, the construction of computer network center information technology should be sound, and the network structure and functions of English system should be given full play to make English professional courses more optimized. Finally, in the process of digital audiovisual teaching resources rectification, the advantages of information-based education should be brought into play to establish academic and distance education literature databases and multimedia electronic reading rooms. English teaching, teaching, and student management should be carried out through computer networks, and paperless

examinations should be implemented, so that online distance education can face a wider group and have a broader development space.

From the perspective of modern distance and open education, the implementation of distance education resource management can effectively integrate various teaching resources, better realize the talent training mode and reform mode of English majors, and explore a more developed teaching resource management mode. The scientific classification and storage of English education resources can help English resources in colleges and universities move toward the goal of clear resource management. Compared with traditional English teaching carriers, distance learning materials are more extensive, changing the old way of single variety and boring classroom mode, and making classroom teaching more vivid through the use of modern information technology. Whether in terms of the variety and quantity of educational resources or technical content, it has broken through the drawbacks of traditional English teaching and guided students to fully use online network education platforms or other media for independent learning. Therefore, English in colleges and universities must strengthen the construction of information

technology, realize distance learning, and improve the quality of teaching, which can use “online English,” “online VOD,” “catechism,” “micro-class,” and so on. We can use various teaching methods, such as “online English,” “online VOD,” “catechism,” and “micro-lesson,” to make up for the inconvenience of students’ learning in the traditional way, broaden the channels of students’ knowledge, and help them search for more learning resources. Through information technology, we try to increase students’ use of distance education resources and increase the weight of English teaching in resource management in universities [1].

With the development of modern technology and the popularity of the Internet, Internet technology has been widely used by many schools in the teaching process. The combination of computer Internet and junior high school English teaching is the key research direction of today’s English teaching reforms. The combination of these two has enriched the teaching mode and brought great convenience to teaching. As teachers, we should take the attitude of innovation and development, combine effective information technology tools, update the teaching mode in time, continuously stimulate students’ learning enthusiasm and motivation, and help rural students improve their English master learning ability. Xu Z. and Shi Y. [2] find a series of problems in English teaching in rural secondary schools in the context of the Internet, and on this basis, they discuss the innovative use of flipped classroom teaching in junior high school English textbooks and explore the flipped classroom teaching model using “Internet +” means.

In taking advantage of the flipped classroom teaching model to transform the traditional teaching process, we find that this new model can improve the current drawbacks of English teaching and greatly increase students’ motivation to participate in English learning, which has positive significance in improving the quality of English teaching and students’ ability to master English. Shyamlee S. D. [3] emphasizes that teachers can make effective use of the Internet to improve the quality and teaching efficiency of junior high school English classes. Micro-lessons, online question and answer sessions, and online question banks are used in the classroom to promote students’ motivation in the learning process and to lay the foundation for students to develop independent learning habits. Students can learn through the Internet, which can improve the efficiency of students in the process of prestudy and review and is also important to enhance students’ learning motivation. Du Y. [4] points out that in the era of information technology, new education models such as micro-class, catechism, and flipped classroom have emerged, which are valued by experts and scholars and loved by students. This new education model can provide students with the opportunity to learn independently anytime and anywhere and improve the mastery and application of knowledge, and this new education model is also the main trend of China’s education development.

In English in colleges and universities, the implementation of education and the development and application of information technology in distance education opens up a broader space for the development of modern

education for English teaching in colleges and universities. On the one hand, the use of modern information technology to realize distance learning can effectively help the distance learning of English in colleges and universities to be more Chinese and distinctive, and the teaching contents to be more open and diversified, which can lay a good technical guarantee for the development of distance learning in China [5]. On the other hand, it can effectively provide scientific theoretical basis for the development and application of distance education and do a good job of typical demonstration, which has a strong guiding role for the development planning and practical application.

The rest of the paper is organized as following. In Section 2, we present an overview of the system and its implementation. Section 3 discusses the experimental setup, the experiments, and the results, and Section 4 is the conclusion of the research study.

2. Methodology

In this section, we are going to discuss the structure and the implementation of the smart campus in detail.

2.1. Remote Implementation. Smart campus is a college English that evolves based on the development of digital campus. Compared with the traditional digital campus, college English can provide various services more quickly, flexibly, and economically and is a new model for the development of college education informatization [1].

The infrastructure involved in the construction of the English network in colleges and universities is wired and wireless networks and mobile network environments. On this basis, the existing network infrastructure is integrated through intelligent promotion, and the Internet of Things (IoT) system is established to build a sensing network environment. To support the massive data storage and high-speed computing environment of college English, the existing data center, one-card system, IDC room, and storage environment are integrated with virtualization technology to establish a cloud service platform to support college English network.

The construction of intelligence needs to be considered from several aspects such as building a physical resource base, building a base platform using physical servers, storage devices, and network devices. Virtualization technology helps to achieve the physical integration of devices. Thereafter, computing resources will no longer be limited to the physical scope.

Firstly, English teaching in colleges and universities needs a ubiquitous and convenient network environment on which to build a system that supports various smart terminals, facilities, and devices (IoT system) and secondly, to establish global big data, including storage environment and computing environment, and to provide data and computing support for smart campus [4]. Smart campus structure is shown in Figure 1.

The construction of smart campus can be divided into the construction of four subplatforms (see Figure 1 for its

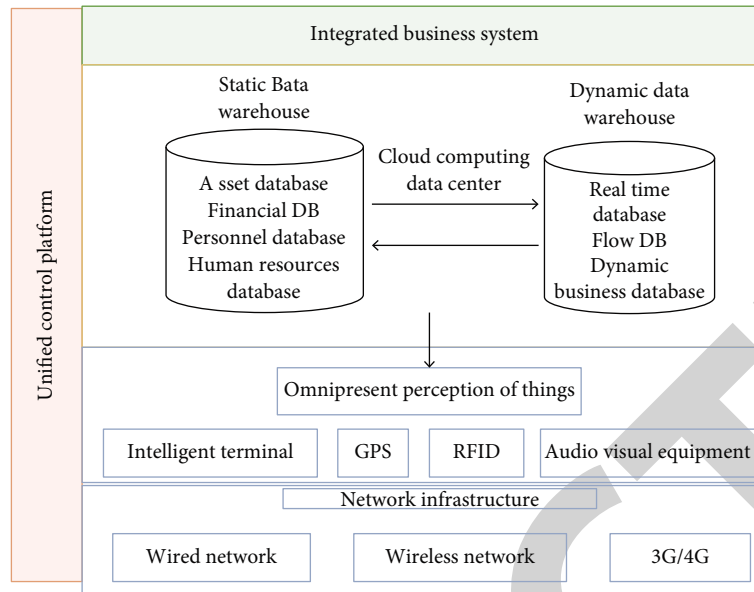


FIGURE 1: Smart campus structure.

structure): first, the construction of basic network infrastructure, the construction of high-speed Internet, and the interconnection of wired and wireless networks; second, the construction of Internet of Things system including all equipment, facilities, and intelligent terminals of various facilities based on ubiquitous network; third, the construction of cloud computing and cloud storage data fusion platform to provide data services; and fourth, the construction of various application and service platforms adapted to the English needs of colleges and universities. The construction of campus network infrastructure is basically mature. The key to the construction of English in colleges and universities at this stage is the establishment of IoT system and cloud stack. The rest of this paper mainly analyzes the above two aspects.

2.2. Specific Implementation. Network architecture is an important factor that must be considered in cloud data center design. It can provide sufficient protection for a highly scalable cloud data center and high resource utilization. The network infrastructure of a cloud data center needs to be virtualized, integrating existing equipment with newly purchased equipment to build an open, secure, easy-to-maintain and manage elastic cloud service. The data center will be transformed into a scalable, converged computing infrastructure. Ethernet is the network technology adopted by important data centers for its good scalability and efficiency [3]. The design of the cloud campus platform mainly includes a cloud storage platform and a cloud computing platform, and its architecture is shown in Figure 2. The campus network is protected by a firewall as shown and connected to the services and the Storage Area Networks (SANs). SAN is a specialized, high-speed network that provides network access to storage. SANs are composed of hosts, switches, storage elements, and storage devices that

are interconnected using different technologies, topologies, and protocols.

The cloud storage area is an important part of cloud computing, undertaking important tasks such as storage, operations, and disaster recovery [6]. The data center consists of Net-APP, Infotrend, and four sets of HDS storage devices, with two additional new devices planned to be purchased for integration into a pool of storage resources. After this process, it can provide the following services, such as assembling capacity allocation, resource provisioning, and data transfer capacity. The main storage area consists of two newly purchased storage devices and one existing web application storage device, which will be placed in the IDC room of the network center. In addition to this, the other two existing storage devices in the library computer lab will be considered for remote disaster recovery. Fiber optic connection between the mainframe and the backup storage is used for real-time synchronization. By using flat network structure, centralized optical switching framework, and WDM fiber virtualization technology, multiple heterogeneous storage device pools are integrated into one storage resource pool to provide transparent services for various applications.

3. Performance Test

In this section, we will take about the campus setup and classroom teaching management, students positioning data, and its processing to test the effectiveness of the proposed approach.

3.1. Online Classroom Teaching Situation. In order to study the current situation of online classroom teaching, this paper conducted a study on online classroom teaching. Through a survey on the use of online courses in five universities in

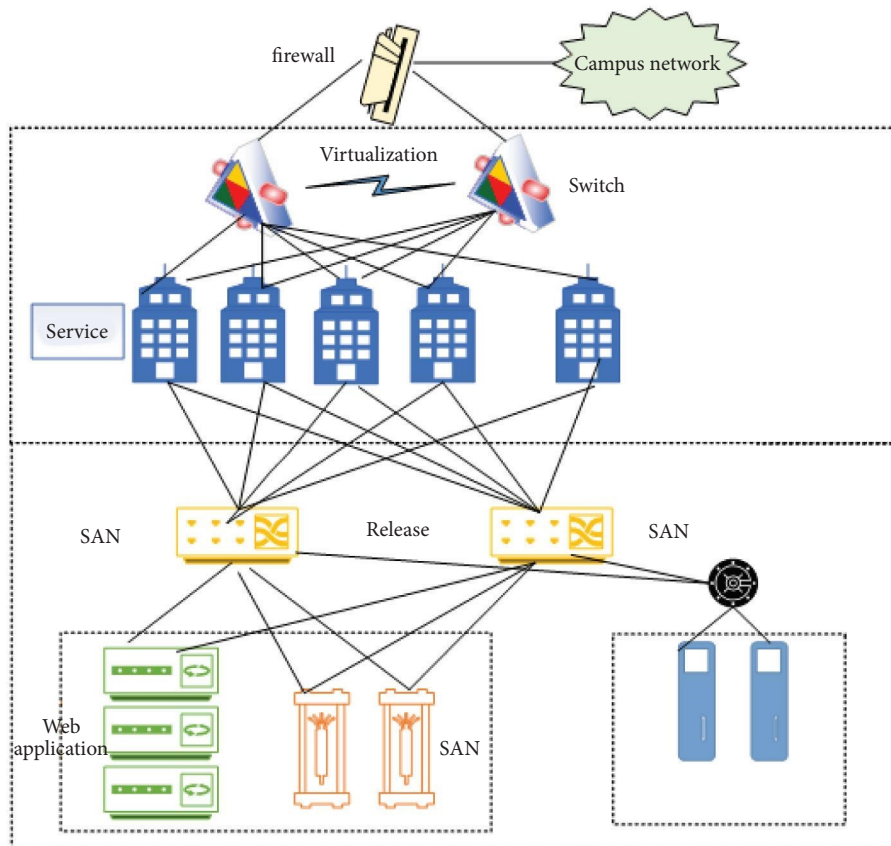


FIGURE 2: Cloud service platform structure.

China, the start time and number of online courses in each university were obtained, as shown in Figure 3.

Starting in late 2016, colleges and universities began offering their own online teaching courses, and this explosive growth in the second half of 2017 suggests a huge crescendo in demand for online classes. It demonstrates that the demand for online teaching courses is widespread. By June 2018, the number of online teaching courses at the five schools had gradually stabilized [7]. This is the result of 4G limitations. It is conceivable that the number of online teaching courses will further increase with the combination of 5G network technology and online teaching platforms. In this case, combining 5G network technology with online teaching platforms will greatly improve education [8].

3.2. Collection and Processing of Student Location Scene Information. Student positioning scenario information can be divided into two major parts, that is, the acquisition of indoor and outdoor positioning information. The indoor location information is collected using RFID-based indoor positioning technology, and the outdoor location information is collected using GPS positioning sensors of mobile terminals. Among them, the purpose of collecting indoor location information is not only to determine the specific location of students who log in during class but also to prevent some students from logging into the system outside of class. Outdoor location information is collected to obtain

the location of students who do not log in during class in order to send them reminders [9].

In order to obtain location information, a simple arrangement in the classroom was required. Four readers are assigned in the four corners of the classroom, and 16 reference tags are evenly distributed in a square space around the readers. In addition, Radio Frequency Identification (RFID) tags are distributed to all students in the class in advance [10].

If the GPS signal collected by the GPS sensor of the mobile terminal is strong, and the received signal strength indication (RSSI) value of the RFID tag on any two readers is particularly weak or has no RSSI value, the student user is judged to be outside the teaching building, that is, outside the classroom. If the GPS signal is weak and the RSSI value of the RFID tag on any three readers is strong, the student user is judged to be in the classroom inside the reader. If the GPS signal and the RSSI value on each reader are weak, it is judged that the student is inside the teaching building but outside the classroom; that is, they are on the floor of the teaching building [11, 12].

The VIRE algorithm uses the principles of the LAND-MARC algorithm and introduces the concepts of virtual reference markers and neighborhood mapping. The key idea of VIRE is to gain more accurate positions of tracking objects by filtering out the unlikely positions while adding no extra reference tags. LANDMARC is a location sensing system that locates objects using RFID technology. The

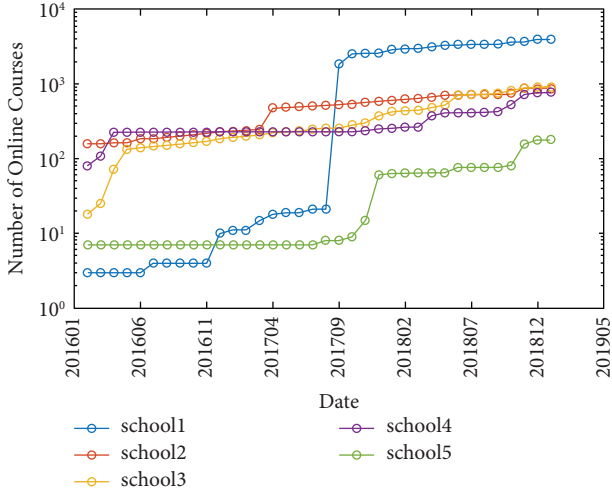


FIGURE 3: Course start time and number of courses in universities.

analysis shows that the location accuracy of the landmark algorithm depends heavily on the number of reference tags. However, adding too many reference tags will not only increase the early cost of the tags but also increase the density of the tags will have a great interference with the signals of the tags, which will adversely affect the positioning accuracy [13]. Based on this, the concept of virtual reference tags Killly:interpolation method is proposed to apply the signal strength values of virtual reference tags for estimation and use these virtual reference tags as actual reference tags for later calculation and localization. The localization model of VIRE localization algorithm is shown in Figure 4.

In the positioning model of VIRE algorithm, four readers are distributed in the four corners of the space, and the reference labels are evenly distributed in the space. The general idea of VIRE algorithm is to regard every four actual reference labels as a unit grid and then further divide them into $N \times N$ small grids, that is, insert (4) virtual reference grids, that is, insert (4) virtual reference labels in every four actual reference labels. The layout of virtual reference labels is shown in Figure 5. The labels shown are uniform and equally spaced. Since the coordinates of the actual reference labels are known, the coordinates of the virtual reference labels are easy to calculate, which is equivalent to adding a lot of references to the tagging algorithm in LANDMARC. We can get the RSSI values of the grid virtual reference tags by using the RSSI values of the actual reference tags and linear interpolation.

The VIRE algorithm is the same as the LANDMARC algorithm. The nearest neighbor reference tag is selected based on the difference between the field strength value of the tag to be located and the field strength value of the reference tag. The difference is that the VIRE algorithm introduces a threshold value, marking as 1 those locations where the difference between the field strength values of the tag to be located and the reference tag is less than the threshold value and marking as 0. Thus, those locations marked as 1 constitute a fuzzy map. Since each reader has its own fuzzy map, the intersection of these fuzzy maps yields the nearest neighbor reference tag, that is, the

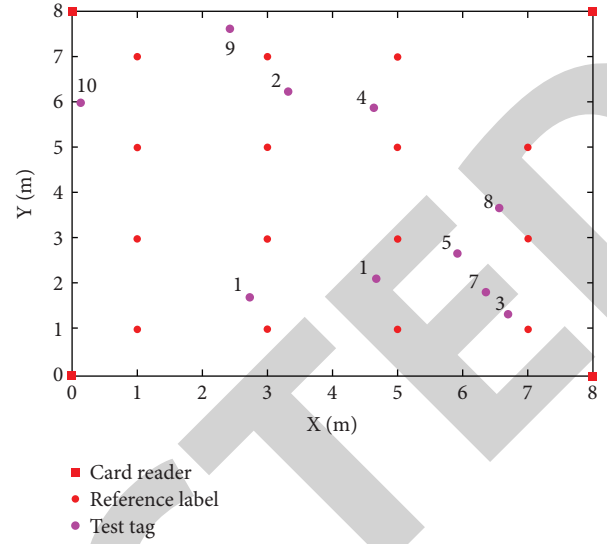


FIGURE 4: Virtual positioning.

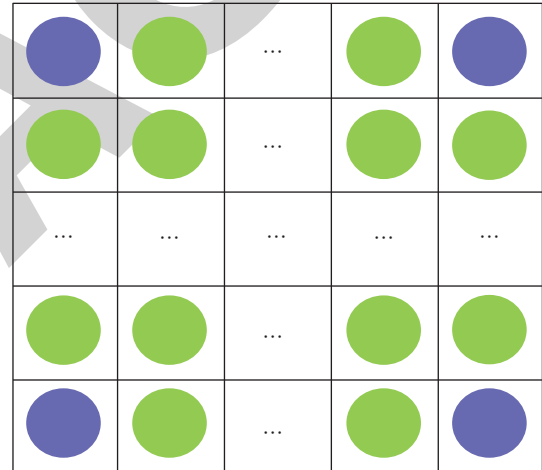


FIGURE 5: Layout of the virtual reference marker.

reference tag represented by the location of 1 in each fuzzy map.

In addition, the VIRE algorithm uses the same weighting factors as the LANDMARC algorithm in calculating the position coordinates of the tags to be located. The difference is that the number of weight factors of the VIRE algorithm is increased from one to two factors of the LANDMARC algorithm. The two weight factors are calculated by

$$w_{1i} = 1 - \sum_{p=1}^K |S_p(T_i) - S_p(R)| / K \times S_p(T_i). \quad (1)$$

$$w_{2i} = \frac{p_i}{i = 1 \sum_{i=1}^{n_a} p_i} = \frac{n_{ci}}{\sum_{i=1}^{n_a} n_{ci}}, \quad (2)$$

where in w_{1i} , $S_p(T_i)$ indicates the RSSI value of the reference tag on the PTH reader. $S_p(R)$ denotes the RSSI value of the location tag hung on the p-reader. The total number of readers is K . w_{2i} is related to the number of distributed

virtual reference tags (i.e., density). p_i denotes the ratio of adjacent regions connected in the space of the region to be located. n_{ci} is the number of adjacent regions, and n_a is the total number of adjacent regions.

Finally, the idea of calculating the position coordinates of the localization tags to be processed is the same as the LANDMARC algorithm. The product sum of the weight factor and the position coordinates of the nearest neighbor tags is calculated as follows:

$$(x, y) = \sum_{i=1}^{n_a} W_i (x_i, y_i). \quad (3)$$

$$W_i = W_{1i} \times W_{2i}. \quad (4)$$

Improved VIRE algorithm positioning model is as follows. Due to the low positioning accuracy of VIRE algorithm, this paper uses the following improved VIRE algorithm to obtain the specific coordinate location of student users in the classroom.

The original VIRE algorithm uses thresholds and fuzzy mappings to find the intersection to get the last nearest neighbor reference tag. The specific idea is that the position where the difference between the field strength value of the label to be located and the reference label is lower than the threshold value is marked as 1 instead of 0. Using k readers corresponding to k fuzzy mappings, the intersection of k fuzzy mappings is calculated to get the optimal nearest neighbor reference label. In this process, the selection of the threshold value is more important. If the threshold value is too low and the number of positions marked as 1 at the intersection of k fuzzy mappings is too small, some valid nearest neighbor reference labeling results will be lost. If the threshold value is too high and the number of locations marked as 1 is too large, the redundant location information cannot be removed effectively, resulting in inaccurate final localization results. In order to prevent the above situation, the concept of threshold interval is proposed [14–16].

First, the initial threshold interval $[a, b]$ is set to a larger interval. Next, the number of positions marked as 1 is checked from the intersection of the fuzzy mappings during the runtime. Then, the threshold interval is dynamically transformed using (5) so that the number of positions is controlled between the interval $\{4, 5, 6\}$. Then, the integers in the threshold interval are taken as the thresholds of the improved algorithm, respectively, to calculate the position

coordinates of the tags to be located. Finally, the average value of the tags to be positioned under these thresholds is calculated as the final position coordinates.

Set the interval A and interval B belonging to the next set, respectively, and evaluate from left to right from the sets to which A and B belong:

$$[a_1, b_1] = \begin{cases} [a, b] + A & \text{num} \leq 3 \\ [a, b] + B & \text{num} \geq 7 \end{cases} \quad (5)$$

$$(A \in \{-1, 0, [0, 1], [-1, 1]\})$$

$$(B \in \{[1, 0], [0, -1], [1, -1]\}).$$

Here, $[a_1, b_1]$ is the new threshold interval after the transformation of the threshold interval. After applying the threshold interval, the threshold does not have to execute the ‘++’ procedure every time during the algorithm operation but can execute ‘++’ or ‘-’ at the upper and lower limits of the threshold interval, respectively, making the threshold transformation more flexible and convenient.

Weight factor correction is as follows. From (5), it is clear that w_{1i} decreases with the increase in the number of $\sum_{p=1}^K S_p(T_i) - S_p(R)/K \times S_p(T_i)$. In addition, if the first weight factor obtained by (1) is used to calculate the position of the final label to be located, the error is relatively large, while the variance equation (6) is the correct match: the smaller the variance, the smaller the fluctuation range of the data and thus the smaller the localization error. Based on this, a new weighting factor calculation method is proposed, and the formula is shown in (7):

$$\sigma^2 = \frac{\sum (x - \mu)^2}{N} = \frac{w_{1i}'^2}{K \times S_p(T_i)}. \quad (6)$$

$$w_{1i}'' = \frac{1}{w_{1i}' \times w_{1i}'} n. \quad (7)$$

As mentioned above, $w_{1i}' = \sum_{p=1}^K S_p(T_i) - S_p(R)/K \times S_p(T_i)$, $w_{1i}'' = \sum_{p=1}^K S_p(T_i) - S_p(R)^2 / (K \times S_p(T_i))^2$; it can be concluded $1/\sigma^2 = K \times S_p(T_i)/w_{1i}'^2 = w_{1i}'' \times (K \times S_p(T_i))$ and that the use of w_{1i}'' replacing the first original weighting factor w_{1i} can relatively reduce the error of the positioning labels to be processed.

w_{2i} is still given by (2). Therefore, at this time, the weight factor of the nearest neighbor reference label is calculated as

$$w_i = w_{1i}'' \times w_{2i} = \frac{1}{w_{1i}' \times w_{1i}'} \times w_{2i} \quad (8)$$

$$= \frac{w_{2i}}{\sum_{p=1}^K (S_p(T_i) - S_p(R)/K \times S_p(T_i)) \times \sum_{p=1}^K (S_p(T_i) - S_p(R)/K \times S_p(T_i))}$$

Based on the improved VIRE algorithm described above, it is possible to determine that each pending location tag is a specific location coordinate of a student user in the

classroom. When the student user at that coordinate location needs to ask a question online or is in a dozing state, the system sends him/her the necessary alert message.

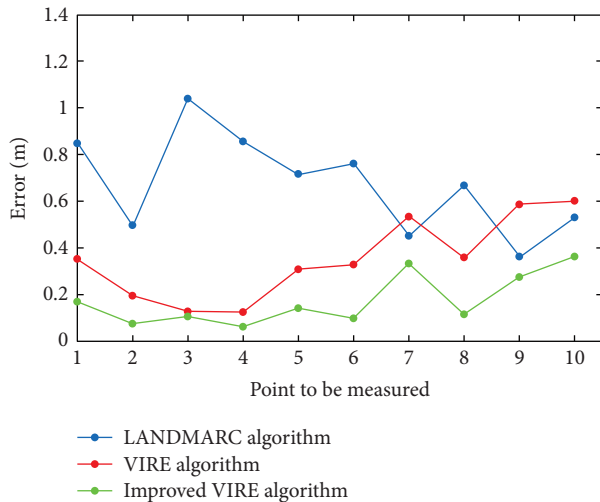


FIGURE 6: Positioning error of different algorithms.

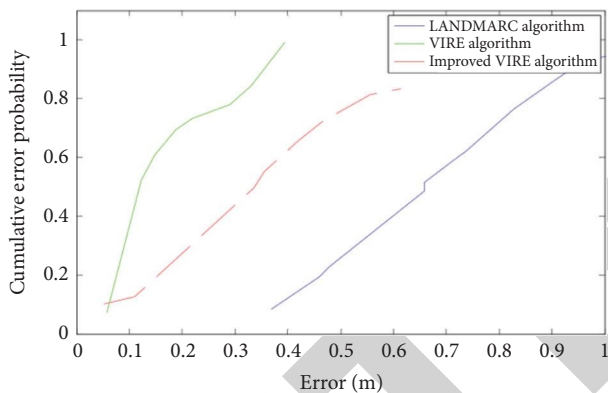


FIGURE 7: CDF error curves fitted by different algorithms.

Positioning error of different algorithms is shown in Figure 6. CDF error curves fitted by different algorithms are shown in Figure 7.

For obtaining location scene information, outdoor information can be obtained through the built-in GPS sensor of android system. Android system's built-in class location manager can locate the phone. For indoor location scene information, RFID is used to determine the specific location of students. The specific method is the improved VIRE algorithm. Figures 6 and 7 show the comparison of the VIRE algorithm with the VIRE algorithm and LANDMARC algorithm for positioning error.

From Figure 6, it can be seen that the average localization error of the tags to be located estimated by the improved algorithm is the smallest. Among the 10 tags to be positioned, the average positioning error of the LANDMARC algorithm is 0.6732 m, the average positioning error of the VIRE algorithm is 0.3517 m, and the average positioning error of the improved VIRE algorithm is 0.1738 m, which are 0.5058% and 0.7418% lower than the previous two algorithms, respectively.

By comparing the localization error of the improved VIRE algorithm with the VIRE algorithm and the LANDMARC algorithm through the analysis of Figure 7, it is concluded that the improved VIRE algorithm has the smallest error and the best result. Compared with the traditional VIRE algorithm, the improved VIRE algorithm has a greater advantage in accuracy, but the determination time of the threshold value is longer. Therefore, the VIRE algorithm is suitable for problems with high localization accuracy and short running time. Therefore, it is more suitable for locating students in specific positions in schools or employees.

4. Conclusions

The modernized information construction of English in colleges and universities is to realize the distance teaching of English in colleges and universities with the help of modern information technology, which is conducive to the continuous development of China's online education in the direction of modern information technology. This paper outlines the research objectives and contents of the modernized information technology construction of English in colleges and universities, analyzes the significance of implementing modernized information technology of English in colleges and universities to realize distance learning, and proposes important measures to realize distance learning of English in colleges and universities with the aim of bringing certain reference and reference to relevant practitioners. The study aims to achieve the sharing of high-quality educational resources and to provide reference for further improvement of English teaching in rural areas.

Data Availability

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

Conflicts of Interest

The author declares that he has no conflicts of interest.

Acknowledgments

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