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Research Article

Design and Implementation of Intelligent English Electronic Dictionary System Based on Internet of Things

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In this paper, the intelligent English electronic dictionary system is studied to design and implement the electronic dictionary system according to the advantages of the Internet of Things. The software architecture, the design, and implementation of the client and server-side and related technologies in the development process of the dictionary application are used as the research content to comprehensively discuss the development process of the electronic dictionary. The client and server-side is based on C/S technology architecture, and the server-side is a standard Maven Web project, which is managed by Maven and does not cause conflicts; the model-view-controller framework is built using Spring MVC to achieve the separation of user interface and application logic. Spring MVC is used to build a model-view-controller framework to separate user interface and application logic. Spring dependency injection is used to build a loosely coupled project, which helps to separate project components; Spring Data JPA is used to build a persistence layer to facilitate data access and maximize the developer's ability to automatically realize logical operations on data. After the overall performance test of the system, the performance is good under the platform, and the intelligence of trilingual word query is achieved, and the quickness and ease of use meet the requirements that can be applied.

1. Introduction

With the continuous development of modern human information society and the progress of high-tech innovation level, various new smart wearable devices have entered our daily life, and human society has completely entered the information age [1]. With the development of modern mobile Internet and network communication technology, the functions of smartphones are also becoming increasingly powerful. Internet of Things (IoT), a new and promising technology, deals with several devices that interact through the Internet, ensuring that smart terminals such as wearables, sensors, and cell phones can be connected to smart nodes that can communicate with each other [2]. The Internet of Things interconnects "objects" and enables machine-to-machine (M2M) communication, which means that heterogeneous devices can communicate with each other without human intervention [3]. Given the recent advances in ubiquitous computing technologies, there are many IoT applications for different environments that promise to enhance and improve the quality of users' daily lives, such as smart homes, smart cities, smart industries, and smart healthcare, which have different characteristics and they also have different latency and data rate requirements. For offline word search function depends on the local dictionary, and the update of local dictionary depends on the server-side update, this update process is usually slow and the update method is relatively simple, directly replacing the original dictionary. To achieve value-added services, many dictionary software provides article translation but charges for the high-quality translation provided, and there is also the phenomenon of checking the nondesired and poor quality of explanation. In addition to the core word search function, customer needs are positioned differently, too many advertisements or fees are pushed, and user experience is poor, so the software has limited vitality [4].

Users can create multiple dictionaries to enable multilingual search functions. By entering entries, definitions, and example sentences for different thesauri, multilingual word search is possible. Also, the user can view the collected vocabulary off-site, i.e., after changing devices and logging in, which is convenient for the user [5]. Also, most of the current papers on electronic dictionaries are limited to discussing the implementation of the client-side functions and do not discuss the server-side implementation in detail. In this paper, in addition to introducing the client-side functions, a feasible solution is given for the server-side implementation. The software should be based on the principle of saving memory and blocking advertisements, thus increasing the vitality of the software. The specific measure is to use tab layout to achieve convergence when implementing client-side functions, with each tab corresponding to a functional module, thus reducing the amount of program code [6]. Different applications in the IoT environment can use small base stations to reduce the traffic load from macrocells, fill the coverage blind spots of macro base stations, significantly increase the system capacity, and improve the energy efficiency of the whole network. Also, small base stations are considered as an effective solution for handling massive data traffic in next-generation cellular networks due to their low transmission power and small size, which allow flexible site acquisition and thus are more cost-effective than traditional macro base stations in meeting the same traffic demand.

An IoT application traffic detection method based on deep learning. This method uses Wireshark for structured data storage of traffic data packets on IoT devices and cuts and filters Pcap traffic packets using the Split Cap tool to obtain different cuts of traffic packets Samples and, then, convert the traffic data with different fragment sizes into a binary graph file representation, and a more accurate application traffic identification can be obtained through the deep learning method. Therefore, a set of three-dimensional dense network planning schemes is needed to meet the coverage demand, capacity demand, and communication quality demand of users in a certain planning area, minimize the cost, and quickly and effectively deploy small base stations in dense network scenarios. In recent years, the network electronic dictionary based on modern multimedia network technology has been different from the traditional dictionary in form. Therefore, the main functions and technical advantages of the system include text fuzzy automatic query, automatic language recognition, fast automatic search, automatic database storage, and smartphone adaptation. It can provide good language communication language, and culture education is the most important component of its core. The current development of education in the history of higher education is in the beginning and development stage, higher education and facilities gradually improved, a higher level of postgraduate students at the higher education level, the proportion of postgraduate students in the total number of rising, and examples of the application of the dictionary, for the promotion of interethnic language and culture exchange and development has a positive role and significance.

2. Analysis of IoT Intelligent English Electronic Dictionary System

2.1. Related Work. As we all know, before the emergence of electronic dictionaries, people used a lot of paper-based word search tools. In terms of Chinese-English dictionaries, there are various versions of dictionaries, such as the Longman Dictionary [7]. Traditional paper-based tools are very inconvenient; in this case, people began to develop electronic dictionaries like calculators [8]. This hardware-based electronic dictionary has a display screen and an input keyboard and is relatively small and easy to carry [9]. The electronic dictionary of this period mainly provides simple words or phrases interpretation. With the development of electronic hardware technology, the computing speed and storage space of hardware electronic dictionaries have also been greatly improved, and there are electronic dictionaries with richer contents and more complete functions on the market. The users of electronic dictionaries are mainly young students [10]. It is launched by some traditional English learning websites, such as Jinshan Word Search. It provides online network word search and provides a simple offline word search function [11]. With China's full access to the Internet, computers became popular and more people started to use PCs to look up information from the Internet [12].

The current development technology of electronic dictionaries mainly uses Android [13]. Many scholars are concerned with the structure of the lexicon as well as the speed of word search, for example, studies based on the construction of word structures between three languages and studies on how to speed up the establishment of indexes carried out by word search [14]. Some foreign scholars on electronic dictionaries also focus on lightweight usability, which plays an auxiliary role in learning, and some applications oriented to special education, which tend to use machine learning methods in the development of technology [15]. Some companies that traditionally provide online translation provide APPs for free download to attract more users, such as Jinshan Word expert and Yadao Dictionary [16]. In terms of core functions, the current electronic dictionaries implement functions such as local word search, online word search, adding new words, and network word search [17]. Also, many electronic dictionaries have some special features. For example, word memorization function, article translation function, and human translation function.

The electronic dictionary discussed in this paper is developed based on the Android platform and is implemented using a combination of Java and MySQL, and the software is divided into a client-side as well as a server-side. To improve the viability of the software, the running efficiency of the client-side is increased based on the principle of memory saving.

2.2. IoT-Based System Design. Capacity and coverage are two key objectives for base station deployment, and the general base station deployment planning process in cellular networks starts with an analysis of the propagation model and traffic density in the target service area. The former is used to measure power coverage, where the goal is usually to ensure that the received power of users in a given area is above a threshold to correctly demodulate the expected information in a worst-case scenario, and the latter is used for capacity coverage, where the goal is that sufficient throughput can be provided for the users covered by the base

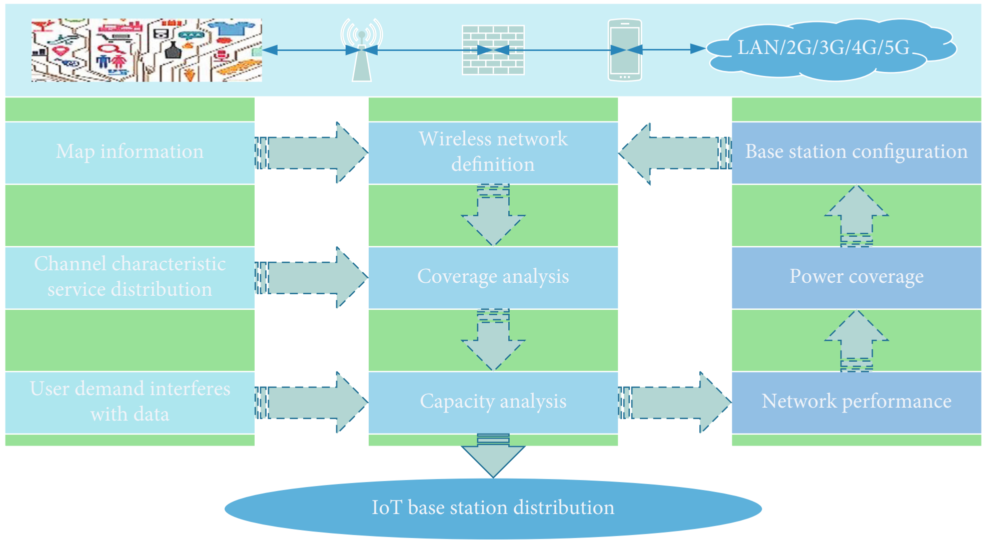

FIGURE 1: Flow chart of IoT base station deployment method.

station in a given area [18]. Both objectives should be achieved in the base station deployment to provide QOS-guaranteed service to the users, and from the overall system perspective, the deployment cost of the system will be minimized if both coverage and capacity can be optimally planned. However, compared to power coverage planning using proven propagation models and field measurements, capacity planning is more challenging because the traffic demand distribution is inherently dynamic and depends on user usage patterns and mobility.

The base station deployment process is shown in Figure 1. First, in the process of wireless network definition, suitable candidate sites are selected, and relevant base station parameters are configured according to the input map information; then, channel characteristics and service distribution are input, and suitable channel models are selected for coverage analysis, and then, the capacity analysis is performed according to user requirements, i.e., required data rate and interference. When the coverage and network performance cannot reach the standard, the iterative process is repeated to adjust the location and number of base stations until the coverage and network performance meet the demand, and then, the base station deployment is completed. The wireless network definition process in the base station deployment process should determine the candidate locations for deploying base stations based on terrain and population density. Coverage analysis is usually achieved by selecting enough sites from the candidate sites to deploy base stations and configuring their parameters to meet the minimum received power demand of users in a given planning area, and capacity analysis is achieved by designing the capacity allocation of base stations to meet all coverage. Capacity analysis is achieved by designing the capacity allocation of the base stations to meet the maximum rate demand of all users in the coverage area. Proper deployment of base stations not only improves the performance of the cellular network but also reduces capacity waste, reduces CAPEX and OPEX, and cost-effectively provides qualified QOS.

The exact method usually uses mathematical modelling or exhaustive search to select the global optimal solution of the base station deployment problem, such as using the simplex method or exhaustive method to find the optimal deployment location of the base station; although the result of this method is theoretically the global optimal solution, it is computationally inefficient for large-scale problems, and usually, an approximate optimal solution is sufficient without sacrificing computation time obtain a globally optimal solution. To balance the accuracy rate and efficiency, a heuristic algorithm can be used for base station planning to find a satisfactory deployment solution in a limited amount of time. Unlike heuristic algorithms, which are problem independent, i.e., do not exploit problem specificity, metaheuristics can be further divided into continuous metaheuristics, which are used to deal with continuous solution spaces, and discrete metaheuristics, which are used to deal with discrete solution spaces; although continuous metaheuristics are only applicable to continuous optimization problems, many researchers have improved them to further deal with discrete problems.

In a dense network in an indoor three-dimensional scenario, due to a large number of small base stations and the high number of floors and walls crossed between small base stations and terminals, the propagation model is chosen in this paper to describe the indoor propagation characteristics in a dense urban environment, with the path loss (in dB) expressed as

$$PL(d_m) = PL(d_0)^2 + 10m \log\left(\frac{d_{su}}{d_0}\right) + AF(D_{su})^2, \qquad (1)$$

where d is the propagation distance between the mobile terminal and the small base station with which it communicates, and F is the near-ground reference distance (recommended to be 1 m) and, therefore, the first-meter loss, when the radio signal frequency is 2.4 GHz.

$$PL(d_0 = 1) = 60\text{dB}. \tag{2}$$

The expression in dB is

$$\text{AF}(d_m) = 10 \log (\mu d_m)^2. \tag{3}$$

U is determined by the environment per unit path length attenuation coefficient, generally taking the value of 0.2~0.7 (dB/m). Therefore, the numerical expression of the path loss can be derived by substituting formula (3.3) into formula (3) as follows:

$$PL(d_{sm}) = \text{K}_{su} d_{su}^{m+1}, \tag{4}$$

$$K_{su}^2 = \frac{u10^{PL(d_0)/10}}{d_0^m}. \tag{5}$$

In the actual network planning scenario, the distribution density of users fluctuates over time and space due to the social attributes of users. In specific hotspot areas, user distribution density fluctuates more over time. For example, user density in residential areas is very high on weekends but smaller on weekdays, in contrast to work areas where user density is very high on weekdays, especially during the day. Later, we can turn on these small base stations during high traffic periods. In the low traffic period, we can also find the minimum number of small base stations that meet the current user demand and their optimal locations. Some of these small base stations have the same locations in the high and low traffic periods, and they have already been deployed in the high traffic period, so later, we only need to deploy some of the small base stations that are only turned on in the low traffic period, and the base stations that are duplicated in the high traffic period only need to be switched on.

The deep learning feature part uses the calculation of the average value of each word feature vector in the text to obtain the sentence feature vector of the same dimension. Since the vector value is in the range of real numbers, there are negative values. In the experiment, the depth feature is normalized to make its value. Both are between 0 and 1; the shallow features use the same combination of words, parts of speech, and dictionary features to obtain the corresponding feature set, and finally, the deep learning features and shallow learning features are weighted and merged, and the weight coefficient is 1 [19]. After the fusion, the features include not only the words, part of speech, and dictionary features of the shallow learning, and the calculation method remains unchanged, but also the deep learning feature vectors obtained by the tool.

Network sizing estimation is usually a comprehensive analysis from both coverage and capacity aspects to determine the required size, i.e., the number of sites, for network planning in a given area. On the one hand, coverage estimation combines link budget and propagation model to calculate the coverage radius of base stations to find the number of base stations required to cover the planning area; on the other hand, capacity estimation calculates the number of base stations required to meet all service demands by processing various actual services into some virtual equivalent services based on the resources provided by individual base stations. The larger number of required BTS in the coverage estimation and capacity estimation is taken as the number of sites for the size estimation.

$$R_{\text{SBS}} = \left\{ d_{\text{su}} \middle| PL(d_{\text{su}}) = \gamma_{\text{PL}}^2 \right\} + \text{DPL}. \tag{6}$$

The length of particles in the original particle swarm algorithm is fixed, which represents the dimension of the search space. In this paper, assuming that the number of deployed small base stations is N, each particle is a vector composed of the coordinates of N small base stations, and since the dense network planning in this paper is to find the optimal location and the minimum number of base stations at the same time, the number of base stations N is varied, so for the optimization problem in this paper, the particle swarm with varying length is used. The particle swarm is used to search for the optimal solution. The initial particle length is equal to three times the number of small base stations obtained from the network size estimation, and then, the optimal position is searched so that it satisfies all constraints, and then, the particle length is reduced.

2.3. Intelligent Electronic Dictionary System Design. One of the core ideas of software engineering is code reuse and decoupling. In this Android client design, we use a modular design; each module can be run independently from other modules, without affecting each other. Many functions common to the modules are written as tool classes, which are convenient for other modules to use, avoiding code redundancy and facilitating maintenance at the same time. For example, the login and registration operations need to access the remote database through the network, where the HTTP access can be written as a public class [20]. The SQLite database files are packaged and compiled together so that nonroot users cannot modify the content, which guarantees the consistency and security of data. The client front-end UI design is simple, with word search input at the top of the screen and a menu switching module at the bottom of the screen; the user interface is intuitive, generous, clear, and easy to learn and use. Generating words is a difficult problem we often encounter in our daily life, and the Android client can maximize the actual work and learning needs of different users in each segment.

The Android-based electronic dictionary system is mainly developed in Java language, and the system architecture is divided into client-side and server-side, based on the MVC hierarchy. The view layer mainly realizes the application interface between client and server, and the control layer is used to extract, analyze, guide, and process the business logic of the interface layer; the logic layer is used to process and guide the underlying components and map the data with the underlying database. The data is encapsulated, delivered, and processed in JASON form. The data interaction between the client and server-side of the Android-based electronic dictionary system is mainly reflected in user login and registration. After logging in, users can look up words from other

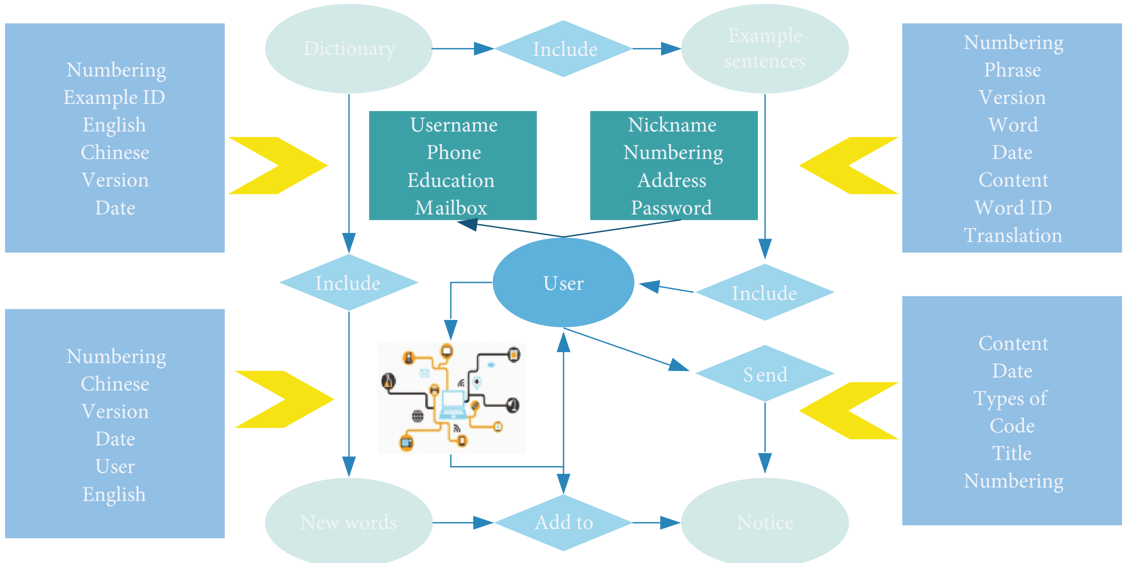

Figure 2: Server-side database ER diagram.

places, for example, after logging in on another phone, they can still view the saved word information.

There is a complete process for user login, which details the location, sequence, and conditions that must be met for each part of the user login process. When the user enters the login information, the user first performs a character check, such as whether the input information characters are correct, whether the input character length reaches the specified length value. If the check is passed, the network check is performed; otherwise, the user returns to the previous step; whether the network is connected is checked, if it is connected, the user name is checked in the next step, and then, the password matching stage is entered; if the password match is successful, the login success message is returned; otherwise, end the login and return the failure message.

The conceptual design is first carried out on the server-side to demonstrate the static data requirements through ER diagram modelling. Five entities are designed in the server-side database, which are User, Dictionary, Ec-sentence, New-word, and Notification. The server-side data entity relationships are shown in Figure 2.

A database was designed based on the ER diagram, as shown in Table 1.

Table 1: User table.

Column name ID	Type of data	Length	Values
Name	Int	3	5.5
Password	Varchar	5	2.8
Mail	Varchar	7	4.7
Address	Varchar	6	6.8
Nickname	Varchar	9	5.4
Content	Varchar	4	1.4
Education	Varchar	7	2.9

Notification management is to let the administrator push some information to the client as needed, such as thesaurus upgrade information. The administrator edits the notification content in the notification management operation interface and saves it in the database. After selecting the edited notification content and clicking push, the message is transmitted to the client. The data is received and displayed in a pop-up window in the client APP.

An Android dictionary application contains several scenario screens, and the user can select different scenarios according to his actual needs. These functions are completely independent of all the scenarios, they do not know what scenarios are handled, and their job is only to control the program logic to exchange information and thus support the complete operation of the system.

After the requirements analysis, the framework design of the system can be carried out based on the software requirements specification. Framework design is essentially an abstract design pattern, which does not consider the actual development operation, but only a general description and planning of the overall software development from the sketch. The framework design of a system will directly affect the robustness, scalability, usability, and other software characteristics of the software. In this paper, we design the English trilingual APP dictionary system, to consider the user habits and the ease of use of the software, while solving the technology of automatic language identification, trilingual word search, and fuzzy query, we also set up the function of automatic interface switching of different languages and automatic image text recognition interface, so that the overall design of the system and the framework of the system include four modules, among which the dictionary module is mainly the dictionary. The system can automatically recognize the language and query the corresponding result according to the user's input. The translation module mainly completes the translation function of long sentences. The image recognition module allows users to take pictures and recognize the words or sentences in the images through the program; the setting module allows users to switch the language of the program interface and select different dictionary libraries; the description section provides instructions for the use of the software and some information about the development.

A collaborative product design project is a field of study that uses computer technology to support professional work, combined with advanced manufacturing technology to effectively manage and support the whole process of the product design project, which not only requires different theoretical knowledge and practical experience in the field of product design but also has a set of effective means and mechanisms to integrate and coordinate the fields of knowledge and experience to accomplish the integration of different product designs and tasks. In general, design experts believe that the basic elements of collaborative work are mutual collaboration, trust, communication, compromise, consistency, continuous improvement, and coordination. In general, a collaborative design-based product design project management approach is as follows: first, under the joint leadership of a complete product design organization and organization involved in completing a product design project, project information and design documents are placed on an information-sharing platform from the first day the project team is created and are viewed and managed by all members of the product design project team.

The system is divided into logical processing, data resources, system interface, button control, input system, local query, and network query according to the characteristics of the dictionary system that the system can work together. Data resources include thesaurus files, icons, and font files. The system interface is responsible for the display function of the system; button control and input system are the underlying interfaces of the system. And the query is the core function module of the system. Among them, logic processing is the core module, and the other six modules all need to be processed logically to play the role of application within the system.

The fuzzy query takes effect by detecting the information in the input information and registration information matching, and the fuzzy query function takes effect when the information is consistent or partially consistent. If the matching is completed, the matching result is judged to be successful or directly returned. Users directly choose to complete the query or continue the query according to the query result. The speed of fuzzy query is faster than the speed of exact query, so the efficiency of the fuzzy query is higher in massive data query, and the design of fuzzy query is one of the core functions of the system.

3. Analysis of Results

3.1. IoT Performance Analysis. For the deployment problem of edge gateways in IoT, this paper proposes a simulated annealing-based edge gateway deployment method. Firstly, we analyze the edge gateway coverage and the conditions of the service endpoint traffic generator, the factors affecting the computational task offloading delay, and the constraints to be satisfied by the edge gateway capacity allocation; then, an edge gateway deployment optimization model is established, and finally, an adaptive external penalty function is proposed, which is combined with the simulated annealing algorithm to solve the edge gateway deployment problem and obtain the optimal deployment scheme. The simulation results show that the algorithm proposed in this chapter can minimize the deployment cost, improve the resource utilization of the edge network, and achieve the edge gateway load balancing in the edge gateway deployment problem, which can provide some guidance for the later IoT edge gateway placement problem. In this section, we use simulation experiments to evaluate the performance of the algorithm proposed in this paper, we set a $1\,\text{km} \times 1\,\text{km}$ planning area, and the performance simulation results are shown in Figure 3.

We did two sets of experiments as shown in Figure 4, Figure 4(a) with 40 endpoint traffic generators randomly distributed in the planning area, and Figure 4(b) with 80 endpoint traffic generators randomly distributed in the planning area.

Based on the city's radio channel interference model, we set the channel gain. The original random perturbation method in the inner loop is to randomly select an edge gateway, cancel it if it is already deployed, and randomly deploy another edge gateway, or deploy it if it is not deployed or swap its state with one of the deployed edge gateways, but we found that this perturbation method is not effective in reducing the objective function during the simulation. Therefore, we change the random perturbation method in the inner loop to randomly select an edge gateway and directly cancel it.

To compare the performance of the adaptive external penalty-based simulated annealing algorithm with the generalized simulated annealing algorithm, we did 10 experiments on the two algorithms separately and took the average of the optimal number of deployed edge gateways for the 10 experiments, and the results are shown in Figure 5. The outer loop of both algorithms is from temperature to down, and the number of inner loops is 1000. The horizontal coordinates of Figure 5 represent the outer loop iteration steps, and the vertical coordinates represent the historical optimal number of deployed edge gateways at each iteration step. From Figure 5, we can see that the number of historical optimal deployment edge gateways decreases in both algorithms as the number of iteration steps increases, but since the algorithm incorporating the adaptive outlier penalty function may be able to reach some isolated feasible domains that are not reachable by the generic simulated annealing algorithm, also, when the algorithm proposed in this paper searches for solutions outside the feasible domain that are not far from the feasible domain, we perturb them to its neighbourhood to explore, and as the search proceeds, the solution moves in the direction of the optimal solution, which increases the probability of finding a better solution than the generic simulated annealing algorithm, so the iteration in which our proposed algorithm obtains a smaller number of optimal edge gateways than the original algorithm.

We increased the number of terminal traffic generators from 30 to 60 to verify whether the increase in the number

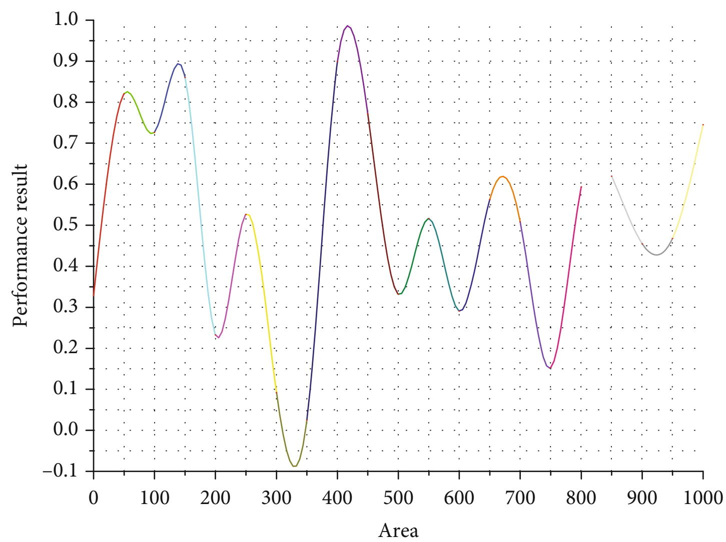

Figure 3: Simulation parameters.

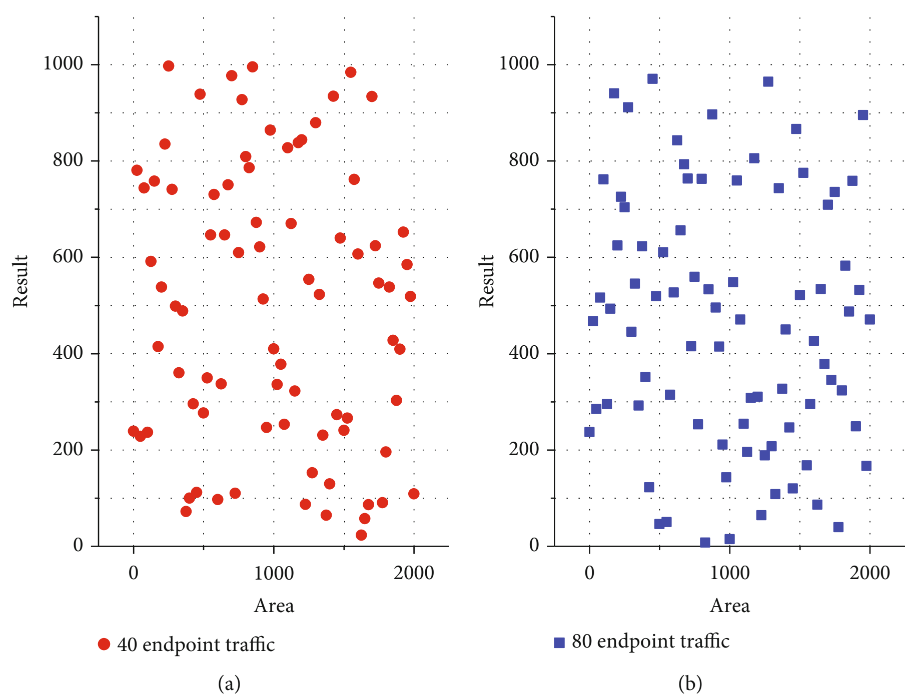

Figure 4: Distribution of terminal traffic generators.

of terminal traffic generators affects the performance of the two algorithms, and we did 10 experiments for each of the two algorithms and took the average value of the optimal number of deployed edge gateways for the 10 experiments. Therefore, the algorithm proposed in this paper will converge earlier than the general simulated annealing algorithm and find a solution with a smaller number of edge gateways. The algorithm proposed in this paper has a faster trend of decreasing target value in the early stage with 60 terminal traffic generators than with 30 terminal traffic generators, because the target value decreases faster in the early stage as the number of iterations increases due to more redundant coverage caused by the randomly generated initial solution with the increase of terminal traffic generators with the constant planning area size and edge gateway coverage.

3.2. Electronic Dictionary System Performance Results Analysis. The translation interface is like the dictionary query interface. Unlike dictionary query, the implementation of translation function is a bit more complicated, which involves many reasons such as sentence slicing, sentence sentiment analysis, and translation according to contextual meaning. This system puts the translation module into the server and reserves the interface to interface with it. As

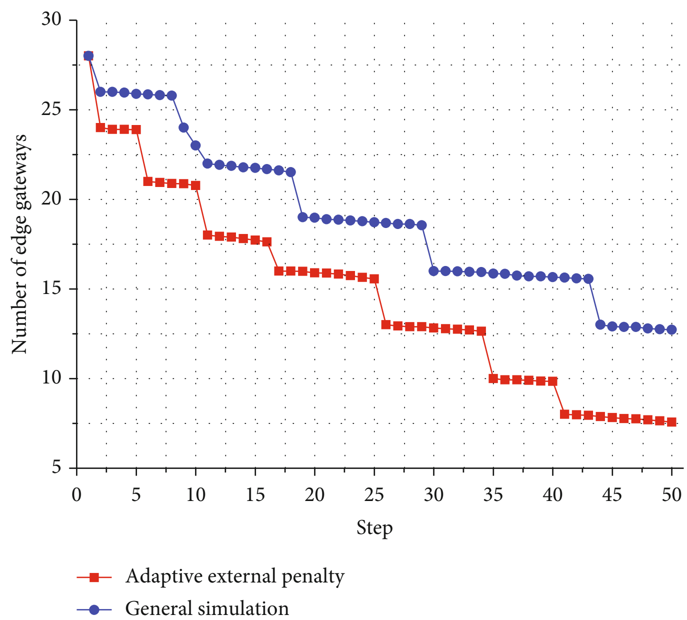

Figure 5: Comparison of two algorithmic solutions (30 endpoint traffic generators).

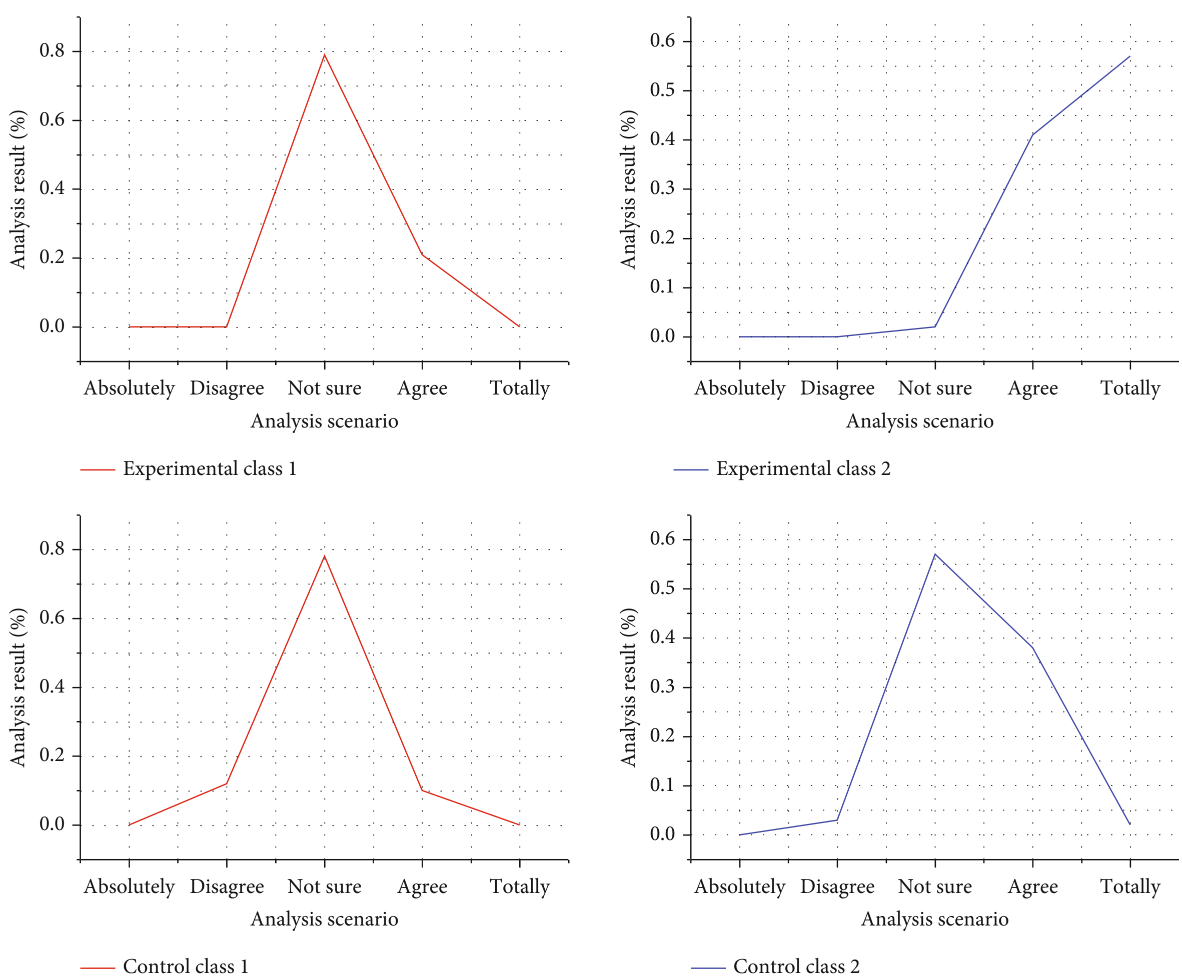

Figure 6: Comparison of postmeasurement data.

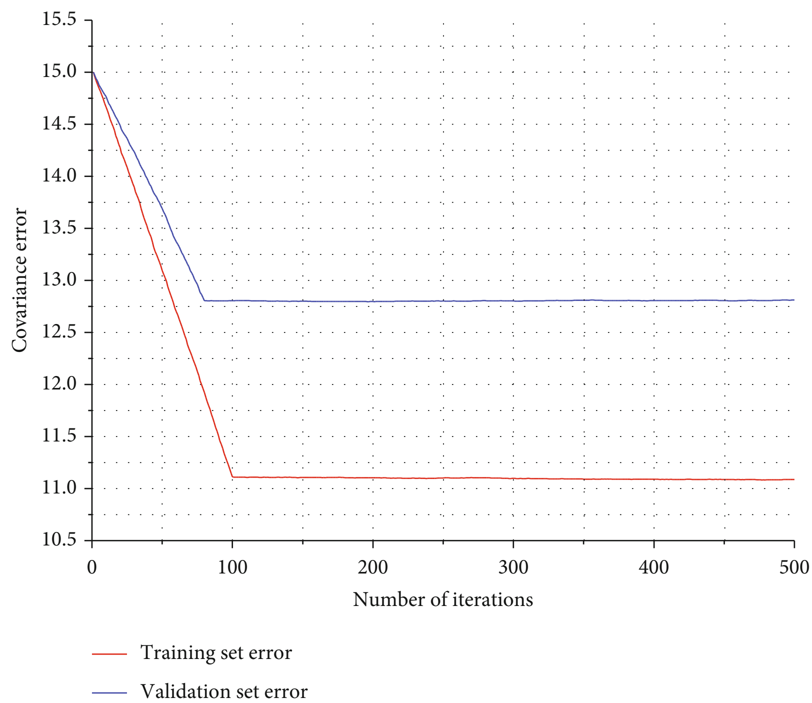

Figure 7: Mean square error variation curve.

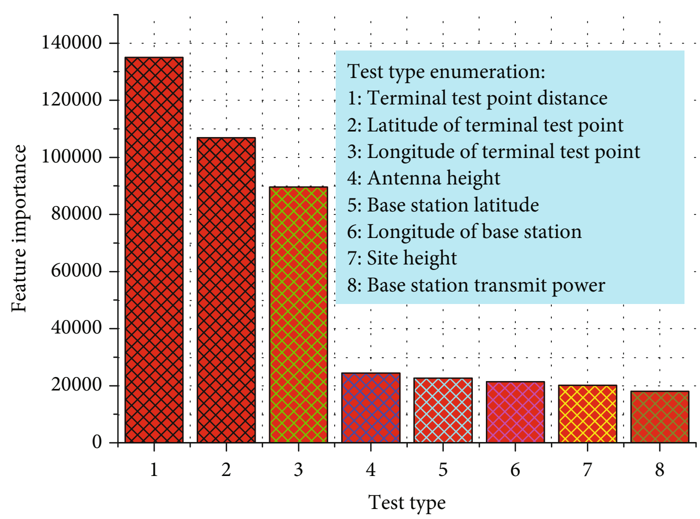

Figure 8: Feature importance results graph.

shown in Figure 6, 91.5% of the students in the experimental class said they wanted their teachers to set more interesting tasks and tasks close to life situations in the vocabulary class, because they had been trained in task-based vocabulary teaching method, while more than half of the students in the control class chose “not sure” about this statement in both the pretest and posttest, which also again, this reflects that students’ attitudes and suggestions about vocabulary lessons have changed from their previous perceptions in the process of using task-based teaching methods.

To prevent overfitting during the training process, this paper adopts 5-fold cross-validation, i.e., the original data set is divided into 5 equal parts, 4 of which are selected as the training set and the remaining 1 as the validation set in each round of training. The mean square error of the training set and the validation set is shown in Figure 7. This is a normal situation because the model has seen all the samples in the training set, so its error is the lowest, but because the validation set is used as feedback to adjust the model parameters, the model is equivalent to refer to the data in the validation set, so the error is higher than the training set error.

Figure 8 shows the visualization results of the average feature importance of each feature in the 5 models. From the results in the figure, it can be seen that the feature importance in descending order is the distance between the terminal test point and the base station it is connected to, the latitude of the terminal test point, the longitude of the terminal test point, the antenna height, the latitude of the base station, the longitude of the base station, the site height, and the base station transmit power; which is consistent with what we said in all factors affecting the received signal strength of mobile devices, the distance between the base station and the terminal is the most important due to the propagation characteristics of electromagnetic waves. The geographical location of the base station is less important than the geographical location of the terminal test point because the number of base stations in our collected data is 37 in total, which is much less than the number of terminal test points, and the variation of the value is relatively small, and the transmit power of the base station is the least important because, among the 37 base stations, the transmit power is only one is 31 dBm, and the others are 30 dBm, the data almost did not change, so there is almost no impact on the prediction results.

In addition to the unit tests, system integration tests were also performed. The focus was on testing the correctness of data interaction between the client and the server. The test results show that the client can normally login and register, get the thesaurus and complete local word search, and call the Yadao Dictionary interface to realize network word search and save raw words; the server-side can normally create thesaurus, add words, and push notifications. The server-side can create thesaurus, add words, and push notifications normally.

4. Conclusion

This article chooses the development of an electronic dictionary based on the Android system as the research content, combined with the existing Internet of Things technology, comprehensively applies the various integration tools of the Android development platform, and the back-end database is implemented by MySQL. By analyzing the mainstream word search tools, aiming at their shortcomings, a systematic realization goal is proposed. Focus on realizing the function of searching words and saving program memory. The client has functions such as local word search, network word search, adding new words, and logging in and registering. The server side mainly realizes the functions of thesaurus management, user management, and notification management. The entire Maven Web project is built around the software engineering ideas of "high cohesion" and "low coupling," and a flexible and loosely coupled Web application is established, which minimizes the coupling between components and facilitates the second project in the future. Expansion of development. This article mainly solves the problems of one-click query and fuzzy query of English vocabulary, the localized storage of SQLite database, the interface of translation and image recognition, and the automatic switch setting function of different language interfaces, which basically achieves intelligence, speed, and ease of use requirements. Through the research of this article, the Internet of Things technology and deep learning technology provide more intelligent, fast, and easy-to-use means in the design of intelligent English electronic dictionary system.

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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