



Development and Maintenance of a Constructive English Learning Platform Based on Neural Network

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Abstract. Neural networks, especially Recurrent Neural Networks (RNNs) and Long Short Term Memory Networks (LSTMs), are capable of processing and parsing natural language, enabling machines to understand and generate English texts. This is crucial for constructive English learning platforms as it allows them to provide personalized feedback and suggestions based on user input. However, from the current situation, there are some problems such as weak pertinence, lack of self adaptability in the selection strategy of test questions, and insufficient analysis ability. The informatization of constructive English learning platform based on RBF algorithm is a new system for English Teaching in the form of interactive games. This is an online game. Players can learn English by playing and interacting. The game consists of multiple levels, each level has its own challenge set, designed by experts. The player starts at the first level and then moves to the next level with his or her further development.

Keywords: English learning platform · RBF algorithm · Constructive · promotion of information technology

1 Introduction

The English learning platform software system is mainly to meet students in English learning, so that students can learn English independently. The functions provided by the current English learning platform are basically the same, mainly including the explanation of English knowledge points, the after-school test of various parts, the comprehensive online test and scoring, the statistics of English scores, and the arrangement of learning plans. The knowledge points according to the corresponding teaching plan, learn their own knowledge through testing [1]. Essentially, constructivism seeks the answer to “how to obtain knowledge” from Piaget’s epistemology. Through in-depth research on cognitive subjects, starting from the perspective of cognitive genesis and development of the child’s psychological system, Piaget actively constructs new knowledge based on existing knowledge and prior experience, rather than passively receiving external stimuli. Many experts have developed constructivist theory from various perspectives based on Piaget’s theory. The basic idea of constructivism theory is that learning is a dynamic and

developing process in which learners actively construct their internal structure. In addition, learners always consciously interact with the environment. Constructivist theory advocates a learning method that focuses on teachers and students in teaching. Students are active builders of knowledge. Knowledge is not imparted by teachers, but with the help of others in specific situations, through the use of necessary learning resources and meaningful construction. Neural network can analyze a large amount of learning data to understand users' habits and needs. This enables the English learning platform based on neural network to provide personalized learning resources and paths according to the learning progress and ability level of each user. In this way, the platform can better meet the needs of different users and improve the learning effect. With the acceleration of globalization, the importance of English as an international language has become increasingly prominent. Traditional English learning methods can no longer meet the needs of efficient and personalized learning in modern society. Therefore, constructive English learning platform emerges as the times require. With the help of advanced artificial intelligence and machine learning technology, especially neural network technology, it provides English learners with a brand-new learning method. This paper will discuss the function, process, significance and goal of constructive English learning platform in depth.

This study aims to stimulate students' interest in English learning. Students in the suburbs lack interest in learning English. They have never been interested in learning English. For most of them, the main classroom is limited and boring, so it is necessary to explore new types of English classes, which are additional courses. The procedures for major English courses are at a mature stage, while the procedures for extracurricular English courses are at an immature stage. In addition, there are some shortcomings, such as the single form of extracurricular English practice, students' preference for activities related to listening and reading, insufficient development of students' subjectivity in practical activities, lack of professional guidance from teachers, poor practical results, a lack of understanding of the role of teachers in practice, and a lack of understanding. Personalized learning experience: Through neural network technology, the platform can analyze students' learning habits, progress and level, and provide them with customized learning resources and paths to meet their personalized needs. Natural Language Processing and Interaction: Using natural language processing technology [2], the platform is able to understand student input, provide immediate and accurate feedback and suggestions, and facilitate student interaction with the machine. Intelligent recommendation of learning resources: The recommendation system based on neural network can recommend appropriate learning resources for students based on their learning history and behavior, so as to stimulate their interest in learning. Automatic assessment and feedback: By training the neural network's ability to evaluate English texts, the platform can automatically score and give feedback on students' assignments, essays, speaking exercises, etc. [3]. Cross-platform learning: With mobile devices and tablets, students can learn anytime, anywhere, and learn more efficiently.

2 Related Work

2.1 Main Contents of Constructivism Teaching Thought

Data collection and analysis: Collect a large amount of English learner data, analyze learning behaviors, habits and effects, and provide a basis for platform design and function development. Platform design and development: Design platform architecture, interface, and functional modules based on requirements analysis. Leverage programming languages and related tools for platform development. Model training and optimization: Train neural network models with annotated data, continuously optimize model performance, and improve the intelligence level of the platform. Testing and evaluation: Exhaustive testing of the developed platform to ensure proper function and stable performance [4]. At the same time, the learning effect of the platform is evaluated. Launch and maintenance: The platform is officially released, long-term maintenance and updates are carried out, potential problems are fixed, and functions and performance are continuously optimized. According to the new curriculum standards, the best classroom model is student centered rather than teacher centered. English extracurricular activities are student centered. Students are the protagonists in the classroom, they are masters, and they can explore knowledge on their own. In addition, they have the right to choose activities that interest them. Teachers are just assistants, supervisors, promoters, and promoters of these activities, while students are participants, organizers, and implementers. Teachers only need to give them some enlightening questions. Only in this way can it truly inspire students to learn English and be interested in it.

English extracurricular activities are different from the first English lesson in that there are no specific teaching content, teaching plans, and teaching methods. There are many forms, such as English music, English poetry, English drama, English movies, and so on. Students can obtain materials from various media or books. The number of people is not fixed, but flexible, ranging from a few to dozens. In addition, students can attend classes at any time or place after class.

- (1) The construction of knowledge depends on the existing experience and knowledge of individuals

The German philosopher Kant believes that all our knowledge starts from experience. Constructivism holds that, first, knowledge is not an objective reflection of the external world, nor is it an abstract symbol for transmitting information, but a subjective understanding of the external world formed by the subject and an absolute representation of reality; Secondly, in the process of solving specific problems, knowledge cannot be used accurately and flexibly, and must be expanded and reorganized on the basis of the original knowledge according to the situation of specific problems; Third, the formation of new knowledge is inseparable from the learners' own knowledge experience and learning situation. The real understanding cannot be separated from the learners and their own experience. Knowledge comes from a certain situation. The understanding obtained from the situation, the learners and the learners' existing experience is not real understanding. Such understanding is passive, static and duplicative [5]. The existing experience and learning situation are unified organisms that interact with each other and

promote the establishment of a new knowledge system. The SECI process of the English information platform is shown in Fig. 1.

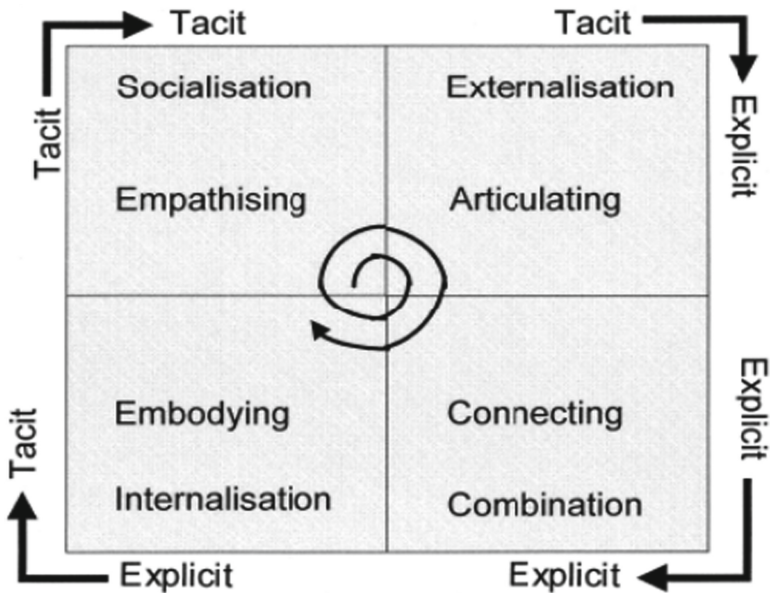


Fig. 1. SECI process of English information platform

- (2) Learning is a process in which individuals actively process and recombine and acquire new knowledge

Constructivism holds that learning is not a process in which teachers simply impart knowledge to students, but a process in which students form their own knowledge. Learning is a process of students' active construction of meaning, not a process of passive indoctrination. The process is to build old knowledge into new ideas or concepts, and then cycle back and forth. Learning is not as passive as the "stimulus response" described by behaviorism. Instead, it combines one's previous experience and understanding, selects and processes with purpose, and thus obtains a new understanding of the external world [6]. The external world has no collateral meanings, which are established through the interaction between old experiences and new external stimuli. The process of learning is that each learner re encodes, re recognizes and re constructs his own understanding of the external world based on the original cognitive experience; There are two main concepts in the development of cognitive structure.

Improve learning efficiency: With the help of advanced technology, students can quickly master English knowledge and improve learning efficiency. Cultivating self-directed learning ability: The platform encourages students to learn and evaluate independently, and cultivates their self-management and self-regulation skills. Enhance intercultural communication skills: By simulating real contexts and scenarios, the platform

helps students better understand and use English and improve their intercultural communication skills. Promote educational equity: Learning methods that are not limited by geography and time allow more people to have access to high-quality English education. Promoting the development of educational technology: The emergence of constructive English learning platforms has injected new vitality into the development of educational technology, which is conducive to promoting the process of educational informatization and modernization [7].

2.2 RBF Algorithm

PC network uses the weights between different nodes to realize data fusion and data analysis.as shown in Fig. 2.

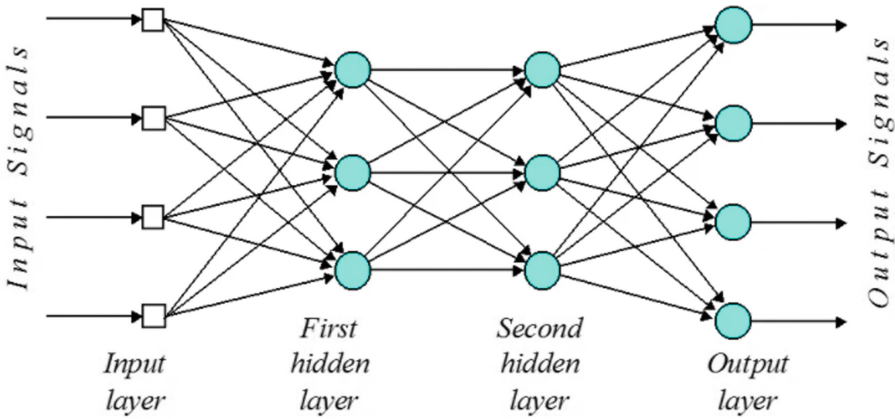


Fig. 2. Structure diagram of RBF algorithm neural network

In neural network, it is suggested to set up input nodes and output nodes, then set up intermediate nodes and classify them into two levels: first-level hiding and second-level hiding. Moreover, weights can be designed between different hidden data to realize the final analysis of output results in turn. Moreover, in the whole analysis and judgment process of output results, the correlation of the whole data should be judged to avoid the data with strong correlation.

According to the process of analysis, input data and output data should be collected, and the synthesis and judgment of input data and output data should be analyzed. In the input data, the standardization and practicality of data should be judged, so the validity analysis of data should be completed.

$$f_t = \text{Sigmod}(W_f[h_{t-1}, x_t] + b_f) \tag{1}$$

After the completion of data analysis, it is necessary to judge the concealment of comprehensive and coupled data contents. The concealment judgment is mainly to identify key contents and key indicators, so the comprehensive judgment of data is completed, such as Formula 2 and 4 tests.

$$z_t = \tanh(W_z[h_{t-1}, x_t] + b_z) \quad (2)$$

$$i_t = \text{sigmod}(W_i[h_{t-1}, x_t] + b_i) \quad (3)$$

$$c_t = f_t * c_{t-1} + i_t * z_t \quad (4)$$

Time management is the second important element of PLE. For non English majors, how to arrange their English learning time is particularly important. In addition, other researchers have also recognized the importance of time management. When they try to establish a personal learning environment to support college students' learning, he believes that learners have great difficulties in time management when constructing their own personal learning environment, which will affect their learning efficiency to a certain extent. Therefore, time management is actually an important factor that affects the construction of a learner's personal learning environment. It is considered the second factor in the subscale of personal learning environment, used to assess how much time students spend on English learning and whether they manage their time appropriately.

2.3 Database Construction of English Learning Platform

The storage and calculation of English learning information in big data complement each other. The storage of English learning information is the focus of business data and the foundation of data processing and analysis. In order to reduce the storage of redundant data for English learning information, it is necessary to adopt paradigms for data, such as the first and second paradigms.

The data types of industrial big data are diverse and widely distributed, including not only structured data collected in industrial processes, but also unstructured and semi structured data with individual performance and unclear mechanisms. Structured data mainly uses relational databases for English learning information storage, while semi structured and unstructured data mainly uses distributed file systems or non relational databases (Not Only SQL, NoSQL) for English learning information storage.

Traditional relational databases store data in rows and establish a relational model between tables. In the early stages of construction, deletion and modification operations are more efficient. However, with the expansion of data size and architecture, when the data in user tables reaches tens of millions of levels or the relationship between tables becomes more complex, when performing highly concurrent operations on user tables, If there is a situation where the update and query areas are close together, the data will reach a minute level delay [8]. For example, when performing associated complex query operations on multiple tables, frequent use of group by or order by operations can significantly degrade query performance, directly affecting the user experience. In addition, there are problems such as low space utilization and troublesome downtime operations in data structure adjustment.

HDFS is mainly responsible for managing the storage of file English learning information deployed on multiple independent physical machines, and consists of Name Node (NN), Data Node (DN), and Block (Block). There is only one NN in a Hadoop cluster, but when an unexpected machine or software or hardware upgrade occurs, it can lead to a single node failure of the NN and machine downtime. To solve this problem, typically a typical topology of a secondary name node (SNN) or a HA highly reliable topology of two NNs is used to replace the NN in the down machine and continue to perform the NN function [9].

A typical HDFS topology includes an NN, an SNN, multiple data nodes (DNs), and multiple blocks. Its structure is shown in Fig. 3. NN manages the metadata and cluster of the cluster by permanently storing the image file fsimage and the tag log exitlog on the local disk. At the same time, NN is also responsible for processing client read and write requests; SNN is mainly responsible for scheduled backups, that is, periodically fetching the image file fsimage and tag log exitlog files for merging, backing up, and pushing; DN is mainly responsible for managing the storage of English learning information for data, reporting the data blocks it manages to NN, and performing read and write operations based on client requests [10]; A block is a collection of data. HDFS divides the files stored in English learning information into a series of blocks that are stored in different DNS. The HDFS read process is shown in Fig. 3.

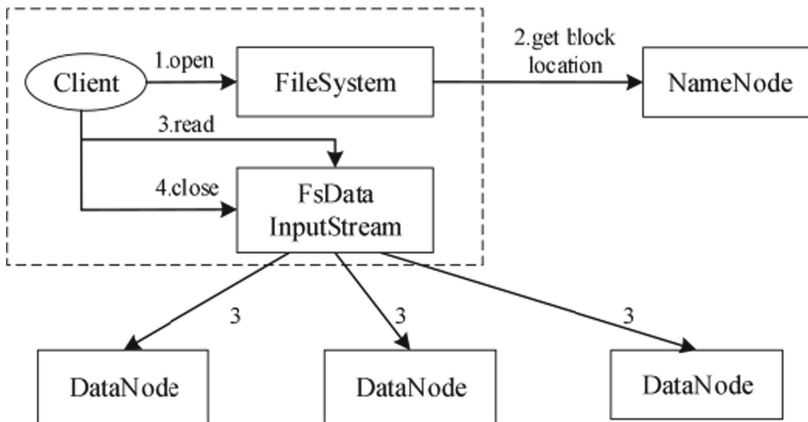


Fig. 3. HDFS read process

3 Constructive English Teaching Mode and Classification

3.1 English Autonomous Learning

Self-directed learning is an important concept in the field of education, which emphasizes the initiative, creativity and self-regulation of individuals in the learning process. Self-directed learning is particularly important in English learning, because English is a practical subject that students need to master through continuous practice and practice.

This dissertation will detail the concept, content, and application of self-directed learning to a constructive English learning platform [11, 12].

Self-directed learning refers to learners' ability to actively plan, organize and manage their own learning activities in the learning process, and give full play to their subjective initiative to achieve learning goals. The key to self-directed learning is for students to self-regulate their own learning process, rather than relying on external guidance and supervision. Self-directed learning content, goal setting: Be clear about your own learning goals, including long-term goals and short-term goals. Plan development: Make a reasonable study plan according to the goal, allocate time and resources. Resource utilization: Make full use of various learning resources, including textbooks, courses, online resources, etc. Learning Methods: Choose appropriate learning methods, such as reading, listening, speaking, writing, etc. Learning Strategies: Use strategies such as metacognition, memory, comprehension, and analysis to improve learning outcomes. Self-evaluation: Regularly evaluate the learning progress and effect, and adjust the learning plan and methodology. Reflection and Summary: Learn from learning experience and continuously optimize learning methods and strategies. The application of self-directed learning in the constructive English learning platform, personalized path planning: Based on the learning needs and level of students, the platform can provide customized learning paths. Intelligent recommendation of resources: According to students' learning behaviors and interests, the platform can recommend suitable learning resources. Automatic grading and feedback: The platform can automatically grade and give feedback on students' assignments and essays, so that students can keep abreast of their learning status. Cross-platform support: With mobile devices and tablets, students can learn on their own anytime, anywhere. Community interaction: Students can communicate and discuss with other students on the platform, share learning experiences and methods, and improve learning motivation. Learning Recording and Tracking: The platform records students' learning process to help them evaluate and reflect on themselves. Online tutoring and support: Students can ask questions from teachers or experts through the platform to get real-time help and support.

After organizing and analyzing real data from online interactive content in English learning communities, the researchers identified two types of knowledge building. In this section, first analyze the construction of the first type of language knowledge [13]. It is closely related to the participants' language performance and the use of language knowledge in the production and understanding of the target language.

One purpose of the TOEFL community is to learn English. All members are required to communicate fully in English. In a language learning community, various language phenomena can occur. Learners make language errors due to various reasons such as negligence, memory impairment, or language system defects. Some are self discovered and corrected. Some are improved by other participants in the community. Obviously, members there have acquired some prior knowledge about English, such as a certain vocabulary, the rules for forming phrases and sentences from these vocabulary, and how to apply them to different real contexts [14]. Therefore, the following courses support and analyze participants' language knowledge construction from three systems: language vocabulary, grammar, and discourse.

Many excerpt logs show how participants use the IM tool for informal communication in the online community. Their online nicknames, timestamps, interactive content, and even spelling, punctuation, uppercase letters, and icon sets. Unchanged. At the same time, these data are the most authentic data for analyzing and drawing relevant conclusions.

3.2 Constructive Teaching

Self-directed learning is one of the core contents of English learning and is of great significance for students' long-term development [15, 16]. The Constructive English Learning Platform provides students with a wealth of self-directed learning resources and tools, which is conducive to cultivating students' self-regulation and lifelong learning ability. By making reasonable use of these functions, students can better realize the personalized needs of English learning, improve their English application ability, and lay the foundation for future development.

4 Constructive English Learning Platform Based on RBF Algorithm

The construction of easy-to-learn platform mainly includes the construction of data collection platform and data integration, as shown in Fig. 4.

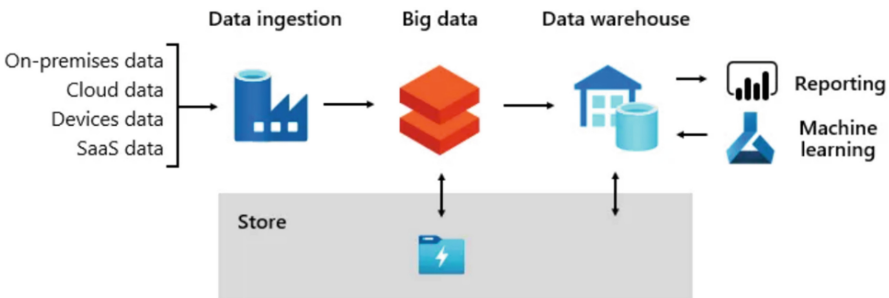


Fig. 4. Network topology

In the English platform, should set up the server and comprehensive channel for teaching resources, standardize the data to form a data set of big data, and make comprehensive judgment of data in the data room, and transmit the data according to the classification of data. At the same time, should record the data in different servers to form a server log. In the process of data transmission, can make comprehensive judgment with the help of cloud data equipment data and next data [17], etc. In order to improve the data types and data depth of English teaching and complete the data fusion. After that, should store the data in the data warehouse to realize the comprehensive judgment and law of the data. After completing the comprehensive judgment of the data, should integrate the multi-mode and multi-mode of the data to improve the effectiveness of the data and finally form effective Internet data (Fig. 5).

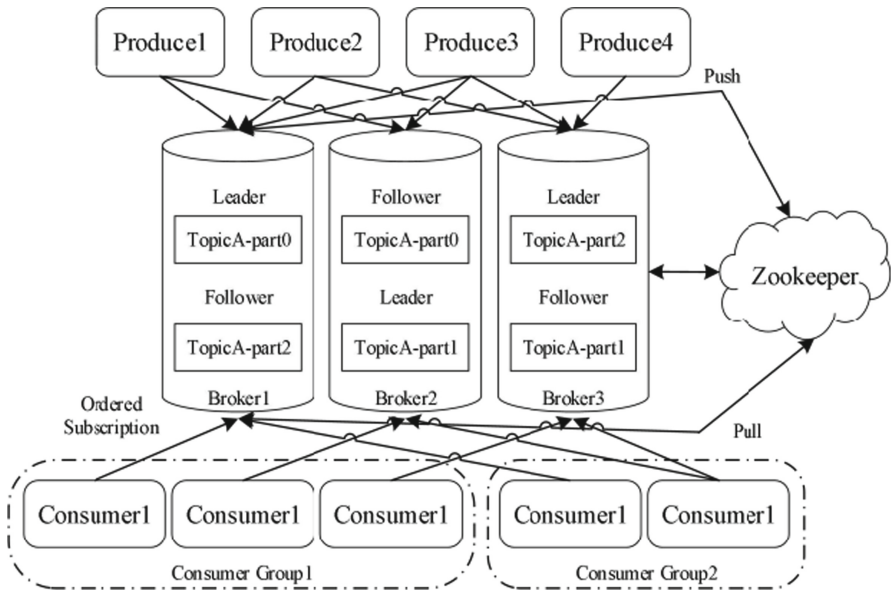


Fig. 5. Kafka messaging system

The process of building an English learning platform is a systematic project, involving multiple stages such as requirements analysis, design, development, testing, release, and maintenance. Here's the detailed build process:

(1) Demand analysis stage

Before building an English learning platform, it is crucial to conduct a detailed needs analysis. This stage mainly involves the following aspects.

Target user analysis: Clarify the user groups targeted by the platform, such as students, teachers, language enthusiasts, etc., as well as their needs and characteristics.
Functional requirements: Collect and analyze users' requirements for platform functions, such as course learning, online testing, community communication, etc.
Learning resources: Identify the learning resources required by the platform, such as courses, textbooks, practice questions, etc., and plan how to acquire and manage these resources.
Technical feasibility: Assess the feasibility and limitations of the technology used to ensure that the platform meets the needs of users and has good performance.

(2) Design stage

In the design stage, the main task is to develop the platform architecture and interface design scheme, as well as the corresponding functional modules. Specifically, it includes:
platform architecture: design the overall architecture of the platform, including the composition of each module and the collaborative relationship between each other [18].
Interface design: According to the characteristics of the target user, design a concise and easy-to-use user interface to improve the user experience.
Functional modules: Design

the functional modules of the platform according to the results of demand analysis, such as course management, learning records, online tests, etc. Data structure: Design a reasonable data structure to store and manage data such as user information and learning records.

(3) Development stage

The development phase is the core part of the platform construction, which involves specific programming and system integration work. It mainly includes: programming language and tool selection: according to the results of technical feasibility assessment, select suitable programming language and development tools. System development and integration: According to the design requirements, the development and integration of each functional module is carried out. Database design and implementation: Design the database according to the data structure, and realize operations such as adding, deleting, modifying [19], and querying data. Front-end and back-end interaction: Realize front-end and back-end data interaction to ensure smooth collaboration between the user interface and back-end data services. Test environment construction: Establish a test environment to test the functions and performance of the platform.

(4) Testing phase

The test phase is to conduct comprehensive functional and performance tests on the developed platform to ensure the stability and reliability of the platform. Specifically, it includes: Functional testing: Each functional module is tested to check whether it meets the design requirements and user requirements. Performance test: Test the load capacity and response time of the platform to ensure that good performance can be maintained even in high concurrency conditions. Security testing: Evaluate the security of the platform and check for security vulnerabilities and hidden dangers [20]. Compatibility test: Test the compatibility performance of the platform in different browsers, operating systems, and other environments. User acceptance testing: Invite your target users to participate in testing and gather their feedback to improve the platform.

5 Conclusion

To sum up, autonomous learning is one of the core contents of English learning, which is of great significance to students' long-term development. Neural network method can provide students with abundant resources and tools for autonomous learning, which is beneficial to cultivate students' self-regulation ability and lifelong learning ability. By using these functions reasonably, students can better meet the individual needs of English learning, improve their English application ability and lay a foundation for their future development.

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