*Original Paper*

# The Design and Implementation of EFL Teaching Resource Database Based on AI Technology

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*Abstract*

*Teaching Resource Database is of great help to EFL learning, especially in this information age. Nevertheless, traditional EFL Teaching Resource Database has some deficiencies, such as underuse of existing resources, inefficiency in information search, insufficiency in personalized service, and inconvenience in resource management. These drawbacks become hinderance to its utilization, as well as unfavorable factor for EFL learning. However, the EFL Teaching Resource Database Based on AI Technology can make a much better performance in terms of information retrieval, aggregation, processing and resource management and application. With the blessing of AI technology, the database is more intelligent and efficient than the traditional one. It can enhance learners' interest and self-learning of English, strengthen co-construction of EFL resources, facilitate personalized use and promote communication among users. This is an example of how AI technology facilitates EFL learning, but more experiments and remedies are needed for its further improvement and it will be polished through more practice.*

*Keywords*

*EFL Teaching Resource Database, AI Technology, Design and Implementation of Database*

## 1. Introduction

With the rapid development of information technologies such as the Internet, big data, cloud computing and the Internet of Things, AI (Artificial Intelligence) is triggering scientific breakthroughs that can produce chain reactions: accelerating a number of innovative techniques, cultivating new drives of economic development, shaping new industrial systems, leading a new round of technological revolution and industrial transformation.

Especially with the advent of the 5G era, education has been continuously reformed in depth and breadth. For EFL (English as Foreign Language) Teaching, more multi-media resources have been applied to daily teaching and learning. However, the drawbacks of traditional EFL Teaching Resource Database become hindrance to the utilization, not to mention the efficient and advanced functions. Therefore, there is an urgent need for a more intelligent and effective EFL teaching resource database.

## 2. Deficiencies in Traditional EFL Teaching Resource Database

### 2.1 Underuse of Existing Resources

Most of the traditional EFL resource databases are developed only once, and the construction only stays at the level of resource accumulation, lacking in-depth development and updating of content. On the one hand, due to the lack of precise demand and personalized service, massive content has been deposited in the system for a long time, which make these resources idle; on the other hand, within the school, between different campuses, and between different teachers, the rich media data, which are accumulated over a long period of time, including text, pictures, videos, audio resources, etc., cannot be shared with or reused through effective methods. The lack of sharing and interaction between users causes a huge waste of resources.

### 2.2 Inefficiency in Information Search

The overload of EFL resources in the database often causes users to get lost in information. They cannot quickly retrieve useful information from a large number of resources nor attain the desired results because the resources are not so specified. Even worse, the system cannot actively analyze user' behaviors and needs, which makes the searching process prolonged and unrefined. This hinders the full play of English teaching resources database.

### 2.3 Insufficiency in Personalized Service

The traditional EFL teaching resource system mainly provides functions such as upload, retrieval and download of teaching resources. It does not have the characteristics of personalization and intelligence. There is always a general search or category, but lack personalized pushing and memory, let alone users' self-processing of materials. The contradiction between the massive teaching resources and the personalized needs of users is conspicuous, so it cannot meet users' demands for resource diversification and individualization.

### 2.4 Inconvenience in Resource Management

The construction cycle of resource database is long, difficult, and requires a lot of labor. Moreover, there is a lack of timely and effective maintenance after completion. Due to the restrictions of authorization and profession, users generally cannot manage the resources all by themselves, which makes it difficult to update resources in time with the modification of knowledge and personal demands, so the teaching resources in the database are not dynamic or portable enough.

## 3. Design of EFL Teaching Resource Database Based on Artificial Intelligence Technology

### 3.1 Overall Construction Design

By comprehensively applying the Internet, big data, artificial intelligence and other technologies, the new English Teaching Resource Database has higher requirements for the performance of the system and further expansibility. The services provided by various cloud manufacturers at the IAAS layer are quite mature, with stable services and high security. Therefore, in the design, the system relies on the basic resources provided by cloud manufacturers as the underlying technology platform, taking advantage of its simple configuration, free capacity, security and stability, and unifies the design of resource services at IAAS, PAAS, and SAAS layers, to construct a complete, intelligent and high-standard English teaching resource database that meets the needs of current and future development. As shown in Figure 1.
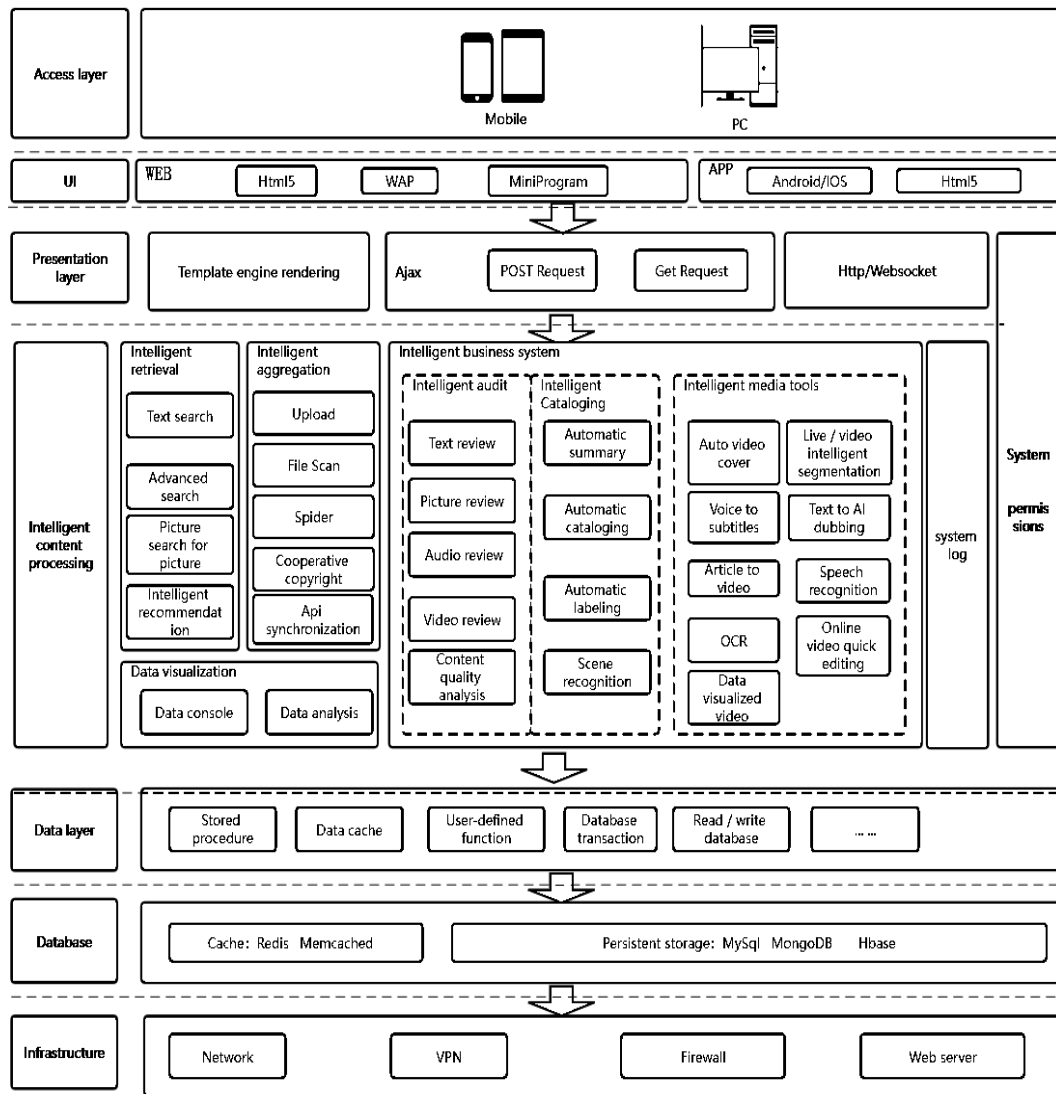


**Figure 1. Overall Construction Design**

*3.2 Design of Function Modules*

The intelligent teaching resource system takes intelligent retrieval as the core, and covers main business functions such as intelligent aggregation, intelligent processing, resource management and intelligent application. It also provides service support for teachers and students in the process of English teaching.

3.2.1 Intelligent Retrieval

The system provides teachers and students with unified retrieval and display of content, materials, entries, and material media in system. Users can achieve unified retrieval of materials through the full-text search box provided by the system. The retrieval results can be classified and displayed as needed, and the relevant entries in the retrieval results and the knowledge map of the entries can be displayed. Retrieval is supported though basic resource information, related information, video type, video status, source, or character information, scene information, subtitle information, content tags, etc. After searching for relevant resources, the segment or key frame that contains the search information can be quickly located.

3.2.2 Intelligent Aggregation

Through the aggregation of AI engine, the efficient and intelligent management of media resources is realized by editing forward and smart labeling. Videos, pictures, audios, documents and other resources from original materials, network-wide collection, cooperative copyright and other sources can be stored uniformly; Meanwhile, intelligent cataloging tools based on voice, images, scenes, etc. can be provided. Moreover, the basic information, type, status, source and other multi-dimensional information of media can be recorded. It supports the storage and association of multi-resolution, multi-dimensional packaged video versions, as well as high-speed storage and reading of resource content. It also supports resource upload and download, content-based outbound permission control and intelligent cataloging management.

3.2.3 Intelligent Processing

For video clips and key frames of video resources, AI techniques such as intelligent video analyses are applied to complete video scene recognition, character recognition, speech recognition, OCR, etc. and record the recognition results of corresponding clips or key frames. Materials, subtitles, music, textures, and transitions can be quickly selected and videos are generated according to templates. Live broadcast can be segmented and multiple live streaming formats are supported. Users can cut, record and view the playback while the video is being played. Video is rapidly produced with intelligent media tools by smart editing, for instance, voice-to-subtitle, text-to-AI dubbing, article-to-video, and quick segmentation. It supports such automatic video production as data visualization video and the construction of a material-based teaching resource system.

3.2.4 Intelligent Resource Management

The system integrates various sources, either from the Internet or professional networks, such as the Internet website, Weibo, WeChat, UGC clues, wireless APP, SMS, MMS, etc.; Video, audio, pictures,

documents, web pages, and 4K/8K ultra-high-definition files, these multiple formats can be played. Each type of resource can be optimally displayed accordingly, which is convenient for users' targeted use.

It can make fine management through different authorization and domain division. It can provide personal domain for users' temporary personal storage space, group domains for personal resources between group members, public domain for resource sharing and exchange of open access. Therefore, different resource domains can be independently managed and allocated storage space. Both the isolation and the sharing of resources can be achieved to meet individual needs.

It can manage resources through cataloging, classification, topic selection and other ways, then directly connect the results with resource retrieval and media production. Specific operation is functional at the same time, such as browsing, creation, edition, retrieval, download, deletion, etc.

3.2.5 Intelligent Application

(1) To Recommend Associated Content

Through resource metadata, the database analyzes the similarity of resource content and recommends related resources that users have browsed. It analyzes users' preferences through their behavior and recommends resources accordingly. It can quickly find the desired resource by means of character relationship graphs, event relationship graphs, etc.

(2) To Generate a Special Topic

Traditional resource database often focuses on finding a piece of single resource, but in actual practice, series of related resources are often needed. The English teaching resource database based on AI technology can examine the relevance among resources, organize and display content according to entity objects. For example, organizing and intensively displaying resources in the dimension of character, so that users can find videos, audios, pictures, documents, etc. related to certain people; or managing and intensively displaying resources in the dimension of events, so that users can sort out the context of events, thus attain event-related videos, audios, pictures, documents. The relationship between resources is fully excavated, and the association prompts (related people, related events, etc.) are displayed in the form of graphs. Consequently, it is convenient for users to form a resource directory on a special topic.

## 4. Significance of the Implementation of EFL Teaching Resource Database Based on AI Technology

### 4.1 Enhance Learners' Interest and Self-learning of English

As is known to all, learners' interest plays a significant role in foreign language learning, so the input and output of English is very important for EFL learners. Compared with things in textbooks, The rich multimedia materials in the resource database are more interesting and diversified, more vivid and dynamic, which can better attract students to learn English and they would like to spend more time in enjoying these materials. As a result, learners do more self-learning voluntarily, at the same time,

increase their own language input and output.

*4.2 Strengthen Co-construction of EFL Resources*

Obviously, rich resources can contribute to EFL learning. However, in the traditional pattern of EFL resource database, teachers or administrators are generally the unilateral constructors. Only they are authorized to do the managerial work. However, in the EFL Teaching Resource Database Based on AI Technology, learners are given the authorization and both teachers and learners are bilateral constructors. Learners can not only use the resources but also participate in construction. For example, they can add and edit new materials to fulfill the sense of participation, process and reproduce materials by themselves to improve their DIY ability; share and recommend materials to get more people involved.

*4.3 Facilitate Personalized Use*

Instead of simple search and download, the artificial intelligence mechanism can analyze users' demands and preferences through their behavior and push related information. The resource is better targeted and desired, so user will not get lost in redundant information. Furthermore, users can edit and process their own material, even generate their own special topic. This is helpful for teachers' lesson preparation as well as learners' personalized learning.

*4.4 Promote Communication among Users*

In the traditional EFL resource database, most work is done by individual. The lack of communication not only lies between teachers and learners, but also among learners, even among teachers themselves. English teachers don't even know what learners are really interested in. They seldom get feedback from learners about the resources, let alone learners' own recommendation or edition. Moreover, there is no sufficient sharing among both teachers and learners. In the EFL Teaching Resource Database Based on AI Technology, there are much more interactions and cooperation between users, even group work is encouraged.

## 5. Conclusion

The EFL teaching resource database based on AI technology not only enables itself to be timely updated and continuously optimized, but also improves the accuracy and efficiency during use. Users can obtain more desirable and valuable resources by easy operation, quick response and regular updating, so it plays a huge role in saving user time, improving user experience, and enhancing the sense of learning fulfillment. It complies with the law of EFL learning and is in sync with the trend of information teaching.

The EFL teaching resource database mentioned above is the application of artificial intelligence technology in English teaching. Through the introduction of artificial intelligence technology, an intelligent EFL teaching database is constructed with functions like intelligent retrieval, intelligent aggregation, intelligent processing, intelligent resource management, intelligent application, and other features like automatic collection, automatic cataloging, knowledge map, personalized pushing, thus

87

effectively solve the long-term problems of traditional EFL resource database. However, there is still improvement of its design and implementation. It can evolve with more practice.

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