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Review

Application of AI-Researched Knowledge to the Intelligent Retrieval of Educational Materials

Xu-Jing Bai*; Jia-Jun Li
School of Management, Northwestern Polytechnical University, Xi'an 710072, China

Corresponding author
Xu-Jing Bai
School of Management, Northwestern Polytechnical University, Xi'an 710072, China

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ABSTRACT
Managing and organizing vast amounts of digital teaching materials has emerged as a critical concern for educators as education informatization progresses. The teaching resource service system relies on a reliable search mechanism. An AI search engine is a practical and dependable option for building AI search systems, and using one to search educational materials thoroughly and effectively is a great first step. This article provides an overview of the intelligent search system, discusses its design concepts and technical standards, explains its database design and functional architecture, and then describes the method and principles of the search system's implementation. This study suggests incorporating the computed feature word weights in the basic education domain into the algorithm for computing the weights of abstract sentences. Simultaneously examining the position of the sentence, its length, and other texts is done by analyzing the features of basic education resources and current automatic abstracting methods. Surface statistics provide an approach for automated summarization. Additionally, this article provides an overview of the current state of the automatic abstract system operating in the basic education resource search engine, outlines the steps for implementing AI-based search design ideas, and looks forward to future improvement efforts.

Keywords
Artificial intelligence; AI search engine; Design concepts; Technical standards.

INTRODUCTION

Building course databases and teaching resource databases is now a top priority for schools of all types in our nation. Courseware resource databases, course resource databases, and resource websites are only a few examples of the many teaching resource databases that they have individually developed [1]. These resource databases are a common way for educators and students to access online learning materials and engage with the world. Teachers and students alike may benefit from engaging in activities that enhance their capacity to gather and absorb information. On the other hand, when utilizing, the following issues persist: Course videos, electronic lesson plans, and a plethora of rehashed instructional materials fall short when it comes to categorization, resource management, uniformity, and overall excellence. The information that learners find while searching is often same or quite comparable. Manual secondary retrieval and filtering is laborious; students have unique requirements for acquiring pedagogical materials [2]. The goal resource must be located as soon as possible by means of placement and retrieval. The storage medium varies, the resource manifestation is singular, and the resource organization structure varies between instructional resource libraries and resources [3]. In addition to making it more difficult to acquire instructional materials, their manifestation fails to suit the demands of learners. The pertinent information and tools are examined in this study. examines the shortcomings of search engines in particular, and proposes a concept of an intelligent search engine that might work well in a classroom setting for students.

Material means. Here is the blueprint for the smart search engine. This concept incorporates AI technologies such as intelligent agents and semantic networks to make search engines smarter. Students' query requests may be expanded via the use of a semantic network, which takes into account the features of teaching materials and is based on the categorization of educational disciplines. This expansion can include synonymous expansion, similar associations, and conceptual expansion. In order to accomplish the goal of increasing search engines' recall rate and retrieval scope, we analyze student feedback to build a personal interest model of students on top of the conceptual semantic network structure. The relevance of concepts is shown by the connections between them. Students' diverse interests may be intuitively reflected in the model. To make search engines more accurate and to better rank the papers that students are interested in, it is necessary to determine the range of students' interests.

Then, the retrieved documents will be reordered accordingly. In addition to presenting the results of the tests, this article also validated and tested the intelligent agent system. Students are provided with instructional resources that pique their interest, and the findings demonstrate that the intelligent agent system can enhance the ranking of linked papers.

The focus of this piece is on outlining the paper's primary points. in five sections. Here is a brief synopsis of the layout of each chapter. An analysis of the AI search model and educational resource retrieval is presented in the first part, which primarily explains the subject background and research importance of the work. The current state of affairs provides a synopsis of the paper's structure and the primary research findings. Related work is included in the second section. In Section 3, we cover the basics of how AI may be used for intelligent resource retrieval in the classroom. Using experimental simulation, the fourth portion examines the AI search algorithm's design for educational resource search, and the fifth section confirms the AI search's performance. The article is summarized and anticipated in the sixth part.

2. Related Work

People have learned to rely on the Internet as a resource for finding information they need, thanks to the exponential expansion of online data [4]. Specifically, resource learning is the foundation of education students' learning. Consequently, a major concern for students pursuing education online is acquiring relevant topic knowledge. Over the last several years, AI search has grown into a major focus for academics throughout the world [5]. A lot of work and research has gone into developing AI search knowledge and its applications in recent years. Here is a summary of the literature on AI search knowledge in intelligent resource discovery for education. The online teaching platform's on-site search subsystem and the Chinese intelligent search engine have been the subject of investigation by relevant experts. A learner-centered educational ethos is the driving force behind online instructional activities.

philosophy, that seeks to build students' capacity for self-directed and collaborative learning. One way that educators and students may work together is via the proliferation of online learning platforms [6]. Online teaching platforms provide a wealth of instructional materials, including course materials, after-school activities, reference materials, teaching courseware, and countless more. However, the diversity among these resources makes it challenging for both teachers and students to find what they need quickly and incorporate it into their lessons [7]. The primary goal of creating search engines for educational purposes is to facilitate the sharing of instructional materials in a way that allows students to easily locate what they need from their own libraries. Building a platform that can be used for online instruction and has a search tool at its heart is the key to achieving this goal.

A related group of researchers examined the features of online I have thoroughly examined the principles of search engines' operation, as well as the features of online education and the criteria for evaluating the learning abilities of online students. Based on these findings, I have developed a search framework that is open source and has confirmed the theoretical value of search tools in online education platforms. Incorporating information push and intelligent knowledge base technologies into the site's search architecture has increased search engines' intelligence, compared and analyzed the current state of word segmentation, suggested a plan to optimize word segmentation, and optimized search result ranking technology. This has made the search tool more user-friendly for learners, allowing them to more easily search and query massive resources on the teaching platform and quickly find the data they need [8]. In order to make the search engine even better, it feeds back to users the results of the necessary resource searches. Students mostly rely on internet media to get the necessary knowledge resources during online instruction [9]. The ability of students to fully use online instructional materials is the primary determinant of their knowledge construction. Nevertheless, students will always exhibit the phenomena of "information trek" due to the present disorganized network of instructional materials. Learners' interest and passion for studying will be influenced by these characteristics in a roundabout way. Therefore, search engines can help online teachers make better use of their resources [10]. Not only can search engines increase the efficiency with which online teaching materials are used, but are also an essential technology for the future of online education.

2.1. Incorporating AI into the Intelligent Retrieval of Educational Materials

2.0.1.1. Building an Ontology Model for Artificial Intelligence Retrieval. Domain ontology provides an abstract definition of ideas and connections in a particular domain, whereas ontology provides a clear and standardized explanation of conceptual models. subject areas. It is a structure for organizing information resources in connected fields, and its functionalities are comparable to relational models [11]. At its core, domain ontology is the building block of any intelligent information retrieval system; it permeates the whole system, serves as a foundation for other functional modules, and gives references to and information about them. Domain ontology development is a time-consuming and intricate system engineering process that calls for the input of several domain specialists [12]. A number of approaches to building ontologies have been put forth. Drawing heavily on the principles and practices of software engineering, this article presents a novel approach to building prototype ontologies using the spiral model. This will help guarantee the establishment of a proper domain ontology. In Figure 1 we can see the ontology construction process. Classifying Educational Materials with the Use of Intelligent Classification Technology (2.2). A plethora of different sorts of educational materials are available. The majority of the information and data included in them is disorganized. Each information resource has its own unique source, format, language, and body of data, information, and knowledge. Efficiently processing information in advance is key to quickly finding correct facts, information, and knowledge [13]. Archive classification management using intelligent classification technology may efficiently organize data, knowledge, and information in intelligent educational resources. Timely classification of the massive and disorganized knowledge, information, and data may be facilitated by particular standards, allowing for easier gathering and location of data [14]. To begin organizing your data, knowledge, and information into meaningful categories, you may use the theme's standards to group related concepts into larger ones. From there, you can build a hierarchical structure by subdividing each larger subject into smaller ones. Machine learning, pattern recognition, natural language processing, and artificial intelligence can intelligently classify teaching resource intelligence. A marked practice text sample library forms the basis of text categorization technology in natural language processing. Finding a relational model that is associated with text kinds and text characteristics is the first step in this example library's process of creating new text categories. With the use of text classification technology, we can intelligently categorize text-based instructional materials [15]. Smart categorization technology that combines speech recognition, picture recognition, and video recognition also allows archivists to intelligently separate and organize multimedia instructional materials. Figure 2 shows the intelligent search system architecture.

Intelligent Retrieval of Educational Materials by the Use of Intelligent Search Technology (2.3). In tandem with the ever-increasing sophistication of AI systems, the varieties and

The exponential growth of instructional intelligence has had a profound effect on the conventional methods of retrieving material from archives [16]. There is no denying that conventional retrieval techniques have their drawbacks, and the efficiency of these procedures has not been up to the standards needed for archive work. Thus, intelligent retrieval technology must replace conventional techniques of archive retrieval if we are to see an improvement in the efficiency of this process. Several AI technologies, including pattern recognition and natural language processing, are fully used by intelligent retrieval [17]. One major advantage of intelligent search over traditional search is its ability to find and display results that are highly relevant to the user's query in the most efficient way possible, significantly cutting down on search time and improving the quality of results returned. Intelligent retrieval may look for multimedia file types including audio, video, and images in addition to text. An increasingly important part of archival retrieval work in this era of more sophisticated multimedia instructional materials is intelligent retrieval technology, which offers benefits above conventional information retrieval methods [18]. Efficiently managing and making the most of information, data, and knowledge in educational resources is the primary goal of file categorization management. Users have challenges while trying to find relevant information due to the abundance and diversity of instructional resources' intelligence, data, and knowledge, as well as the heterogeneity of their sources of information, data, and knowledge [19]. Consequently, new search methods are required to satisfy user demands for archive search and to ensure that users can quickly locate the information they need. An AI technique known as "neural network technology" replicates the distributed processing capabilities of biological neural networks by modeling its behavior after those of these systems. An all-encompassing use of neural network technology in file categorization management has the potential to substantially enhance search engines' searchability. In order to achieve effective management of archives classification, it is necessary to develop an intelligent search engine that can accurately search information, data, and knowledge within intelligence of teaching resources. This will solve the problem of information, data, and knowledge overload [20]. The intelligent search engine uses statistics and neural network theory to swiftly evaluate and categorize large amounts of data, and then sends the user relevant information and data depending on their supplied search terms. More than that, the AI search engine can automatically decipher the new information's complicated ideas, figure out what they signify, and store them for future use [2]. Intelligent search may now find and search for information based on text content, contextual relationship, and meaning with the addition of neural networks and pattern recognition. That being said,

Intelligent search has the ability to rapidly locate the most relevant and helpful material, while also offering users an extensible conventional system of data, information, and knowledge. As a result, the usage rate of intelligence-based teaching resources is significantly enhanced. Figure 3 depicts the intelligent information retrieval system's framework.

The two basic components of this paradigm are the offline processing component and the online processing component. The primary functions of the offline processing component are data gathering, domain ontology creation, and data processing. In the online processing phase, the user's query is collected, the query conditions are coded, the search engine queries the semantic index library, the result sets are sorted, and the user is returned with the sorted final results. Since the offline processing component takes some time, you have the option to disable the service, and the server burden is minimal.

3. Design of Educational Resource Search Based on Artificial Intelligence

Search Algorithm

3.1 Online Learning Platform's Intelligent Search Engine Features. There are several functional issues with traditional search engines, such as an excess of useless information and a great deal of information feedback in search results. Reason being, to fulfill users' search requirements, conventional search engines rely heavily on mechanical matching algorithms based on keywords [21]. There is a limit to how well typical search engines can understand and evaluate search phrases; in other words, they can't quickly and accurately search users' specialized and personal knowledge across disciplines. Smart search engines, which will be available when search engine technology advances, will, however, address the aforementioned issues [7]. In addition to improving the initial resource search from a keyword search to knowledge comprehension, smart search engines may provide users with a user-friendly search interaction interface. In addition to realizing automated word segmentation, synonym, machine learning, etc. technologies, they can also search existing resources for the most relevant results for users, provide feedback based on the user's search query, and more. In order to improve the search experience for users, intelligent search engines will include more personalized features, learn users' search preferences over time based on data like resource browsing and search habits, create a user description model for each user, and actively provide relevant information to users [22].

Students using the platform at home will benefit most from the onsite intelligent search engine architecture suggested in this piece. An analysis of the online teaching platform's resource library use reveals that the vast majority of its items are papers, particularly courseware and supplementary reference materials for instruction. documents presented in this manner. Thus, the five major features of an intelligent search engine for a learning platform should be:

(1) A smart and tailored search function: search engines' smarts mostly show in their capacity to learn users' search preferences from their search patterns and accordingly provide various users varying kinds of information. Using the learner's attributes as input, the

search engine should build an interest model and continuously refine it to ascertain the search's breadth and provide its expert, personalized search service, as outlined in this article.

(2) Dealing with the area of professional development materials for educators: now, generic commercial search engines aren't up to the task of satisfying the specialized search requirements of users in a given industry. The teaching platform's built-in intelligent search engine speeds up the process of finding relevant teaching resources by identifying themes and then retrieving those materials. This saves time for students.

(3) Well-designed user interface: while creating the interface, take cues from the most popular search engines of the moment, merge the features of the online learning platform, and strategically include in-site links. To enhance the search experience for the user, you may define the courses from which the teaching materials are derived, as well as individual teaching modules within those courses.

(4) Assisting students in making informed search decisions: a field-specific search engine is available on-site as a teaching resource. Adopting technologies like semantic web and automatic word segmentation technology that accurately and swiftly understands learners' search requests is essential, as is providing learners with some commonly used keyword input prompts related to teaching resources. Additionally, the search tool should interact with learners using natural language.

(5) More accurate search results: search engines employ information mining, filtering, and other technologies to sift through the network teaching platform's instructional materials, and then they combine search phrases to re-sift the importance of learners, resulting in feedback search results that are more relevant to their needs.

3.2 Machine Learning for Search Engine Resource Allocation. Our current strategies for acquiring search engine resources are blind, as we can see from the study above. They lose efficiency and search accuracy due to the abundance of irrelevant data they obtain from width- and depth-first methods. We need to know how to make search faster and more accurate, and how to

we get access to more useful data resources simultaneously? Using the depth-first search method on a page where the necessary information is already there results in a lengthy process of traversing the previous page. The cost is high, while the efficiency is only about 10%. In contrast to the inefficient depth-first technique, the heuristic search is often accessible throughout page traversal. Search engines will be able to acquire information resources more effectively with the use of AI applied to site crawlers [23]. Web crawlers may employ heuristic algorithms to skip over useless links and get straight to the ones that will really help them once they compute the evaluation function. This drastically cuts down on the amount of links that need to be navigated, and a significant fraction of those connections go to sites that fulfill the criteria. Web crawlers have also become better at accurately collecting information resources. One recent development in the field of artificial intelligence is the concept of intelligent agents, sometimes just called agents. The system is capable of doing complex tasks on the user's behalf based on their preferences, even in the absence of explicit instructions. A new generation of more powerful online intelligent search systems may be developed by applying intelligent agent technology to search engines. Determining the page type from a link is a challenging topic. A better solution would be to create an intelligent agent system that can automatically classify documents or determine their kind. Figure 4 shows the primary processing processes performed by the AI search algorithm.

When people talk about retrieving information from networks, they often mean retrieving it via the Internet. Using the terminal's built-in network interface software, users may conduct queries across many fields. A lot of data is spread out in the corresponding server, and this retrieval technique is mostly reliant on the Internet's distribution function, which is data storage and distribution. The user may access and utilize any data stored spread across the system by searching for it using the application terminal.throughout the internet. Figure 5 shows the network information retrieval system's fundamental structure.

The knowledge base is a good place to start. Because of its role in the AI system's long-term memory, this component mostly retains domain-specific information. This encompasses not just generally accepted principles and common sense, but also previously established facts and knowledge. Databases are also a part of certain specialized systems. Following that, we have the inference engine. It is primarily composed of master control and several task programs that carry out retrieval tasks. Its function in assisting with searches is crucial, given that it is a specialized library. The system and the links that the user uses to enter and deliver important information make up the majority of the user interface. Displaying the final processing output to the user and transferring the user's will to the computer are two of its functions as a bridge between external information and internalization. Users may feel less strain and stress as a result of the usage of nonnatural language in this procedure. Commonly referred to as the "blackboard," the intermediate database is primarily responsible for storing data and outcomes obtained at various stages of a process or inference. The system will show the issue and its original condition on the blackboard during the application process. While concurrently fixing and inferring the blackboard's contents, the expert system draws conclusions based on the knowledge search matching state of the knowledge base. Whenever there is a gap in the knowledge base, we will also reach out to customers to fill it in. Thus, the blackboard may also be seen as a living repository of information. In terms of managing the job's advancement, it is very essential. In the end, the tool for acquiring new information is also known as a learner. Constantly fixing the knowledge base's material based on system operating experience is its primary duty. This is a powerful additive that will keep the system running smoothly. Answering user inquiries and providing context about the system's calculation trajectory are the primary responsibilities of the interface designer. To put it simply, AI is a tool for the advancement of science technology to help people solve some urgent problems in the form of analogy thinking.

4. Experimental Results and Analysis

Setup of Data Sets and Experiment 4.1. Using resources from the field of basic education, we build a two-tiered hierarchical classification system to objectively test the aforementioned feature selection strategy in a real-world text classification scenario. Figure 6 displays the twelve main

8428 training documents and 1867 open test documents make up the associated data set, which was manually gathered and organized into 18 subcategories. Figure 6 displays the particular distribution. The training set and test set will be referred to as such throughout the experiments and discussions that follow this article.

The Roccio method is used as the classification algorithm in the experiment. The Roccio method considers only positive samples in the real application, where $\alpha = 1$ and $\beta = 0$, and the category vector is located in the middle of the category's training text.

There are limited negative examples that can be used to create the category vector, and they could even provide more noise. With the value assessment standard and the microaverage classification accuracy rate Micro-F, the classification results are assessed. Training papers are organized using the following structure: training documents at the first level are made up of documents at the sublevel below them. When training a first-level category, all documents belonging to that category make up the positive example document set, whereas all documents belonging to other categories make up the negative example document set. At the second stage of subcategory training, we compare all of the subcategories that fall under the same parent category. As an illustration, consider the following language subcategories: elementary school, junior high, and high school. To extract the characteristic words from the elementary school subcategory, we have a document from elementary school (the normal document set) and a sum of documents from junior high and high school (the negative example document set). Concurrently, this increases the feature contrast across subcategories and speeds up training. To assess whether a document belongs to a tiny category, the test uses a top-down classification approach, which involves first classifying the document into a broad category and then further classifying it by each subcategory inside that broad category.

The results of the correct rate analysis are presented in Section 4.1. In the first set of trials, six popular feature selection algorithms were evaluated. approaches known as DF, IG, CHI, WET, and MI. Figure 7 displays the value, which is located in the second layer, the Micro-F of the subcategory. Both statistics show that other algorithms have outperformed mutual information in terms of categorization accuracy. The main category's Micro-F stands out above the others with an exceptionally high value—up to 97.1%, to be exact. While there is a general downward tendency as feature counts drop, before 3000 dimensions, there is no difference in the Micro-F values of the four approaches. After 300D dimensions, the Micro-F value of the weight of text evidence drops dramatically. After 1000 dimensions, another Micro-F value clearly begins to decline. Distinctly lower than the big category's Micro-F value—up to 78.2%—is the tiny category. Overall, the trend graph resembles that of major categories, which might be due to poor discrimination between tiny categories within the same category leading to poor classification results.

Feature classification is an important part of feature selection.

The cation signifies the weight used to choose significant traits. To adequately portray the significance of the text's qualities, it is necessary to provide weight to them in the text description. Essentially, the capacity of features to classify and describe data is the foundation for the assessment of feature relevance in both contexts. Nevertheless, the approaches used and the extent to which they are considered are distinct. When seen as a whole, the data set highlights the distribution of characteristics across categories and the importance of features across all categories. When it comes to content, features are more important than the latter, which is applicable to individual texts.

5. Conclusion

People have learned to rely on the Internet as a resource for finding information as the amount of data available online continues to rise. In the field of education, resource learning is very important for pupils. Consequently, a major concern for students pursuing education online is acquiring relevant topic knowledge. But it's hard to get the necessary information from a broad search because of students' lack of expertise and the Internet's censorship. Consequently, search research in education is shifting its attention to the creation of intelligent search. Search engine intelligence will get more in tune with people's real demands as AI technology advances. With AI knowledge as a foundation, this article explains how to find useful teaching resources, investigate them, and construct a semantic network within the retrieval module. The goal is to categorize the do-main words in educational resources so that the retrieval engine can broaden the query request using this idea. Research on intelligent search's use in educational materials is the focus of this article. It is an initial investigation on AI search engines. Despite the suggestions, there are still several issues that need to be investigated. In order to determine how closely related the domain terms are to the content, this article use the word frequency approach. It may be more useful in certain contexts, but it cannot impartially

stand in for the document's contents. The search engine's intelligence has always rested on its ability to comprehend and convey the document's information. Achieving transformational goals like as comprehending the document's primary content, precisely automatically locating it, and fully grasping its conceptual level are as important as extracting keywords from it. The core technology of intelligent search will unavoidably be enhanced as AI technology progresses, and intelligent search will undeniably have promising future applications in the search industry.

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