Research Article

Grid Management Optimization of College Students under Artificial Intelligence and Wireless Networks

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The work is aimed at solving the problem of colleges and universities to expand the enrollment scale and optimize the management strategy. Based on grid management theory, wireless communication network, NET framework technology, and the browser/server (B/S) framework, a grid security management system is presented. Grid knowledge is explained, wireless communication network address calculation and analysis are mentioned, and NET framework technology and analysis of B/S framework technology optimized by C/S (client/server) framework technology are discussed. The grid management system is built on this foundation and applied to university management. Two questionnaires are designed to explore the grid management of students and faculty. Students believe that the system can effectively solve their management problems, and teachers and workers believe that the system can optimize their work. These results show that the grid management system can be applied to the management of colleges and universities, which provides some ideas for optimizing the management strategy of colleges and universities.

1. Introduction

According to a study, China was increasingly shifting to industrial automation and artificial intelligence (AI) as a huge country in the process of modernization, and the state would pay attention to the development of various new technologies [1]. In recent years, educational reform is carried out extensively, and colleges and universities begin to expand their enrollment [2], adjust their major settings, and diversify the number of majors [3]. However, their internal facilities and management techniques have not been updated and optimized on time, resulting in an inability to meet the internship needs for students’ instruction and teachers suddenly having to educate and lead more students [4]. Teachers’ inability to communicate intensively, untimely feedback of students’ problem ideological changes [5], teachers’ difficulty in clearing students’ doubts on time, the limitation of the learning process, and experimental practice process are among the problems that colleges and universities are beginning to reform their teaching strategies and change the unified teaching mode into the decentralized teaching mode [6]. Therefore, developing a grid learning management system has become a goal that must be pursued.

The improvement of computer performance and the development of wireless network technology bring convenience to the establishment and optimization of the school’s grid management strategy. Gradually, some colleges and universities begin to establish their grid student management system [7]. This management strategy needs the support of modern information statistics and management technology. Stergiou et al. (2020) created a novel and secure cache decision system via intelligent construction and big data based on wireless networks, and it provides users with a more secure and efficient environment to browse, share, and manage large-scale data [8]. During the COVID-19 outbreak in early 2020, Liu et al. (2020) offered an online teaching approach as a student management strategy. It is utilized to implement intelligent grid management for students via wireless networks, and it has been determined that it performs well [9]. Gacanin (2019) discussed the available technologies and opportunities of using AI in the design of the autonomous wireless system. Based on the combination of
knowledge management, perception, reasoning, and active learning, he (2019) provided readers with AI methods independent of big data in real time in the context of self-organization and some ideas for the intelligent management of networks [10]. Wang et al. (2020) established a tram integration system based on AI and blockchain, and it only manages the battery of electric vehicles.

This proves that AI plays an important role in intelligent management [11]. Through the three subfunctions of automatic attendance, fingerprint attendance machine network monitoring, and attendance inquiry, Liu (2020) brought the fingerprint attendance technique into the intelligent management of college students. Liu integrated fingerprint attendance into the smart campus environment and improved the efficiency of student attendance management, which has a good effect on intelligent grid management [12]. The above research shows that various network technologies based on AI can play a significant role in managing work. Therefore, a method is proposed to realize students’ intelligent grid management based on AI. Under the NET framework, a student intelligent grid management system is established based on AI and wireless networks. First, the theoretical basis of grid management, the relevant technology, and the required knowledge are introduced. Second, the basic technology of wireless transmission networks based on AI is displayed. After that, a system for students’ intelligent grid management is established. Finally, a questionnaire survey is conducted on students and counselors to ask about the implementation effect of the method and reveal whether the system is feasible. The idea is to create a management system using the NET framework. In addition, the system’s performance is assessed, and recommendations are made as a result.

The rest of the paper is organized as follows: Section 2 gives materials and methods, Section 3 gives us results, and the conclusion is discussed in Section 4.

### 2. Materials and Methods

#### 2.1. Grid Management

The term “grid” is an acronym for “power grid.” It is a large organization with high-performance computers, large databases, and remote actual data collection devices such as sensors and collectors [13] connected by wireless networks in different regions, allowing computing, communication, computer software, and other technical resources to be shared. Users can get an integrated service when using network resources, realizing resource sharing through virtual environment and organization [14] and maximizing the utilization efficiency of network information.

Grid management comes from people’s behavior in obtaining resources in daily life. When people consume water or electricity, for example, they do not need to guess how the water or electricity is delivered to the user. People can acquire resources by just turning on the faucet or the control panel switch, i.e., they can obtain good resource supply at any moment based on their resource demand. It is an important idea in grid management to interact between users and the grid through the agreement, providing instant and convenient services for users in need and responding accurately and quickly with the grid.

In the students’ grid management of colleges and universities, there are two differences between broad sense and narrow sense in the management of political thought. The goal of student grid management is to educate college students in the field of ideological and political education through the use of modern wireless network technology and real-time learning of advanced grid technology, resulting in more organized and standardized ideological and political work. The grid theory concept of ideological education [15] can be described by five nodes in Table 1.

![Figure 1: Three-dimensional grid.](image)

#### Table 1: Three-dimensional grid.

<table>
<thead>
<tr>
<th>Nodes</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Longitude</td>
<td>The attention to education generally covers organizations, individuals, and organizations of grass-roots departments.</td>
</tr>
<tr>
<td>Latitude</td>
<td>Contents and responsibilities of education</td>
</tr>
<tr>
<td>Node</td>
<td>The subjects of ideological education are specific users.</td>
</tr>
<tr>
<td>Frame</td>
<td>The operation mechanism of ideological education includes norms, processes, assessment, rewards, and punishments.</td>
</tr>
<tr>
<td>Procedure</td>
<td>The center of ideological education is to form the concept of grid coverage for all users of the university, know about the thoughts, performance, potential, and skills of all users, and realize comprehensive grid management.</td>
</tr>
</tbody>
</table>

Figure 1 shows several aspects of grid management. Grid control of students’ ideas, as well as grid management of students’ possessions and mental states, is all designed to keep students safe. If students’ safety cannot be guaranteed, their administrative comments will have a serious negative impact on the whole management [16].

People’s perspectives differ. Many of the elements depicted in Figure 2 can have an impact on college students. As a result, effective grid management is required to steer them in the right direction.

Students’ security grid management must be personalized. Independent colleges need to pay attention to students’ security grid management. Figure 3 shows the advantages of grid security management. After a comprehensive analysis of grid management, establishing a grid security management system with new technologies is the goal of school management.

#### 2.2. Wireless Communication Networks

Wireless communication networks attract the concern of researchers in recent years, and they are outstanding in realizing communication objectives. Deep convolution falls into two steps [17]. One is deep convolution and the other is point-by-point convolution.
Convolution is to change the layer of \( M \cdot D_F \cdot D_F \) into \( M \cdot D_F \cdot D_G \cdot D_F \). \( D_F \) is the length and width of the input graph, \( M \) is the number of input channels, \( D_G \) is the length and width of the output graph, and \( N \) is the number of output channels. If the convolution kernel size is \( D_K \cdot D_K \), the amount of calculation is

\[
D_k \times D_k = M \times N \times D_k \times D_F \times D_k \times D_F,
\]

and

\[
\frac{M \times N \times D_k \times D_F \times D_k \times D_F + M \times N \times D_F \times D_F}{M \times N \times D_k \times D_F \times D_F} = \frac{1}{N} + \frac{1}{D_k}.
\]

There are two communication address allocation rules. The 64-bit Institute of Electrical and Electronics Engineers (IEEE) extended address [18] is one, while its coordinator’s network address is 0. When the node is linked to the network, the other is the address of the parent node using distributed address assignment mechanism (DAAM) [19]. \( C_{\text{skip}}(d) \) is a parameter in the DAAM allocation rule and the address offset of the child node. It is the space left for the node address at depth \( d + 1 \) between the coordinator at depth \( d \) and the node. The address of the first child node added to the parent node is the parent node + 1. The calculation of \( C_{\text{skip}}(d) \) satisfies the following equation:
The active server page NET (ASP.NET) [22] is a powerful wireless network web application that includes a page and control framework, an ASP.NET compiler, security infrastructure, state management, application configuration, device performance function monitoring, operation, debugging, the reference program application cycle, and an extension designer. ASP.NET page and control framework is a structure that can run on the server of wireless network, dynamically generate ASP.NET web page, request access from any browser or client, and mark the client or browser that sends the request. The ASP.NET web page is a completely user-oriented web page, in which the attribute method can be used to deal with network elements through ASP.NET application configuration system, define the configuration settings of web server, website, or single application according to different requirements, and add or modify the configuration according to the changes of requirements at any time.

ASP.NET program is shown in Figure 4. Every time an object sends a network request to the wireless network web server, the Internet information server will provide the corresponding file for the request after receiving it, then process it through some network modules, and finally send it to the equipment that can handle this network module. Such a processing flow can improve the overall security and enhance the information control ability of users in many links. In general, ASP.NET is generally assembled in the Windows Server Internet information services (Windows Server IIS) [23] and ASP. When ASP.NET is registered, the Internet script application program interface (ISAPI) needs to be extended. Figure 5 shows the structure of the operation mechanism, which can make IIS of ASP.NET transfer the response request control to ASP.NET after receiving the network request. When ASP.NET is running, it determines if the site is being accessed for the first time. The initialization process is carried out if it is accessed for the first time. ASP.NET is also responsible for creating the bearing results of the response thread in the running state and then processing the network request. After the work is done, the corresponding results are transmitted to the client through IIS [24].

Figure 5 shows that the main task of ASP.NET and ISAPI is to arrange the processing of requests and monitor ASP.NET to deliver the request to a series of managed objects called HyperText Transfer Protocol (HTTP).

In general, ASP.NET is built in the IIS environment of windows ASP. NET framework is registered in IIS NET, which makes IIS hand over the control of the response request to ASP.NET after receiving the request of HTTP. After ASP.NET gets the request, it determines if the site is being accessed for the first time. If it is accessed for the
first time, it will carry out initialization (such as loading dynamic link library, reading ISAPI file, initializing application instance, and compiling and loading file). ASP.NET also creates context instances of request-response threads and session instances that host response results in the running. ASP.NET looks for a suitable handler to process the request and waits for the module to return the processing result. Finally, ASP.NET returns the response result to the client through IIS after saving the session and handling follow-up work.

2.4. The Structure Design of the Grid Management System. The hierarchical division is the grid management system’s structure. The creation of a system necessitates the
interconnection of several components. The system’s structural function is to design the relationship between its components. In addition to completing user requirements, it also needs the scalability of the experimental system. The system will be established based on the browser/server (B/S) structure [25], which is the optimization of the prototype client/server (C/S) [26]. Under the B/S structure, the user’s interactive interface is realized through the web browser, and some logical things are realized in the front end, but the main logical things are realized in the server. As a result, the B/S structure can lower the burden on the computer client, as well as workload and expense, but the related application server’s operation data load is slightly heavier, as illustrated in Figure 6, which compares the B/S and C/S structures. Because it is obtained after C/S is optimized, the performance of B/S is better.

Figure 7 shows the structure of grid management. The presentation layer acts as a bridge between users and systems at the entrance of users for data input and result output. The function layer is responsible for general logic functions and operations, mainly including business capabilities and data functions, which can only be completed by interaction with the data layer. The data layer is the equipment for centralized management of data in the system, covering two parts: business entity and data processing. The advantage of this structure is that it can quickly process data [27], improve maintainability, and immediately and accurately judge the level of vulnerabilities in the facilities.

2.5. Questionnaire Design. A questionnaire survey is being conducted to determine whether the grid management system is acceptable to instructors and students and to determine whether it can be implemented to present university management by analyzing the system’s application effect. The specific design and content of the questionnaire are in the appendix (Appendix 1 and 2).

The validity tests of the student and teacher questionnaires are shown in Tables 3 and 4, respectively. The validity of the two questionnaires is good, and they may be utilized in the inquiry experiment. In this experiment, a total of 300 questionnaires are distributed to students in a university, 285 are recovered, of which 268 are valid; 30 teachers’ questionnaires are distributed, 29 are recovered, and 28 are valid. The results of the questionnaire are analyzed.

3. Results

In this section, we will discuss the results of the students’ questionnaire and the results of the teachers’ questionnaire in detail.

3.1. Results of Students’ Questionnaire. The findings of the students’ questionnaires are examined and summarised, and the model’s viability is determined by looking at the students’ input on the grid management system. The results are shown in Figure 8.

Figure 8 shows that among the 268 students, 247 students approved of the grid management system, accounting for 92%, while 15 students disapprove of it. The remaining six students have a neutral attitude, accounting for 3%. This shows that this system has good performance and can be recognized by most students. It is effective in ensuring the safety of kids as well as providing ideological and political instruction.
3.2. Results of Teachers’ Questionnaire. Teachers’ survey findings are statistically assessed, and the role of the grid management system is examined. The statistical results are shown in Figure 9. Whether the grid management system can improve the effectiveness of teaching management is evaluated.
Figure 9 shows that among the 28 teachers, 25 think that their work effectiveness is significantly improved after using the grid management system, accounting for 89%. One teacher argues that it has no help for him in the teaching process. The remaining two think that there is no difference after the system is adopted, accounting for 8%. After it is used, teachers can complete their tasks more efficiently and completely. Therefore, the grid management system can be used for the management of teachers, and their work efficiency is improved.

4. Conclusions and Future Work

Although the number of students enrolled in domestic colleges and universities has increased, the level of education strategy has not improved. This might put a lot of strain on the administration of a growing number of students. In this case, a grid management system is proposed to improve the management of students and teachers, formulate the safety management strategy, and strengthen ideological education. First, the concept of the grid and the theoretical knowledge of grid management are introduced. Second, wireless communication networks are presented as technical support. Finally, a grid security management system is established, deployed, and tested in the management of a university, and two questionnaires are designed to evaluate the grid management system of students and teachers in a university. Through the results, it is known that students and teachers have a high evaluation of the grid management system. The technique is seen to apply to the grid management of colleges and universities, as it helps to increase management effectiveness. However, there are still a few
flaws. For example, the number of polled teachers is 30, which is a tiny number. The scale of the system will be increased and the system’s logic will be evaluated further in the follow-up study.

Data Availability

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

Conflicts of Interest

The authors declare no conflicts of interest.

Supplementary Materials

Appendix 1: Students’ questionnaire (Supplementary Materials)

References


