Development of the Electronic Information System for University Biomedical Engineering Scientific Research Management Based on Computer Internet

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Abstract. The quality of scientific research management (SRM) in universities plays a vital role in the development of universities, and it is still one of the most important factors reflecting university reform and development and informatization construction. As the number of university scientific research (SR) projects has increased year by year and funding has increased, the emergence of diversification has put forward new challenges and requirements for SRM. Therefore, there is an urgent need for university SRM departments. Have it already. It is more systematic, standardized and efficient in managing SR projects. Various evaluation methods of electronic information systems, such as student evaluation, question evaluation, and teacher evaluation, provide a comprehensive view of the university's medical and bioengineering SRM electronic information system. As for the experimental results, more than 90% of the students in the experimental class accepted interviews and surveys, and more than 90% of the students agreed to research and develop electronic information systems for the management of biomedical engineering SR in the university and expressed their satisfaction. It shows that it is. Based on the computer Internet.

Keywords: University SRM, Computer Internet Cloud Algorithm, In-Depth Mining Algorithm, Management Electronic Information System

1. Introduction
In recent years, in the management and service of science and technology in universities, all universities have further sorted out SR work methods, actively built a strong academic atmosphere, optimized the state of SR work, strengthened the reform of science and technology management system, and continued to strengthen basic research, applied basic research and Applied research, and actively integrated into local economic construction, has made considerable progress in platform construction, team building and research capital injection, and the comprehensive scientific and technological strength has been significantly enhanced [1]. With the continuous development and change of university science and technology management system, university science and technology management system needs a sound and complete university SR information management system, which can timely and accurately query and feedback various SR results, optimize and improve the
entire university SRM process. The optimization of SRM process, the overall health of the school, improve work efficiency, and realize the standardized management of SR information [2].

The application value brought by the SR results and SR level of ordinary colleges and universities, and the SR ability of university SR workers have been regarded as a very important indicator reflecting the comprehensive strength of ordinary colleges and universities [3-4]. Domestic scholars Gui and Herong believe that traditional SRM with the help of office and other processing software is time-consuming and laborious, and when querying various SR information and personal data, data sharing is poor, causing a lot of inconvenience to SR staff [5]. Foreign scholar O. Akhavana believes that in the face of advanced SRM of various sample types of report forms and data processing, manual calculation methods have been difficult to adapt to the pace of modern management. It needs an efficient means to solve [6]. Most universities have realized this problem, and various universities have successively developed and designed SRM systems with different functions, which have played a SRM effect with convenient statistical management [7-8]. At present, many universities have begun to explore and establish SRM information systems of different levels and scales to adapt to the development of higher education and the further construction of digital campuses [9-10].

This article summarizes the advantages of the SRM system in the application process, and fully explains that the university biomedical SRM system develops a system that meets the needs of the majority of biomedical SR workers in various scientific and technological management activities such as scientific and technological planning, achievement management, and platform construction. The biomedical SRM information system to improve the SR and information management of biomedicine and the efficiency of biomedical SR has become an urgent need for current SR.

2. Research and Development of the Electronic Information System for University Biomedical Engineering SRM Based on Computer Internet

2.1. Computer Internet Cloud Algorithm

The use of computer Internet cloud algorithm data mining is to discover all strong association rules from the source database, and the strong association rules must satisfy the support degree greater than or equal to the corresponding minimum support degree and the confidence degree greater than or equal to the corresponding minimum confidence degree. That is,

\[ \text{conf}(A \Rightarrow B) \geq \min \text{conf} \quad \text{and} \quad \text{sup}(A \cup B) \geq \min \text{sup} \], then \( A \Rightarrow B \). This mining process includes the following two steps:

1. Search for frequent itemset: To search for itemset whose support degree is not less than the specified support threshold, to obtain frequent itemset, it needs to scan the transaction source database. This is the main step of association rule data mining, according to the scope, target, and direction of the search data format, different search algorithms can be constructed.

2. The generation of strong association rules: For any frequent item set \( L \), detect each non-empty subset \( X \) in it, and generate the rule \( L \Rightarrow L - X \), the corresponding support is recorded as \( \text{Pr}(L) \), and the confidence is recorded as \( \text{Pr}(L) / \text{Pr}(X) \), delete those rules that do not meet the confidence level set by the user, and the rest are strong association rules. Based on the nature of support calculation, the process can be simplified to find the largest subset of \( L \) first, and only when the confidence of its generation rule meets the conditions, other subsets are tested. For example, \( L = \{A, B, C, D\} \), if the confidence of rule \( \{A, B, C\} \Rightarrow D \) does not reach the confidence threshold, then \( \{A, B\} \Rightarrow \{C, D\} \) also does not meet the confidence threshold (because of \( \text{Pr}(\{A, B\}) \text{Pr}(\{A, B, C\}) \)).

2.2. Deep Mining Algorithm

(1) Data mining technology

Using data mining technology to deeply mine for item set \( X \), \( X \subset I \), the support degree of item set \( X \), the frequency of item set \( X \) appearing in \( D \), denoted as
where $\text{count}(X \subseteq T)$ is the number of $X$ contained in the transaction database $D$.

Association rule $R : X \Rightarrow Y$, the confidence of rule $R$ refers to the ratio of the number of transactions where $X$ and $Y$ appear at the same time to the number of transactions that only appear, denoted as

$$\text{confidence}(X \Rightarrow Y) = \frac{\text{Support}(X \cup Y)}{\text{Support}(X)}$$

The credibility reflects the probability that $Y$ appears in the transaction if $X$ is included in the transaction. The minimum confidence threshold is denoted as $\text{min}_\text{conf}$.

2) Data Fusion Technology

Data fusion technology, this technology is established on the basis of mankind's own information processing ability, and can use data combination to obtain more resources, so as to realize the collaboration of network information resources. The application of artificial intelligence in the management of computer network security technology can enable multiple sensors used to coordinate with each other during operation and play their due role together, so that the capabilities of each sensor system can be effectively improved. Then ensure the integrity and accuracy of intrusion detection results.

The main problem that the fusion function solves is how and what algorithm the data will be fused. The simplest methods include the average method, the maximum (small) value method, and the intermediate value method. Of course, there are also more complex algorithms. It depends on the specific integration requirements. Assuming that there are $n$ sensor nodes in a multi-sensor data fusion system, and their output data are $X_1, X_2, \ldots, X_n$ respectively, then the fusion function of the system can be expressed as:

$$y = F(X_1, X_2, \ldots, X_n)$$

In the above formula, $F$ represents the fusion function, and $y$ represents the result of the data fusion of these $n$ nodes. The fusion function should have the three properties of commutative and idempotent functions.

The tolerance function, as the name implies, describes the degree to which the data collected by two or more touch sensor nodes can be fused, which means the degree of similarity of the node data. The higher the similarity of the data, the closer the data is, the value of the tolerance function. The bigger it is. The value of the allowable function is specified in the interval $[0,1]$. When multiple data are waiting to be merged, the tolerance function is defined as follows:

$$R(x_1, x_2, \ldots, x_n) = \min \{R(x_i, x_j)\}$$

$R$ represents the tolerance function, $R(x_i, x_j)$ represents the tolerance result of two sensor nodes, and $R(x_1, x_2, \ldots, x_n)$ represents the total tolerance result of the data of $n$ sensor nodes. It can be seen that the tolerance of multiple sensor nodes value of is obtained by comparing the tolerances of the two-node data and then taking the minimum value.

3. Experimental Research on the Research and Development of University Biomedical Engineering SRM Electronic Information System Based on Computer Internet
3.1. Experimental Data
The research object of this article is a random selection of 400 biomedical students from the College of Natural Sciences, of which 240 are boys and 160 are girls. Then divide them into two groups A and B. Group A is the experimental group, group B is the control group.

3.2. Experimental Process
First of all, the randomly selected college students in this article will conduct a questionnaire survey to obtain the understanding, like and awareness of the biomedical research management information system of these 400 college students, so as to get a more true understanding of the biomedical students’ understanding of the biomedical research management information system the opinion of. After that, the computer-based Internet-based biomedical SRM information system proposed in this paper was used to conduct a one-month SR simulation test on group A biomedical students, and under the same conditions, the traditional SRM model of group B was also conducted for one month. Of SR simulation testing. Finally, conduct a questionnaire survey and compare experimental data.

4. Experimental Analysis of the Research and Development of the Electronic Information System for SRM of Biomedical Engineering in Colleges and Universities based on Computer Internet

4.1. Students' views on the Electronic Information System of Biomedical Engineering SRM in Colleges and Universities Based on the Computer Internet
This article uses the questionnaire method to conduct a questionnaire survey on 400 biomedical students selected at random. In this way, we can obtain the understanding, liking and cognition level of contemporary college students on the electronic information system of biomedical engineering SRM in colleges and universities, so as to understand more realistically the views of contemporary biomedical students on the electronic information system of college biomedical engineering SRM. The purpose of the first questionnaire survey is to understand the professional level of biomedical students and their views on SR.

|                  | Understand resource pool | Used resource library | Like resource pool | Think resource pool is very important |
|------------------|--------------------------|-----------------------|-------------------|---------------------------------------|
| Boys             | 156                      | 106                   | 42                | 128                                   |
| Girls            | 108                      | 90                    | 36                | 78                                    |

Table 1. Professional Level of Biomedical Students and Their Views on SR

![Figure 1. Biomedical Students' views on Different SRM Models](image)
After using two different SRM methods to simulate the SR of two groups of biomedical students A and B for one month, the vast majority of college students in group A believed that the computer-based Internet-based college biomedical engineering SRM electronic information system proposed in this paper is more effective, more interesting, interactive, and richer in resources, which improves the students’ enthusiasm for SR. However, group B college students who adopted the traditional SRM program generally gave low evaluations.

4.2. Changes in Music Students’ Love for Music

In this paper, the A group of college students use the university biomedical engineering SRM electronic information system to conduct a one-month SR simulation, and under the same conditions, the B group of college students use the traditional SRM model to also conduct a one-month SR simulation. During the experiment, the students participating in the experiment were surveyed every 5 days, and the changes in their love for the SRM system were counted. We visualized the changes in the degree of interest in SR for the two groups of college students A and B, and performed curve fitting according to the mean value. As shown in Table 2, Figure 2.

| Time | After 5 days | After 10 days | After 15 days | After 20 days | After 25 days | After 30 days |
|------|--------------|---------------|---------------|---------------|---------------|---------------|
| Group A | 50%          | 55%           | 63%           | 75%           | 81%           | 86%           |
| Group B | 50%          | 51%           | 54%           | 60%           | 63%           | 69%           |

**Figure 2. Changes in the Degree of Preference for SRM Systems**

From the experimental results, it can be seen that the students in Group A who used the electronic information system of biomedical engineering SRM in colleges and universities proposed in this paper are gradually increasing in the degree of interest in SR, and the increase speed is faster than using traditional SRM methods. Class B students are faster. And the students in group A are much more interested in SR than those in group B. This proves once again that the computer-based Internet-based electronic information system for SRM of biomedical engineering in colleges and universities proposed in this paper has a positive effect on SR workers, and greatly promotes the enthusiasm of students for SR, which is of great significance.

5. Conclusions

In this paper, under the background of the electronic information system for SRM of biomedical engineering in colleges and universities, the impact of SR on biomedical engineering in colleges is studied. The rapid development of computer technology and network has been able to provide a strong guarantee for the progress of SRM technology. A good SRM system can fully allocate resources and bring a qualitative leap in the management of SR in universities. The university SR information
management system is an information management system that applies the research results of computer science and technology. It is an information platform that serves the teachers and students of universities with SR activities and provides networked support services for university SRM.

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