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Analysis of Employment Competitiveness of College Students Based on Binary Association Rule Extraction Algorithm

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Abstract

Today, assessing competition among college students in the job search is extremely important. However, various methods available are often inaccurate or inefficient when it comes to determining the level of their readiness for work. Conventional techniques usually depend on simplistic measures or miss out on crucial factors responsible for employability. The challenging characteristics of such competitive employment of college students are the lower levels of perceived stress, financing my education, and crucial professional skills. Hence, in this research, the Internet of Things Based on Binary Association Rule Extraction Algorithm (IoT-BAREA) technologies have improved college students' employment competitiveness. IoT-BAREA addresses this situation using a binary association rule extraction algorithm that helps detect significant patterns and relationships in large amounts of data involving student attributes and employment outcomes. IoT-BAREA positions itself as capable of providing insights into features that highly mediate the employability levels among students. This paper closes this gap and recommends a new IoT-BAREA method to help increase accuracy and efficiency in evaluating student employment competitiveness. Specifically, this study uses rigorous evaluation methods such as precision, recall and interaction ratio to determine how well IoT-BAREA predicts students' employability.

Keywords: BAREA, Employment Competitiveness, college students, IoT

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1. Overview of employment competitiveness, usage, and its impact

1.1. Background

Anyone attending a four-year institution to further their education is considered a college student. Students who have just graduated from high school make up most of these folks and have decided to pursue further degrees [1]. Online learning powered by big data allows students to track and understand the characteristics of different types of learners comprehensively. They may create unique personalities for various learners and use those traits to build learning models [2]. There is verification that students engaged while they study have a more well-rounded educational experience, more capacities for personal growth, and greater levels of subjective well-being [3]. College students are expected to play a more significant role in achieving lofty goals, such as fostering social development and creating a prosperous and powerful nation [4]. For example, the learning promotion network matrix, the employment competitiveness promotion network relation type matrix, and four database matrices—a learning promotion network matrix, an employment competitiveness promotion network relation type matrix, and a personnel node number processing matrix—are all

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essential components of the process of data analysis [5]. Visualizing the network, evaluating centrality, cohesion, structural defects, and other indicators, identifying factions, and doing quantitative analysis are all possible with the assistance of the social network analysis tool. The assumption is that parental nodes do not impact parental learning, and employment competitiveness promotion aims to promote parents' learning and employment competitiveness [6].

1.2. Motivation

The primary cause of the problem college students have while looking for a job is the absence of their fundamental competitive advantage. The article lays out the steps for constructing the model to make college students more competitive in the job market using IoT [7]. For the purpose of researching campus system innovation and student employment education, this paper makes use of mobile edge computing and Internet of Things technologies [8]. It is a triple-win situation for universities to provide college students with high-quality job advice education since it facilitates connections between universities and companies, increases the amount of talent that is exported to the outside world, and enables colleges to contribute back to society [9]. Consequently, this study's overarching objective is to look at the potential applications of big data analytics and the IoT by college student professional organisations in fostering the development of creative and entrepreneurial thinking among their members [10,11].
Using data on college students' lives and academic performance, BAREA can determine potential connections between various student attributes; this allows educators better to understand their student's strengths and areas for improvement and tailor their lessons to each student's unique abilities in their employment [12,13]. Students' ability to compete for jobs based on performance may be forecasted using a binary association rule extraction approach, as shown in this study. Extract college students' employability using the mentioned technique [14,15].

1.3. Problem Definition

One of the most problematic aspects of the employment competitiveness of college students is the fact that they experience lower levels of perceived stress. Additionally, the use of IoT-BAREA has helped me overcome issues about funding my education and essential professional abilities.

1.4. The main objectives of the paper

- To develop a system to discuss the employment competitiveness of college students.
- An evaluation system has been developed based on the lower level of perceived stress, financing my education and crucial professional skills for employment competitiveness.
- The Internet of Things enabled Binary Association Rule Extraction Algorithm (IoT-BAREA), which has been used to design, develop, and verify employment competitiveness in college students.
- The experimental result has been validated with IoT-BAREA counterparts regarding high accuracy, efficiency, precision, recall, and interaction ratio.

1.5. Organization of the paper

Section 2 of the paper will cover similar works and the discussion. Section 3 examines the article and introduces factor models used to detect IoT-BAREA. The results and forum from Section 4 were compared to those of an existing methodology. Section 5 discusses the following research scope in light of the analysis presented in the preceding section, which brings the study to a close.

2. Survey

Tian, F (2023) [16] introduced college student's technology for the program's stated goals include encouraging the industrialization of Wireless Sensor Networks (WSN) through a transformation of scientific research accomplishments, developing students' practical skills and innovative awareness, and fostering their analytical thinking and problem-solving talents. Teachers use a variety of strategies, including class discussions and case studies, in their lessons. They emphasise practical components, create acceptable lesson plans, and evaluate and give feedback to students. Students work on real issues, develop creative solutions, and advocate for using and sharing research results.
Peng, J et al. (2022) [17] explained many college students' employment competitiveness sees training in Information Technology (IT) as a solution to this problem. This research takes a mixed-methods approach to investigate what makes computer science majors marketable to potential employers. The philosophy of competency-based education, full-scale development theory, and an extensive literature review guided the study's questionnaire. Education institutions may enhance their training by discovering student employability variables, which can serve as a benchmark for students to self-evaluate and improve upon. The report provides educational institutions with some pointers on more effectively educating their students for careers in information technology by developing IT skills training courses.
Gherheș V et al. (2018) [18] detailed that Students pursuing degrees in both the hard sciences and the arts have different perspectives on Artificial Intelligence (AI). The focus is on understanding their perspectives on the phenomena, the meanings attached to it, and the potential effects of AI on certain spheres of social life. Research has shown that many respondents are optimistic about the advent of AI and

think it will positively impact society. Additionally, the findings have highlighted gender inequalities and variations in the respondents' areas of expertise (humanistic vs. technical).

Palacios, C. An et al. (2021) [19] advocated the construction of models that are based on machine learning algorithms (CM-MLA) in order to extract useful information that forecasts student participation at various levels. Following that, they would be able to put this information to good use by aiding in the journey of discovering new information. The examination of dropout at various levels that is presented here is used by higher education institutions all over the world that are in situations that are analogous to Chile's, where dropout rates have an influence on the efficiency of such institutions. Through the use of student data, these educational institutions have the ability to prevent students from dropping out of school. The performance of algorithms is improved when the interests of the majority and the minority are balanced.

The machine learning-based precision education (ML-PE) was suggested by Luan H. et al. (2021) [20], who examined all of these methods in a systematic manner. Predicting academic accomplishment or dropping out of college is the primary focus of the majority of research conducted on college students majoring in data science. Both online and hybrid learning environments were used for the research, and a variety of data sources were utilized. Assessment methods and validation procedures are explored in relation to some of the most efficient algorithms for machine learning. The discussions center on the existing issues and the possible solutions to such issues.

As an analytical tool, the Fuzzy C-Means method (FC-MA) was proposed by Supangat S. et al.(2021) [21]. It is possible for students who are currently enrolled in higher education at a university or campus to be present since they paid their enrollment fees when the previous payment cycle came to a conclusion, as well as the amount that they paid. The researchers collected information for this study from as many as one hundred different datasets between the years 2014 and 2020. From the 100 Informatics Engineering Datasets, students were able to obtain 92% of students who were loyal to the institution, and 8% of students who were anticipated to churn.

Jiang L. et al. (2017) [22] detailed the Analytic Hierarchy Process (AHP) as an area of critical importance for the advancement and reform of education; the assessment of college students' employability has long been a focus of the field. To circumvent the need to check the consistency of the judgement matrix and make adjustments, this study suggests an improved AHP algorithm for evaluating college students' employment competitiveness. The algorithm uses the three-scale method to construct the optimal transfer matrix and a judgement matrix with high accuracy. A more accurate and efficient AHP may make the index weight more realistic and acceptable, minimise the number of calculations needed to reach a result and provide a scientific foundation for assessment decisions.

Yuan Zhao, Y et al. (2023) [23] discussed the employment competitiveness of college students based on the College Employment Guidance Service System to increase college students' employability by proposing realistic changes to the current system of job assistance services offered by educational institutions. The essential problem for the growth of college student management and society is the renewal of high matching and professionalism and the enhancement of college students' job competitiveness. In response, this paper takes a systematised approach to study college and university employment management, applies the "innovation structure of college employment management system" model to examine the college employment guidance service system from the viewpoint of student administration, and breaks down the system into its parts: the employment service team, the employment guidance course, and the employment information platform.

Following on from the previous section, complex traits such as employment competitiveness, having a lower level of perceived stress, financing my education and crucial professional skills are taken into consideration as the significance of using a college student such as [16], [19] and [21]. Further, this research discusses how the Internet of Things enabled the Binary Association Rule Extraction Algorithm (IoT-BAREA), which helps predict precision, recall, interaction rate, and high accuracy efficiency.

2. Internet of Things enabled Binary Association Rule Extraction Algorithm (IoT-BAREA) and its discussion

Because college students are often defined by a high level of comprehensive quality and a specific level of practical skill, it is first essential to properly understand them. Simultaneously, students don't always pay attention in class when teachers impart theoretical knowledge. This is usually because the information is too dry and formulaic, and teachers don't always try to tailor their lessons to each student's unique interests and skill sets. College students often possess exceptional skills in communication, organisation, and management. The process of employment competitiveness of college students is discussed below.

Figure 1 illustrates the employment competitiveness of college students; employment competitiveness refers to students' capacities to find and keep a job, advance in their current position, and adapt to changes in the workplace. Employability is defined by the Department of Labour, Employment, and Education as the capacity to obtain and hold down a job and make the most of it by reaching full employment.As a matter of paramount importance for college students' selection, education, and employment, studies examining their employability have long occupied the attention of governments, universities, and businesses. Education reform and government and university career advising may benefit from scientific assessments of college students' employability.

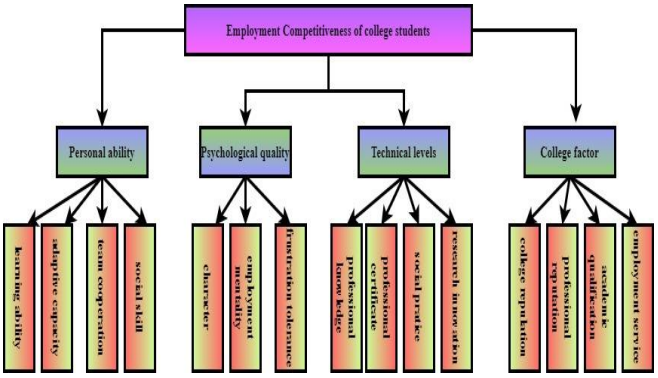

Figure 1. Method for enhancing college students' employability

Colleges can do more to help their students be competitive in the job market by focusing on three areas: first, providing better education in professional skills, research, social practice, and technology; second, enhancing students' learning abilities, teamwork skills, and adaptability; and third, helping students develop a regular employment mindset and better handle frustration. Therefore, it is essential to instruct college students in political and critical thinking, help them develop a positive attitude toward learning, instill in them strong study habits, and finally, to show them how to distinguish between historical materialist views and changeable materialist ideas, as well as how to think scientifically and practically. The structural elements of employment competitiveness of college students are shown in Fig. 1. Further, the college students are discussed in Figure 2, and the evaluation system of employment competitiveness of college students is discussed as follows.

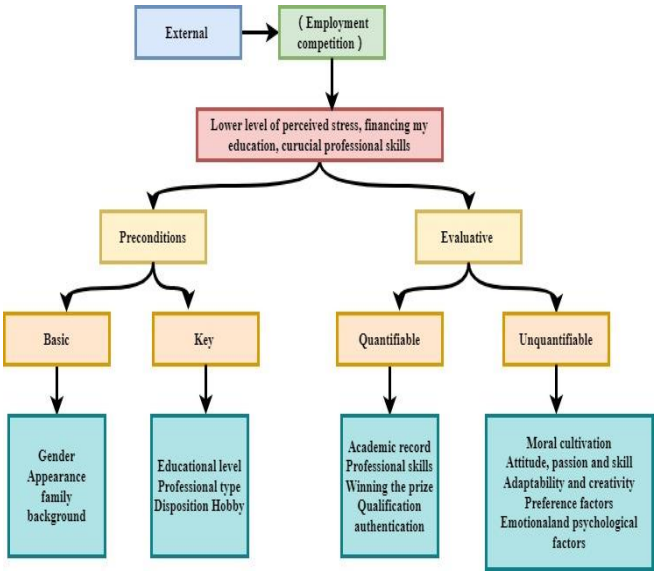

Figure 2. College Student Employment Competitiveness Evaluation System

An illustration of the Employment Evaluation System may be seen in Figure 2. According to the findings of a research that investigated the connotation system of employment competitiveness among independent college students, the degree of work competitiveness is influenced by a variety of complex factors, and the effectiveness of this competitiveness is influenced by the external environment. Concurrently, employment competitiveness becomes a relative notion if the majority of the employed begin actively seeking jobs and engage in a competitive interaction with other types of job searchers. So, it is impossible to analyse independent college students' employability using quantitative measures. To objectively assess their job competitiveness, it is crucial to thoroughly examine the pros and cons of employment competitiveness, accurately identify the opportunities and problems they encounter, and conduct a thorough analysis. Because a wide range of people are looking for work, it would be unrealistic and unnecessary to compare all sorts of job-seekers in society to determine how competitive independent college students are. This report chooses the most representative sample of college students from competing groups based on their degree of undergraduate studies. It is clear from the data that initially, as the meat of the job description, the pros and cons of self-sufficient university pupils first, from an external perspective, independent more difficulties arise for college students than opportunities, and they will be much less competitive when it comes to employment. This is because the two factors are interdependent and do not put them in an unfairly solid or weak position relative to one another. Third, even if independent college students' internal circumstances aren't the most crucial factor and external pressure is high, we can overcome the challenges, minimise the dangers, and increase job competitiveness using the proper plans and approaches. Lastly, the employment competitiveness matrix is complicated, consisting of many levels and components (Figure 2). These levels and components range from preconditions to evaluative criteria, primary and critical conditions, and measurable indicators to non-quantifiable elements. College students' employment competitiveness is a systematic, multi-dimensional, hierarchical connotation system that includes innate conditions, internal qualities, knowledge and skill level, moral and psychological quality, emotion, and the inclinations of the major body of employment. All of these factors are included in the system. Consequently, the key variables the BAREA for employment competitiveness of students have been discussed as follows,

The BAREA for employment competitiveness is shown in Figure 3 (a). Due to the fact that it is a relatively new type of higher education, the perception of employability among students attending independent colleges is comparable to that of students attending regular colleges. As a result, it is vital to take into consideration the degree to which society accepts independent college students as a new form of job topic, and it is also essential to have a comprehensive understanding of the item's internal and exterior qualities

in order to have an accurate understanding of any of these aspects. What characteristics college students have that make them competitive for jobs might influence how they grow and change. Distributed storage and parallel processing are the foundational elements required to do association mining on student behavioural data. Data from many student behavioural datasets that meet rigorous association criteria were collected using the association rule mining method. Significant links may be found by analysing this data.

A top-down architecture was developed for the purpose of collecting, storing, calculating, and analyzing student employment (see Fig. 3 (a)). This design was inspired by the notion of association rule mining as well as the features of student behavior. The data collection layer, which serves as the basis for association rule mining, is largely accountable for the acquisition of student behavioral data from a variety of network devices, manual investigations, and the system log. It is the responsibility of the data storage layer to establish a computational cluster that is capable of storing huge quantities of diverse student behavioral data that has been delivered in blocks by the collecting layer. Additionally, it provides services that allow for the rapid reading and writing of data. Calculations and processing of the data are carried out by the data computing layer via the use of the MapReduce distributed computing architecture. Finally, in order to acquire useful information, the researchers apply the association rule mining technique to the findings that were calculated on the data analysis layer.

From the above discussion on college students, the characteristics of employment competitiveness [16], [19], and [21] need to improve in several aspects. Therefore, this advent the pathway for IoT-enabled BAREA, which helps to predict and detect employment competitiveness of college students as technical issues, lower level of perceived stress, financing my education and crucial professional skills as discussed: IoT-BAREA framework is discussed below:

Figure 3 (b) demonstrates the IoT-BAREA framework; college students have a more comprehensive range of career options and a more holistic view of the job market, many still have irrational ideas about comprehending the nature of the task adequately, disregard their present situation, and fail to grasp the meaning of being an employee. Some college students, for instance, prioritise short-term gain above long-term professional advancement while looking for a job. Businesses that do not provide civil services will have difficulty hiring students since some are only interested in working for government agencies. Undergraduates don't always give enough thought to their situations, pay enough attention to the graduate admissions exam, and ignore firm recruitment materials. Its decision is still driven by vanity, regardless of whether the employment unit is ideal for expansion. Many grand job openings go unfilled because some students are too shy to advertise their professional graduate school qualifications. Because of problems with self-sufficiency, lack of understanding of two-way alternatives, and related concerns, some children depend totally on parental arrangements.

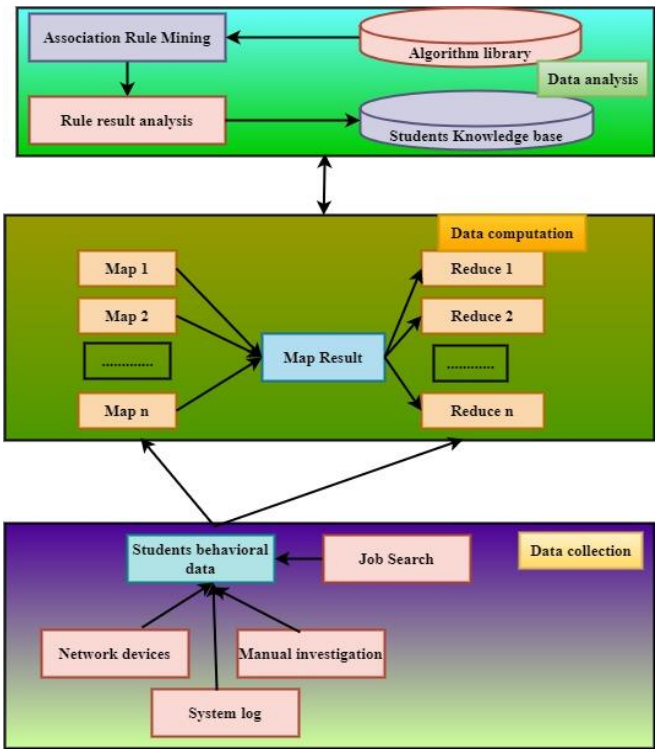

Figure 3.a. BAREA for employment competitiveness

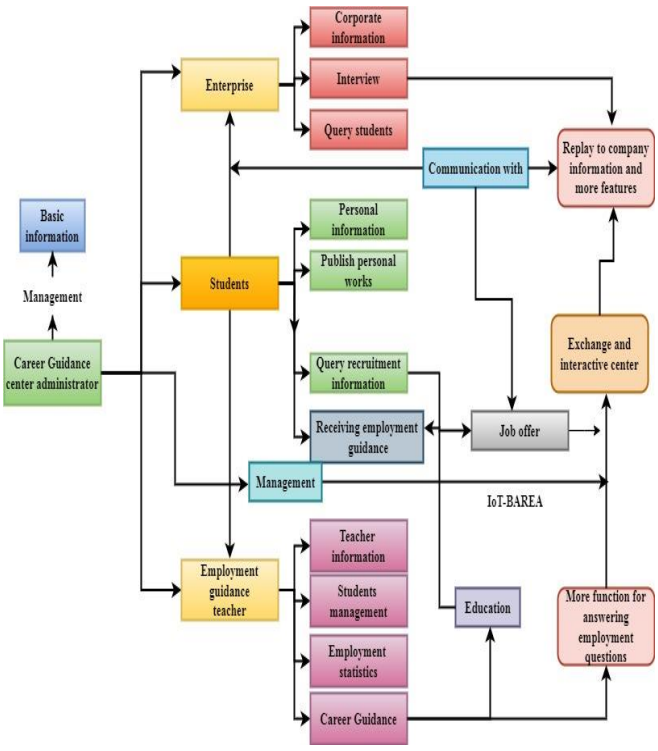

Figure 3.b. IoT-BAREA framework

On top of that, students are discouraged from showcasing their abilities until they have a job that aligns with their degree. While it's true that college students have a lot of leeway in deciding how they want to enter the workforce and that there's no one correct way to look at it, it's apparent that they need to refine their concept of employment by investigating the origins of their desire to work and pinpointing the exact position they hope to hold upon graduation. Many students take graduate entrance exams without considering prospective employers' challenges when trying to narrow down the pool of candidates. This prevents them from taking advantage of an excellent opportunity to go to graduate school and obtain a career. Having realistic expectations for one's future career is crucial for students and for professionals to use student work to enhance their critical thinking skills. Surveys show that most undergraduates do not want to immediately enter the field after graduating with a degree in cognitive studies. This will make it harder for college students to get jobs they love and establish themselves as professionals. But some schools in our country still use the same old ways of cultivating ability. Talent development is defined by an excessive concentration on students' lack of knowledge and professional training, emphasising group cohesion rather than students' individual growth and the dissemination of new information. Graduates from various institutions thus have similar knowledge and abilities, but none of them have the defining characteristic that would make them stand out in the job market.

The process of skill set formation is represented by the following Equation given below:

The process of skill set formation is represented by the following Equation given below:

$$\mathrm{X_y} = \frac{\mathrm{X_{y-1}}}{\mathrm{Y_y(B_y^m X_{y-1} - V_y)}} \tag{1}$$

Where,

$$\mathrm{B_y^m} = \mathrm{X_y} * \mathrm{Y_y} \tag{2}$$

Where $X_y$the skills of the students are is, V_y is the data obtained from the students, B_y^m and is the performance of the students. Equations (1) and (2) clearly explained the formation of the skill set. Now, the skill set is divided into outcomes and similarity assessments. Based on the skill set, a similarity assessment can be done. The similarity can be identified by how well students make choices, find solutions, and analyze information. The overall purpose of similarity assessment for skills is to verify the students are illuminating how to react and think in various situations. The skills of the students (X_y) are identified for the classification outcomes and to find the similarity of their skills represented in equations 1 and 2 by using the interaction ratio in Figure 5

The similarity assessment procedure can be explained by the following Equation given below:

$$\frac{Z_y - Z_{y-1}}{Z_{y-1}} = B_y(1 + B_y^m Z_{y-1} B_y)^{-1} B_y^m Z_{y-1} \tag{3}$$

Such that,

$$B_y^m Z_{y-1} = \frac{Z_{y-1} - X_{y-1}}{Y_{y-1}} \tag{4}$$

Where $(B_y^m Z_{y-1})$ is the similarity assessment of the students is, (Z_y) is the digital data obtained in the similarity by the machine. Equations (3) and (4) demonstrated the similarity in assessment operations. The skill set can now determine the innovative outcomes of the student's skill. An innovative outcome for the student is the ability to spawn ideas that make value and are used to improve the processes to find a faster way to work calculated in equations 3 and 4 by using the efficiency ratio in Figure 6

Maximizing the student's intellectual capabilities $M(\vartheta)$ by using maximum likelihood estimate and associated probability is defined as,

$$M(\vartheta) = (\textstyle\sum_{k=1}^{m}(z_m; \vartheta)) \tag{5}$$

As shown in Equation (5), to provide a more accurate representation k of a student's cognitive abilities, the percentage of correct answers ϑ, and the average score. z_m of all students taking the test.

According to the comparison matrix A, calculate the importance of various factors storing an index. r_i, that is $r_i = \sum_{i=1}^{n} A_i$, Take $r_{max} = \max\{r_i\}$, which represent the most significant sort index corresponding elements. Take $r_{min} = \min\{r_i\}$ as the index minimum order corresponding element. Take $k_m = {}^{r_{max}}/_{r_{min}}$ as r_{max} when compared with r_{min} according to the importance of a specific scale. Finally, the judgment matrix B_{ij} is constructed so that the elements of the b_{ij} satisfy the following conditions:

$$b_{ij} = \begin{cases} \frac{r_i - r_j}{r_{max} - r_{min}}(k_m - 1) + 1, & r_i \geq r_j \\ \left[\frac{r_i - r_j}{r_{max} - r_{min}}(k_m - 1) + 1\right]^{-1} & r_i \leq r_j \end{cases} \tag{6}$$

Based on the competitiveness of the ascent path design of the college students' core competitiveness promotion model, we can enhance university students' employment core competitiveness and solve the employment problem. To begin, we need to know the parameters of the calculation model, the school as the micro unit of the education system, its macro forecast, and the ability to grasp the market demand, which is limited. Further education adds time and effort to developing one's talents. In the near run, the impact is difficult to discern. It is shown that talent lag factors exist.

$$\mathrm{g} = \mathrm{b_k} - \mathrm{r_i} \tag{7}$$

$$\mathrm{g_o} = \mathrm{g(k - r)} \tag{8}$$

In formulas (7) and (8), b stands for teaching index, k stands for teaching environment factor, r stands for teaching status factor, and i stands for correlation coefficient. It is challenging to avoid the disconnection between talent cultivation in colleges and universities and market demand.
The calculation formula is shown in

$$P = \frac{\sqrt{B}}{R} \quad (9)$$

In formula (9), B represents the competitiveness factor, and R represents the competition base, which can be used to accurately evaluate the competitiveness improvement effect of the designed model construction method in P.
The innovation outcomes of the skill set can be expounded by the following equations below:

$$V - \theta = \left(X_j - X_i\right)^m L - 2L^m L \quad (10)$$

$$V = \alpha - (\alpha - Y) \quad (11)$$

Where,

$$L = \left(\frac{V-\theta}{\alpha}\right) \quad (12)$$

Where $(V - \theta)$ is the innovation outcome of the skill set, $(X_j - X_i)$ is the student's mutual intelligence, (L) is the benefit of the process by the innovation skills of the students, and α is the joint intelligence of the student. These processes cooperatively form student management through multiple digital data analysis technologies. Equations (10), (11), and (12) elucidated the innovation outcomes of the student's skill set.
Algorithm 1 illustrates that when mining geographic association rules, intelligent mining systems waste time and resources, which reduces their efficiency. The overarching goal of this research is to provide a theoretical framework for understanding college students' job competitiveness that draws from both existing theoretical literature and practitioners' real-world experience in the field of career guidance. Students at private universities have the same view of their employability as those at public universities. It should be noted that the autonomous college has its own unique qualities, like its student body's quality and number, its administration's style, its approach to staff education, and so on. Understanding self-sufficient college students requires considering how much of a novelty they are as a demographic in the workforce.

Algorithm 1 BEREA for college students

1. While ($DT \in [3, max]$) {
2. If (all $NFDT_j \not\subset DT$) {
3. While ($DT \leq D_i$, value && $i \leq N$) {
4. If ($DT \subseteq Di$, value)
5. S_count+= Di,count;
6. I++;}//computing support of DT
7. If (s_count/N≥support) {
8. Delete all $FDT_k (FDT_k \subset DT)$ from FDT;
9. Write DT and s_count to FDT;
10. }// checking frequent digital transaction
11. Else
12. Write DT to NFDT;}
13. DT++;
14. }//searching all frequent digital transaction
15. For (all DT∈ FDT) {
16. DT=FDT.value;
17. S_count=FDT. Count;
18. Create_Rules (DT,s_count);
19. }//generating association rules.

Table 1. List the notations for algorithm 1

Sr.no	Notation	Description
1	DT	Transaction Database
2	D_i	Database of students iteration
3	N	Number of students
4	FDT	Frequent Digital Transaction
5	$NFDT_j$	Number of frequent digital transaction in iteration

Regarding problem detection, IoT-BAREA activation functions are like a collection of transfer functions applied to college students. Input and feedback are considered to determine the required output efficiently for employment competitiveness characteristics in college students.

4. Experimental analysis:

The research concludes that the ***IoT-BAREA*** effectively predicts and validates the employment competitiveness for college students compared with interaction based on interaction ratio, precision, recall and high accuracy efficiency, which are discussed as follows.
Dataset Description: 10 college students were taken from [24] for this experimental analysis. They need to give the job considerable thought if they think the skills they'll get in these programmes are valuable in the hiring market. A study was conducted to identify the most potentially deficient areas of knowledge, abilities, and character attributes. The goal of gathering participant input was to enhance the internship programme by identifying areas for improvement. By administering this survey, we hoped to learn if formal education was the only criterion used to evaluate job candidates or whether other factors were considered.

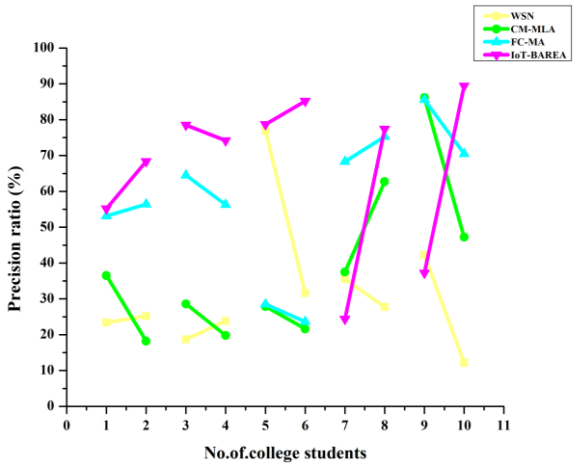

Figure 4 Precision ratio for college student's employment competitiveness

When calculating precision, the ratio between the value of true positives and the total of the values of both true positives and false positives is used as the basis for estimation (see Equation (13).

$$Precision = \frac{True\ Pos}{(TruePos + FalsePos)} \tag{13}$$

Figure 4 illustrates the precision ratio for college students' employment competitiveness. According to the study of the connotation system of employment competitiveness among independent college students, several complicated elements influence the magnitude of job competitiveness, and its efficacy is impacted by the external environment. Concurrently, employment competitiveness becomes a relative notion if the majority of the employed begin actively seeking jobs and engage in a competitive interaction with other types of job searchers. So, it is impossible to analyse independent college students' employability using quantitative measures. To objectively assess their job competitiveness, it is crucial to thoroughly examine the pros and cons of employment competitiveness, accurately identify the opportunities and problems they encounter, and conduct a thorough analysis. Compared to other existing methods, WSN, CM-MLA, and FC-MA, the proposed IoT-BAREA is a precision ratio for college students and can be calculated using Equation (13). The suggested approach outperforms the current strategy by an interaction ratio of 89.7%.

Table 2 Recall ratio for employment competitiveness

No.of.college students	WSN	CM-MLA	FC-MA	IoT-BAREA
1	46.3	41.3	56.6	85.3
2	39.3	44.4	57.6	77.6
3	55.3	47.3	59.2	86.5
4	42.2	45.5	59.4	75.2
5	25.8	43.5	26.75	60.6
6	25.9	34.6	43.9	72.5
7	22.3	42.3	26.4	77.1
8	39.5	47.3	69.6	79.7
9	22.7	59.3	68.3	70.2
10	54.2	45.2	68.7	81.3

Recall is the ratio between the value of false negatives and the sum of the total value of true positives and false negatives (see Equation (14)).

$$Recall = \frac{TruePos}{(TruePos + FalseNeg)} = \frac{1 - FalseNeg}{Total} \tag{14}$$

Table 2 illustrates the recall ratio for employment competitiveness based on the data, concluding that first, as a whole, independent college students don't have it wrong. Their pros and cons are about equal, and how they're connected means they aren't in a particularly strong or lacking strength in the employment market. Furthermore, independent college students encounter more obstacles than opportunities in the real world, which negatively impacts their ability to compete for jobs. Third, even though independent college students don't have it wrong internally, and external pressures are substantial, we can turn disadvantages into strengths, minimise risks, and maximise employment competitiveness if we use the correct strategies and methods. Compared to other existing methods, WSN, CM-MLA, and FC-MA, the proposed IoT-BAREA is a recall for college students and can be calculated using Equation (14). The suggested approach outperforms the current strategy by a recall ratio of 81.3%.

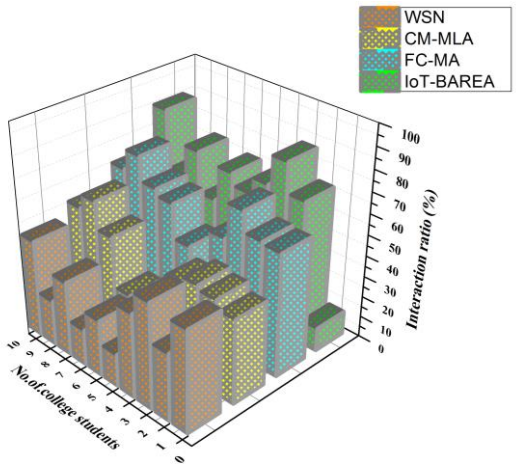

Figure 5. Interaction ratio

Figure 5 illustrates the interaction ratio characteristics factor theory, personality career type matching theory, career development theory, decision-making theory, etc., that have emerged from the earlier and more developed system of research on making foreign employment more competitive. This system is primarily based on vocational guidance, education, consultation, evaluation, etc. Studies aimed at making college graduates more marketable to potential employers have shown several trends that are

consistent with the state of nation today: The emphasis is shifting from the "labour market" to "the needs of students' development"; the focus is moving from the result to the process of finding a job, meaning that job-seekers are once again taking the lead in improving their employment competitiveness; and the emphasis is shifting from static placement to more permanent placement, to gain a foothold in the market.

Table 3. Accuracy analysis of IoT-BEREA for college students

No.of.college students	WSN	CM-MLA	FC-MA	IoT-BAREA
1	49.9	38.2	69.3	96.2
2	35.5	46.5	64.4	88.5
3	59.1	49.6	64.4	97.3
4	35.3	45.1	68.5	95.2
5	46.2	57.9	57.6	78.2
6	29.2	49.5	65.3	89.6
7	47.8	65.4	58.7	86.3
8	40.5	57.3	88.2	90.2
9	49.4	62.7	79.8	89.4
10	57.2	64.2	52.9	91.3

Moving away from a concentration on specialised institutions, full-time staff, and social organisation, college students' dynamic career planning has shifted towards integrating the teaching process, paying careful attention to students' personality traits, and inventing a new method of talent training. Compared to other existing methods, SCAS, OLLVC, and SOLPS, the proposed IoT-SE is an interaction ratio for students and can be calculated using Equation (1, 2). The suggested approach outperforms the current strategy by an interaction ratio of 81.3%.

$$\text{Accuracy rate} = \frac{(\text{TruePos} + \text{FalsePos})}{(\text{True} + \text{False})} = \frac{(\text{TruePos}+\text{FalsePos})}{(\text{TruePos}+\text{FalsePos}+\text{TrueNeg}+\text{FalseNeg})} \quad (15)$$

Equation 15 says TP is the value of the true positive rate, TN is the true negative rate, FN is the false negative rate, and FP is the false positive rate.

Table 3 illustrates the accurate analysis of IoT-BEREA for college students during their ideology and education; teachers should engage in a variety of targeted teaching activities aimed at developing students' awareness of good ideology and polity as well as their relevant ability to apply these ideas. As a result, schools should host a variety of exchange meetings \ knowledge and experiences, and representatives from each class should showcase the accomplishments of their predecessors to pique the interest of current students and inspire them to strive for more incredible things in their educational journeys. The employment advice and service department plays a crucial role in college and university student work by managing student employment, providing career advice, and serving students. Higher education institutions and colleges' capacity to provide students with career assistance and services is inversely proportional to the size and quality of their employment faculty. Compared to other existing methods, SCAS, OLLVC, and SOLPS, the proposed IoT-SE has a high accuracy ratio for students and can be calculated using Equation (15). The suggested approach outperforms the current strategy by an accuracy ratio of 91.3%.

Figure 6 illustrates the college student's efficiency analysis of employment competitiveness along with the above subjects; college students may cultivate a competitive work ethic via moral and political education, evident in classroom instruction and real-world experience. On the one hand, this pattern can signify the strategic guiding importance of ideological and political education in practical operation. On the other hand, it can expand the education system through student internships to build more platforms that foster innovation and student start-ups. This, in turn, allows education to develop a sensibility to reason, providing a new path for colleges and universities to cultivate all-around talents. Compared to other existing methods, SCAS, OLLVC, and SOLPS, the proposed IoT-SE is a high-efficiency student ratio and can be calculated using Equation (3,4). The suggested approach outperforms the current strategy by an efficiency ratio of 97.5%.

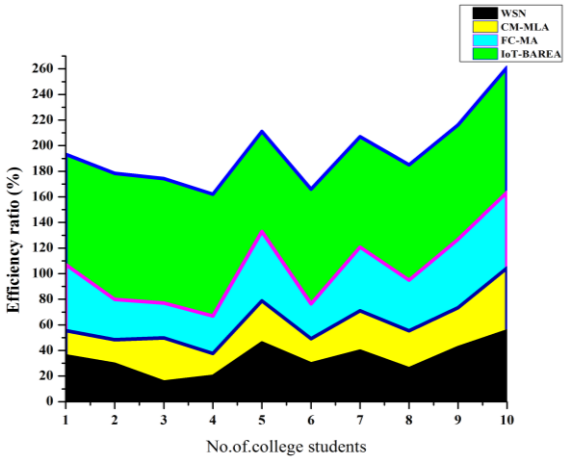

Figure 6. College Student's efficiency analysis of employment competitiveness

Figure 6 illustrates the college student's efficiency analysis of employment competitiveness along with the above subjects; college students may cultivate a competitive work ethic via moral and political education, evident in classroom instruction and real-world experience. On the one hand, this pattern can signify the strategic guiding importance of ideological and political education in practical operation. On the other hand, it can expand the education system through student internships to build more platforms that foster innovation and student start-ups. This, in turn, allows education to develop a sensibility to reason, providing a new path for colleges and universities to cultivate all-around talents. Compared to other existing

methods, SCAS, OLLVC, and SOLPS, the proposed IoT-SE is a high-efficiency student ratio and can be calculated using Equation (3,4). The suggested approach outperforms the current strategy by an efficiency ratio of 97.5%.
Tables 3 summarize the above comparisons.

Table 3 Comparison Summary for college students

Metrics	WSN	CM-MLA	FC-MA	IoT-BAREA
Precision ratio(%)	12.2	47.2	70.5	89.4
Recall ratio(%)	54.2	45.2	68.7	81.3
Interaction rate (%)	46.2	52.2	61.7	82.5
accuracy ratio (%)	57.2	64.2	52.9	91.3
efficiency ratio (%)	55.2	49.2	59.2	97.5

The proposed IoT-BAREA reduces the precision, recall, and interaction ratios by 89.4%, 81.3% and 82.5 %, respectively. It improves the accuracy and efficiency by 91.3% and 97.5%, respectively.
Therefore, future work discusses fault diagnosis power equipment in industries with IoT-BAREA assistance to validate the interaction ratio, recall ratio, precision and high accuracy ratio, and efficiency ratio results.

5. Conclusion

WSN, CM-MLA and FC-MA are similar to college students but are not predicted; they are effective using IoT-BAREA methods, the advantages are expected correctly, and the experimental analysis is compelling. As part of this research project, build an IoT-BAREA to address the increasing need for employment competitiveness of college students. Make sure competitiveness always finds its path and place in the harsh struggle of social employment; it's essential from a practical standpoint. There has been an effort to diversify the methods that teach children to be competitive, both in school and in the job. The ultimate goal is to help college students become contributing members of society by setting attainable, long-term goals. Among these goals is making sure that students are ready to compete in the job market of the future by cultivating in them a love of learning and the ability to learn by doing.Establishing a benign employment market and reducing work stress for college students are two ways that IoT-BAREA might be improved. To set itself apart from similar studies, this one will assess college students' capacity to find work by including employment into its basic competency structure. By shaping their perspectives on work during their time in college, students may get an edge in the competitive job market, pave the way for more growth chances, and learn to take the lead. By following through with their objectives, college students who adopt an accommodating stance may feel less pressure from their loved ones. There is a lot of rivalry for jobs, and there are more and more recent college grads, so many students are going back to their hometowns to try to find work. This gloomy outlook highlights the critical need for concerted effort from all sectors to aid recent college grads from rural areas in their job hunt and help them avoid the employment pitfalls they have encountered.

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