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Computer-Aided Design AND APPLICATIONS

Virtual Reality Revolutionizing Digital Marketing Design and Optimization of Online English Teaching in Universities with Wireless Network Technology Support in the Context of 5G

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Abstract: A rise in global demand for wireless communication networks may be traced back to the widespread use of wireless devices and the proliferation of wireless service providers. Data transmission speeds, coverage regions, cost-effectiveness, resource utilisation, security, scalability, and adaptability are all expected to improve in the future 5G wireless networks. Students may acquire more advanced teaching abilities if they are required to use cutting-edge technology into their lessons. Instructors of English in tertiary institutions like colleges and universities should reform the subject by utilising network resources, most notably tools for 5G network communication, given that the rapid development of network communication technology offers a new perspective for English education. To fully benefit from the IT revolution, researchers are concentrating their attention on optimising how we use these new tools. Academics are beginning to take notice of it as a promising new direction for the development of English language teaching. Based on these results, the study proposes a new approach to teaching English that makes use of 5G integrated wireless communication technologies. In this case, categorization is accomplished via a decision tree. For better performance, the File Transfer Protocol (FTP) might make use of the Advanced Artificial Bee Colony Optimization Algorithm (AABCOA). The proposed system is tested by simulating it in the simulation tool MATLAB and analysing how well it functions. According to the results of the study, most of the students are not happy with the conventional methods of teaching English in schools and are keener on exploring the novel learning possibilities offered by 5G integrated wireless networking technology.

Keywords: Online English teaching, Universities, learning possibilities, Wireless communication, 5G network; Virtual Reality Revolutionizing
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1 INTRODUCTION

Data capacity and wireless access are both enhanced by the digital cellular network communication technologies known as 5G networks. Demand for wireless communication networks has risen globally in response to the proliferation of wireless service providers and wireless devices [12]. It is anticipated that future 5G wireless networks would enhance data transmission rates, coverage areas, cost-effectiveness, resource utilisation, security, scalability, and adaptability [14]. There is some evidence that requiring students to incorporate cutting-edge technology into their classes might help them develop more sophisticated teaching skills [1]. As a result of the fast advancement in network communication technology, English teachers at tertiary institutions such as colleges and universities now have a new opportunity to reshape their subject via the use of network resources, most notably 5G network communication tools. Researchers are focusing their efforts on perfecting our use of these cutting-edge resources so that we may reap the full benefits of the information technology revolution [3][5][15]. Many experts in the field see this as an exciting opportunity to further English language instruction. The findings of the research suggest a novel method of English instruction that makes use of 5G integrated wireless communication technology [8]. The original data is processed by Butterworth filtering and the Gaussian Mixture Model (GMM). A decision tree is used in this context for data classification. To improve performance, the File Transfer Protocol (FTP) might use the Advanced Artificial Bee Colony Optimization Algorithm (AABCOA). We use MATLAB, a popular simulation environment, to conduct simulations of the suggested system to ensure its efficacy. It seems from the findings of this research that most students would like to be taught English using the innovative methods associated with 5G integrated wireless networking technology [8]. A "suitable" learning plan and collection of instructional materials may be designed by taking into account students' current skill sets, prior knowledge, and grade-level peers [19]. Online and traditional forms of instruction complement one another. Through a process called networked learning, technology is able to overcome the limitations of location and prior knowledge inherent in traditional classroom instruction [4].Digital marketing campaigns can raise awareness among educators and students about the potential of 5G integrated wireless communication technology in English language instruction. Through targeted online advertising, social media campaigns, and content marketing, digital marketers can inform and educate the target audience about the benefits, features, and applications of 5G networks in language learning.

The students' current educational abilities and degrees of comprehension will tend to develop "appropriate" lesson plans and resources. There is a role for both conventional classroom instruction and online learning [2]. The technique employs the utilisation of online education to get around the time and place constraints of traditional classrooms [7][9]. Some techniques such as problem-solving in groups, statistical analysis, and iterative loops of feedback are included. Utilizing Internet-enabled mobile devices in a collaborative manner improves the quality of student contributions and accomplishes a key educational objective [17]. Levels in a comparable class, as well as their educational talents and understanding levels, may be utilised to create "suitable" lesson plans and content. There is a synergy between online and traditional methods of teaching. With a networked approach to education, technology may be able to get around the problems of distance and lack of subject matter expertise.

Today's educators have the tools necessary to handle classrooms of thousands of students without assistance. Teachers and students can have real-time conversations over the Internet, and the interaction between them can achieve the same benefits as small-group instruction [18]. Online consumers will have access to better-quality courses without having to leave the convenience of their homes. Anyone with a computer and a thirst for knowledge can get a college degree. Students are able to learn at their own pace, according to their own interests, requirements, tasks, and cognitive processes when the English language is taught via multimedia and the Internet. This will abolish the geographical and temporal limits of traditional classrooms, replacing them with a learning

area that is infinite and open [10]. The granting of a licence for a 5G network results in the establishment of a network that can be used for commercial purposes legally. Therefore, 5G will evolve into a one-of-a-kind economic development engine in the digital society, and it will serve as the impetus for a historic surge in the transformation of modern information technology. The development of 5G wireless networks has the potential to become an essential choice in the future for the purpose of providing customers with pleasant network experiences, particularly in urban areas, as a result of its ultrahigh transfer speed, constant stability, and low delay index. This is especially true in metropolitan areas. The structure of the building's walls will reduce the strength of wireless network signals; the 5G system is a cellular framework that is largely used inside buildings, with outdoor use accounting for just around 20% of total usage time. Because of this, there is a decrease not only in the speed at which data can be transferred, but also in the amount of spectrum that is utilised. The development of 5G technologies is helping to address this issue while also improving the overall quality of the user experience [20]. Because only about twenty percent of the time that a 5G system is in operation is spent outside, the wireless network signals will be weakened as a result of the wall structure of the building. This issue will be alleviated to some degree with the introduction of 5G networks, which will also lead to an overall improvement in the quality of the user experience. As a result of the rapid growth of AI technology in the fields of living, production, and learning over the course of the past few years [13], our society is on the verge of entering an era of artificial intelligence (AI) in which humans and AI will work and live together. It is crucial to establish an AI education programme that provides students with exposure to and an understanding of artificial intelligence in order to better prepare students for working and learning in the smart society of today. This will allow students to be better prepared for today's smart society. Online education has become the most common method of instruction for teaching majors, and in many cases it is now the only method available. This is because the vast majority of overseas students are unable to get teaching jobs in their native countries. The usage of online English courses across the country, however, raised a lot of issues, such as a wide range of students to educate, a plethora of platforms to choose from, and the challenge of implementing classroom activities [16]. Some students may lack the courage to speak up in class because they have never participated in practise sessions or have never had the opportunity to improve their public speaking skills outside of the virtual classroom. There is a significant drop in overall instructional quality because teachers cannot accurately gauge their students' emotional states, have trouble communicating with them, and so cannot effectively connect with them. Online English teachers must overcome a wide range of specific challenges [11].

1.1 Motivation of Study

In this research, we propose an empirically grounded, methodically measurable paradigm shift in higher education via the use of quantitative regression. We outline the strategy for transforming universities and the distinguishing features of the organization's standards of conduct. A methodology for analysing multiorder intrinsic modal functions is devised, and an index structure for constraint parameters is created. The effectiveness of the strategy employed to transform higher education on campus is analysed quantitatively using regression analysis. The empirical analysis of educational reform in higher education is demonstrated to be more effective after concluding that the technique of effectiveness analysis in higher education is more trustworthy and after concluding that the results of the quantitative analysis are more accurate and reliable.

2 MATERIALS AND METHODS

Modifying university practises in light of evidence of what really works. The linear programming model is used to create a fuzzy set scheduling set for distributing practise effects, and a characteristic quantity for making decisions about them is built as part of a university education reform strategy.

The results of the association's strategy for changing higher education at universities, as well as the standards for practise put out by the organisation, are revealed. Constructing an index structure for constraint parameters and modelling the investigation of multi-order intrinsic modal functions. The method employed to alter higher education is studied using statistical regression analysis. In the empirical study of education reform in higher education, the results are more positive because the effectiveness analysis method was improved and the results of the quantitative analysis were more accurate and reliable. Figure 1 represents the proposed model of the study.

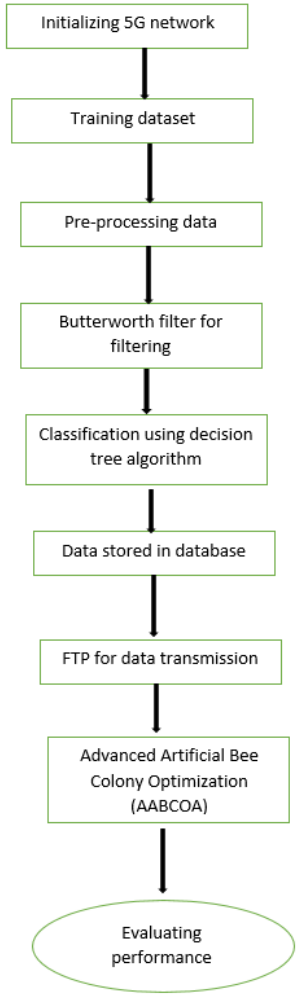

Figure 1: Proposed model.

2.1 Comparison Dataset

In this investigation, all data transmissions take place using 5G wireless connections. In order to transmit files, a standardised protocol called File Transfer Protocol (FTP) is needed. FTP is predicated on the client-server model. This protocol's main benefit is that it enables the client and server to

maintain completely separate control and data connections. The student information is preprocessed before providing data for analysis [20]. In order to accomplish denoising, the cleaned data is processed using a combination of the Butterworth filter. Filter. Data filtering, denoising, and feature extraction for classification are all accomplished. Classification results are recorded in a database and sent through FTP. The Advanced Artificial Bee Colony Optimization Algorithm (AABCOA) is used to compare the new system to previously developed models.

2.2 Butterworth Filter

Because of its flat frequency response curve within the passband, the Butterworth filter is well-suited for use as a bandpass filter. As the amplitude of the Butterworth function is a squared function, it is stated in the equation (1) chosen for the system, and the requirement for smooth frequency is given in the equation, the system is said to have a smooth frequency in equation (2).

$$|K(uw)|^2 = \frac{1}{1 - \varepsilon^2 (u\Omega/u\Omega c)^{2N'}} \tag{1}$$

$$N \leq \ln(\lambda/s). \tag{2}$$

One drawback of the traditional wavelet demonization approach is that it improves the demonization impact only for noisy signals with large variances in the noise, rather than for quiet ones. EMG noise is typically assumed to be Gaussian, since this best describes other sources of physiological noise. In this study, we use the Gaussian mixture model (GMM) to estimate the noise variance of electromyography (EMG), with the minimal Gaussian coefficient serving as our measure of uncertainty.

$$p(\gamma \backslash 0) = \sum_{m-1}^{h} amp(\gamma \backslash 0m) \tag{3}$$

Gaussian mixture model (GMM) to generate a preliminary approximation of the noise variance (refer equation 3). The goal of texture analysis is to construct a new representation of a texture's core features, abstracting them and giving them a distinct flavour so that they can be identified consistently and accurately. The grey level co-occurrence matrix is a geometric approach to analysing texture that takes into account the spatial relationship between pixels. With a grey co-matrix, we can determine how intense the i-th pixel is in comparison to the j-th pixel's value. The value I of a pixel represents the frequency with which it is next to a pixel of value j. For noisy signals, measuring the noise variance may help achieve a greater demonising effect; however, when the noise is minimal, this is not the case. This is due to the widespread assumption that the Gaussian distribution best describes EMG background noise. So, we attempt to quantify the level of noise in this investigation.

2.2.1Advanced Artificial Bee Colony Algorithm

For those playing along at home, that's a Butterworth Filter. As its frequency response curve is flat inside the passband, the Butterworth filter performs wonderfully as a band pass filter. The following equation provides the necessary smooth frequency by using a Butterworth function as the system function, with the amplitude given as a squared function.

The Advanced Artificial Bee Colony Optimization Algorithm can differentiate between worker bees, observation bees, the scouting bees. With enough worker bees exploring the search area, a rough approximation of a solution may be obtained. The observation bees are despatched to expand the exploitation area around the working bees, who have higher performance, to enhance the

precision of the response. Maintaining the population's scout bees is critical to the health of global search operations. For the purpose of investigating English as a second language (ESL) education, these three groups are collaborating.

(1) "Initialization: Assuming U and L are the upper and lower boundaries of the search space, respectively, the equation (4) below may be used to determine where the jth variable of the ith food source should be located.

$$X_{ij} = L_{ij} + (U_{ij} - L_{ij}) * \text{rand}(0,1) \tag{4}$$

where 1, 2, ..., N, Here N is the total number of English teachers, D is the size of the search area, and rand is a uniformly distributed random integer between 0 and 1.

(2) Division of Employed Bees:

The equation (5) of the hunt for worker bees is as follows. :

$$V_{ijt+1} = x_{ijt} + \omega * (x_{ijt} - x_{kjt}) \tag{5}$$

where k is a neighbour chosen at random from [1, N] who is not the current person; I is a value created at random within; and (1, 1) t is the current iteration. Following the generation of a set of candidate solutions, the objective value I and fitness value F I are determined for each set of solutions. Using a greedy selection technique, ABC uses the target optimization problem's value of i to decide whether or not a candidate solution Vi should be kept for the next iteration. Vi is kept while xi is thrown out if fi is higher than xi's current objective value. If not, we have to give up on Vi. Formula for determining Fi is mentioned in equation (6)

$$F_i = \begin{cases} \dfrac{1}{(1+f_i)}, & \text{if } f_i \geq 0, \\ 1 + |f_i|, & \text{if } f_i < 0. \end{cases} \tag{6}$$

Observer bees are chosen to do additional research into the field of English instruction, with the hope that their improved performance would lead to increased compensation for the workers. Here, we compute the probabilities of selecting various food sources using the formula. The observing bees then use the traditional roulette wheel selection method to decide which food source to exploit. This indicates that the following equation (7) holds true: the quality of English instruction directly correlates to the probability that it will be adopted.

$$p_i = \frac{F_i}{\sum_1^N F_i}. \tag{7}$$

3 RESULT AND DISCUSSION

To evaluate the efficacy of this novel method for collecting and analysing experimental data, a mock experiment was conducted using the technique. Analysis was performed in MATLAB. The absolute values attained by each node during data transmission are shown in Figure 2. Since the measured value is larger than the variance, this graph supports this conclusion. There is at least a 0.1 standard deviation between the actual value and the value that was measured.

The sample size for this analysis is 3200 pupils. For the specified course, ten evaluations are taken into account and scored using the proposed AABCOA algorithm. This evaluation considers not only the number of students who participated in the online sessions but also those who attended

and turned in the accompanying assessment afterward, as well as their average performance on the test. A perfect score of 90 or higher will get you a "A" mark, while a score between 80 and 90 would earn you a "B." A "C" grade is awarded for scores between 70 and 80, while a "D" mark is provided for scores between 60 and 70. Students scoring between 50 and 60 on a 100-point scale are given the letter "E." An issue exists if your score is below 50. Of the 320 students enrolled in the course, 301 had their proficiency in its two assessments administered using AABCOA. Figure 3 displays the aggregate assessment 1 and assessment 2 evaluation findings. Number of pupils present for the second assessment is lower by 17 than the first assessment, as shown in the graph. Nonetheless, it can be shown that a large percentage of pupils earned an A. Figure 4 depicts the AABCOA assessment evaluation for assessments 3 and 4. A total of 321 students showed up for Assessment 3, whereas only 299 showed up for Assessment 4. Comparison of the results of assessments 3 and 4 reveals that the proportion of students scoring in the "B," "C," and "D" range is greater in assessment 3 than in assessment 4. The number of failures, however, is reduced by three in assessment 4 compared to assessment 3. Figure 5 is a line graph illustrating grades 5 through 8. The percentage of A's and B's varies between the two tests, demonstrating that there are minor differences in the students' overall performance. The grade of "D," however, rose by 5% between assessments 5 and 6. The number of applicants who submitted an evaluation reduces precipitously to a minimum of 269 pupils as the number of tests remaining in the series approaches zero.

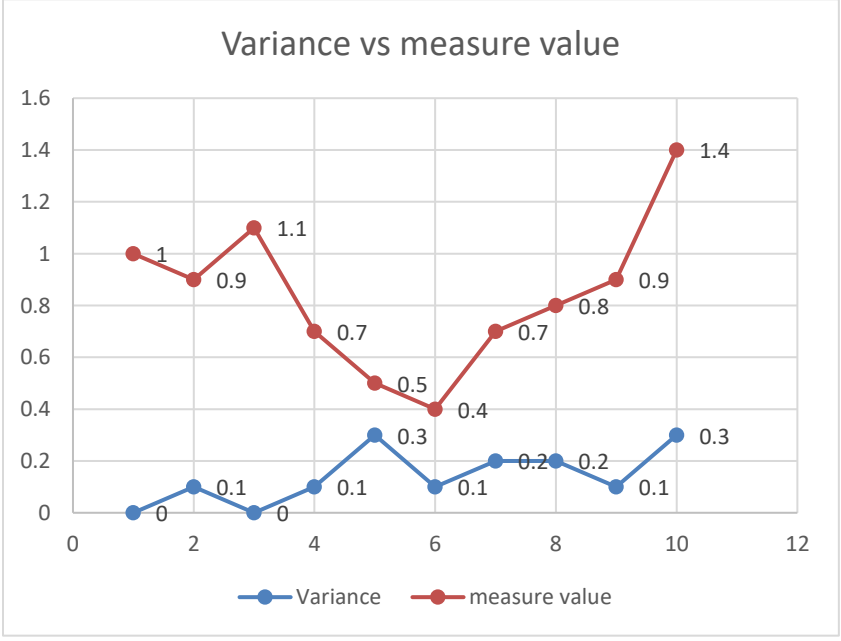

Figure 2: variance vs measured value.

Figure 6 compares the proposed AABCOA to the standard SVM and KNN". Teacher and student satisfaction, as well as the quality of instruction and the efficiency of administration, are the study's foundational pillars. It has also been shown that teachers are more satisfied with their jobs than students are with theirs online education. Dissatisfaction with the online approach may stem from users' inability to effectively apply previously learned concepts.

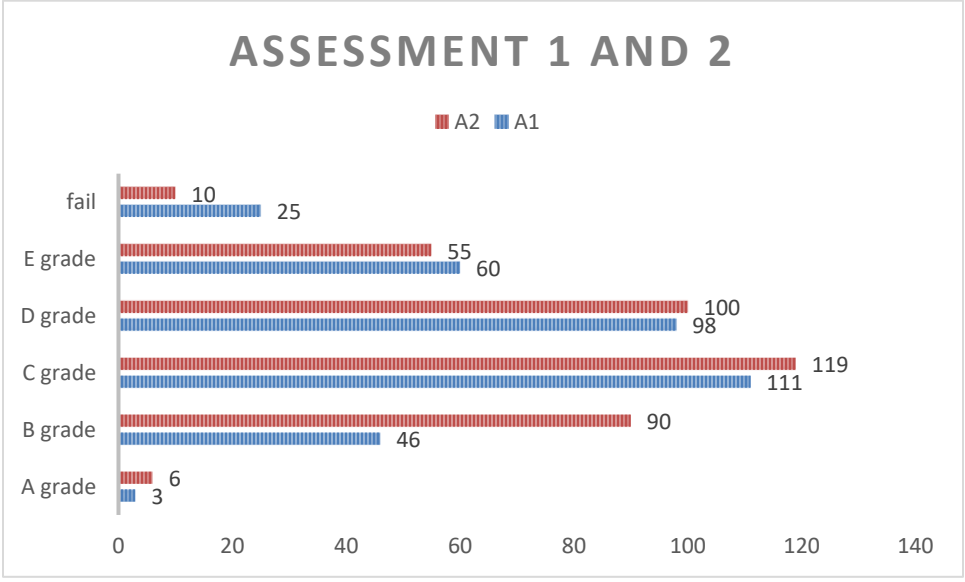

Figure 3: Assessment 1 and 2.

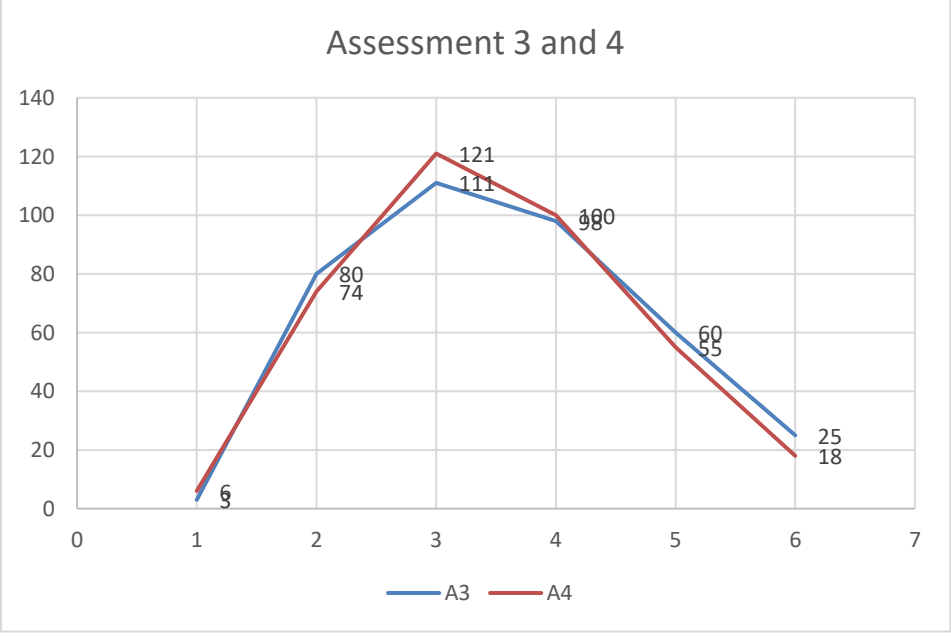

Figure 4: Assessment 3 and 4 using AABCOA.

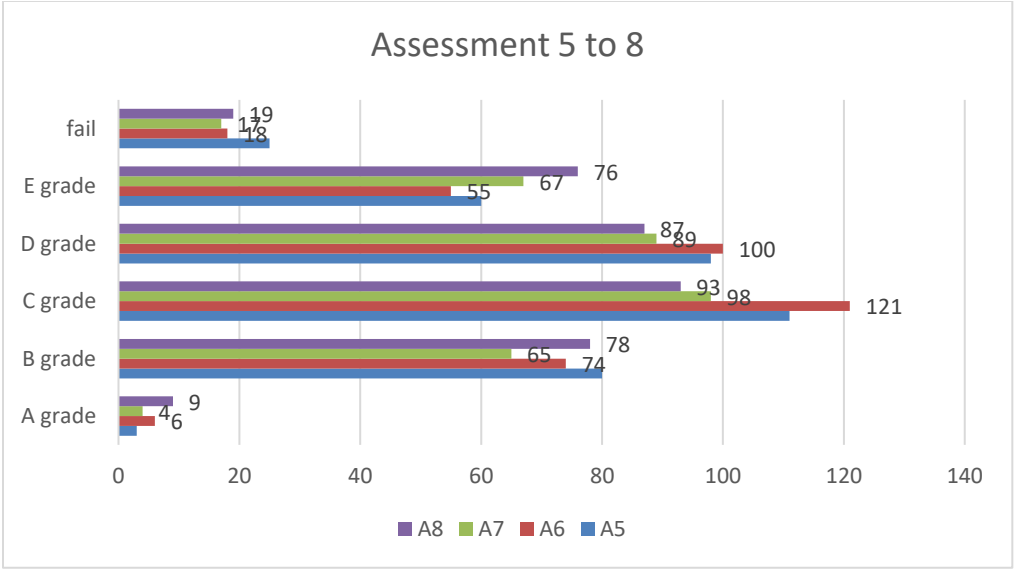

Figure 5: Assessment 5 to 8.

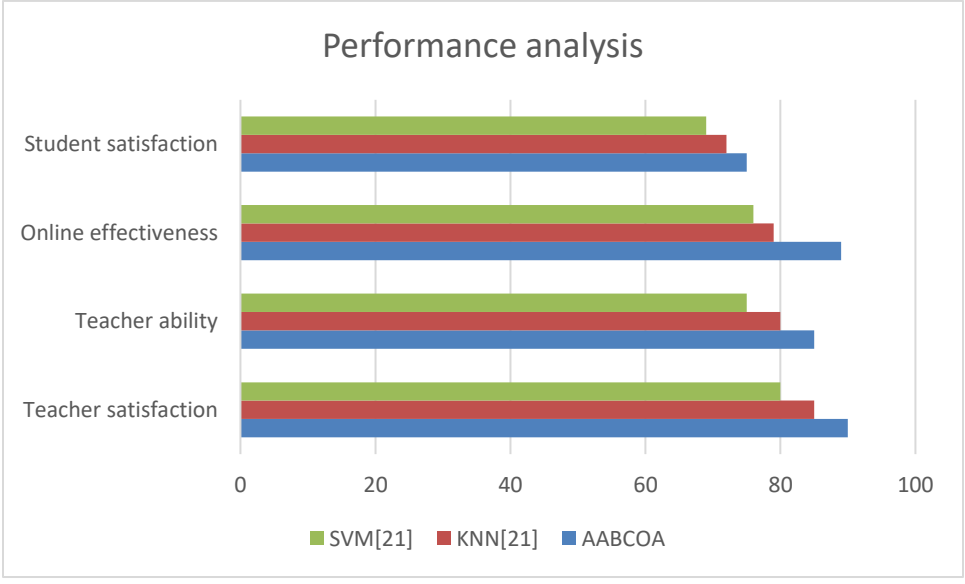

Figure 6: Comparison of optimization results.

4 CONCLUSION

Academic institutions are not immune to the changes that will accompany the introduction of 5G networks. The traditional English classroom has evolved with the introduction of wireless connection

and cloud computing. Since the system shifts, there has been a decline in the interest in studying English among students majoring in other disciplines at universities and colleges. The difficulties in college English education are serious enough that the combined forces should approach them scientifically, taking into consideration various factors. As it turns out, the results of a small-scale experimental investigation showed that gender and grade level differences existed in the perspectives of students on the efficacy of online education with wireless communication for English language acquisition. It is imperative that we make the necessary changes and begin the journey of personal evolution. Blend English lessons with the needs of students' future careers, and be bold enough to try new methods of learning in order to pique their interest in becoming educators. The learning outcome is enhanced. The bee optimization approach aids in the discovery of several crucial aspects.

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