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International Journal of Continuing Engineering Education and Life-Long Learning

ISSN online: 1741-5055 - ISSN print: 1560-4624
https://www.inderscience.com/ijceell

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DOI: 10.1504/IJCEELL.2025.10074389

Article History:

Received:	04 January 2025
Last revised:	21 February 2025
Accepted:	26 May 2025
Published online:	28 November 2025

Creation and application of education and management intelligence software based on artificial intelligence strategy

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Abstract: With the rapid development of AI, intelligent technology is in a rapid development stage. An in-depth discussion on the testing methods, testing standards, and applications of AI software can help ensure the ultimate business purpose of software applications. In the continuous deepening of teaching reform, the introduction of AI technology into teaching is a major measure to improve the level of teaching and education management. With the development of technology, a variety of new technologies have been widely used in the development of information technology, making all kinds of software in the process of rapid development, also undergoing rapid changes. Through the detailed analysis of the application of this technology in education and management, the technical upgrading of the corresponding software could be effectively realised. Based on the background of AI, this paper analysed the characteristics and applications of AI and studied the structural model of software components.

Keywords: artificial intelligence; intelligent software; education and management; probabilistic programming.

Reference to this paper should be made as follows: Gao, L. and Xiao, J. (2025) 'Creation and application of education and management intelligence software based on artificial intelligence strategy', *Int. J. Continuing Engineering Education and Life-Long Learning*, Vol. 35, No. 9, pp.16–34.

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1 Introduction

In the era of education informatisation, the teaching and management intelligent software can effectively deal with the problems of unbalanced resource allocation and low utilisation of server resources, so that the teaching and management system resources can be better integrated, thus promoting the healthy development of the education management information system. The practical application of AI is deeply analysed and discussed. If the application of AI technology in teaching and management realises the development of intelligent software, the overall automation, informatisation, and intellectualisation of intelligent technology can be realised.

This paper aims to explore how to use artificial intelligence technology to improve the efficiency and quality of education management systems, mainly for scholars and practitioners in the field of educational technology. Combined with the latest AI research results, an intelligent software solution for education management based on artificial intelligence is proposed through an in-depth analysis of the current problems in education management. This solution cannot only solve the problem of uneven allocation of educational resources but also significantly improve the quality and effectiveness of teaching management.

The future development trend is to combine AI with various fields to give full play to its advantages. With its unique technology, it is a good direction to effectively reduce costs and improve the efficiency of education and management. Only under the guidance of correct thinking and methods, intelligent teaching and management software products are developed from passive and random personal development to active and targeted planning and development, to produce high-quality teaching multimedia teaching software. The main contribution of this article is to propose and verify an intelligent software system model for education management based on artificial intelligence (AI) strategy, aiming to improve the efficiency and quality of teaching and management. The article points out that by integrating technologies such as big data, the internet of things, and cloud computing, the system can achieve effective allocation of educational resources and rapid processing of information, thereby solving the problems of uneven resource allocation and backward management methods in traditional education management systems. Studies have shown that AI-based education management software has a 6.22% higher accuracy rate in data processing than traditional software and also shows significant advantages in user experiences, such as interface friendliness and ease of operation, which score 9.2/10 and 9.5/10 respectively. In addition, the article also explores how to use advanced technologies such as deep learning and reinforcement learning to further improve the intelligence level of the system, providing a valuable theoretical basis and technical guidance for the future development of education management software. This not only promotes the development of educational

informatisation but also provides a reference example for the application of AI technology in other fields.

2 Related works

Now, there are scholars' research on intelligent software. Althar and Samanta (2021) excavated the data sources hidden in the development of intelligent software. To better understand the source of information, they discussed machine learning, deep learning, and other related knowledge, and proposed the idea of applying security in software engineering. Santana (2017) investigated the current technology of the smart city software platform. He analysed the most common technologies (such as the internet of things, big data, artificial intelligence, etc.) and proposed a reference architecture for future development. The analysis results showed that the urban intelligent software system could support the development and integration of the city, thereby improving the urban service, sustainability, and residents' living quality. Kose and Arslan (2017) introduced a set of autonomous learning intelligent software and adopted a new type of AI comprehensive evaluation technology, and a new combination of artificial neural network and eddy current optimisation algorithm. The intelligent software could be applied to the electronic technology specialty in colleges and universities, thus simplifying the abstract learning process, and improving the learning efficiency of students majoring in software engineering. Huo (2020) constructed a constrained optimal method to reduce estimation errors, thereby improving the accuracy of traffic information obtained by intelligent software. He verified the designed test method through simulation experiments and proved that the algorithm could effectively improve the accuracy of intelligent software for traffic information. Ampatzis (2017) studied that robust optimisation could improve the effectiveness of maximising the economic benefits of household battery storage system owners when there is uncertainty in dynamic electricity prices. The advantage of the robust model was that it maintained its linear level. Based on this, he proposed a mixed integer linear program (MILP) optimisation model to schedule the power curve of a residential energy storage device controlled by an intelligent software agent within a 24-hour range. The so-called intelligent software refers to software with human intelligence characteristics, which includes the ability to acquire and use knowledge, induce reasoning, learn, and solve problems. At present, the application market of intelligent software has developed very fast, and its application scope is very wide, such as employment, transportation, medical care, etc.

At present, there are relevant research on AI by scholars. Yang (2022) applied computer vision technology and AI technology to the design of apple classification and proposed a new idea of fruit classification based on less cost. He used different levels, such as greyscale processing, binarisation, enhancement processing, feature extraction, etc., of technology to automatically classify apples according to the set levels. The experiment proved that this method could be used for non-destructive inspection of apples and had a certain guiding significance for apple sorting. Popenici and Kerr (2017) studied the application of AI technology in colleges and universities and discussed how AI technology could play a role in students' learning methods, school teaching, and development in education. They raised the problems faced by universities and students in teaching, learning, and the implementation of intelligent technology, and looked forward to the future development trend. Nguyen (2019) made a comprehensive review of the

development and application of the current AI frontier from a chronological perspective and made a comparison of its applications. It was found that in the age of big data intelligence, computing could be carried out efficiently, and new intelligent technologies could bring more new changes. Li (2017) discussed the new century of 'network + AI' through the latest research in the field of manufacturing. The rapid development of key technologies has led to significant changes in the mode, means, and ecosystem of the manufacturing industry, and also promoted the development of AI technology. Khisamova et al. (2019) made a detailed analysis of the problems in Internet security and investigated how to reduce crime risk by using AI. Research showed that the use of AI could effectively deal with a large number of moral and legal issues and reduce the risk of data confidentiality. As the most important scientific and technological achievements of the 20th century, AI has broad applications. With the advent of AI, human daily activities have become more convenient.

3 Basic theory of AI

3.1 Basic concepts of AI

AI is a subject that studies and develops the theory, method, technology, and application system of human intelligence. Its entire industrial chain includes: a hardware technology support layer, software application layer, and product layer (Katare et al., 2018). In the aspect of hardware technical support, it mainly includes sensors, central processing units, etc. At the software level, there are deep learning, speech recognition, natural language processing, computer vision, etc. The product layer refers to the application of AI technology in a specific area or scenario (Lu, 2018).

The application of AI can be divided into independent software operation and mixed operation. The single-use is just a simple pattern of artificial neural networks based on image recognition and semantic recognition. At present, some commonly used algorithm combinations, such as speech recognition, deep learning, natural language processing, virtual assistants, intelligent driving, robots, etc., are based on different software architectures (Davenport and Ronanki, 2018). The concept of AI Plus comes from the deep integration of AI with a specific industry. All aspects of the industry have been expanded, which can double the efficiency of the industry and drive the production of the entire industry. This is why it is called the 'fourth industrial revolutions'.

3.2 Technical characteristics of AI

Intelligent technology has three main functional characteristics: intelligence, accurate calculation, and the implementation of machine specifications.

1 Intelligence: the machine imitates the human brain. With the support of deep learning and big data, the robot can independently analyse the laws of data, to achieve the human goal.

2 Precise calculation: it is understood and calculated according to the massive data collected through a specific calculation process. For example, in education, it makes accurate statistics on students with emphasis on basic information, student files, learning materials, living materials, etc.

3 Implementation of mechanical specifications: according to the calculation of intelligent programming, intelligent jobs are completed. Based on accurate calculation and analysis, the intelligent operation is realised.

3.3 Main features of AI software

Compared with general software, it is characterised by the high degree of intelligence of AI and certain autonomy and coordination ability (Jordan, 2019). Therefore, it requires more environments, especially on hardware. A good operating condition can make AI work better. Although high operating conditions are required, AI technology can effectively coordinate the information exchange between various institutions, so it can quickly process data. At the same time, it has a better user interface. The learning function of AI can enable it to have sufficient knowledge and application ability in control strategy, environment, and controlled target. In addition, in some cases, AI is more reliable, especially in fault tolerance. In addition, in the process of information collection, transmission, and storage, the security of information is also very high. The final feature of AI is that it is easy to maintain, and its modularity and reusability are better, so it is easy to maintain (Haenlein and Kaplan, 2019).

3.4 Latest theoretical and technological progress

In the field of artificial intelligence, deep learning, and reinforcement learning are among the most promising technologies. Deep learning can automatically extract features through neural network models and is suitable for a variety of application scenarios such as image recognition and natural language processing. Reinforcement learning achieves autonomous learning through a reward mechanism and is suitable for decision-making tasks in complex environments. In education management software, these technologies can be used for personalised learning path recommendations, intelligent question answering, and other functions, further improving the intelligence level of the software.

4 Application of AI in intelligent software

4.1 Problems in education management in the era of AI

4.1.1 The management of teaching work is in chaos

At present, there are some problems in the teaching management of colleges and universities. For example, first, some schools do not clearly define the management of teaching work. Some teachers are confused with ‘cannot control’, and do not know the important and difficult points of work, which confuses the teaching management of colleges and universities. However, at the same time, because the teaching work of the school involves a wide range of fields, some teachers lack autonomy in teaching activities, and most of the time they are passively waiting. This kind of work mentality also confuses teaching management. Especially in the face of student safety problems, psychological problems, and other emergencies, some teachers are often difficult to deal with.

4.1.2 Outdated teaching management means

At present, the problem faced by many universities is that their teaching methods are relatively backward. In particular, some teachers have become accustomed to offline business methods and are not suitable for online business methods. Today's college graduates live in an era of 'online entertainment', 'online ordering' and 'online reading'. If teachers cannot give full play to the advantages of online business, it is difficult to form contact with students. Some teachers use 'websites', 'WeChat', 'small programs', 'teaching software', 'attendance software' and other methods for teaching and management. However, how to effectively apply it to practical work is a big problem. Especially for the elderly teachers, it is difficult for them to grasp the internal rules of the intelligent system and make full use of them. If the intelligent software cannot be properly controlled and used, it does not improve the learning efficiency, but distracts the students' attention, thus reducing their scores.

4.1.3 Lack of educational management personnel

At present, some universities are short of educational management talents. This is not only because the number of people is insufficient, but also because their quality is not high. In particular, some educational administrators have poor comprehensive quality and are only good at professional teaching, psychological counselling, ideological education, practical teaching, and other aspects. The educational administration in the new era, which simply imparts students' specialised skills, can no longer meet the needs of the new era, nor can it achieve the educational purpose of the school. Secondly, some educators are too achievement-oriented. They only care about their behaviour, but ignore how to make them successful. This type of teacher lacks professional quality, and it is difficult to set an example for them. The strengthening of the professional quality training of the school's educational administrators is the top priority of the current construction of the teaching staff in higher vocational colleges.

4.2 Difficulties faced by traditional software testing technology

Conventional testing technologies mostly rely on the analysis of the original requirements, which makes it difficult to test whether they can meet the requirements of users. These 'processes' cannot quickly adapt to the development requirements of the new era, so there are many problems.

1 Diversity of operation schemes: from the most basic systems and devices to the current working conditions of wireless, 3G, 4G, 5G, and other networks, as well as the dynamic and static changes of various states, the traditional software detection technology has brought many difficulties. The conversion of various modes makes it difficult for traditional software detection methods to obtain effective methods.

2 There are more functions to be tested and more tests. Because there are more functional requirements for testing, conventional testing techniques can no longer meet the requirements. In addition, the tester not only tests the performance of a certain item but also tests whether the system can successfully perform the corresponding work during operation. Therefore, in addition to testing individual functions, combination tests, path tests, and so on must also be performed.

3 There is not enough reliability for the test. Traditional software testing mainly depends on manual. With the increase of test functions, the work pressure of manual detection is increasing. Due to the limitation of human resources, the software cannot cover all aspects. Due to the existence of subjective factors, it is likely to ignore some minor errors, leading to the product quality cannot be guaranteed, and there are also many unexpected problems in the market.

4 The test time is more. With the updating of new functions, software development has increased the workload of software development. If there is not enough experimental support, it can only be done manually. Some complex codes, must be constantly improved in the continuous improvement of testing process, which consumes a lot of time and energy. However, the final test results are not ideal.

4.3 Advantages of AI in software testing

AI technology is adopted to solve the testing problem. The deep learning ability of AI can automatically analyse and discover software, thus realising the integration of traditional software testing and AI, and the automatic identification of some problems. The advantages of AI in software testing are shown in Figure 1.

1 Rapid testing and early detection of product defects

   In seconds, AI can quickly browse thousands of programs. Through various methods, the problems in the current program are solved, thus promoting the software development process. It can be analysed and checked without running code, and can also find vulnerabilities in advance to avoid some defects.

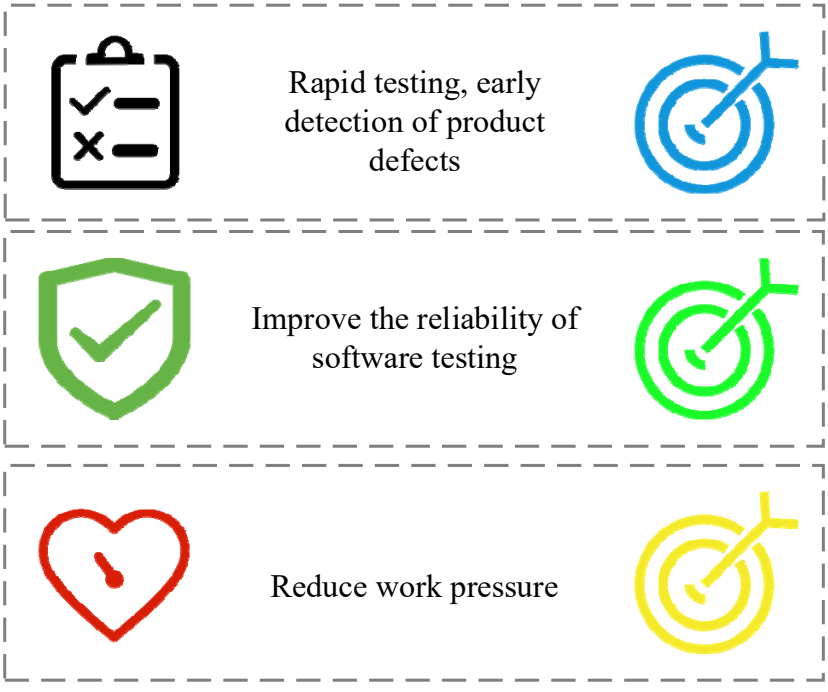
2 Improvement of the reliability of software testing

   In traditional software testing, the test coverage is low, especially in the increasingly complex environment. The more complex the function, the more data involved. However, the energy of manual inspection is limited, and minor defects are rarely found. Therefore, when the product is put on the market, there is a huge risk, resulting in an increasing difference between test coverage and real coverage. The emergence of AI is a good method. Because AI has a large amount of test data, self-research can be carried out by itself. With the support of cloud computing, a series of test cases can be completed in a very short period.

3 Reduction of work pressure

   AI has a certain learning function. Therefore, in the process of testing, as long as a large number of test data is injected into the computer, it can be automatically detected. During the test, the system makes corresponding corrections according to the actual situation of the test and puts forward corresponding suggestions for users promptly. This cannot only reduce the workload of testers but also improve the performance of software.

Figure 1 Advantages of artificial intelligence in software testing (see online version for colours)



4.4 Application of AI in education management

Education and management are issues of great concern to social personnel. Therefore, when implementing education management, the characteristics of modern society must be fully considered and organically combined with AI with education, to promote the overall quality of education management. To establish the corresponding intelligent education and management system according to the actual needs of education management, attention must be paid to the following aspects:

1 Establishing an intelligent system structure

When implementing education administration, a system framework based on AI must be established, which requires the organic integration of big data, the internet of things, cloud computing, and other technologies to make full use of their technologies. As a mechanism that can realise the perception and transmission of the whole system, the internet of things plays an important role in data acquisition, pre-processing, and transmission. Due to the adoption of the internet of things technology, the data acquisition accuracy is higher, and the error rate in the transmission process is smaller. Big data technology is to establish a data warehouse by collecting, sorting out, and analysing the internet of things information on campus. In data processing, it has a simple storage architecture and fast storage functions. In addition, the application of cloud technology is also to ensure the full play of computing power, thus effectively solving the network bottleneck problem in cloud computing.

2 Building a cloud service platform.

In the field of education and management, big data and cloud computing platforms a very critical technology, which includes a large number of data integration, data processing and analysis, data storage, and other functions. Different modules have different functions. As for data, it is through data mining technology that these data can be connected to obtain more data, thus contributing to the development of AI.

3 Creating an intelligent system

In the education and management system, an AI system has been established, which is a comprehensive application of previous systems. Cloud computing can provide a large amount of data for AI systems. The main function of AI is natural language, such as vision, hearing, fuzzy operation, intelligent judgement, neural operation, etc., to make correct judgements for future systems. As the core system of the whole system, its primary task is to receive education management data from all levels for decision making, which plays a certain role in promoting practical application.

In a word, while implementing teaching work, the intelligent education management system is integrated, which can comprehensively improve the quality of teaching management and promote students' academic development.

4.5 Security and stability analysis

In the design of the intelligent education management software, the paper placed special emphasis on data encryption and anti-tampering measures. All sensitive data is stored and transmitted using the AES-256 encryption algorithm to ensure data security. In addition, it has implemented fault-tolerant processing and load-balancing mechanisms to improve the stability and reliability of the system. Through distributed architecture and automatic failover technology, the system can continue to operate normally even when some servers fail, ensuring the continuity of teaching management work.

5 Architecture of intelligent software

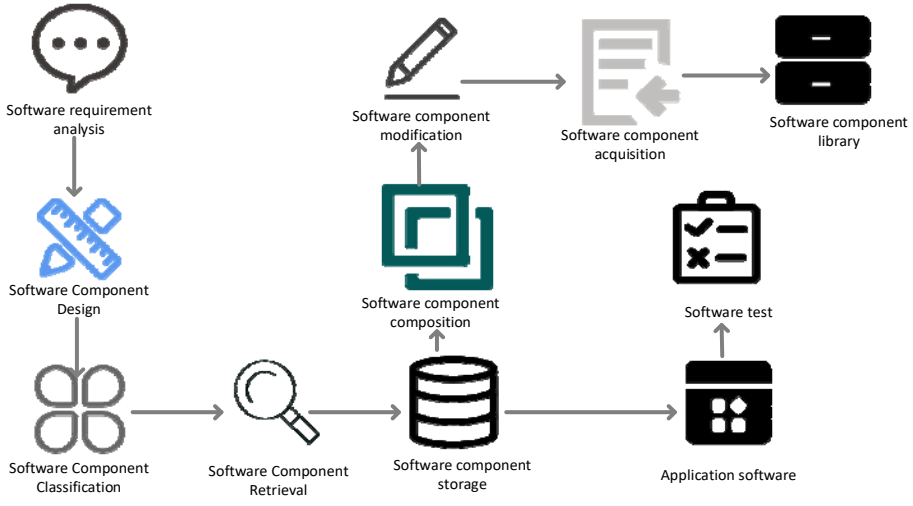
5.1 Construction and development model based on software component technology

As for intelligent software architecture, it refers to a system framework, which is composed of different components and thus forms a whole. To put it simply, the three elements of software architecture are: components, connectivity, and visualisation features. Processor components and connectivity components are two different architectures. They exist independently in different architectures. Their external information is covered up, and their characteristics can only be displayed through the interface.

In the process of componentisation, software is designed based on components. In software component reorganisation, the use of one or more components to achieve high-quality and efficient integration is the most promising software development field. This intelligent software has the advantages of the object-oriented, component library,

integrated spiral development mode, and iterative technology. The software development model based on software component technology is shown in Figure 2.

Figure 2 Software development model based on software component technology (see online version for colours)



5.2 Advantages of component-based software development

The advantage of component-based development is that it allows developers to combine components developed by different languages and manufacturers to form a complete system. The development method of software components has the following advantages:

1 Accelerated enterprise development: because component developers have written many components, they can reduce the development cost of components by reusing them, thus greatly reducing the development time.

2 Reduction of R&D expenses: because users can reduce the workload of software, the development cost can be reduced. In general, the use of software components to build software can greatly reduce the cost of software development compared with conventional methods.

3 Improvement of application availability: applications are written based on components. According to user requirements, they can often be completed by replacing or modifying one or more components in the application.

4 Reduction of software maintenance costs: because the component-based application is easy to change, it is generally only necessary to change the components without making comprehensive changes to the overall software, thus greatly reducing the software maintenance cost.

5 Promotion of rational division of labour in the software industry: proprietary software parts manufacturing can become a separate industry. The manufacturing of software is to purchase commercial software components, and then integrate and

assemble them to form a complete set of software. From this, it can be seen that software component technology can simplify, speed up, and reduce the cost of software development.

6 AI under dynamic uncertainty

6.1 Dynamic uncertainty: Bayesian AI

Bayesian model focuses on how to correctly describe the uncertain factors in the problem. Due to the increasing diversity and scale of data, the requirements for Bayesian modelling are becoming higher and higher. Generally, layered Bayesian and Bayesian networks are based on the assumption that data are mutually independent and distributed. On this basis, the attribute expression of each parameter and the correlation of each parameter are studied.

$P(a)$ represents the initial probability assumed before the test data are obtained. $P(b)$ is a prior probability of test data. $P(a/b)$ refers to the possibility of a's establishment, that is, $P(a/b)$ refers to the posterior possibility of a. Bayesian equation gives the posterior possibility $P(a/b)$ of $P(a)$, P(b) and $P(b/a)$:

$$P(a/b) = P(b/a)\,P(a)/P(b) \tag{1}$$

It is assumed that the condition state y_{t+1} and observation equation z_t are respectively:

$$y_{t+1} = \phi\left(x_{t+1}, x_t\right) y_t + \lambda_t \tag{2}$$

$$z_t = \Pi_t y_t + \lambda_t \tag{3}$$

Among them: $\phi(x_{t+1}, x_t)$ is the state transition matrix. λ_t is the state noise, Π_t is the design matrix.

According to the principle of maximum likelihood estimation, the following conditions are maximum verified:

$$P = p\left(y_t, y_{t+1}/Z_k\right) \tag{4}$$

Among them:

$$Z_k = z_1, z_2, \ldots, z_k \tag{5}$$

The equation is used:

$$p\left(y_t, y_{t+1}/Z_k\right) = \frac{p\left(y_t, y_{t+1}, Z_k\right)}{P\left(Z_{\mathrm{k}}\right)} \tag{6}$$

It can be noted that:

$$p\left(z_{t+1} \cdots z_k / y_t\,,\, y_{t+1} \cdots Z_t\right) = p\left(y_{t+1}/y_t\right) p\left(y_t/Z_t\right) \tag{7}$$

Therefore, the equation can be reduced to:

$$p\left(y_t, y_{t+1}/Z_t\right) = \frac{p\left(Z_t\right)}{p\left(Z_k\right)} p\left(y_{k+1}/y_k\right) \tag{8}$$

6.2 Probability programming

When using C, C++ and other general programming languages to express uncertain probability models, more errors often occur. It is difficult for other users to understand the models and algorithms written by different users. The goal of probabilistic programming is to provide a unified programming language for the modelling and reasoning of probability models. On the relationship between universality and performance, probabilistic programming must have a balance point. At the same time, due to the constant emergence of various new hardware and models, software development programs with strong flexibility are developed.

7 Construction of educational information management software system model

7.1 Building application model of education and management software based on AI

Based on the background of AI strategy, this paper constructs the educational information management software system model. The model consists of six parts: student management system, education management system, personnel management system, scientific research management system, logistics management system, and regional integration server. Each component exists independently and operates with each other. The application model of education and management software based on AI is shown in Figure 3.

7.2 System structure of education and management intelligent software

The intelligent software system of education and management is a reusable key resource and the framework and core of the whole system. The structure of each layer of the education and management intelligent software system is shown in Figure 4. The education and management architecture is composed of five layers: infrastructure layer, data layer, component layer, business logic layer, and application layer. The bottom component provides a functional function interface for the upper structure layer. High-level components do not need to have a detailed understanding of their internal implementation when using these layers. At the same time, to make the development of applications more effective and faster, the system also includes integrating components at all levels into one application and integrating them according to user requirements.

The educational information management software system consists of multiple layers, each of which is responsible for different functional modules. The data layer is responsible for data collection, storage, and preprocessing; the component layer provides core algorithms and functional interfaces; the business logic layer implements specific business rules and process control and the application layer provides services directly to users. The data flow between the layers is as follows: the data layer passes the collected data to the component layer for processing, and the processed results are then integrated by the business logic layer and finally presented to the user. The specific technical implementation path includes the use of big data technology for data analysis, cloud

computing platforms to provide computing resource support, and the internet of things technology to achieve device interconnection.

Figure 3 System model of education and management software (see online version for colours)

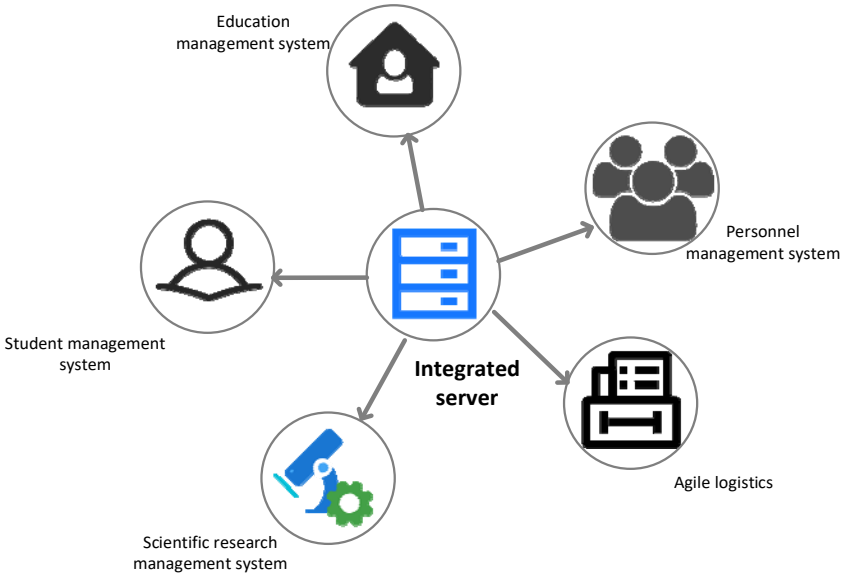
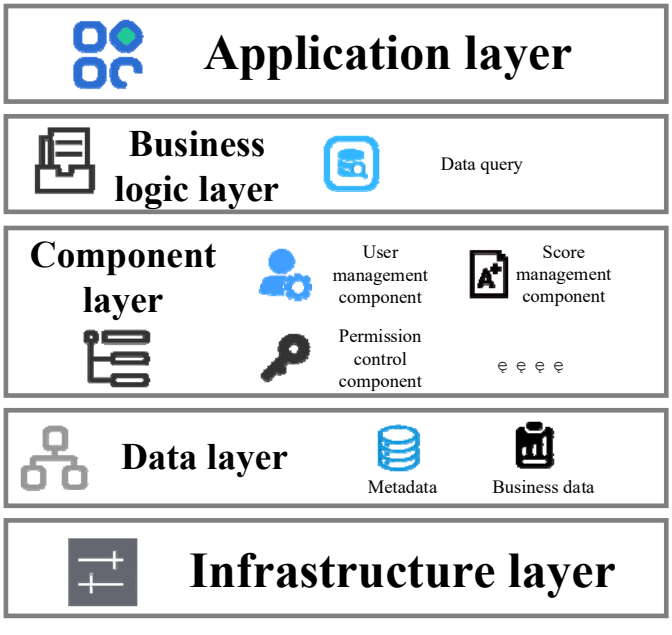


Figure 4 System structure diagram of education and management intelligent software (see online version for colours)

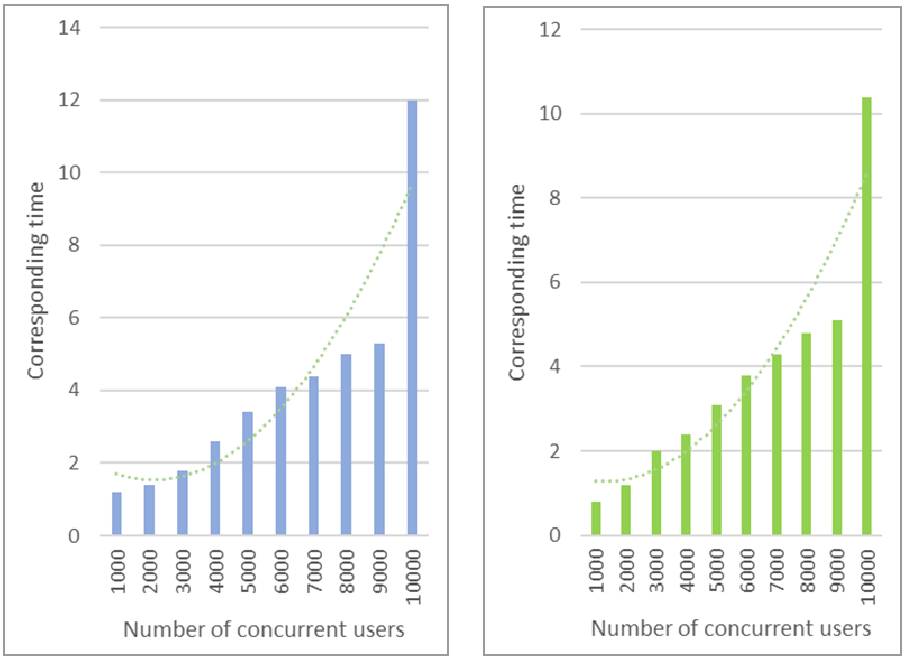


8 Simulation results of intelligent software

8.1 Load

The load must be stable. Under one or more environmental conditions, parallel requirements are continuously added to the system to increase its pressure until one or more indexes reach a safety threshold to reach a stable load. If some resources reach a certain level and more pressure is exerted on them, their processing capacities decrease. The load analysis of education and management intelligent software before and after simulation optimisation is shown in Figure 5. Figure 5(a) shows the load analysis of the intelligent software before optimisation, and Figure 5(b) shows the load analysis of the intelligent software after optimisation. It can be seen from the figure that the corresponding time of the system increases gradually as the number of concurrent users increases.

Figure 5 Load analysis of simulated educational and management intelligence software, (a) before (b) after (see online version for colours)



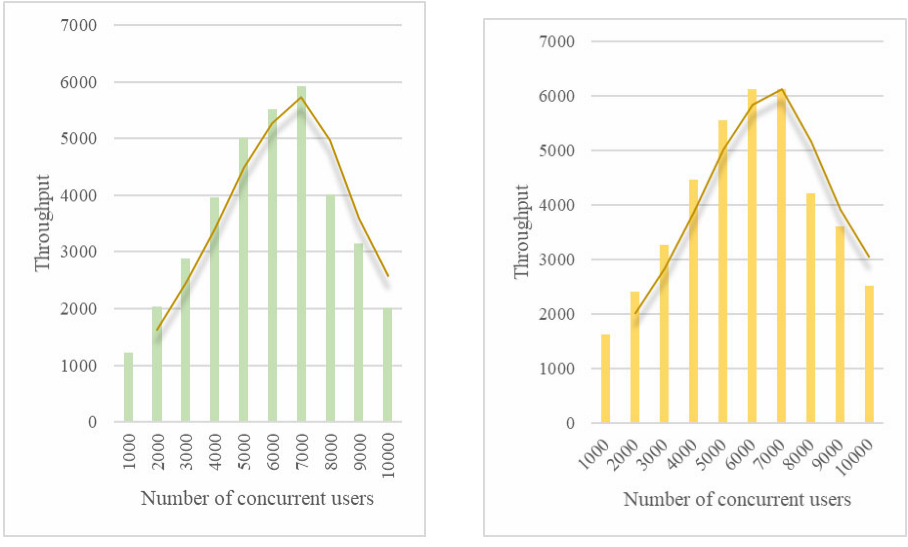
(a) (b)

8.2 Throughput

Throughput refers to all data transmitted during a performance test. The comparison of the throughput of education and management intelligence software based on AI is shown in Figure 6. Figure 6(a) shows the throughput before optimisation, and Figure 6(b) shows the throughput after optimisation. It is found from the comparison before and after optimisation that with the increase in the number of concurrent users, the throughput first

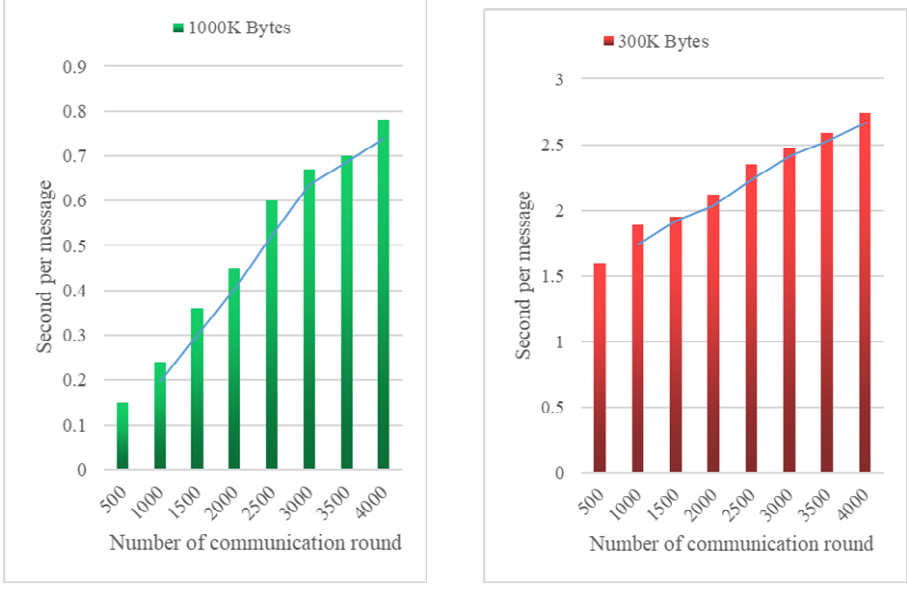
increases and then decreases. When the number reaches about 6,000–7,000, the software throughput starts to decline.

Figure 6 Throughput test of education and management intelligence software based on artificial intelligence (see online version for colours)



(a) (b)

Figure 7 The changing trend of processing time of each message of the intelligent software (see online version for colours)



(a) (b)

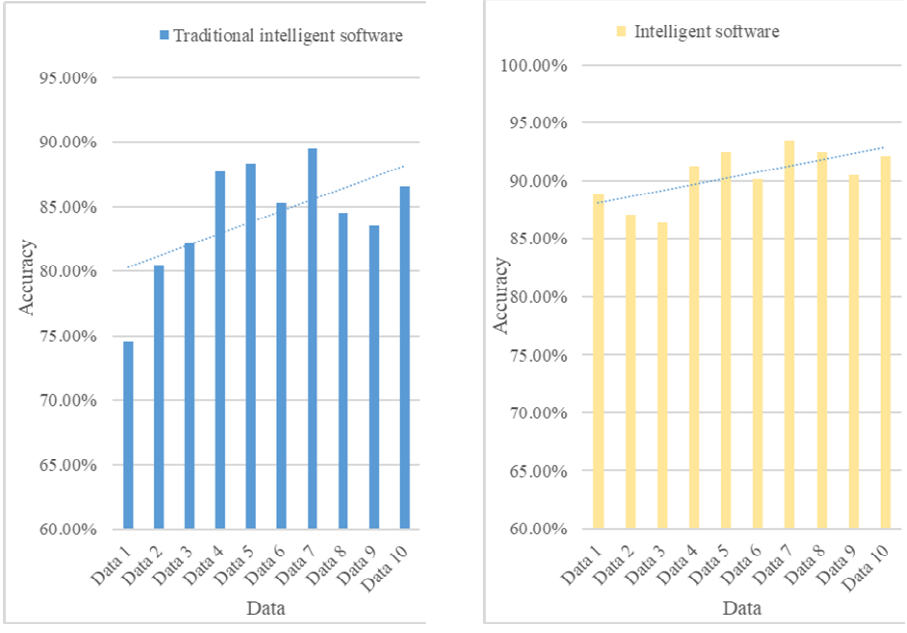
8.3 Evaluation index

The trend of processing time of each message of the intelligent software is shown in Figure 7. Figure 7(a) shows the trend of processing time of each message of the intelligent software under 1,000 Kbytes. Figure 7(b) shows the trend of processing time of each message of the intelligent software under 300 Kbytes. It can be seen that with the increase in traffic, the processing time of each message is on the rise, no matter in 300 Kbytes or 1,000 Kbytes.

8.4 Performance comparison

The comparison between the intelligent software and the traditional intelligent software is shown in Figure 8. Figure 8(a) shows the accuracy of data processing by traditional software. Figure 8(b) shows the accuracy of education and management intelligence software based on AI. It can be seen from the figure that the correct rate of data processing by the education and management intelligence software based on AI is 6.22% higher than that of traditional software.

Figure 8 The comparison between the correctness of the intelligent software and the traditional intelligent software in data processing (see online version for colours)



(a) (b)

8.5 Accuracy and recall

Table 1 compares the data processing accuracy and recall of traditional intelligent software and AI-based education management intelligent software in different test scenarios. The table shows that the AI-based education management software

outperforms the traditional intelligent software in both accuracy and recall. As the number of test cases increases (from 500 to 2,500), the performance of both software improves, and the improvement of AI-based software is greater. Overall, the AI-based system is more efficient in data processing, and both accuracy and recall are better than traditional intelligent software.

Table 1 Comparison of the two software in terms of accuracy and recall

Scene number	*Number of test cases*	*Traditional AI software data processing accuracy (%)*	*AI-based educational management software data processing accuracy (%)*	*Traditional AI software recall rate (%)*	*AI-based educational management software recall rate (%)*
Data 1	500	74.5	88.9	85	95
Data 2	1,000	80.49	87.1	87	96
Data 3	1,500	82.16	86.42	88	97
Data 4	2,000	87.74	91.3	89	98
Data 5	2,500	88.35	92.45	90	99

8.6 User experience design and evaluation of software

According to the data in Table 2, AI-based education management intelligent software is significantly better than traditional intelligent software in terms of user experience design. In terms of 'interface friendliness', AI software scored 9.2/10, compared with 6.5/10 of traditional software, showing a more modern and intuitive interface design, which improves the user's operating comfort. In terms of 'operational convenience', AI software scored 9.5/10, higher than 7.1/10 of traditional software, showing that its intelligent design makes operation simpler. In terms of response speed, AI software reached 9.6/10, which is significantly higher than 7.3/10 of traditional software, ensuring a smoother user experience. These data show that AI-based software provides higher effectiveness and efficiency in all aspects of user experience.

Table 2 User experience design and evaluation of intelligent education management software

Evaluation dimension	*Traditional intelligent software*	*AI-based educational management intelligent software*
Interface friendliness	6.5/10	9.2/10
Ease of use	7.1/10	9.5/10
Feedback mechanism	6.0/10	8.7/10
Navigation fluidity	6.8/10	9.3/10
Response speed	7.3/10	9.6/10

To verify the effectiveness and efficiency of the intelligent education management software, we deployed it in a certain university and collected the usage results and user feedback. Through a three-month trial run, we found that the software performed well in improving teaching management efficiency and reducing workload. Teachers and students generally believe that the software is easy to operate and practical, especially in attendance management and grade statistics. In addition, through the analysis of user

feedback, we further optimised the software's functions and interface design to improve the user experience.

9 Conclusions

AI is one of the most popular technologies, and it is widely used in various industries, including business, education, etc. With its technological advantages, the comprehensive education system based on intelligence is gradually promoting the informatisation and efficient operation of intelligent education and management. Today, with the deepening of education reform, the role of 'AI+' in education and management reform is increasingly significant. Specifically, this paper presented a new type of education and management intelligence software based on AI technology. Compared with traditional education and management, teaching quality has been greatly improved. It can be said that the effect of applying AI to educational management intelligence software is obvious. At the same time, in the environment of education and management reform, intelligent software has great innovation. Based on the AI strategy, this paper constructed the education and management intelligence software system model, to better promote the application of AI in education and management to give full play to the greatest advantage of AI in education and management, to enhance the effectiveness of AI in education management. However, in this intelligent software system, the amount of data is insufficient and the analysis method is relatively simple. In the future, efforts would continue to be made to update the software continuously, to improve the accuracy of intelligent software.

Declarations

2025 Year General Project of Humanities and Social Sciences in Shandong Province: Research on the Inter-generational Collaborative Community Embedded Elderly Digital Literacy Education Model.

The authors declare that there are no conflicts of interest regarding the publication of this article.

References

Althar, R.R. and Samanta, D. (2021) 'The realist approach for evaluation of computational intelligence in software engineering', *Innovations in Systems and Software Engineering*, Vol. 17, No. 1, pp.17–27.

Ampatzis, M. (2017) 'Robust optimization for deciding on real-time flexibility of storage-integrated photovoltaic units controlled by intelligent software agents', *IET Renewable Power Generation*, Vol. 11, No. 12, pp.1527–1533.

Davenport, T.H. and Ronanki, R. (2018) 'Artificial intelligence for the real world', *Harvard Business Review*, Vol. 96, No. 1, pp.108–116.

Haenlein, M. and Kaplan, A. (2019) 'A brief history of artificial intelligence: on the past, present, and future of artificial intelligence', *California Management Review*, Vol. 61, No. 4, pp.5–14.

Huo, L. (2020) 'An intelligent optimization-based traffic information acquirement approach to software-defined networking', *Computational Intelligence*, Vol. 36, No. 1, pp.151–171.

Jordan, M.I. (2019) 'Artificial intelligence – the revolution hasn't happened yet', *Harvard Data Science Review*, Vol. 1, No. 1, pp.1–9.

Katare, G., Padihar, G. and Qureshi, Z. (2018) 'Challenges in the integration of artificial intelligence and internet of things', *International Journal of System and Software Engineering*, Vol. 6, No. 2, pp.10–15.

Khisamova, Z.., Begishev, I. and Sidorenko, E.L. (2019) 'Artificial intelligence and problems of ensuring cyber security', *International Journal of Cyber Criminology*, Vol. 13, No. 2, pp.564–577.

Kose, U. and Arslan, A. (2017) 'Optimization of self-learning in computer engineering courses: an intelligent software system supported by artificial neural network and vortex optimization algorithm', *Computer Applications in Engineering Education*, Vol. 25, No. 1, pp.142–156.

Li, B-h. (2017) 'Applications of artificial intelligence in intelligent manufacturing: a review', *Frontiers of Information Technology & Electronic Engineering*, Vol. 18, No. 1, pp.86–96.

Lu, H. (2018) 'Brain intelligence: go beyond artificial intelligence', *Mobile Networks and Applications*, Vol. 23, No. 2, pp.368–375.

Nguyen, G. (2019) 'Machine learning and deep learning frameworks and libraries for large-scale data mining: a survey', *Artificial Intelligence Review*, Vol. 52, No. 1, pp.77–124.

Popenici, S.A.D. and Kerr, S. (2017) 'Exploring the impact of artificial intelligence on teaching and learning in higher education', *Research and Practice in Technology Enhanced Learning*, Vol. 12, No. 1, pp.1–13.

Santana, E.F.Z. (2017) 'Software platforms for smart cities: Concepts, requirements, challenges, and a unified reference architecture', *ACM Computing Surveys (CSur)*, Vol. 50, No. 6, pp.1–37.

Yang, M. (2022) 'Development of image recognition software based on artificial intelligence algorithm for the efficient sorting of apple fruit', *International Journal of System Assurance Engineering and Management*, Vol. 13, No. 1, pp.322–330.