Application of Face Recognition Technology Based on Deep Learning Algorithms in Credit Banks

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Abstract: With the development of the times, the use of credit banks in education has become very widespread, but the accuracy of face recognition in credit banks is still insufficient. Therefore, further improvements need to be made to credit banks. This article focused on the use of deep learning algorithm based facial recognition technology in credit banks, aiming to improve their facial recognition through deep learning algorithms. This article experimentally investigated the average scores of credit bank classes and traditional credit bank classes using deep learning algorithms for facial recognition technology. It was found that the class average score of credit banks using deep learning algorithms for facial recognition technology was up to 90 points, while the class average score of traditional learning banks was up to 76 points. Therefore, it was proven that the use of deep learning algorithms for facial recognition in credit banks was still effective and could improve students' grades.

Keywords: credit bank, facial recognition, deep learning algorithm, information platform

1. Introduction

With the application of credit banks in education, credit banks have played a significant role in students' learning. Credit banks refer to the model of banks to store learning results, so that students can always know their learning progress and level, which is very helpful for students to plan their own learning arrangements.

Many researchers have studied learning banks. Ravshanbek J believed that the invention of student credits was a tool for the smooth transition of higher education and has been strengthened by the Foundation. He hoped to encourage business models in higher education, including competition and Unit cost analysis [1]. Lei S A believed that the experience of advanced countries in improving education quality had examined the characteristics of introducing the credit system in higher education, which was an important factor for higher education institutions to cultivate high-quality, competitive, and mature talents that meet international standards [2]. Denning J T believed that higher education systems in other developed countries were increasingly interested in introducing credit systems or similar indicators to promote curriculum internationalization in the absence of student credit systems [3]. With the increasingly widespread use of learning banks, the existing problems are gradually

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becoming apparent.

Many university education and training organizations are actively attempting credit banking. If the combination of credit banking and deep learning algorithm facial recognition technology can achieve better results, this article studied credit banking based on deep learning algorithm facial recognition technology. Through research on the average score of credit bank classes using deep learning algorithms for facial recognition technology, it was found that the average score was higher than that of traditional credit banks, indicating that deep learning algorithms for facial recognition can achieve good results in credit banks.

2. Application of Facial Recognition Technology Based on Deep Learning Algorithms in Credit Banks

2.1 Overview of Credit Banks

The main content of "credit bank" is the accumulation of credits, which breaks through the traditional professional restrictions and learning time restrictions, and combines skills training with academic education. The "credit bank" system changes the time for students to complete their studies from a fixed learning system to a flexible learning system. According to the "credit bank" system, as long as students finish a course, they will get a certain amount of credits, participate in skills training, certificate also count credits, and then accumulate all the credits due; At the same time, students are allowed to study not according to the regular semester time, but like a bank deposit, the study time can be concentrated or interrupted, even after a few years, the study experience can still be converted into credits, and stored in the "credit bank".

Credit bank is a learning system and teaching management system that simulates or references the mechanisms, functions, and characteristics of banks, utilizes internet technology, and references the operational principles of banks to store, verify, accumulate, and transform learning results at various levels. Branch banks can provide students with more high-quality learning resources, build a lifelong learning “overpass” for them, and promote equality in education [4-5].

Credit banks are an information platform and carriers of educational achievements. The establishment of a credit bank enables students to store, authenticate, accumulate, and transform their learning outcomes online, making their learning more convenient [6-7].

2.2 Typical Models of Credit Banking Practice

Under a series of policy incentives and support, education and training organizations such as ordinary universities, vocational colleges, and open universities are actively trying credit banking, and have achieved some results. At the same time, they have also developed their own unique credit banking model. The typical model of credit bank practice is citizen learning credit bank. The purpose of citizen credit bank is for local citizen learning, such as online community education. In online communities, various types of educational resources are effectively used to form vertical interaction and horizontal collaboration, so that they can play the largest role [8-9]. Within the networked community, a comprehensive and organized opening of ordinary primary and secondary schools, vocational schools, adult schools, educational and training

institutions, and cultural and sports facilities to citizens is carried out, and various forms of educational and training activities are carried out. An information-based and modern learning achievement management system for citizen learning activities has been constructed to achieve certification, accumulation, and conversion of citizen learning achievements, such as conversion to certificates for non-academic education, learning rewards, shopping discounts, etc., thereby promoting the construction of a learning oriented city and the construction of a lifelong education system [10-11].

Lifetime Education Credit Bank: Lifetime Education Credit Bank attempts to break the interdependence between formal education and training institutions such as higher education institutions, vocational colleges, open universities, and educational institutions, integrate various educational resources, and truly achieve lifelong education, better promoting the construction of a learning society [12-13]. Currently, most lifelong education credit banks are led by regional governments or education departments, based on formal education and training organizations in the region, targeting students and the public in the region. A series of lifelong education plans have been formulated, and a service platform for lifelong education credit banks has been established to promote the certification, accumulation, and transformation of learning outcomes in non-academic and academic education.

Open University Credit Bank: The role of credit banks is to provide certification, accumulation, and transformation of learning outcomes for students in open universities, and to explore flexible learning mechanisms to ensure the "universality" and "individualization" of students in open universities [14-15]. Its characteristic is that students do not need to pass the entrance test, and there are no special restrictions on learning time, length of study, learning location, etc. They can study anywhere and anytime [16-17].

Enterprise Credit Bank: Credit bank is centered around the company, combining various educational and training resources, implementing flexible management, allowing employees to have targeted, flexible, and autonomous learning and training on the job, thus replacing the fixed centralized education and training methods in the company. This model is established in enterprises, and the certification, accumulation, and conversion results of credit banks are not aimed at obtaining specific types of certificates, but are directly related to employees' job promotion, and performance evaluation, etc., thereby promoting continuous learning among employees in the company [18-19].

General Higher Education Credit Bank: Credit banks are a platform for continuous education and training of advanced talents in the industry, relying on higher education institutions. The University Credit Bank Alliance can also be utilized to fully utilize the disciplines and specialties of universities, providing services for some graduates and college students, and establishing a new management approach similar to credit banks, in order to achieve the goal of credit mutual recognition, course selection, and resource sharing between universities [20].

2.3 Difficulties Faced by Credit Banking Practice

The difficulties faced by credit banking practice are mainly reflected in:

Unclear credit banking framework standards: The credit banking structure standards are a key link in the credit banking system, and a unified standard that links various forms of teaching and training. There are various credit banking models, each

with its own unique credit system, such as establishing a student bank, establishing citizens' needs for education and training, accumulating learning outcomes, and converting credits; To meet the education and training needs of the intellectual property and non-intellectual property industries, a lifelong education credit database is established; The credit reserve library converts the knowledge and skill qualifications learned with the credits of the subject being studied; There are relevant conversion guidelines for students' learning, training, and evaluation in the learning sub database; On the basis of professional degree and professional and technical qualification certification, the sub library of vocational education is formulated. Although different types of credit banks have set their own recognition criteria to meet practical needs, they have increased communication and connections between different types of credit banks, affecting their nationwide popularity and weakening their credibility and authority.

Unclear implementation subject of credit banks: Under market economy conditions, implementing credit banks involves multiple interests, and the subject of implementing credit banks is its core. From the perspective of the executing entity, it can be an education and training institution, a joint organization composed of several schools, or an independent, non-profit public welfare organization. Functionally speaking, credit banks do not have the ability to develop training plans that match qualification certificates, conduct qualification evaluations, and issue certificates; In terms of responsibility, although credit banks do not provide independent qualification certification for each operating institution, each operating institution plays a role in organizing services, setting standards, managing credits, supervising and ensuring the operation of credit banks. The unclear execution subject of credit banks can easily affect the interconnection between various universities and majors, reducing the probability of credit transfer.

The lack of strong quality assurance in credit banks: In credit access, the quality of credit access is usually constrained by the following factors. First is the authenticity of credit access. Learning outcomes are difficult to measure on a single scale, as they can be measured through attendance, assignments, exams, or explicit abilities, experiences, and training evidence. The quality of informal education outcomes without a fixed format is difficult to assess their authenticity. Secondly, there is no independent "third-party" professional evaluation organization; The operation of credit banks is susceptible to environmental and multiple factors, and it is necessary to improve the credibility of credit sources and credit confirmation in order to ensure that the authority of credit banks is recognized by the whole society. The quality assurance of the academic sub database is weak, and the root cause lies in the lack of an authoritative, unified, and standardized national hierarchical system.

2.4 Implementation Method of Facial Recognition System on Credit Bank Information Platform

In recent years, deep learning has been widely applied in the field of face recognition, and its accuracy in face recognition has been greatly improved. At present, facial recognition technology is relatively mature and has been widely applied in areas such as intelligent security and internet finance. Due to its excellent practical value, facial recognition has been well applied in credit banks. On the credit bank information platform, facial recognition technology can be used to log in, making it convenient for

users to use. The flowchart of the credit bank facial recognition system is shown in Figure 1.

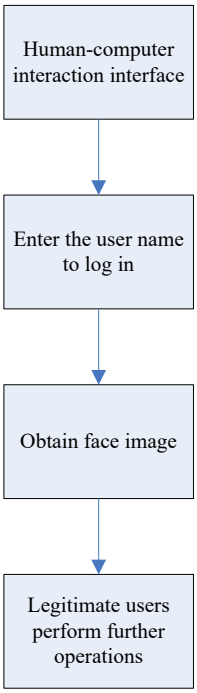

Fig.1 Credit bank face recognition system flow chart

2.5 Platform Selection for Face Recognition Systems

The credit bank's information system either uses the built-in AI (Artificial Intelligence) chip on the phone or builds a facial recognition system. To achieve facial recognition using AI chips, it is necessary to have a mobile phone with AI chips. However, the application of AI chips is now very common and does not waste too much time and energy. In addition, credit banks are still developing and funds are still tight. At this time, it is better to use mobile phones for facial recognition. However, this approach is not universal and is not suitable for mobile phones without artificial intelligence chips. The establishment of a facial recognition system is to make it easier for users without AI chips to verify their identity through "facial recognition". Cloud platforms have powerful computing power and do not rely on terminal computing resources, enabling resource sharing with users, but at a high cost. On this basis, facial recognition login function can be added to the cloud to better adapt to different user needs. The overall framework of facial recognition is shown in Figure 2.

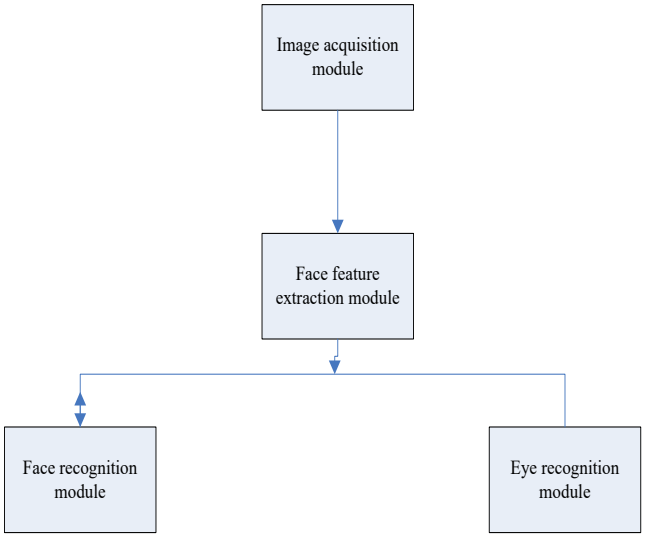

Fig.2 Face recognition of the overall framework

2.6 Current Situation of Face Recognition

Facial recognition technology is the use of computer vision technology to extract images of people from static images or dynamic videos, in order to achieve the goal of identity recognition. Compared to traditional manual selection, deep learning based facial features can achieve higher recognition rates through autonomous learning. Deep learning has become an important research direction in the field of computer vision due to its better feature representation ability. Using deep learning to achieve facial recognition not only has higher efficiency, but also greatly improves the training speed of the neural network and improves recognition rate. The facial feature extraction algorithm based on deep learning has higher accuracy than traditional facial feature extraction algorithms.

2.7 Application of Deep Learning Algorithms in Credit Banks

Traditional facial recognition technology, although faster in computation speed, still has a significant gap compared to the deep learning that has emerged in recent years. On the one hand, traditional principal component analysis methods have a significant difference in accuracy compared to deep learning algorithms. On the other hand, principal component analysis technology cannot meet the needs of large-scale users.

With the development of deep learning technology and its associated deep learning chip technology, its recognition accuracy continues to improve, and the price of its chips is also constantly decreasing. The advantages of deep learning based facial recognition technology have become more significant compared to traditional facial recognition technologies. Based on the above reasons, it is necessary to adopt deep learning technology to provide users with a facial recognition login method in the credit management system.

Currently, two aspects have been studied. The first aspect is to use deep neural

networks to identify the position of the face from the detected image and determine its position. The second part is based on other deep learning networks to identify the tested faces and determine the specific identity of the user. In addition, with the widespread application of 3D cameras on mobile devices, 3D images of faces can be obtained through structural techniques in 3D cameras. On this basis, it is necessary to adopt a deep learning model that combines the obtained color features with deep features to improve the accuracy of facial recognition in the credit bank information system.

2.8 Face Recognition Algorithm Based on Deep Learning

The deep learning facial recognition algorithm introduces classifiers on the basis of existing universal feature extraction methods, and establishes a guiding deep learning model to achieve online training of existing universal features and fine adjustments, ultimately achieving facial recognition. Assuming there are i training samples, for i sample d_i, the expression for encoding b_i of d_i obtained through the encoding process is shown in Formula (1):

$$b_i = f(Qd_i + n) \tag{1}$$

In Formula (1), Q represents the weight in the encoding process, n represents the offset in the encoding process, and f represents the activation function. The calculation method of d_i is shown in Formula (2):

$$d_i = f(Qb_i + n) \tag{2}$$

The noise reduction self-coding is trained by minimizing the reconstruction error. The expression of the loss function is shown in Formula (3):

$$\min \sum_{i=1}^{a} MQ^2 \tag{3}$$

M is a parameter used to balance reconstruction error and weight.

3. Deep Learning Algorithm for Facial Recognition Technology Credit Bank Simulation Experiment

3.1 Experiment

The credit bank for deep learning algorithms in facial recognition technology can improve students' learning efficiency. This article selected ten classes for the experiment, five of which used traditional credit banks and five of which used deep learning algorithms for facial recognition technology credit banks. The average exam scores of these classes were surveyed. The average scores of these class exams are shown in Figure 3.

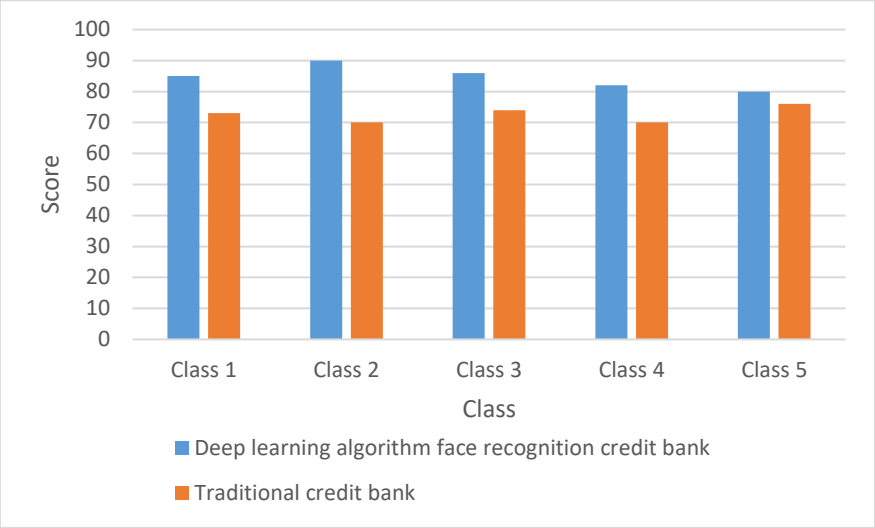

Fig.3 Comparison of class test average scores

From the experimental results in Figure 3, it can be seen that the face recognition technology using deep learning algorithms had an average score of 90 points for the credit bank class, while the average score for the traditional credit bank class was 76 points. From the experimental results, it can be seen that the facial recognition technology of deep learning algorithms is indeed helpful for the construction of credit banks and can help students improve their grades.

3.2 Discussion

Face recognition technology is a process of identity retrieval or verification, by extracting face information from a given static or dynamic image, and matching with known identity faces in the database. Due to the influence of interference factors such as illumination, expression, occlusion, orientation, etc., the accuracy rate of face recognition technology is relatively low compared with other technical means based on ID card, iris, palm print, fingerprint, etc., but its collection method is the most friendly: without the cooperation of the parties, or even without their awareness, the collection and recognition of face information is completed. Therefore, face recognition technology in the past 40 years has been a hot research topic in the field of artificial intelligence, has gradually matured, has been applied to anti-terrorism, security, access control and other fields, in recent years began to promote education, finance and other fields.

4. Conclusions

The use of credit banks is becoming increasingly widespread. Credit banks can store learning results to help students understand their learning status and help them learn better. Therefore, how to further improve the quality of credit banks is currently the focus of research. This article studied the face recognition technology credit bank of

deep learning algorithms, which aimed to improve the efficiency of credit banks through facial recognition using deep learning algorithms. The experiment found that the average score of face recognition classes using deep learning algorithms was higher than those using traditional credit banks, which proved that deep learning algorithms could achieve good results in face recognition for credit banks.

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