

Face Recognition Technology in English Online Examination System

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ABSTRACT

The English test system based on B / S structure or the automatic scoring system of English test for oral English based on sequence matching is mainly designed to improve the performance of the English online test, using the judgment feedback balanced adjustment method to collect information, and realize effective marking and scoring through matching the correlation function features. In order to improve the accuracy of user verification and to ensure the intelligence of the English online test system, it is necessary to apply face recognition technology. The final experimental results also show that the English online test system based on face recognition technology can quickly generate test papers and score them, which is more efficient and practical than the first two systems.

Keywords: Face recognition technology; surround function; system test

1. INTRODUCTION

The application of English online examination system is mainly to improve the efficiency of English examination work, and the application of face recognition technology in English online examination system is to reduce the error rate in English online examination system, avoid the occurrence of surrogate examination and other situations, [1] and ensure the fairness and openness of the examination. In the face recognition technology, the first is the collection and processing of face images, [2] and the second is the extraction of face features and account information verification. Only those who pass the test can take the test. After the test begins, the system will automatically draw the test paper, draw up the answer time, and automatically mark the paper after submission. [3]

2. FACE RECOGNITION TECHNOLOGY IN THE ENGLISH ONLINE EXAMINATION SYSTEM EXAMINATION SYSTEM STRUCTURE

The client side and the server side jointly constitute the English online examination system, and its structure is shown in Figure 1.

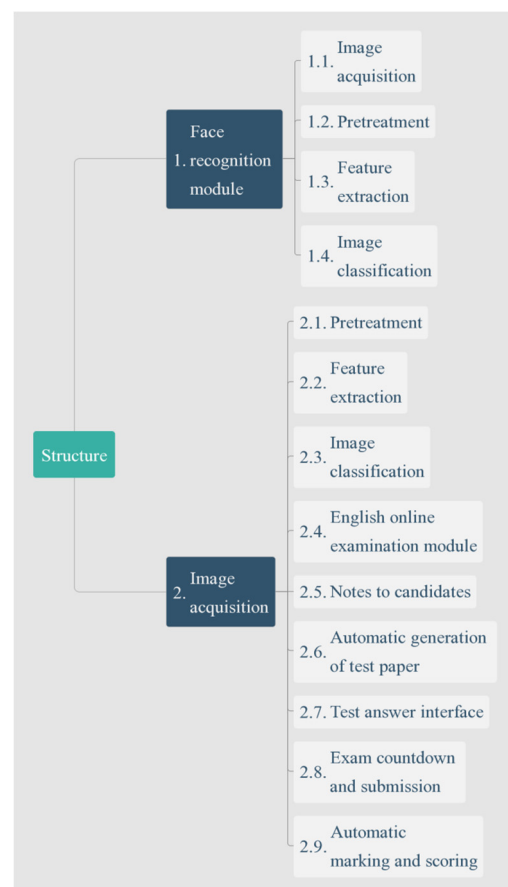


Figure 1: Structure of the English online examination system

3. FACE RECOGNITION TECHNOLOGY IN THE ENGLISH ONLINE EXAMINATION SYSTEM

3.1. Face image acquisition

External input devices can play a very important role in the process of video collection. The longer the collection time, the more detailed the video processing is. [4] However, the facial details of the human face have little impact on the collection results in fact, and the skin color model is usually used for face collection to divide the face and background. Compared with other facial areas, [5] the gray scale of the facial features is lower, so after the image gray scale processing, it is also necessary to divide its dynamic threshold, use the gray scale information to transform it into binary images, and then accurately locate the facial features. [6]

3.2. Face image preprocessing

For the grayscale images, the Retinex was preprocessed as follows:

$$Retinex(x, y) = \lg T(x, y) - \lg T(x, y) \otimes K(x, y) \quad (1)$$

Where $T(x, y)$ is an image gray value and $K(x, y)$ is a surround function, as follows:

$$K(x, y) = l \exp\left[-(x^2 + y^2) / \sigma^2\right] \quad (2)$$

Where, σ is the scaling parameter of the surround function, and l is the normalization coefficient.

For color images, Retinex preprocessing is as follows:

$$Retinex(x, y) = \left[\sum_{j=1}^3 w_j \lg T_j(x, y) - \lg T_j(x, y) \otimes K(x, y) \right] \quad (3)$$

Where, $T_j(x, y)$ represents the j th color channel image.

Because the Retinex preprocessing of images requires stretching the gray value linearity, the overall Retinex preprocessing also needs to be realized by the gray value normalization. The algorithm is shown as follows:

$$Retinex(x, y) = \frac{Retinex(x, y) - h_{old}}{\mu_{old}} \times \mu_{new} + h_{new} \quad (4)$$

The h_{old} is the mean of the image output, While the μ_{new} is the standard deviation of the image output. It can represent the normalized mean of the gray value or the normalized standard deviation of the gray value. [7]

3.3. English online exam module

The most critical part of the English online examination system is the English online examination module. [8] Through the English online examination

module, the identity of the test personnel can effectively verified and identified, and their face features can be extracted. In addition, the English online test module is also responsible for issuing the test countdown reminder and test instructions to the examiners, [9] selecting the test questions for the examiners, and reviewing and correcting the test papers after the end of the exam. The flow is shown in Figure 1. [10]

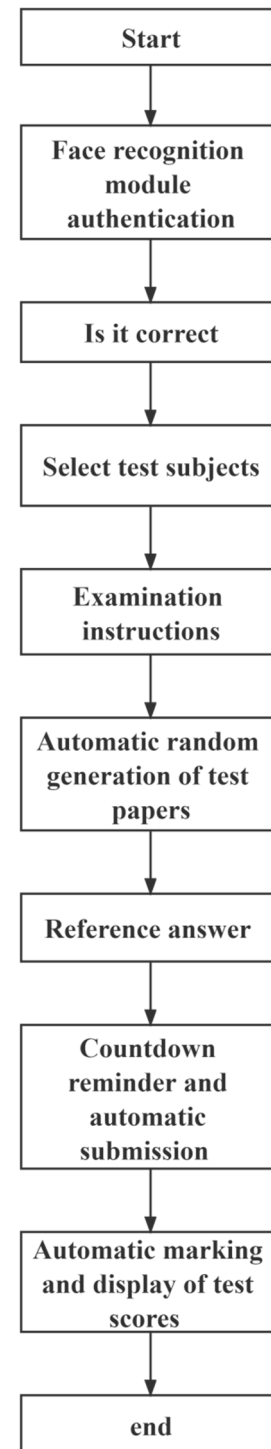


Figure 2: Application flow chart of English online examination module

First of all, random generation of papers can be marked to ensure that there are no duplicate papers. When a paper is selected, the system will mark the paper, and when the test is over, the mark will be eliminated. [11]

Secondly, the examination personnel mainly use the button and selection box on the examination paper to answer the question, the side will show the answer time, [12] convenient for the examination personnel to control the question time, and then automatically hand in the paper. [13]

Finally, the system will automatically start to mark the paper after handing in the paper, but because there is no unified answer to the English test paper, the system will use the keyword search method to score the test paper. In addition, there is the function of manual auxiliary modification of reading errors, so to a certain extent, the English online examination system has been fully improved. [14]

4. EXPERIMENTAL RESULTS AND ANALYSIS

The test situation of 1000 students is selected as a sample of the English online test system, first to fill 800 questions as optional questions, including 200 single-choice questions, listening questions and fill-in-blank questions, 50 translation questions and composition questions, and 100 reading comprehension questions. The test time is 120 minutes, the difficulty is 0.5, and the total score is 150. [15] The comparison system is the system (system 1), the college English examination system based on B / S structure (system 2) and the oral English test automatic scoring system based on sequence matching (system 3).

The generation speed of system 1, system 2 and system 3 is shown in Figures 2 and 3.

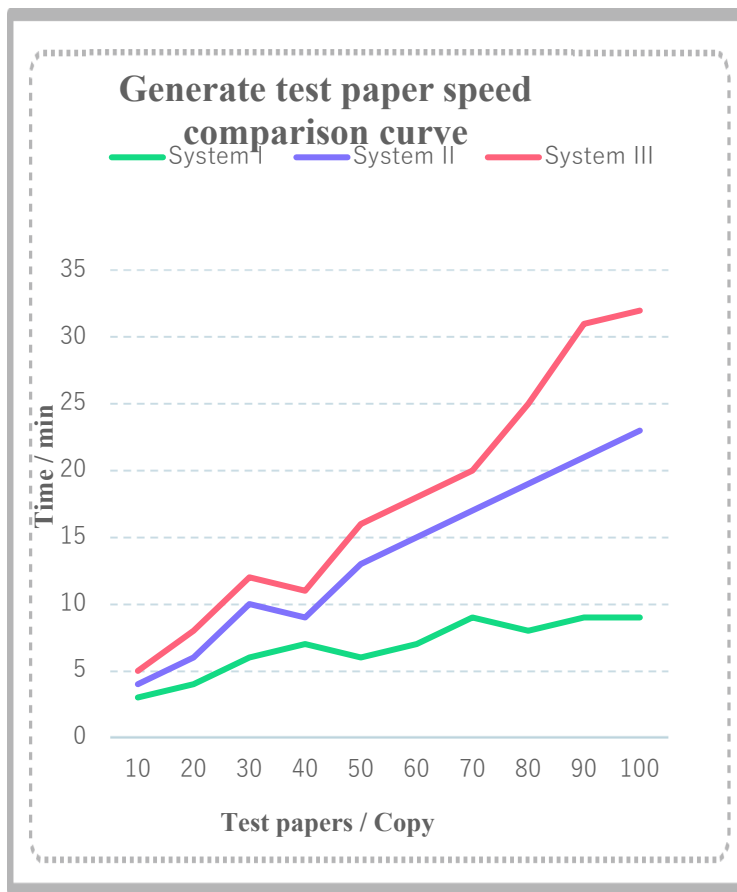


Figure 3: Generates a test paper speed comparison curve

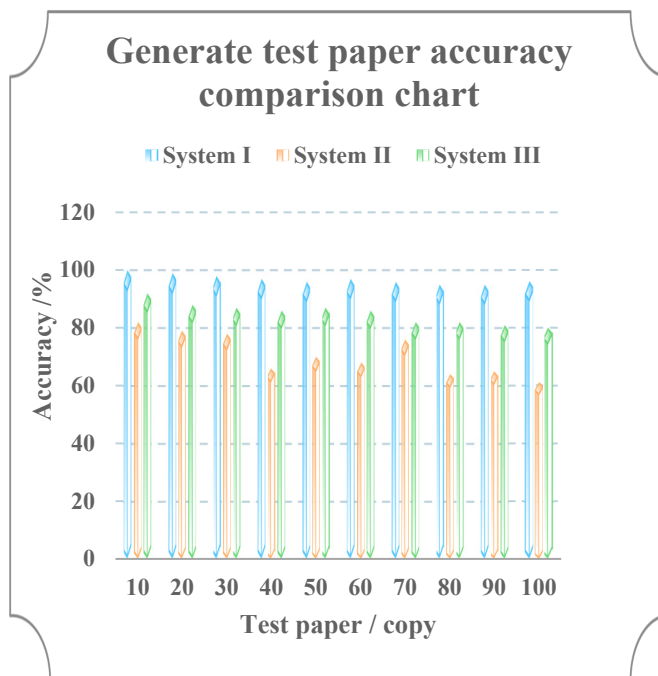


Figure 4: Generates a precision comparison map of the test paper

It can be seen that the time consuming of the three systems is all rising with the increase of the number of randomly generated papers, among which the shortest time consuming and the highest efficiency is system one, that is, this system, which represents the high stability of this system and can ensure the smooth progress of the examination to a certain extent. [16]

In addition, the online examination system has the function of automatic marking, and the automatic marking function of the three systems is tested. The test results are shown in Figures 4 and 5.

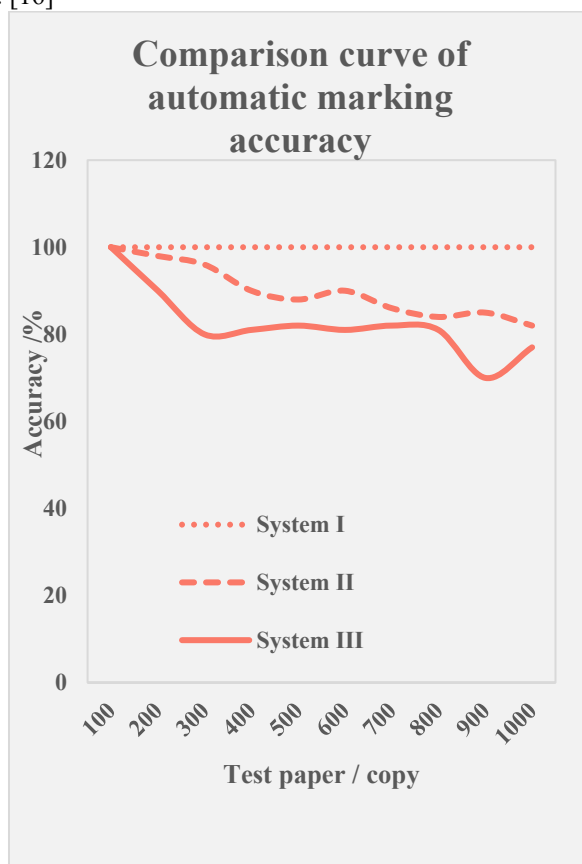


Figure 5: Comparison curve of automatic marking and scoring accuracy

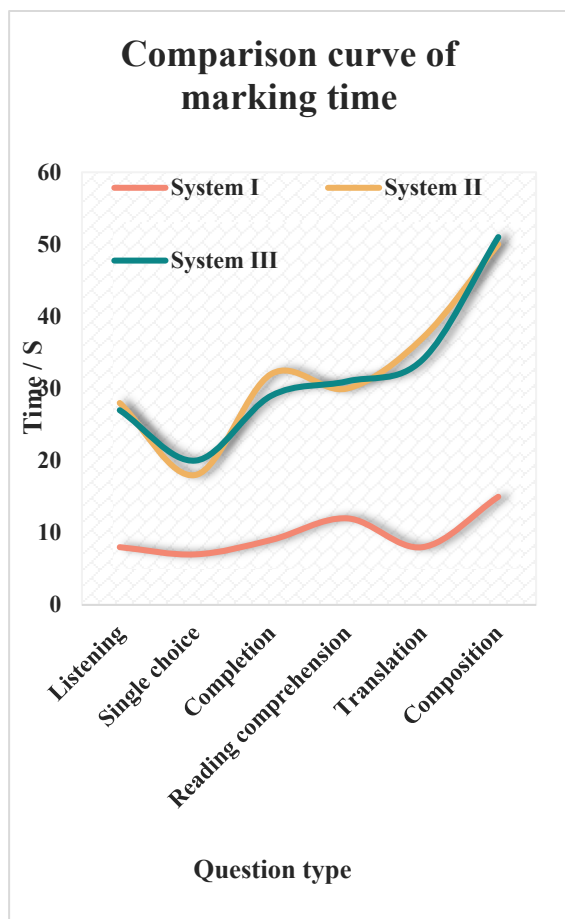


Figure 6: Marking the time-consuming comparison curve diagram

As can be seen above, system one is better than system two and system three, because system one is more intelligent. According to Figure 5, the comparison of the marking results of the same test paper shows that the system takes the shortest time, is the fastest, and is most suitable for online English exams.

5. CONCLUSIONS

In the English online examination system, face recognition technology greatly improves the efficiency of English examination work, reduces the teaching burden of educators to a certain extent, and makes the examination mode more diversified and convenient. In addition, face recognition technology also greatly reduces the probability of English online test work mistakes, avoiding the wrong test or surrogate test. However, the face recognition technology has certain requirements for the image acquisition technology, so in the subsequent face recognition technology research, the image acquisition technology will need some improvements.

REFERENCES

- [1] Danyun Li. The Online English Writing Assessment system, iWrite 2.0 Application Case Assessment [J]. *China Education Technology and Equipment*, 2018 (23): 26-28.
- [2] Hui Chu, Chen Song, Chencan Wang. Multi-face Recognition Based on Keras Convolutional Neural Network [J]. *Journal of Luoyang Institute of Technology (Natural Science edition)*, 2022,32 (01): 62-67.
- [3] Jingyi Li, Xianguo Li, Yuanhao Huang, Huijia Peng. Research on the influence of face recognition on consumer preference for self-improvement products [J / OL]. *Nankai management Review*: 1-21 [2022-04-08]. <http://kns.cnki.net/kcms/detail/12.1288.F.20220307.1621.004.html>
- [4] Jing Liu, Yujie Li, Qiang Li, Lu Wang, Shaoyang Zhang. Research on the Network Control Scheme of Beijing Metro Face Recognition System [J]. *Information Technology*, 2022(01):49-55.DOI:10.13274/j.cnki.hdzj.2022.01.010.
- [5] Jing Luo. Application and optimization ideas of face recognition technology in the radio and television industry [J]. *Modern TV Technology*, 2022 (02): 92-95.
- [6] Ling Lin. "Inform consent" and "data utilization" rules in face recognition information protection [J]. *Contemporary Communication*, 2022 (01): 108-112.
- [7] Min Zhao. The Theoretical Definition and Rule Construction of Face Recognition Evidence in Criminal Procedure [J]. *Financial Law*, 2022(02):163-175.DOI:10.16823/j.cnki.10-1281/d.2022.02.002.
- [8] Nan Ni, Min Wang. The Legal Regulation of Personal Information Protection in Face Recognition Technology [J]. *The Humanities Magazine*, 2022(02):121-131.DOI:10.15895/j.cnki.rwzz.2022.02.007.
- [9] Shiting Dong. Engineering Design of Front-end Architecture and Its Application in English General Examination System [D]. *University of Science and Technology of China*, 2018.
- [10] Shuyu Wang, Huangzhao County, Zheng Mengqiao, Zhang Yanling, Wang Jun. Design and implementation of body temperature detection based on face recognition and multi-machine control system on cloud platform [J]. *Technology*

- and Innovation,
2022(02):151-155.DOI:10.15913/j.cnki.kjycx.
2022.02.045.
- [11] Shiyong Lian, Zhongtao Liu. Application of Artificial Intelligence Technology in Modern Media asset Management System [J]. Modern TV Technology, 2022 (01): 90-92.
- [12] Tianshui Jiang, Jianguo Wang. Road recognition technology based on 3D face recognition [J]. Modern Radar, 2022,44(02):64-68.DOI:10.16592/j.cnki.1004-7859.2022.02.010.
- [13] Ting Wang. Optimization Design and Implementation of English Language and Literature Teaching Management System [J]. Microcomputer application, 2019,35 (05): 45-47 + 51.
- [14] Xingyu Ma. Research on the Mechanism of Growth Thinking Mode on English Online Learning [J]. Changjiang Cong magazine, 2020 (24): 78-79.
- [15] Yudong Cai, what harmonic. —— visited Shi Lin [J], deputy director of artificial Intelligence Department of Cloud Computing and Big Data Research Institute, China Information and Communication Institute. Contemporary financier, 2022 (03): 108-111.
- [16] Zedong Dong, Xinjie Sun, Yang Hu. Design and Implementation of English stratified Online Examination System Based on Machine Learning [J]. Technology Wind, 2019(32):78-79.DOI:10.19392/j.cnki.1671-7341.201932064.

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