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English Translation Teaching Based on Digital Information Technology and Resources

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Abstract: The main purpose of teaching translation is to promote students' English learning and cultivate English application ability through translation activities. As a kind of language teaching method, the development of translation activities should serve the teaching goals of the whole classroom, and combine with other teaching methods to jointly promote the improvement of students' English comprehension ability and application ability. The full use of digital information technology and digital resources in English translation teaching will greatly improve the effect of college English translation teaching. In order to deeply explore the role of digital information technology in English translation teaching, we have carried out research on the reform and exploration of English translation teaching based on digital information technology. This paper first discusses the teaching of English translation and its basic methods. This paper will combine the background of digital information teaching to analyze how to apply digital information technology and digital teaching resources in college English translation teaching, so as to improve the teaching effect of college English translation. Cultivate students' interest in learning and enhance students' translation ability. By using the image extraction method, the multimedia construction method and the classroom learning contrast method in the digital information technology, the sample is collected, the technical framework is analyzed, and the algorithm is simplified. And create a digital information technology teaching model. The experimental results of this paper show that the accuracy of dictionary translation is 44.5% by comparing the methods based on digital information technology and resources. The accuracy of the g and b translations is slightly lower than that of the dictionary method, with an accuracy of 40.5%. And the translation method based on digital information technology and resources has the highest accuracy rate of 79.8%. This essentially verifies the effectiveness and robustness of the proposed translation teaching method.

1. Introduction

With the increasing strengthening of international exchanges and cooperation in education, science, culture, politics, economy and other fields after China's accession to the WTO, society has

higher and higher requirements for translation talents, and there is an urgent need for foreign language departments in universities to train a large number of qualified translators. However, the traditional teaching mode of translation is centered on the teacher and pays attention to the final result of translation. The students' translation emphasizes the teaching of basic translation knowledge and basic skills, and seldom pays attention to cultivating students' innovative spirit and practical ability.

Digital information technology has significantly advanced modern teaching reform, with numerous studies focusing on its impact on English translation teaching. In 2016, Amato G compared advanced aggregations and binary feature applications, finding that the aggregation method is effective but lacks multimedia integration [1]. In 2019, Kaljahi MA introduced a visual monitoring mechanism for scene image classification, achieving better results with an SVM classifier over rule-based methods, though the process lacked transparency [2]. Ahmad J (2016) proposed a personalized image collection descriptor for social images, which performed well but isn't applicable to teaching practice [3]. Thanh TM (2017) developed a robust image watermarking scheme, but the research was narrow and flawed [4]. Mbeudeu CD (2017) explored the improvement of Cameroon's grammar translation method in EFL teaching, though the investigation lacked rigor [5]. Kalmazova N (2016) analyzed the translation difficulties of legal texts, but there were data gaps in her approach [6]. Rahman M M (2018) reviewed issues with implementing a communicative language teaching curriculum in Bangladesh, but the experimental results were unclear [7].

The innovation of this paper is that the research of this paper combines digital information technology and resources with college English teaching translation, and proposes a new teaching model. It provides a new idea for improving students' translation ability and comprehensive English practical ability, and also expands the research space and direction for the subsequent development of English teaching and related research.

2. English translation teaching design and implementation method based on digital information technology and resources

2.1 English Translation Teaching and Basic Methods

What is translation? In China, most of the translation works and books define it as the language practice activity that accurately reproduces the content in another language form in one language, that is, the product of a language is not contained in the content information [8].

The Soviet translation theorist Barhudarov said: "Translation is the process of changing the speech product of one language into another language product while keeping the content, that is, the meaning unchanged"[9].

From the perspective of teaching, it can be divided into the following types: according to the translation path, it can be divided into two types: interpretation and written translation; according to the theme, it can be divided into three types: professional translation, general translation and literary translation. English translation teaching is reflected in the grammar translation method to a certain extent. The grammar translation method is "a traditional foreign language teaching method for teaching foreign language written language by native translation, that is, a method of teaching foreign language by means of grammar explanation and translation exercises". Here we give an example. English document translation is a method of translating all the English documents that need to be retrieved into Chinese, that is, transforming the results into a language consistent with our mother tongue [10]. Of course, the current document translation has shortcomings. We have expressed its translation methods and advantages and disadvantages in Figure 1 [11].

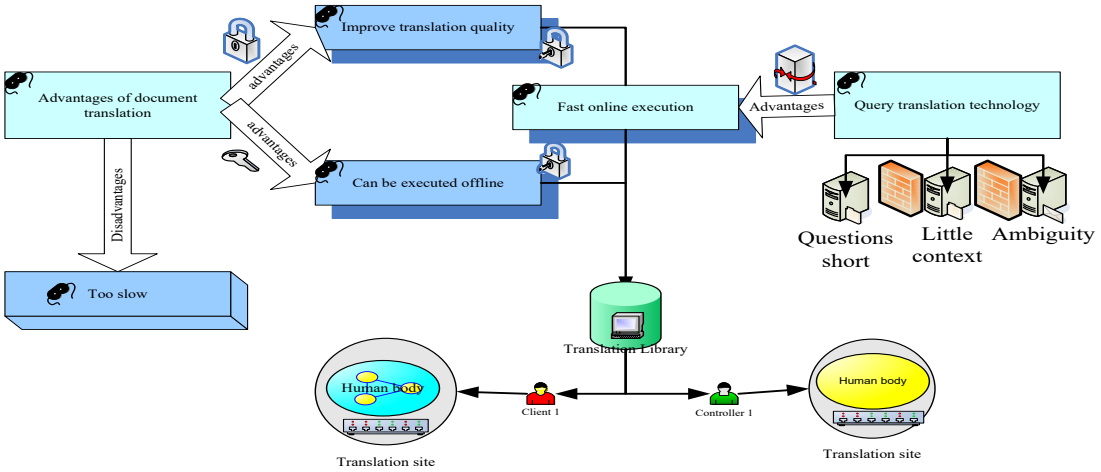

Figure 1: Pros and cons of document translation

It can be seen from Figure 1 that we can also understand the current research status. In the 1980s, China's English education unified the syllabus, textbooks that conform to the syllabus, and began to implement professional examinations [12-13]. These have played a considerable role in promoting translation teaching. However, due to the in-depth development of reform and opening up, China is rapidly moving towards the world, and society has put forward higher requirements for students' English ability. Relatively speaking, English teaching has a certain lag[14].

2.2 Digital Information Technology and Resource Methods

There are still many deficiencies in college English translation teaching, such as allocating most of the teaching time to vocabulary, listening, reading, and writing; and the single form of translation practice questions involved in college English textbooks [15]. In today's fast-paced business society, people prefer to receive information in digital form rather than large paragraphs of text. Abundant digital data and resources provide teachers with great help in teaching. English translation teaching based on digital information technology and resources is a new teaching mode, which not only enriches teachers' teaching resources, but also broadens students' learning methods, which has brought great help to the reform of English translation teaching [16].

The most popular concept in the digital network era is interaction, and the development of technology has also made interaction in the digital era more realistic. Among them, virtual reality technology is one of the main forms of current digital technology development that has attracted much attention. Computers are used to generate a simulation environment, and users can be immersed in the environment through the simulation environment. For details, see the example in Figure 2.

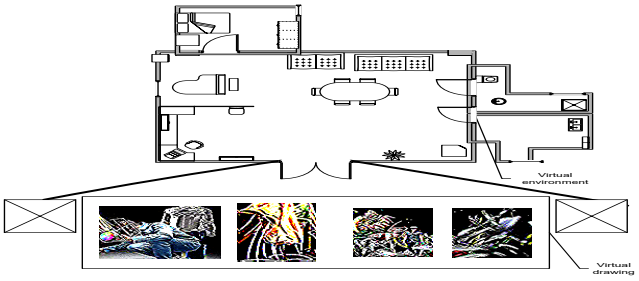

Figure 2: Operational diagram of virtual environment

It can be seen from Figure 2 that users can paint any image in the space, for example, they can

draw a house, and "drill" into the house to paint any furnishings to decorate the room, and they can go out and paint what they want outside the house. The interactivity of digital media brings new presentation forms and aesthetic feelings to visual images, and more importantly, the receiver's participation in the communication of visual images. The same principle can be applied to actual classroom teaching.

2.3 Introduction to Related Theories and Algorithms

Before applying the visual image mode, it is necessary to digitize the translation textbooks in the classroom. This project aims to design a semantic image retrieval system based on digitization technology and resources, and use machine learning methods to translate systematic images into non-systematic images. So that images can be searched in the same way as text, just like text search in Google. .

(1) Feature Normalization

After the basic operation, for each area, there is a 3-dimensional color feature, an 80-dimensional line feature and a 12-dimensional appearance feature. The regional feature vector of each dimension needs to be unified between [0,1]. The normalization of g value is shown in Equation 1.

$$g^{u} = \frac{g^{u} - \max_{g}}{\min_{g} - \max_{g}}, u = 1, \cdots, o_0 \tag{1}$$

In the formula, $\min_{g}$ is the largest g value among all o_0 regional features, and $\max_{g}$ is the smallest value.

If most of the eigenvalues in an eigenvector are very small, then after the unified processing, most of the information in the vector will be limited to a narrow range.

Gaussian normalization method is a better normalization method, and it is widely used in image feature normalization. Take the g value again as an example to explain this process. Calculate the mean and variance of the o_0 values of all g^{u} regions. The corresponding relationship is shown in Equation 2.

$$g^{u'} = \frac{g^{u} - \eta_g}{3\theta_g} + \frac{\sum_{xy}^{u=1} x_a * y_b}{ab}, u = 1, \cdots, o_0 \tag{2}$$

Among them, η_g is the average value and θ_g is the mean square error. According to the principle of distribution, the probability of $g^{u'}$ falling between [0.5-1] is 99%, and all values beyond this range need to be corresponding to 0.5 or 1. It is shown by Equation 3.

$$g^{u*} = \begin{cases} -1 & g^{u'} < -1 \\ g^{u*} & \left|g^{u'}\right| \le 1 + \sqrt{\prod_{u=1} (xu + yu)} \\ 1 & g^{u'} > 1 \end{cases} \tag{3}$$

$$g^{u^0} = \frac{g^{u^*} + 1}{c} + \frac{g^{c^*} - 1}{z} + \frac{g^{z^*} + 1}{2} \tag{4}$$

Among them, g^{u*} and g^{u^0} are both characteristic representative parameters.

(2) Semantic Region Extraction

The maximum expectation algorithm is a method to solve the clustering problem. It is an iterative algorithm for processing defect data.

Let two random variables a and b be the analysis targets, assuming that there is a probability distribution function as shown in Equation 5.

$$\mathrm{q}(a,b/\pi)=q(a/b,\pi)q(b/\pi) \tag{5}$$

The distribution depends on the parameter $\pi \in \Xi$.

$$\mathrm{q}(a/\pi)=\sum_{b\in B} q(a,b/\pi)=\sum_{b\in B} q(a/b,\pi)q(b/\pi) \tag{6}$$

$$\mathrm{i}(\pi/w_a)=q(w_a/\pi)=\prod_{u=1}^{i} q(a_u/\pi)=\prod_{u=1}^{i}\sum_{b\in B} q(a_u/b,\pi)q(b/\pi) \tag{7}$$

$$\mathrm{q}(a/b,\pi)=\frac{1}{(z\rho)^{w/2}\sqrt{wfs\left(\sum_b\right)}}uzi\left(-0.2(a-\eta_b)^s\sum\nolimits_b^{-1}(a-\eta_b)\right) \tag{8}$$

$$\sum\nolimits_{\mathrm{uk}}=\sum_{g=1}^{o}\left(a_g^u-\eta_g^u\right)\left(a_g^k-\eta_g^k\right), u=1,\cdots,w; k=1,\cdots,w \tag{9}$$

Among them, w represents the dimension, and the unknown parameters are mainly composed of the mean vector η_{b} and the covariance matrix $\sum_{\mathrm{b}}$. Assuming that similar sample data belonging to the same class are generated by the same Gaussian element, then B can determine the corresponding cluster. Then it is brought into this system, and the semantic area of the visual image can be extracted more accurately.

3. Reform and exploration of English translation teaching based on digital information technology and resources

3.1 Specific Implementation Steps

In this part, the specific application process of multimedia visual image mode in translation teaching classroom is based on many academic teaching research and consideration of the characteristics of translation teaching in colleges and universities. The specific process is shown in Table 1.

Table 1: The specific application process of multimedia visual image mode in translation teaching for college English majors

Phase	Translation process	Translation task	Accuracy	Number of translated texts
Phase 1	Preparation Phase	Material collection	96.5%	120
Phase 2	Management phase	time control	92.5%	410
Phase 3	Evaluation phase	Group evaluation	99.8%	350
Phase 4	end	Excellent works display	94.8%	300

As shown in the table, the specific application process of visual information images in college English professional translation teaching classes includes three main stages, namely, the preparation

stage before the translation task, the management stage during the translation task process, and the evaluation stage after the translation task. Each stage actually includes different specific tasks. These tasks need to be completed by the instructor and the students.

3.2 Translation Materials and Task Design

Assuming that the main body of the sample teaching is students majoring in hotel management and tourism management, then the collection of translation activity materials should be closely related to their majors, including customs and hotels, tour guides, immigration, and various foreign business letters in tourism management. In addition, the instructor should design and ensure that the translation tasks in the classroom are based on the collected materials, and take into account the skills that students use when processing these materials, as well as the different aspects of translation skills that each student needs to improve. Finally, the needs of future employment after graduation should also be considered. Take the writing of guide words in translation workshop activities as an example, the instructor should do the following necessary tasks;

(1) Material Type

Introduction of scenic spots and some knowledge related to translation skills, translation principles and translation process.

(2) Translation Task

In the classroom, students are encouraged to translate an introduction to a local scenic spot in the form of multimedia visual image teaching method.

In the translation teaching class, in addition to translation skills and translation principles, the instructor should help students learn the correct translation steps. See Table 2 for details.

Table 2: Learning of translation steps

Process	Independent completion(0-10)	Specific forms	Student cooperation(%)
Read	9	Read the original text carefully	96.5
Understand	9	Grasp the exact meaning	99.6
Express	8	Improve translation quality	97.4
Examination	9.5	Continue to polish translation works	98.1

3.3 Research Objects and Research Tools

The subjects of this study are 44 students from the 12th level of English majors in the College of Education of a certain normal university. These 44 students came from two ordinary classes, of which there were 22 students in class 12 (1) and 22 students in class 12 (2). The majors of these students are English majors. Because most of their contacts in future work are related to English. Therefore, it is extremely urgent to improve their English-Chinese Chinese-English translation ability.

The tools used in this teaching experiment are mainly shown in Table 3:

Table 3: Tools used in teaching experiments

Tools	Specific description	Research platform	Data reliability
Pre-test	Are they at the same level	Intel 520	100%
Post-test	Is there a significant difference	IE 110	99%
A survey	Use separately	BP 440	98%
An interview	After the teaching experiment	UK 230	100%

There are two types of translation tests in this study: one is pre-test and the other is post test. The purpose of using the pretest is to verify whether the translation ability of the students in the experimental class and the control class is at the same level. The purpose of using the back side is to verify whether there is a significant difference in students' translation ability between the experimental class and the control class after a semester of teaching experiment.

3.4 Data Statistics and Analysis

The collected data was calculated and analyzed through relevant data statistical tools. The analysis of the collected data mainly uses descriptive statistical analysis. The experimental results of the pre-test and post-test are shown in Figure 3.

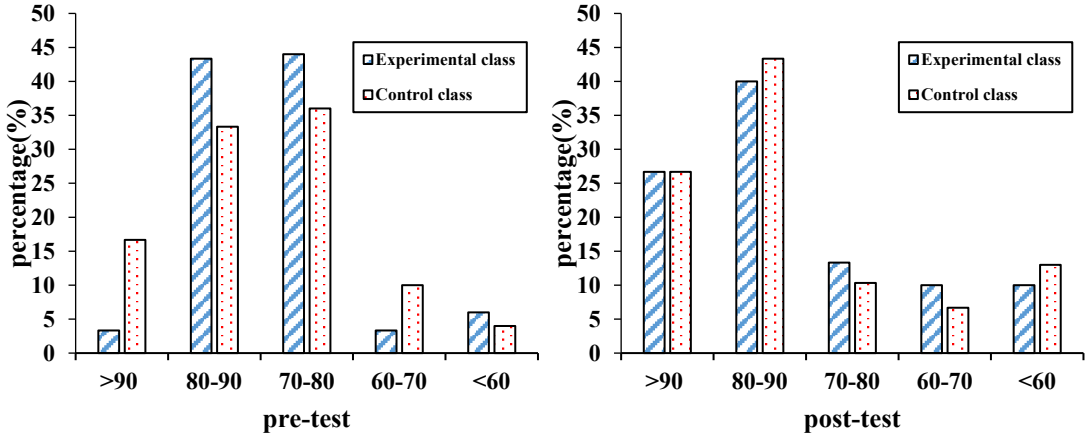

Figure 3: Pre-test and post-test score statistics of experimental class and control class

It can be seen from Figure 3 that although the experimental class and the control class have some differences in the scores above 80 and below 60, the average scores (75.5 and 76.1), highest scores (90 and 93), and passing rate of the two classes (86.3 and 85.5%) are very close. The standard deviations of the two classes (4.98 for the experimental class and 4.985 for the control class) are also very similar. Overall, there is no significant difference between them. In the previous part, we compared the pre-test results of the experimental class and the control class, and found that the subjects of the two classes were at the same level of translation ability. After a semester of teaching experiments, I will compare the post-test results to investigate in-depth whether there is a significant change in the translation ability of the experimental class and the control class. The figure shows that there is a significant gap between the average score of the experimental class and the average score of the control class (92 points and 81 points), and there is a large gap in the excellent rate (99.8% and 82%). At the same time, in terms of score distribution, there are no students in the experimental class with a score below 65.

In the above part, we can observe the significant difference between the results of the pre-test and the post-test through the figure; in order to further understand the specific changes in the translation interest and attitude of the experimental class students, we need to observe Figure 4.

As shown in Figure 4, before the teaching experiment, the experimental class students' interest in translation is relatively low. However, after multimedia visual images were applied to translation teaching, the students in the experimental class obviously had a strong interest in translation (in the pairing group 1, the average value of the pre-experimental class was only 2.03; but the average value of the post-test interest in translation It rises to 3.65). Similarly, in the pairing group 2, the attitudes of the students towards the traditional teaching method and the visual image teaching

method are also very different (the average value has changed from 2.51 to 3.85), which shows that most students in the experimental class are beginning to pay attention to the learning of translation. It is believed that teachers should incorporate a large amount of extracurricular practical materials in translation teaching, and that the current content and methods of translation teaching are helpful to improve their translation ability.

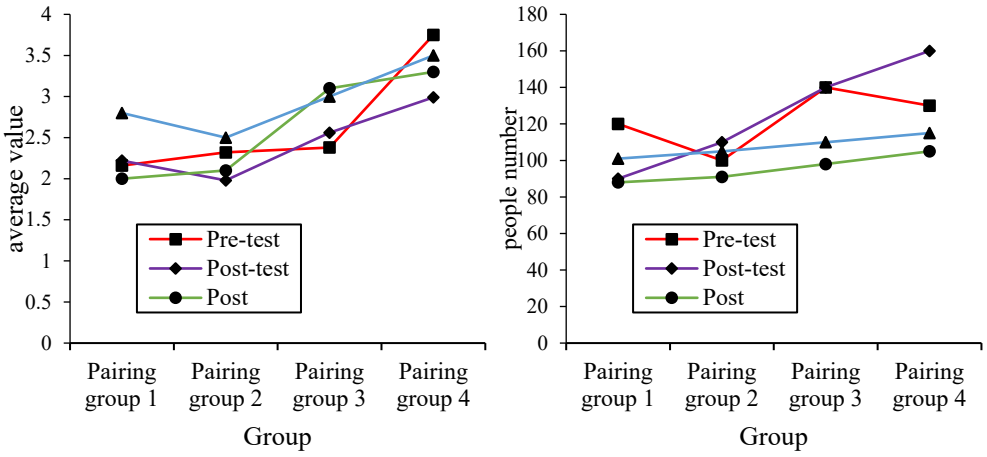

Figure 4: Paired sample statistics of the experimental class

3.5 Translation Accuracy

We use different methods to compare with methods based on multimedia visual image translation. There are simple dictionary translation methods, and some commonly used translation tools, g translation and b translation. The correct rate can be seen in Figure 5.

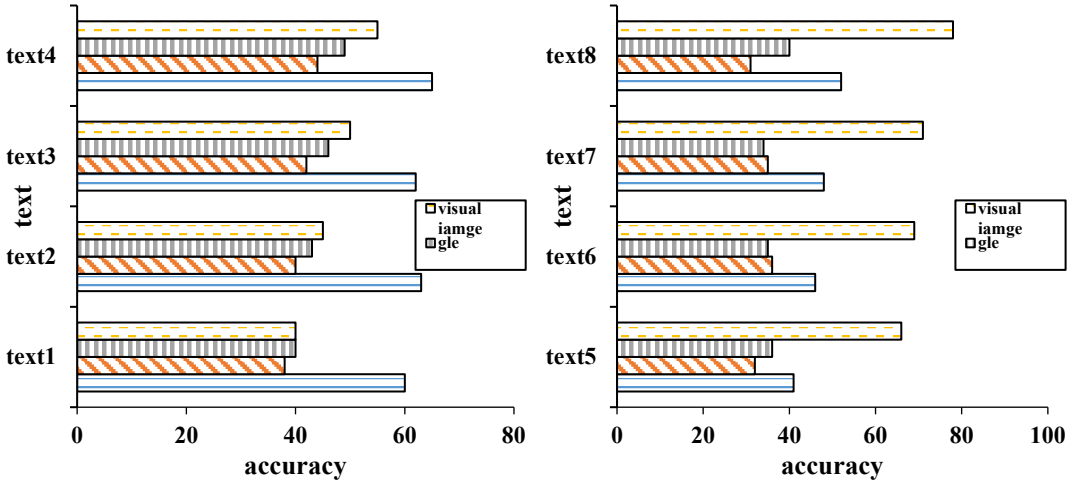

Figure 5: Experimental results

It can be seen from Figure 5 that the final translation accuracy of the dictionary is 44.5%. The final translation accuracy rate of g and b is slightly lower than that of the dictionary method, and its accuracy rate is 40.5%. The translation method based on visual image information has the highest accuracy rate of 79.8%.

This paper also observes the performance of the proposed algorithm through an expansive experimental analysis. Figure 6 shows the retrieval performance of 44 English words from 260 keywords.

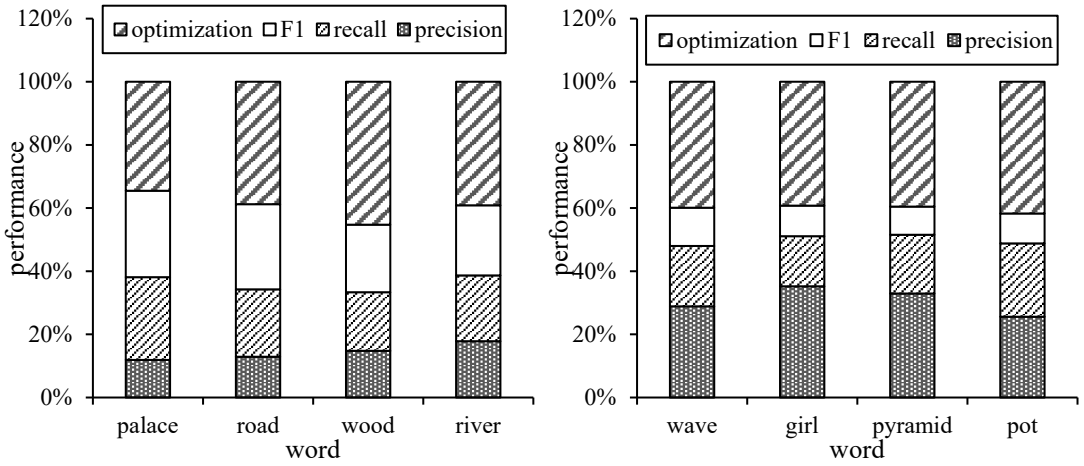

Figure 6: Retrieval performance of 260 keywords in the image library

It can be seen from Figure 6 that due to the image search results based on metadata, some retrieved images are not related to keywords. This greatly increases the difficulty and challenge of learning. Therefore, compared with traditional databases, this image database in this paper can effectively test the robustness of the algorithm.

For word search, Table 4 shows the comparison results of the three methods using this English image collection. For image search, this article also chose the same English test set, which includes 600 different English images. Table 5 shows the performance comparison between different methods.

Table 4: Comparison of retrieval performance between different methods for 270 words in the image database

Method	WWR	MP	MR	MFM
CSD	41	0.029	0.049	0.041
SVD	50	0.045	0.052	0.042
SVM	52	0.05	0.051	0.055
DT	61	0.058	0.069	0.059

Table 5: Comparison of retrieval performance between different methods for 600 test images in the image library

Method	MP	MR	M-F1-M
CSD	0.036	0.054	0.043
COS	0.045	0.065	0.053
SVM	0.042	0.062	0.051
HSVM	0.054	0.071	0.061

In general, HSVM has better performance in both word finding and picture finding. This essentially verifies the effectiveness and robustness of the proposed model.

4. Conclusions

This paper mainly studies and analyzes the performance of digital information technology in English translation teaching. The purpose of this article is to reform and explore the existing English translation teaching system. Therefore, this article uses a variety of scientific methods such as data sampling and analysis to analyze multimedia visual image technology. In the experiment, we use different methods and methods based on multimedia visual image translation to compare. There

are simple dictionary translation methods, and some commonly used translation tools, g translation and b translation. The results show that the final translation accuracy rate of the dictionary is 44.5%. The final translation accuracy rate of g and b is slightly lower than that of the dictionary method, and its accuracy rate is 40.5%. The translation method based on visual image information has the highest accuracy rate of 79.8%. This essentially verifies the effectiveness and robustness of the proposed classroom model.

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References

[1] Amato G, Fa Lchi F, Vadicamo L. Image Retrieval. Multimedia Tools and Applications, 2016, 77(5):5385-5415.
[2] Kaljahi M A, Palaiahnakote S, Anisi M H, et al. Visual surveillance system. Multimedia Tools and Applications, 2019, 78(5):5791-5818.
[3] Ahmad J, Sajjad M, Rho S, et al. Multi-scale local structure patterns histogram for describing visual contents in social image retrieval systems. Multimedia Tools and Applications, 2016, 75(20):12669-12692.
[4] Thanh T M, Tanaka K. An image zero-watermarking algorithm based on the encryption of visual map feature with watermark information. Multimedia Tools and Applications, 2017, 76(11):13455-13471.
[5] Mbeudeu C D. Introducing translation-based activities in teaching English as a foreign language: A step towards the improvement of learners' accurate use of words and expressions in writing. Research in Pedagogy, 2017, 7(1):76-89.
[6] Kalmazova N. Teaching Law Students Pre-Translation Text Analysis. Studies in Logic Grammar & Rhetoric, 2016, 45(1):87-96.
[7] Rahman M M, Pandian A. A Critical Investigation of English Language Teaching in BangladeshUnfulfilled expectations after two decades of Communicative Language Teaching. English Today, 2018, 34(3):43-49.
[8] Ren Y, Liu F, Yan W, et al. A new visual evaluation criterion of visual cryptography scheme for character secret image. Multimedia Tools and Applications, 2019, 78(18):25299-25319.
[9] Zhang S, Zhang J, Guo P, et al. A FWCL-based method for visual vocabulary formation. Multimedia Tools & Applications, 2016, 75(1):647-665.
[10] Lakrissi Y, Saaidi A, Essahlaoui A. Novel dynamic color image watermarking based on DWT-SVD and the human visual system. Multimedia Tools & Applications, 2017, 77(1):1-25.
[11] John B A, Raj C, Sukumaran R, et al. Enhanced semantic visual secret sharing scheme for the secure image communication. Multimedia Tools and Applications, 2020, 79(23):17057-17079.
[12] X Wang, Pang Y, X Ma. Real distorted images quality assessment based on multi-layer visual perception mechanism and high-level semantics. Multimedia Tools and Applications, 2020, 79(35):25905-25920.
[13] Zhou Z, Zhang R, Zhu Z. Robust Kalman filtering with long short-term memory for image-based visual servo control. Multimedia Tools and Applications, 2019, 78(18):26341-26371.
[14] Chen T H, Lin K S, Lin C H. On the design of a two-decoding-option image secret sharing scheme. Multimedia Tools and Applications, 2018, 77(7):7865-7881.
[15] Shen B, Liu B D, Wang Q. Elastic net regularized dictionary learning for image classification. Multimedia Tools and Applications, 2016, 75(15):8861-8874.
[16] Wu X. AHP-BP-Based Algorithms for Teaching Quality Evaluation of Flipped English Classrooms in the Context of New Media Communication. International Journal of Information Technologies and Systems Approach, 2023, 16(2), 1-12.