

Analysis of Lexical Pragmatic Error Differences in Cross-Cultural Communication Based on AI Technology

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Abstract:

In the context of globalization, cross-cultural communication has become more and more important and complex. People often suffer from communication barriers due to pragmatic bias in their communication in different cultural contexts. The aim of this paper is to explore how to analyze and understand lexical pragmatic bias in cross-cultural communication by using AI techniques, especially Convolutional Neural Network (CNN) and Transformer models. By constructing a theoretical framework, this paper not only provides a new perspective for the combination of pragmatics and AI technology, but also supports the practical application of cross-cultural communication and promotes effective communication and cooperation among different cultures.

Keywords:

AI Technology, Intercultural Communication, Lexical Pragmatic Bias, CNN, Transformer Models

1. Introduction

In the context of globalization, cross-cultural communication has become more and more common and important. People inevitably encounter language barriers and cultural differences in cross-cultural communication, and these factors often lead to pragmatic bias, which in turn affects the communication effect. Pragmatic bias refers to the deviation in understanding and expression caused by cultural background, language habits and other factors in language use. The complexity of intercultural communication is not only reflected in the language level, but also involves cultural, social, psychological and other factors. Studying and solving the problem of linguistic bias in cross-cultural communication is of great significance in promoting international communication and cooperation.

This study aims to explore how AI technology can be used to understand and analyze lexical pragmatic bias in cross-cultural communication. By introducing advanced AI models, such as Convolutional Neural Network (CNN) and Transformer, it is hoped to systematically identify and analyze the types and features of lexical

pragmatic biases in different cultural contexts, so as to provide theoretical basis and practical application support for cross-cultural communication.

This research enriches the theoretical integration of pragmatics and AI technology, offering a novel perspective and methodology for examining pragmatic errors in cross-cultural communication. Practically, the findings can be leveraged to create training systems and educational tools aimed at enhancing understanding and management of pragmatic errors, thereby improving the effectiveness and accuracy of cross-cultural interactions and advancing research in this field. The results of this study can be used to develop intercultural communication training systems and language education tools to help people better understand and cope with discourse biases in intercultural communication, enhance the effectiveness and accuracy of intercultural communication, promote the further development of intercultural communication research, and promote intercultural understanding and communication.

2. Literature Review

2.1. Intercultural Communication Theory

Intercultural communication refers to how people in different cultures transmit and understand information in the process of communication. Its research covers many aspects such as cultural differences, pragmatic strategies, cultural adaptation, etc. Hall's (1976) high-context and low-context cultural theories point out that there are significant differences in the way information is conveyed in different cultures, which affects the effectiveness of communication. Hofstede's (1980) cultural dimensions theory further proposes individualism and collectivism, power distance, uncertainty avoidance and other cultural dimensions, which are important guiding significance for cross-cultural communication research.

2.2. Linguistic bias theory

Pragmatic bias refers to the deviation of understanding and expression in the process of language use due to factors such as cultural background and linguistic habits, etc. Thomas (1983) classified pragmatic bias into pragmatic failure, which is a misunderstanding caused by cultural differences, and pragmatic error, which is an error caused by insufficient linguistic competence. The former is a misunderstanding caused by cultural differences, while the latter is an error caused by language proficiency. Research on pragmatic error in cross-cultural communication focuses on politeness strategies, speech acts, conversational meanings, etc. Brown and Levinson's (1987) theory of politeness points out that there are differences in the way that different cultures understand and realize politeness, which can easily lead to pragmatic error.

2.3. AI technology and Linguistics

In recent years, AI technology has made significant progress in the field of natural language processing (NLP). Convolutional neural network (CNN) and transformer (Transformer) models are widely used in tasks such as text categorization, sentiment analysis, and machine translation, etc. CNN extracts the local features of text through convolutional operations, which is suitable for short text and fixed-length feature extraction tasks. Transformer captures the global dependencies in sequences through the mechanism of self-attention, which is suitable for processing long text and context-dependent tasks. The application of these techniques greatly improves the

efficiency and accuracy of language processing and provides new possibilities for the analysis of linguistic bias in cross-cultural communication.

3. Theoretical Framework

3.1. Overview of AI technology

Artificial Intelligence (AI) is a technology that simulates human intelligence through computers, aiming to enable machines to perform tasks such as perception, reasoning, learning, and decision-making. AI technology includes several branches such as machine learning, deep learning, and natural language processing. The development of AI technology can be traced back to the 1950s. From the initial symbolist approach to the expert system in the 1980s to machine learning and deep learning in the early 21st century, AI technology has undergone many changes. Currently, the combination of deep learning and big data technology has led to a rapid expansion of AI applications in various fields.

AI technology has a wide range of applications in several fields, including image recognition, speech recognition, automatic driving, medical diagnosis, financial analysis and natural language processing. Especially in the field of natural language processing, AI technology has been able to handle complex linguistic tasks such as translation, dialog generation and sentiment analysis.

3.2. Convolutional Neural Networks (CNN)

Convolutional Neural Network is a deep learning model specialized for processing grid-structured data such as images. CNN extracts local features of the data through a convolutional layer and reduces the feature dimensions through a pooling layer, and ultimately performs classification or regression tasks through a fully connected layer. CNNs are widely used in fields such as image processing, video analytics, and natural language processing.

3.3. Transformer model

Transformer model is a deep learning model for sequence-to-sequence tasks, which is particularly good at handling natural language processing tasks. Transformer model is based on the self-attention mechanism, which can effectively capture long-distance dependencies in sequences. [1] Its main structure includes two parts, encoder and decoder, and is widely used in tasks such as machine translation, text generation and sentiment analysis.

3.4. Application of CNN and Transformer in Natural Language Processing

In the field of natural language processing, CNN is mainly used for tasks such as sentence classification and sentiment analysis, where local features of sentences are extracted through convolutional operations. While Transformer models are applied to more complex language tasks, such as machine translation and dialog systems, to capture contextual information in text through the self-attention mechanism.

3.5. Theoretical integration of pragmatics and intercultural communication

Pragmatics studies the use of language in specific contexts, including speech acts, politeness strategies, conversational meanings and so on. In cross-cultural communication, the study of pragmatics helps to understand the rules of language use

and the phenomenon of bias in different cultural contexts. Through AI technology, especially NLP and ML technology, it is possible to automate the analysis and detection of pragmatic bias in cross-cultural communication. For example, deep learning models are used to analyze large-scale corpora, identify common pragmatic biases in different cultural contexts, and classify and label them.

In order to construct an effective framework for analyzing pragmatic bias, pragmatics theory can be combined with AI technology. [2] First, local pragmatic features in the dialog text are extracted by convolutional neural network. Second, the transformer model is utilized to capture the global contextual information in the dialog. Finally, the features extracted by the model are combined with pragmatics theory to perform pragmatic analysis to identify and classify the phenomenon of pragmatic bias.

The framework enables automated and systematic discourse bias analysis, which helps to improve the accuracy and effectiveness of cross-cultural communication and provides theoretical support and technical tools for language education and communication.

4. Analysis of Pragmatic Biases

4.1. Types and manifestations of lexical pragmatic bias

In cross-cultural communication, vocabulary pragmatic bias refers to the improper use of vocabulary due to cultural differences, which in turn leads to communication barriers. This kind of bias is mainly reflected in the following aspects:

4.1.1. Politeness Strategy

There are significant differences in the way politeness is understood and realized in different cultures. For example, in English-speaking cultures, “please” and “thank you” are commonly used in daily communication, and their frequent use is regarded as a sign of politeness. However, in some Asian cultures, excessive use of these words may be seen as overly formal or distant, which is not conducive to building close relationships.

4.1.2. Direct or Indirect Expressions

The choice of direct versus indirect expressions is also an important aspect of intercultural communication. In some cultures, such as American culture, direct expression is considered an effective and honest way of communication. However, in Japanese or Chinese cultures, indirect expressions are more common to avoid confrontation and maintain harmony. For example, “Could you please close the window?” in English may be expressed more indirectly as “The window seems to be a bit open” in Chinese.

4.1.3. Idioms and idioms

Idioms and idioms are a very culturally specific part of language. In cross-cultural communication, there are often differences in the understanding and use of idioms and idioms by people from different cultural backgrounds. [3] For example, the English idiom “kick the bucket” means “to die”, while direct translation into other languages may not convey the same meaning at all. In addition, some idioms that are positive in one culture may have negative connotations in another.

4.1.4. Culture-specific vocabulary

Every language has some culture-specific vocabulary, which may not have direct equivalents in other cultures. For example, the concept of “face” in Chinese does not have an exact counterpart in Western cultures, which leads to misunderstandings in cross-cultural communication involving “face”.

4.2. The Potential of AI Technologies in Discourse Bias Analysis

AI technologies, especially Convolutional Neural Networks (CNN) and Transformer models, have demonstrated strong capabilities in the field of Natural Language Processing (NLP), which can help to identify and understand linguistic biases in cross-cultural communication.

4.2.1. Data Processing and Analysis

AI technology is capable of processing large-scale cross-cultural corpora and discovering common types of pragmatic biases in different cultural contexts by analyzing large amounts of text data. [4] For example, by analyzing data such as cross-cultural communication emails, conversation records, etc., it is possible to identify which words or expressions are prone to cause misunderstandings in different cultural contexts.

4.2.2. Automated Recognition

By training AI models, especially using CNN and Transformer models, it is possible to automate the identification of linguistic biases. These models are able to learn features from data and identify potential linguistic biases. For example, by analyzing conversation data in English and Chinese, the AI model can identify which expressions have pragmatic biases in both languages and provide corrective suggestions accordingly.

4.2.3. Context Understanding

The transformer model, especially its self-attention mechanism, is able to capture the contextual relationships in the text, which is crucial for understanding cross-cultural pragmatic biases. For example, in cross-cultural communication, a certain word or expression may have different meanings in different contexts. the AI model can accurately determine the occurrence of pragmatic bias through contextual analysis and provide corresponding adjustment suggestions.

4.2.4. Real-time feedback

AI technology can be applied to cross-cultural communication training systems to provide real-time discourse bias detection and feedback. For example, through the development of intelligent chatbots, when users communicate with people of different cultural backgrounds, the system can monitor and prompt possible linguistic bias in real time, thus helping users adjust their expressions in time to avoid misunderstanding.

4.3. Theoretical Model Construction

In order to systematically use AI technology to analyze discourse bias in cross-cultural communication, this paper proposes a theoretical model that specifies the application of AI technology in discourse bias analysis.

4.3.1. Data Input

First of all, a large-scale corpus of intercultural communication is collected and labeled. These corpora should include conversation texts, email exchange records, social media posts, etc. in different cultural contexts. By labeling these data, common types of pragmatic biases in different cultural contexts can be identified.

4.3.2. Feature Extraction

Local features of the text are extracted using Convolutional Neural Networks. CNN can effectively capture local patterns and features in the text through convolutional operations to identify potential pragmatic biases. For example, through the convolutional operation on dialog text, it can identify which words or expressions are prone to trigger misunderstanding in different cultural contexts.

4.3.3. Context Analysis

Contextual analysis is performed by utilizing the Transformer model. Transformer, through the self-attention mechanism, can capture global dependencies in the text and understand contextual and cultural differences. [5] For example, through the contextual analysis of conversation text, it can accurately determine the occurrence of discourse bias and provide corresponding adjustment suggestions.

4.3.4. Model Training and Validation

The AI model is trained, validated and optimized through a large-scale corpus. During model training, methods such as cross-validation can be used to ensure the robustness and accuracy of the model. Through repeated training and optimization, ensure that the model can accurately identify and analyze linguistic biases in different cultural contexts.

4.3.5. Application Scenarios

The theoretical model can be applied to cross-cultural communication training systems and intelligent language education tools. For example, in cross-cultural communication training systems, the AI model can monitor users' communication content in real time, provide detection and feedback of pragmatic bias, and help users adjust their expressions in time. In the intelligent language education tool, the AI model can analyze the learner's language usage and provide personalized suggestions for correcting the linguistic bias to improve the learning effect.

4.4. Example Analysis

In order to verify the effectiveness of the theoretical model, it can be analyzed through specific examples. Suppose there is a cross-cultural communication scenario involving English and Chinese, by analyzing the conversation data in this scenario, we can identify which expressions have pragmatic errors and provide corresponding corrective suggestions. [6] For example, in a cross-cultural business meeting involving communication between native English speakers and native Chinese speakers, the AI model can recognize the difference in politeness strategies and prompt native English speakers to use a more indirect way of expressing their requests to avoid misunderstandings caused by direct expressions.

4.5. Conclusion

Through the above analysis, it can be seen that AI technology has an important potential for the application of linguistic bias analysis in cross-cultural communication. Using Convolutional Neural Network (CNN) and Transformer (Transformer) models, linguistic bias in different cultural contexts can be effectively identified and analyzed, providing a theoretical basis and practical application support for cross-cultural communication. Future research can further optimize the models to improve their applicability and accuracy in different application scenarios and promote the further development of cross-cultural communication research.

5. Factors Affecting Cross-Cultural Pragmatic Bias

5.1. Cultural differences

Cultural difference is one of the main factors affecting cross-cultural pragmatic bias. There are significant differences in the norms of language use, politeness strategies, and expressions of people from different cultural backgrounds in the process of communication.

5.1.1. Cultural Norms

Every culture has its unique language norms and rules. For example, in Western cultures, individualism is emphasized, and expressing one's opinions and needs directly is considered an honest and effective way of communication. Whereas in Eastern cultures, collectivism is dominant and people prefer to express themselves indirectly to maintain harmony and face. This difference in cultural norms can easily lead to discourse bias. For example, when an Easterner expresses dissatisfaction in an indirect way, a Westerner may misinterpret it as an unclear attitude or lack of sincerity.

5.1.2. Politeness Strategies

There are significant differences in the way politeness is understood and expressed in different cultures. In English-speaking cultures, politeness is usually expressed through polite phrases (e.g., "please", "thank you") and euphemisms. These linguistic expressions are considered to be signs of respect and friendliness towards others. For example, the use of "please" when asking for a favor indicates the politeness of the request, while saying "thank you" after receiving help is a sign of gratitude for the help.

However, in some Asian cultures, politeness is expressed more in behavior and attitude than in words. For example, in Japanese culture, politeness is expressed in an attitude of respect and humility towards others. In everyday communication, bowing is a common polite behavior that shows respect and appreciation for others. In addition, the use of honorifics and humility is also an important expression of politeness in Japanese. These linguistic forms are not just linguistic variations, but also reflect respect for the status and identity of others.

In cross-cultural communication, if one party expresses politeness according to his or her own cultural habits, the other party may feel uncomfortable or misunderstand. For example, an English speaker who relies solely on polite phrases and ignores behavioral expressions of politeness when communicating with a Japanese person may be perceived as not being polite enough. Similarly, a Japanese person who relies too much on behavioral and attitudinal expressions of politeness at the expense of

verbal expressions of politeness when communicating with an English speaker may be misinterpreted as not being direct or explicit enough.

In addition, different cultures have different expectations and standards of politeness. In some cultures, direct expression of opinions is seen as frank and honest, while in others such directness may be seen as offensive and disrespectful. [7] Therefore, politeness strategies in cross-cultural communication involve not only language and behavior, but also understanding and adapting to the cultural context and communicative conventions.

Through AI technology, the patterns and characteristics of politeness expressions in different cultures can be analyzed to help people better understand and adapt to the politeness requirements in cross-cultural communication. For example, using natural language processing technology, it is possible to analyze large-scale conversation data, identify patterns of polite expressions in different cultures, and generate corresponding suggestions for polite strategies. In this way, AI technology can provide strong support for cross-cultural communication and help people avoid misunderstandings and conflicts caused by differences in politeness expressions.

5.1.3. Modes of Expression

Differences in expression are also an important factor leading to discourse bias. In some cultures, such as American culture, people tend to express themselves directly, while in Japanese or Chinese culture, indirect expression is more common. For example, Americans will directly say "Can you help me?" when expressing a request, whereas Japanese may say "If it's convenient for you, can you help me?". This kind of difference in expression can easily lead to cross-cultural misunderstanding. This difference in expression can easily lead to misunderstanding and bias in cross-cultural communication.

5.2. Gender differences

Gender is also an important factor influencing the language bias. In cross-cultural communication, there are significant differences between male and female language use habits and strategies.

5.2.1. Language Style

Studies show that women usually use more polite phrases and indirect expressions, while men tend to be more direct. Females focus more on establishing and maintaining interpersonal relationships in communication, while males are more concerned with the delivery of information and the completion of tasks. For example, when asking for help, females may say, "If you don't mind, could you help me?" whereas men may simply say "help me". This gender difference may exacerbate pragmatic bias in cross-cultural communication.

5.2.2. Speech Behavior

There are also differences between males and females in terms of verbal behavior. For example, women are more likely to use questions to lead a conversation, while men are more likely to state facts and express opinions. This difference can lead to misunderstandings in cross-cultural communication. For example, when a woman expresses her opinion indirectly by asking a question, a man may misinterpret this as her asking for advice or being unsure of her opinion.

5.2.3. Social Roles and Expectations

Societal role expectations of men and women also influence the way they use language. In many cultures, women are expected to be gentle, considerate and submissive, while men are expected to be assertive, decisive and authoritative. Such role expectations may lead to discourse bias in cross-cultural communication. For example, when a woman displays assertiveness and authority, she may be misinterpreted as being inappropriate or overbearing, whereas a man may be misinterpreted as being insufficiently considerate or concerned about the feelings of others.

5.3. Language Acquisition and Social Factors

The influence of language acquisition process and social factors on pragmatic bias should not be ignored as well.

5.3.1. Language Acquisition Process

In the process of language acquisition, learners not only learn the grammar and vocabulary of a language, but also need to understand and master the pragmatic rules of the language. However, there are differences in the process of language acquisition in different cultures, which makes learners prone to make pragmatic errors when using a second language. [8] For example, when learning Chinese, English learners may ignore the politeness strategies and indirect expressions in Chinese, which may lead to misunderstanding in communication.

5.3.2. Social Background

Social background is also an important factor affecting pragmatic bias. For example, social status, occupation, education level, etc. will affect the way individuals use language. In cross-cultural communication, differences in language use among people from different social backgrounds may exacerbate pragmatic bias. For example, a highly educated Westerner may use technical terms and complex sentences, while an Easterner with a general education level may be more inclined to use simple and clear expressions, and such differences may lead to misunderstandings and biases in communication.

6. Prospects of AI Technology in Cross-Cultural Pragmatics Research

6.1. Prospects for the application of theoretical research

The prospect of the theoretical application of AI technology in cross-cultural pragmatics research is very promising.

6.1.1. Automated Discourse Bias Detection

Using AI technology, especially Natural Language Processing (NLP) and Machine Learning (ML) technology, linguistic bias in cross-cultural communication can be detected and analyzed in an automated way. For example, by training AI models, linguistic biases can be automatically extracted and identified from large-scale cross-cultural corpora, providing more accurate and efficient analysis results. This automated detection method can greatly improve the efficiency and precision of cross-cultural pragmatic research.

6.1.2. Validation of Pragmatics Theory

AI technology can be used to validate and extend existing pragmatics theories. For example, by analyzing conversation data in different cultural contexts through AI models, theories such as politeness strategy and indirect expression in pragmatics can be verified and new pragmatic phenomena and laws can be discovered. [9] This kind of theoretical validation and extension can enrich and deepen the theory of pragmatics and provide new perspectives and methods for cross-cultural pragmatics research.

6.1.3. Prediction and prevention of pragmatic bias

AI technology can also be used to predict and prevent pragmatic bias in cross-cultural communication. For example, by training AI models, it is possible to predict the types and occurrence probability of common pragmatic errors in a certain cultural context, provide preventive measures and adjustment suggestions in advance, and help both communicators avoid potential misunderstandings and conflicts. This prediction and prevention function can greatly improve the success rate and effect of cross-cultural communication.

6.2. Potential Applications in Practice

The application of AI technology in practical cross-cultural communication and language education also has a broad prospect.

6.2.1. Intelligent cross-cultural communication training system

The intelligent intercultural communication training system based on AI technology can provide personalized training programs and real-time feedback. For example, the system can automatically generate customized training content according to the user's cultural background, language level and communication needs, helping the user to master the linguistic rules and skills in cross-cultural communication. At the same time, the system can also monitor the communication content of users in real time and provide suggestions for detecting and correcting pragmatic biases, helping users adjust their expressions in time to avoid misunderstanding.

6.2.2. Language Education Tools

AI technology can be applied to intelligent language education tools to enhance language learners' cross-cultural communication skills. For example, by developing intelligent dialog systems and language learning applications, users can learn and practice the rules of discourse in cross-cultural communication in dialog with AI. The system can provide personalized feedback and suggestions according to the user's learning progress and performance, helping the user to continuously improve the accuracy and fluency of language use.

6.2.3. Cross-cultural Business Communication

AI technology can provide important support in cross-cultural business communication. For example, by analyzing communication content such as business emails and contract texts through AI models, potential linguistic biases can be automatically detected and corrected to ensure the accuracy and effectiveness of communication. In addition, AI technology can help businesspeople understand and adapt to the communication habits and strategies of different cultures, improving the success rate and effectiveness of cross-cultural business communication.

6.3. Directions for Future Research

Future research can further explore and optimize the application of AI technology in cross-cultural pragmatics research. [10] For example, more advanced and efficient AI models can be developed to improve their applicability and accuracy in different application scenarios. At the same time, it can also combine AI technology with psychology, sociology and other disciplines through interdisciplinary cooperation to study in-depth the mechanisms and influencing factors of pragmatic bias in cross-cultural communication, so as to provide more comprehensive and systematic theoretical and methodological support for cross-cultural pragmatics research.

7. Conclusions

By exploring the application of AI technology in the analysis of lexical pragmatic bias in cross-cultural communication, this study proposes a theoretical framework that organically combines pragmatics theory and AI technology. Specifically, this study firstly outlines the basic concepts, development history and main applications of AI technology; then it introduces in detail the principles of convolutional neural network (CNN) and transformer (Transformer) models and their applications in natural language processing; finally, it constructs a framework for the analysis of lexical pragmatic bias in cross-cultural communication, which utilizes AI technology to automate the identification and analysis of lexical pragmatic bias in different cultural contexts. Through this framework, the study reveals the great potential of AI technology in improving the accuracy and comprehension of cross-cultural communication, and provides new theoretical perspectives and technical tools for language education and cross-cultural communication.

Future research can further validate and optimize the applicability and generalization ability of AI models by constructing a multilingual and multicultural corpus, and at the same time combine AI technology with psychology, sociology and other disciplines to study in depth the mechanism of linguistic bias and the influencing factors in cross-cultural communication, in order to provide more comprehensive and systematic theoretical support and methodological guidance. In addition, more advanced and efficient AI models should be developed in the future, such as combining the latest deep learning algorithms and self-supervised learning techniques to improve their applicability and accuracy in different application scenarios. At the same time, we should explore the possibility of applying AI technology in actual cross-cultural communication and language education, and develop intelligent cross-cultural communication training systems and language education tools, so as to help users improve their cross-cultural communication skills and language usage. When applying AI technology to cross-cultural language use research, ethical and privacy issues need to be fully considered to ensure the legitimacy of data use and the privacy protection of participants. Future research also needs to explore how to provide personalized linguistic bias analysis and adjustment suggestions based on the individual's cultural background, gender, social role, and other factors to enhance the effect and experience of cross-cultural communication. Although future research will face challenges in data collection, model training, and cross-cultural adaptation, through continuous exploration and innovation, the application of AI technology in cross-cultural pragmatics research will have a broader future and provide stronger support for language communication and understanding in the context of globalization.

Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

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References

- [1] Dai, H.; Zhao, T. Intelligent Analysis Strategy of Pragmatic Failure in Cross-Cultural Communication Based on Convolution Neural Network. *Mobile Information Systems*, 2022, 2022(1), 7803959.
- [2] Barron, A. Acquisition in Interlanguage Pragmatics: Learning How to Do Things with Words in a Study Abroad Context; John Benjamins Publishing Company: Amsterdam, The Netherlands, 2022.
- [3] Barron, A. Acquisition in interlanguage pragmatics. *Journal Name* 2003, Volume (Issue), page range. (Note: Fill in journal details)
- [4] Zhang, K.; Aslan, A.B. AI Technologies for Education: Recent Research & Future Directions. *Computers and Education: Artificial Intelligence*, 2021, 2, 100025.
- [5] Fitria, T.N. Artificial Intelligence (AI) Technology in OpenAI ChatGPT Application: A Review of ChatGPT in Writing English Essay. In *ELT Forum: Journal of English Language Teaching*, 2023, 12(1), 44-58.
- [6] Hamamoto, R.; Suvarna, K.; Yamada, M.; Kobayashi, K.; Shinkai, N.; Miyake, M.; Kaneko, S. Application of Artificial Intelligence Technology in Oncology: Towards the Establishment of Precision Medicine. *Cancers*, 2020, 12(12), 3532.
- [7] Wan, H.; Liu, G.; Zhang, L. Research on the Application of Artificial Intelligence in Computer Network Technology. In *Proceedings of the 2021 5th International Conference on Electronic Information Technology and Computer Engineering*; October 2021; pp. 704-707.
- [8] Wei, R. Application of Information Technology in Optimizing Primary School English Teaching. *Primary School Teaching Research* 2024, 18, 37-38.
- [9] Shao, Y.; Jiang, H. Construction of an Anchor-Based Oral English Teaching Model Based on Virtual Simulation Technology. *Journal of Changsha Aeronautical Vocational and Technical College*, 2024, 24(02), 77-80.
- [10] Du, X. A Visual Analysis of Pragmatic Errors in High School English in China Over the Past Twenty Years. *Language and Culture Research*, 2024, 32(04), 112-115.
- [11] Cong, J. Research on the Application and Effectiveness of Multimedia Technology in Junior High School English Writing Teaching. *Journal of Multimedia and Network Teaching in China (Late Edition)*, 2024, 05, 164-166.

- [12]He, X.; Chen, X.; Du, X.; et al. Maritime Micro-Target Classification Method Based on CBAM-Swin-Transformer Transfer Learning. *Systems Engineering and Electronics* [J/OL], 1-17 [2024-07-10].
- [13]Tian, X. Research on Workload Power Consumption Prediction Method Based on Multivariate Time Series Data Learning and Transformer Model [Doctoral dissertation]. Qilu University of Technology, 2024.
- [14]Liu, F. Research on Cultivating Cross-Cultural Communication Competence of Vocational College Students Under Blended Learning. *Public Relations World*, 2024, 13, 52-54.
- [15]Wang, Y.; Tang, Z. The Connotation, Strategies, and Paths of Integrating Traditional Chinese Culture into Cross-Cultural Communication Courses in the New Era. *Foreign Languages and Translation*, 2024, 31(02), 69-74+98.
- [16]Chen, B. Research on Vocational College English Reading Teaching from the Perspective of Cross-Cultural Communication. *Journal of Hubei Open Vocational College*, 2024, 37(11), 177-179.
- [17]Zhang, L. Strategies for the Development of Vocational College English Teaching in the Context of Cross-Cultural Communication. *Journal of Hubei Open Vocational College*, 2024, 37(11), 180-182.
- [18]Zhang, G. A Case Study and Research on Pragmatic Errors in the Context of Cross-Cultural Communication [Doctoral dissertation]. Northwest University, 2022.
- [19]Wang, Y.; Ji, Y. Exploration of Image Recognition Algorithms Based on Convolutional Neural Networks. *China New Telecommunications*, 2021, 23(12), 100-101.
- [20]Zhou, X. Analysis of the Chinese Double Negation “Not... Not...” Format and Its Errors [Doctoral dissertation]. Nanchang University, 2021.



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