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Translation Strategies for AI Agreements from the Perspective of Functional Equivalence: A Case Study of ChatGPT

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Abstract

This research aims to deeply explore the translation strategies of artificial intelligence agreement texts from the perspective of functional equivalence, and conducts a detailed case analysis with ChatGPT as the research object. With the increasing global AI cooperation, such as OpenAI's API partnerships, the demand for AI agreement translation has increased sharply, but there are still many challenges in achieving accuracy and functional equivalence in the translation process. The research comprehensively uses the literature research method and case analysis method to deeply analyze the translation strategies of ChatGPT at the lexical, syntactic, and discourse levels. The study finds that ChatGPT performs well in the accurate translation of technical terms and other levels, but there is still much room for improvement in sentence structure adjustment and discourse coherence. Based on this, this research proposes improvement strategies such as algorithm optimization, corpus expansion, and human intervention, in order to provide solid theoretical and practical references for the development of AI agreement text translation, effectively improve translation quality, and promote exchanges and cooperation in the global AI field.

Keywords

Functional equivalence, Artificial Intelligence Protocol, Translation strategy, ChatGPT, Machine translation

1. Introduction

In an era marked by the exponential growth of artificial intelligence (AI), global collaboration within the AI industry has become both extensive and indispensable. Initiatives such as OpenAI's API partnerships have led to a proliferation of international business transactions, thereby intensifying the demand for accurate translation of AI - related agreements. These agreements, which govern crucial aspects like data usage, intellectual property rights, and service - level obligations, require translations that not only

convey the correct semantic content but also maintain the same legal force and communicative functions as the original texts.

The theory of functional equivalence, developed by Eugene A. Nida, offers a valuable framework for evaluating translation quality. Nida emphasized that translation should strive to achieve the "closest natural equivalent" of the source - language message in both meaning and style, ensuring that the translated text elicits a similar response from the target - language audience as the original does from the source - language audience. In the context of AI agreement translation, this means that the translated document must accurately represent the legal, technical, and business implications of the original, leaving no room for misinterpretation.

ChatGPT, a sophisticated language - generation model developed by OpenAI, has been widely applied to various translation tasks. However, its effectiveness in translating AI agreements, which are characterized by highly specialized technical jargon, complex legal language, and strict structural requirements, remains to be fully explored. This study aims to fill this gap by analyzing ChatGPT's translation strategies in the context of AI agreements from the perspective of functional equivalence. Through a detailed examination of its performance at the lexical, syntactic, and discursive levels, this research seeks to identify its strengths and weaknesses and propose practical improvement strategies.

2. Literature Review

2.1 Functional Equivalence Theory

Eugene A. Nida's functional equivalence theory has been a cornerstone in translation studies since its introduction. Nida (1964) argued that translation should not merely focus on the literal transfer of words but rather on achieving equivalence in terms of the message's impact on the reader. He proposed two types of equivalence: formal equivalence, which emphasizes a close match in form between the source and target texts, and dynamic equivalence (later renamed functional equivalence), which prioritizes the similarity of the readers' response.

In the decades following Nida's proposal, functional equivalence theory has evolved and been refined by numerous scholars. Some have criticized the theory for its potential subjectivity in determining "equivalent responses," while others have sought to apply it more precisely to different text types. For technical and legal texts, in particular, the focus has been on how to operationalize functional equivalence in practice.

In the field of technical and legal translation, functional equivalence takes on a particular significance. Scholars such as Peter Newmark (1988) have emphasized the importance of semantic translation in these domains, where precision and accuracy are paramount. Baker (1992) further developed the concept, exploring how different text types require different approaches to achieving functional equivalence. For AI agreements, which are both technical and legal in nature, maintaining semantic accuracy, legal validity, and business clarity is essential for successful translation.

Recent research has also explored the application of functional equivalence theory in the context of machine translation. As translation technology advances, understanding how to adapt this theory to evaluate and improve the performance of AI - based translation tools has become a new area of inquiry. For example, some studies have investigated how machine - translation algorithms can be designed to better capture the functional aspects of source texts, such as the intended audience and purpose of the translation.

2.2 AI - related Translation Research

With the increasing prominence of AI in various industries, research on AI - related translation has gained momentum. Existing studies have primarily focused on the unique characteristics of AI - related texts and the challenges they pose for translation. AI - related texts are known for their dense technical terminology, complex sentence structures, and domain - specific discourse patterns.

Zhang (2023) conducted a study on machine - translation tools' performance in translating AI technical documents and found that while these tools can provide quick translations, they often struggle with accurately rendering specialized terms and maintaining syntactic coherence. The study also pointed out that machine - translation tools may lack the ability to understand the broader context of AI - related texts, leading to misunderstandings and incorrect translations.

Li (2022) explored the translation of AI contracts and highlighted the importance of understanding the legal and business contexts to ensure that the translated texts are legally binding and operationally meaningful. Li's research emphasized that AI contracts often involve complex legal concepts and business models that require translators to have specialized knowledge in both law and AI. However, most of these studies have concentrated on traditional translation methods, and there is a lack of in - depth research on how AI - based translation tools like ChatGPT perform in this specialized area.

In addition to the challenges of translation, recent research has also explored the opportunities presented by AI in the translation process. For example, some studies have investigated how AI can be used to assist human translators by providing real - time translation suggestions, automating repetitive tasks, and improving translation quality through machine - learning algorithms. However, these studies have not specifically focused on the translation of AI agreements, leaving a significant gap in the research.

3. Research Methodology

This study employs a combination of literature review and case - study analysis. The literature review provides a theoretical foundation by synthesizing existing research on functional equivalence theory and AI - related translation. It helps to define the research questions, identify relevant research methods, and establish a framework for evaluating ChatGPT's translation performance.

The case - study approach involves collecting a corpus of AI agreement texts and their translations generated by ChatGPT. The selected texts cover a wide range of AI agreements, including API usage agreements, data - sharing agreements, intellectual - property agreements, and service - level agreements.

These texts are carefully selected to represent different types of AI - related business transactions and legal requirements.

To ensure the reliability and validity of the study, the data collection process follows a systematic approach. First, a list of representative AI agreements is compiled from various sources, including OpenAI's official website, AI industry reports, and legal databases. Then, these agreements are input into ChatGPT to obtain the translations. Each translation is recorded and saved for further analysis.

The analysis is conducted at three levels: lexical, syntactic, and discursive. At the lexical level, the focus is on the translation of technical and legal terms. This involves comparing the translations provided by ChatGPT with established translations in the field and assessing their accuracy and appropriateness. At the syntactic level, the study examines how ChatGPT handles sentence - structure adjustments and grammatical consistency. This includes analyzing the word order, verb tenses, and subject - verb agreements in the translated texts. At the discursive level, the analysis evaluates the coherence and cohesion of the translated texts, as well as their overall structural integrity. This involves examining how the translated texts maintain the logical flow and organizational structure of the original agreements.

To facilitate the analysis, a coding system is developed to categorize the translation errors and strategies identified in the study. This coding system helps to systematically analyze the data and identify patterns and trends in ChatGPT's translation performance. Additionally, qualitative analysis techniques, such as content analysis and thematic analysis, are used to interpret the data and draw meaningful conclusions.

4. Analysis of ChatGPT's Translation Strategies from the Perspective of Functional Equivalence

4.1 Lexical - level Analysis

4.1.1 Translation of Technical Terms

Technical terms are a defining feature of AI agreements, and their accurate translation is crucial for maintaining the integrity of the text. ChatGPT demonstrates both proficiency and limitations in handling these terms.

ST: "Deep learning neural network"

TT: "深度学习神经网络"

ChatGPT accurately translates this common technical term in the AI field. The translation "深度学习神经网络" is widely used and recognized in the Chinese - speaking AI community, indicating that ChatGPT can correctly handle basic technical terminology. This success can be attributed to the large - scale training data that ChatGPT has been exposed to, which likely includes numerous examples of this term in various contexts.

ST: "Natural language processing model"

TT: "自然语言处理模型"

Here, ChatGPT again provides an accurate translation. The Chinese term "自然语言处理模型" precisely conveys the meaning of the English original, showing that the model is capable of translating standard

technical terms in AI. This consistency in accurate translation of common terms suggests that ChatGPT has learned the basic mapping between English and Chinese technical vocabulary effectively.

However, ChatGPT also encounters difficulties with more complex or less - common technical terms.

ST: "Transformer - based language generation architecture"

TT: "基于变压器的语言生成建筑"

This translation is inaccurate. In the context of AI, "Transformer" refers to a specific type of neural network architecture, not the electrical device "变压器". The correct translation should be "基于 Transformer 的语言生成架构", highlighting ChatGPT's potential misinterpretation of specialized technical terms when the context is not fully understood. This error may occur because the term "Transformer" has a dual meaning in the general language, and ChatGPT may not have sufficient context - awareness to distinguish the appropriate meaning in the AI domain.

Another aspect to consider is the translation of newly - emerging technical terms. As the AI field evolves rapidly, new concepts and technologies emerge constantly, leading to the creation of new technical terms. ChatGPT may face challenges in translating these novel terms accurately, as it relies on pre - existing knowledge and patterns in its training data. For example, terms related to the latest AI research breakthroughs or proprietary AI technologies may not be adequately represented in its training corpus, resulting in inaccurate or inconsistent translations.

4.1.2 Translation of Legal Terms

AI agreements are legal documents, and the accurate translation of legal terms is essential for ensuring their legal validity.

ST: "Non - disclosure agreement"

TT: "保密协议"

ChatGPT provides a correct and commonly used translation in Chinese. The term "保密协议" accurately conveys the legal obligation of confidentiality, demonstrating the model's ability to translate basic legal terms in AI agreements. This accuracy is important as confidentiality is a fundamental aspect of many AI - related business transactions, and an incorrect translation could lead to misunderstandings about the parties' rights and obligations.

ST: "Arbitration clause"

TT: "仲裁条款"

This translation is accurate and consistent with legal usage in Chinese. ChatGPT successfully translates the legal term, ensuring that the translated text maintains the same legal implications as the original. The correct translation of such terms is crucial for the enforceability of the agreement in a legal context, as any ambiguity in the translation of legal terms could potentially invalidate the arbitration process.

However, in some cases, ChatGPT may not fully capture the legal nuances.

ST: "Liquidated damages provision"

TT: "清算损害条款"

This translation is misleading. In legal terms, "liquidated damages" refers to a pre - agreed amount of compensation for breach of contract. A more accurate translation would be "违约金条款". This example shows that ChatGPT may struggle with translating legal terms that have specific meanings within the legal context of AI agreements. The complexity of legal language, with its specialized definitions and historical precedents, poses a significant challenge for ChatGPT, as it may not have a deep - enough understanding of the legal system and its terminologies.

Moreover, different legal systems may have different interpretations and terminologies for the same legal concept. For example, the concept of "liability" may be expressed differently in common - law and civil - law systems. ChatGPT may not be able to distinguish between these differences based on the jurisdiction specified in the AI agreement, leading to potential inaccuracies in translation.

4.2 Syntactic - level Analysis

4.2.1 Sentence - Structure Adjustment

English and Chinese have different syntactic structures, and effective translation requires appropriate adjustments to ensure readability and naturalness in the target language.

ST: "If the user fails to comply with the security requirements specified in this agreement, the service provider has the right to suspend the user's access to the AI service immediately."

TT: "如果用户未能遵守本协议规定的安全要求，服务提供商有权立即暂停用户对人工智能服务的访问。"

ChatGPT effectively adjusts the sentence structure to conform to Chinese syntactic norms. The conditional clause is placed at the beginning, followed by the main clause, which is a common structure in Chinese. This makes the translation clear and easy to understand. By following the typical Chinese sentence - building pattern, ChatGPT enhances the readability of the translated text and ensures that the logical relationship between the conditions and the consequences is clearly conveyed.

ST: "The AI system, which is designed to analyze large - scale data and provide real - time insights, will be continuously updated and optimized by the development team."

TT: "该人工智能系统旨在分析大规模数据并提供实时洞察，将由开发团队持续更新和优化。"

Here, ChatGPT successfully rearranges the relative clause in the English sentence into a more natural - flowing structure in Chinese. The translated sentence reads smoothly and maintains the logical relationship between the different parts of the original sentence. By integrating the descriptive information about the AI system into a single, coherent statement, ChatGPT presents the information in a way that is more in line with the Chinese language's preference for concise and straightforward expressions.

However, ChatGPT does not always make optimal syntactic adjustments.

ST: "In the event that the AI model's performance does not meet the predefined standards and the developer fails to rectify the issue within the specified time frame, the client has the right to terminate the contract and claim compensation."

TT: "如果人工智能模型的性能不符合预定标准且开发者未能在规定时间内解决问题，客户有权终止合同并要求赔偿。"

While the translation conveys the correct meaning, the long and complex conditional clause in Chinese can be difficult to follow. A better translation could involve splitting the sentence into smaller, more manageable units to improve readability, indicating that ChatGPT may not always optimize sentence structures for the target language. The long and convoluted structure in the translation may cause confusion for the readers, especially those who are not familiar with complex legal language, and may affect the clarity of the message.

Furthermore, ChatGPT may also struggle with translating sentences that involve complex grammatical structures, such as nested clauses, passive - to - active voice conversions, and conditional - subjunctive mood. These structures require a deep understanding of both the source and target languages' grammatical rules and the ability to transform the structures appropriately while maintaining the original meaning.

4.2.2 Agreement of Verbs and Subjects

Maintaining grammatical agreement between verbs and subjects is crucial for accurate translation.

ST: "Each party to this agreement is responsible for its own actions."

TT: "本协议的每一方应对其自身行为负责。"

ChatGPT correctly maintains the singular - subject - verb agreement in the translation. The Chinese sentence "每一方应对其自身行为负责" accurately reflects the grammatical structure of the English original, ensuring syntactic accuracy. This correct translation of subject - verb agreement is essential for the logical consistency of the translated text, as incorrect agreement could lead to misunderstandings about the responsibilities of the parties involved.

ST: "The data provider and the AI developer, along with their respective legal representatives, are required to sign this agreement."

TT: "数据提供者和人工智能开发者及其各自的法定代表人，被要求签署本协议。"

Although the translation is grammatically correct, the passive - voice construction in Chinese can be less natural. A more active - voice translation, such as "数据提供者、人工智能开发者及其各自的法定代表人需签署本协议", could improve the flow of the sentence, suggesting that ChatGPT may not always choose the most natural - sounding syntactic structures. The passive - voice construction may make the sentence sound more formal and less fluent, which may not be the most appropriate choice for enhancing the readability and comprehension of the translated agreement.

In addition to subject - verb agreement, ChatGPT may also face challenges with other aspects of grammatical consistency, such as tense agreement, pronoun - antecedent agreement, and number agreement. These issues can arise when the source text contains complex sentence structures or when the translation requires adjusting the grammatical forms to fit the target language's rules.

4.3 Discursive - level Analysis

4.3.1 Coherence and Cohesion

Coherence and cohesion are essential for ensuring that the translated text reads as a unified whole and conveys the intended message clearly.

ST: "This agreement outlines the terms and conditions for data sharing. All parties must comply with these terms. Any violation may result in legal consequences."

TT: "本协议概述了数据共享的条款和条件。所有各方必须遵守这些条款。任何违反行为都可能导致法律后果。"

ChatGPT uses consistent reference ("这些条款") to maintain cohesion in the translation. The logical relationship between the sentences is clear, and the translated text reads coherently, indicating that the model can handle basic discursive connections. By using the appropriate referential expression, ChatGPT creates a sense of unity and continuity in the translated text, making it easier for the readers to follow the flow of ideas.

However, in more complex discursive structures, ChatGPT's performance is less satisfactory.

5. Improvement Strategies

5.1 Algorithm Optimization

To enhance ChatGPT's performance in AI agreement translation, algorithm optimization is essential. The developers should focus on improving the model's ability to analyze context, especially for technical and legal terms. By incorporating more advanced natural - language - processing techniques, such as semantic role labeling and named - entity recognition, ChatGPT can better understand the specific meanings of terms within the context of AI agreements. For example, in the case of the mistranslated "Transformer - based language generation architecture", an optimized algorithm could recognize "Transformer" as a specialized AI term rather than a common noun.

5.2 Corpus Expansion

Expanding the training corpus with a diverse range of AI - related legal and technical texts is another effective strategy. The corpus should include high - quality human - translated AI agreements, as well as texts from various sub - domains within the AI industry. This will enable ChatGPT to learn correct translation patterns, syntactic structures, and discursive strategies specific to AI agreements. Additionally, incorporating more examples of complex sentence structures and discursive connections will help the model improve its performance in these areas.

5.3 Human - Machine Collaboration

Given the complexity and importance of AI agreement translation, a human - machine collaboration approach is highly recommended. Professional translators with expertise in both AI and law can review and post - edit ChatGPT's translations. They can correct errors in technical and legal terminology, optimize sentence structures for better readability, and enhance the overall coherence and cohesion of the translated texts. This hybrid approach combines the efficiency of machine translation with the precision

and expertise of human translators, resulting in higher - quality translations.

6. Conclusion

This research has meticulously explored ChatGPT's translation strategies in the realm of AI agreements through the lens of functional equivalence. By conducting a comprehensive analysis at the lexical, syntactic, and discursive levels, it reveals a nuanced picture of ChatGPT's translation capabilities. On one hand, ChatGPT demonstrates proficiency in translating basic technical and legal terms, as well as in making certain syntactic adjustments and maintaining elementary discursive connections. For instance, it accurately translates common phrases like "Deep learning neural network" and "Non - disclosure agreement." On the other hand, significant challenges emerge. Complex technical jargon often confounds the model, leading to mistranslations, and it struggles to optimize sentence structures for readability or ensure smooth discursive coherence in complex contexts.

To overcome these limitations, three strategic recommendations have been proposed. Algorithm optimization stands as a fundamental solution, aiming to enhance ChatGPT's contextual analysis ability, especially for specialized terms. Incorporating advanced natural - language - processing techniques would enable the model to better grasp the precise meanings of terms within the specific context of AI agreements. Corpus expansion is another key strategy, involving the integration of diverse, high - quality AI - related legal and technical texts into the training data. This would expose ChatGPT to a wider array of translation patterns, syntactic structures, and discursive strategies. Finally, human - machine collaboration, leveraging the expertise of professional translators in AI and law, is crucial for post - editing and refining translations, ensuring accuracy, readability, and overall quality.

In the context of the burgeoning global demand for AI - related translation, improving the performance of AI - based translation tools like ChatGPT is of paramount importance. Not only does it facilitate seamless international cooperation in the AI industry by ensuring accurate translation of crucial agreements, but it also paves the way for advancements in machine - translation technology in specialized fields. This study serves as a foundation for future research, which could delve deeper into integrating diverse translation theories and techniques, ultimately driving continuous improvement in the capabilities of AI - based translation tools when handling complex technical and legal documents.

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