Context-Based AI Translation From a Globalization Perspective:
A Case Study of ChatGPT

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The trend of globalization has brought new requirements to existing translation industry. Need for flexibility calls for contextualized translation that can be applied to various scenarios. This is an exploratory case study of ChatGPT, aiming at discovering potential of artificial intelligence (AI) translation tools. ChatGPT is compared with machine-aided translation tools like Google Translate, Microsoft Translate, Youdao Translate, and Baidu Translate. Data were collected based on accuracy of terminologies in the fields of economy, politics, and arts. This study found that ChatGPT translation has more contextual understanding that makes the generative translation more accurate and more relevant to specific fields. This study also analyzes its economic and cultural benefits to the process of globalization.

Keywords: globalization, contextualized translation, AI translation

Introduction

In recent years, the translation industry has encountered unprecedented challenges in the wake of the introduction of ChatGPT, a sophisticated artificial intelligence (AI) language generator. This development has engendered a significant dichotomy in the field. On one hand, ChatGPT and similar AI applications have exhibited substantial promise in the realm of machine translation (MT) (Peng et al., 2023). Diverging conspicuously from their conventional counterparts, these AI-driven systems incorporate contextualization through domain-specific information and a heightened emphasis on task-specific nuances. As a result, the translations they generate tend to be better aligned with diverse contextual exigencies.

The advent of large language models (LLMs), such as GPT-3 and ChatGPT has ushered in a paradigm shift in MT, heralding remarkable advancements in its state-of-the-art capabilities. The present study embarks on an exploration of contextualized translation using ChatGPT across an array of contexts, with the aim of underscoring the substantive advantages intrinsic to AI-based translation systems. Subsequently, this investigation proceeds to assess translation quality across a diverse spectrum of scenarios, thereby shedding light on the potential of AI-based translation within the overarching context of globalization. The principal objective of this study is to scrutinize the distinctive attributes characterizing translation facilitated by ChatGPT, juxtaposed against

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traditional translation platforms. The contextualization theory of J. Catford (1965, p. 139) is used to fulfill that objective.

Within this overarching framework, this study endeavors to address the following research questions:

1. What characterises popular contextualized translators, e.g., ChatGPT?

2. What is the impact of the wide application of ChatGPT on globalization?

An Overview of Globalization

"Globalization is changing, and changing the world in the process" (Baldwin, 2016). It represents an intricate and continuous process characterized by the deepening interconnections and interdependencies among nations and regions across multiple domains, encompassing economics, politics, culture, society, and technology. It serves as the catalyst for cross-border exchanges, resource flows, and heightened global interactions, reshaping the contemporary global landscape.

This phenomenon can be parsed into four discernible stages, according to Cheng Xijun (2000), each reflective of distinct historical contexts. The inaugural stage, often denoted as "Humanizing the Globe", was marked by rapid population growth, prompting extensive exploration and utilization of production resources in geographically remote areas.

The second stage, termed "Localizing the Global Economy", coincided with the advent of the agricultural revolution. During this phase, economic value largely hinged on local supply and demand dynamics, with production and consumption activities predominantly localized rather than internationally oriented.

The third epoch, "Globalizing Local Economies", emerged concomitant to the steam and industrial revolutions. These transformative epochs mitigated the challenges of geographic distance, thus facilitating international trade and fostering greater economic integration across borders.

The fourth and contemporary stage, "Globalizing Factories", has been expedited by the rapid advancements in information and communication technologies. This stage has witnessed a quantum leap in economic exchanges, thereby fostering unprecedented levels of global connectivity.

Globalization, as a multifaceted phenomenon, permeates various fields, including economics, culture, politics, ecology, and the global community. Economically, it is exemplified by the intricate international division of labor, the fluidity of international financial capital, and the establishment of robust international trade networks. These aspects encompass the exchange of products, services, and technologies, accompanied by consequential adjustments in global market structures.

Culturally, globalization is typified by the amalgamation and convergence of cultural products, values, and ideologies from diverse corners of the world, fostering a rich tapestry of global cultural diversity.

Politically, globalization has led to the ascendancy of international organizations, the evolution of global governance mechanisms, and an amplified spirit of international cooperation.

Ecologically, globalization has engendered an emerging consciousness regarding shared human habitation, necessitating equitable resource allocation, and fostering shared responsibilities. Within this context, the recognition and mutual understanding among individuals take on paramount significance in navigating the intricacies of our interconnected global milieu (Cheng, 2000).

The Trend of Globalization

The triumphs of globalization. In the aftermath of the Cold War, there exists a prevailing consensus within the academic realm concerning the trajectory of globalization. On the political front, the emergence of intergovernmental

organizations, such as the United Nations, alongside non-governmental entities, has instilled a framework of regulations governing the actions of international actors. This has, in turn, fostered a more peaceful international order and significantly enhanced communication between nations. Moreover, from an economic perspective, the explosive expansion of global trade in the wake of World War II has played a pivotal role in propelling the worldwide economy to new heights. Nations have proactively implemented policies aimed at bolstering import and export trade, thereby facilitating the flourishing of multinational corporations. According to the World Trade Organization (WTO), today's global trade volume is approximately 45 times greater than the levels witnessed during the early days of the General Agreement on Tariffs and Trade (GATT), representing an 4,500% growth from 1950 to 2022.
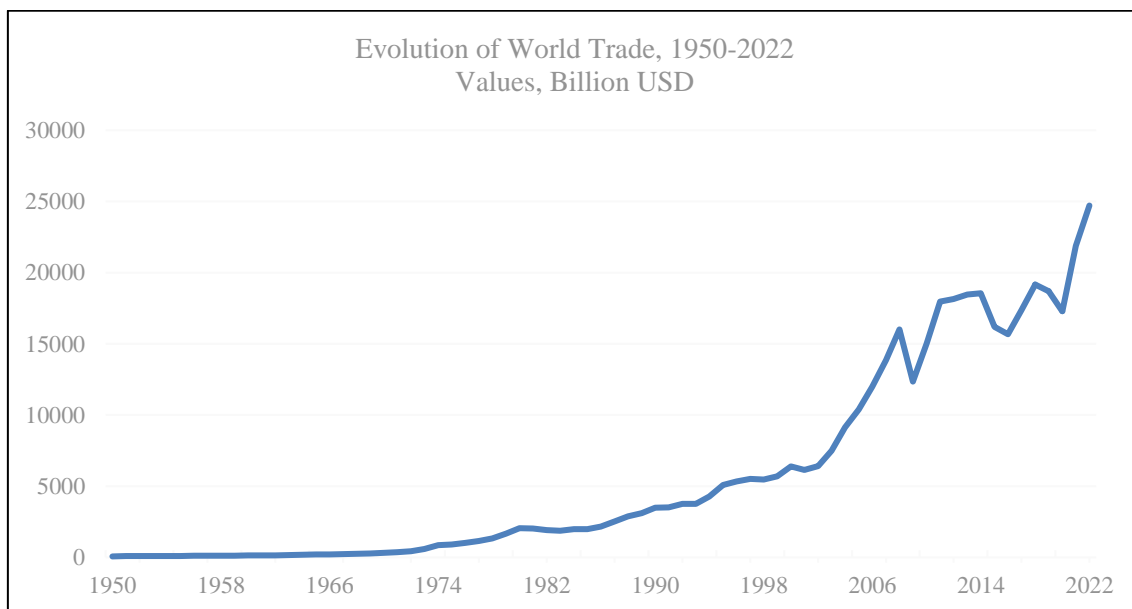

Figure 1. Evolution of world trade from 1950 to 2022 (World Trade Organization, 2022).

Using China as a notable case in point, the magnitude of import and export trade has witnessed a remarkable surge since the inception of the Reform and Opening-up policy. From its accession to the World Trade Organization in 2001 through to 2022, exports have soared by an impressive 1,250%, while imports have expanded by 1,015%. This remarkable economic transformation has propelled China from its former sixth position in the global rankings to the prestigious position of second-largest economy worldwide, accompanied by a substantial growth in its GDP.

Table 1

International Trade Statistics (World Trade Organization, 2023a)

Reporting economy	Year	1978	2001	2021	2022
	Export	9,955	266,098	3,358,163	3,593,601
China	Import	11,131	243,553	2,686,747	2,715,999
	GDP	3,678.7	110,863.1	1,149,237.0	1,210,207.2

The import and export trade figures for other developing nations, including India and Malaysia, also experienced substantial growth.

Table 2

International Trade Statistic (World Trade Organization, 2023a)

Reporting economy	Year	1991	2001	2021	2022
India	Export	17,727	43,361	395,426	453,481
	Import	20,448	50,392	573,092	723,348
Malaysia	Export	34,350	87,969	299,425	352,501
	Import	36,649	73,744	238,240	294,430

Globalization exerts a potent catalytic influence on the economic progress of developing nations. It provides a gateway for previously marginalized countries, which were hampered by trade barriers in the past and unable to partake in the economic prosperity enjoyed by developed nations, to actively engage in global trade. The global marketplace serves as an immense engine driving the enhancement of the economic vitality of these developing nations, thereby elevating the quality of life for their citizens, eradicating poverty, and advancing the modernization efforts of nations with lower levels of development (Hamdi, 2013). In the context of nations with advanced development levels, the increasing inclusion of more countries in the global wave of globalization leads to a reciprocal reinforcement of global supply chain development and the emergence of new markets. It is worth highlighting that developed countries rank as the most profoundly integrated players in the global landscape. The most pronounced correlation is observed between the degree of economic globalization and per capita GDP (Swadźba, 2020). In conclusion, globalization has, on the whole, delivered substantial advantages in enhancing the quality of life for individuals across different nations. It is imperative that all stakeholders actively engage in the process of globalization. Nevertheless, it is crucial to acknowledge that while globalization has been largely beneficial to the majority of countries worldwide, there remain some nations in Latin America and Africa that have lagged behind in the realm of economic growth (Kontsas & Kalogiannidis, 2022). This underscores the fact that globalization still has a significant distance to traverse before the fruits of modernization can be equitably distributed to the populations of all nations.

The current state of globalization—The anti-globalization phenomenon. Over the past decade, the anti-globalization movement has continued to gain momentum, as evidenced by significant events like Brexit, the Sino-US trade tensions, and the Russia-Ukraine conflict. This surge in anti-globalization sentiment has been further exacerbated by a global economic downturn, intensifying geopolitical divisions, the rise of right-wing populism, an increasingly pronounced public aversion to globalization, and the proliferation of trade protectionism. The impact of the COVID-19 pandemic has only served to amplify these anti-globalization trends, affecting not only the economy but also politics and various other facets of global society.

As the COVID-19 pandemic draws to a close, the restrictions and barriers to cross-regional mobility it imposed are gradually easing. The global economy is on a path to recovery, with sectors such as transportation and tourism experiencing growth. However, experts within academic circles contend that certain factors, including a declining global population growth rate, a slower pace of technological advancement in emerging markets, and reduced economic dynamism at the forefront, indicate a potential deceleration in the pace of globalization. These factors, which could contribute to a continued slowdown in global economic growth, leave the future of globalization shrouded in uncertainty (Swadźba, 2020).

Novel prospects for globalization's advancement—Through the lens of translation.

Economics. The primary driver behind the anti-globalization sentiment stems from setbacks within the global economy. Notably, regions such as Southeast Asia, Africa, and Latin America, which were not direct

participants in the preceding wave of economic globalization, now hold the potential to inject fresh impetus into global economic development. Streamlined, cost-effective translation services can play a pivotal role in diminishing information and communication expenses, thereby curbing transaction costs. This, in turn, facilitates stronger connections between local labor forces and markets with the global arena, aiding emerging markets in their integration into the global trade network. Moreover, for nations deeply entrenched in globalization, a reduction in translation expenses also serves to lower transaction costs, thus propelling the further expansion of global trade.

Politics and culture. The manifestation of anti-globalization often manifests as political divisions. Some scholars posit that this phenomenon shares a close connection with economic globalization (Fukuyama, 2019). The surge in global mobility and heightened cross-cultural exchanges, propelled by globalization, has resulted in significant demographic shifts and intensified cultural interactions. The proliferation of the internet has further accelerated the frequency and intensity of these cultural collisions. Globalization's contribution to the economic growth of developing nations has also fostered a deeper sense of national identity and cultural pride as their global influence expands. This, in turn, challenges the once-dominant position of western culture on the world stage and prompts a reevaluation of concepts once considered universal values. As a result, a diverse and pluralistic world cultural landscape is gradually taking shape, underpinned by the economic prosperity brought about by globalization.

In this evolving panorama, Samuel Huntington's framework on the clash of civilizations is increasingly coming to fruition. Behind international confrontations lies the clash of deeply rooted cultural traditions (Huntington, 1996). While Huntington's classification of "The West vs. the Rest" may be somewhat simplistic, it is apparent from his discourse that the widespread influence of western civilization in modern times has left a profound imprint on other ethnic cultures. Moreover, the rapid development of developing nations has spurred a reassessment of their own cultures. Each culture's unique values have become a breeding ground for the cultivation of populist ideologies. In the midst of these intercultural clashes, national and cultural identities have grown stronger, providing a cultural backdrop to political divisions and discord.

Cultural conflicts and political confrontations have brought about significant consequences. Cultural discord has given rise to security challenges in multicultural societies, while political hostilities have fueled a trend towards global economic and trade fragmentation. To mitigate supply chain instability, countries are actively avoiding substantial business engagements with nations mired in severe political conflicts and non-allied relationships. As a result, countries are gradually diminishing their economic interdependence. In the long run, this could have a detrimental impact on both economic globalization and the sustained economic development of diverse nations, ultimately yielding more harm than good (Goldberg & Reed, 2023). In this context, at the cultural level, the pursuit of cultural consensus by individual entities and the effort to establish universally acknowledged, core values represent potential avenues for conflict avoidance. Jürgen Habermas's theory of communicative action provides a philosophical foundation for this line of thinking, emphasizing the necessity of effective communication among entities to achieve consensus. The tenets of communicative action theory encompass the intelligibility of discourse and the correctness of manner (Habermas, 1991). Nevertheless, human translation, constrained by human resources, often struggles to serve as a proficient medium for efficient cross-cultural communication, especially in real-time and widespread scenarios. If large language models can efficiently provide high-quality translation services, it could mark a significant milestone in intercultural communication.

In environments such as the internet, inter-subject dialogues are more likely to achieve a degree of cultural consensus at the public level, thereby mitigating cultural conflicts.

According to Quine's theory, cross-cultural translation, which seeks to bridge two independently evolved conceptual systems, encounters inherent obstacles (Quine, 1964). Nevertheless, since the 15th century, the burgeoning cross-cultural communication has resulted in the accumulation of cross-cultural concepts and lexicon across various linguistic and cultural frameworks. This accumulation has paved the way for the creation of new vocabulary designed to facilitate the transfer of concepts from one culture to another—a development that finds utility in the capabilities of large language models. Moreover, within the intertwined progress of globalization and modernization, the conceptual underpinnings of disparate cultural systems are gradually converging. This convergence is progressively rendering the effective translation by large language models a plausible reality.

Contextualization and Contextualized Translation

Context is categorized into two kinds by Van Dijk (1997, p. 15), local context and whole context. While the former stands for a specific situation where a communication takes place, the latter indicates the cultural background of it. Because communication and context coincide, and translation is a special form of communication, which involves a message producer, a receiver, and a translator, context exists and even dominates whether the message is well-conveyed.

Contextualization, at its core, refers to the process of embedding a text within its specific cultural, social, and situational context. It involves, according to J. Catford (1965, p. 139), considering not only the linguistic elements but also the broader environment in which communication occurs. Contextualization recognizes that language is not isolated but is intricately linked to the cultural and social factors that shape its usage. From a linguistic perspective, contextualization includes the adaptation of language to suit the communicative intent, audience, and setting. This can encompass variations in vocabulary, grammar, and style to align with the target context.

The contextualization of translation can therefore be defined as the process of translating a text while preserving its original contextual richness and nuances by not only conveying the same situational information as the source text but also capturing its cultural, social, and situational context in a manner that resonates with the target audience. In an increasingly globalized world that the conflict among different cultures deteriorates, the practice of contextualized translation is essential for effective cross-cultural communication.

Machine Translation and AI Translation

The salient advantage of ChatGPT translation is rooted in its adaptability within the learning paradigm. In contrast to conventional machine translation tools and earlier iterations of AI models, which heavily depended on extensive corpora for training, contemporary AI models such as ChatGPT employ the zero-shot translation approach. This method entails reduced data requirements while concurrently addressing more intricate translation challenges. This paradigm shift was underscored by the insights of Stanford computer science professor Carlos Guestrin during the November 2022 Intelligent Applications Summit, wherein he posited that "big data" had lost its centrality as a requisite (Wolff, 2023).

Leveraging large language models (LLM) and pertinent indices, AI models harness the potency of transfer learning to produce translations of exceptional quality. These models can acquire and generalize knowledge and strategies applicable to translation tasks, even when such tasks have not been explicitly imparted during training (Wolff, 2023).

In contradistinction to conventional machine translation tools, AI tools notably enhance the precision and fluidity of translations. While machine translation frequently grapples with intricate content, AI translation transcends mere word-by-word conversion. It delves into the connotations inherent in idiomatic expressions, discerns cultural nuances, and effectively elucidates technical jargon. The result is translations that manifest greater precision and a semblance of human-like comprehension. Furthermore, the adept learning capabilities intrinsic to AI translation enable it to dynamically adapt to evolving linguistic landscapes and cater to the diverse exigencies of a discerning clientele (Wolff, 2023). This is exemplified by ChatGPT's versatile role as an Infrastructure as a Service (IaaS), whereby it employs prompt patterns to customize translations for specific audiences and contextual scenarios (Zhu & Wang, 2023).

An additional and consequential advantage of AI translation resides in its long-term cost-effectiveness. In stark contrast to machine translation systems, which mandate perpetual updates to glossaries for frequently translated terms, AI translation seamlessly accumulates and retrieves new and previously utilized terms. This augmented translation memory empowers Generative AI to efficiently process substantial volumes of recurrently translated content, thereby mitigating the exigency for incessant glossary maintenance (Wolff, 2023).

The Mechanism and Application of ChatGPT

ChatGPT stands as a meticulously designed and highly scalable conversational generation system that has been deployed across a spectrum of use cases, including customer service and intelligent assistants, garnering commendation from both end-users and developers. This sophisticated system operates primarily on the underpinnings of artificial neural networks and advanced natural language processing technology. Termed "Conditional Generative Pre-trained Transformer" (ChatGPT), it epitomizes the synergy of artificial intelligence technology, refined through supervised machine learning and reinforcement learning paradigms, thereby endowing computational systems with the autonomous capability to generate natural language conversations (Ma, 2023).

At its core, ChatGPT is founded upon the transformer architecture and derives its competence from extensive training on vast corpora of conversational data procured from diverse sources. This amalgamation of pre-trained deep learning models and a programmability layer underpins its capacity to proficiently generate natural language dialogues. In the course of this study, we embark upon an exhaustive review of the extant literature. Subsequently, we undertake an exploration of ChatGPT's applications, discernible opportunities, and attendant challenges across 10 salient domains. To provide clarity and context, we present illustrative examples within the realms of commerce, industry, and educational domains.

It is imperative, however, to emphasize that notwithstanding ChatGPT's exceptional proficiency in generating linguistically coherent responses, it remains bereft of the nuanced comprehension, empathy, and creative faculties intrinsic to human interaction. Consequently, its potential to fully supplant human counterparts across a wide spectrum of contexts remains a challenge. However, while causing challenges again and again, it has played a driving role in its further development and renewal.

In summary, ChatGPT embodies a versatile repertoire of applications, endowing myriad domains with potent natural language processing capabilities. ChatGPT has a very wide range of applications, and it can provide powerful natural language processing capabilities for a variety of applications. In the future, with the continuous development of natural language processing technology, ChatGPT will be more and more widely used, bringing more convenience and innovation to people.

Method

The method involves selecting 10 diverse Chinese text samples, spanning various topics and contexts, and using multiple translation tools, including ChatGPT, Google Translate, and Baidu Translate, to independently translate each text into Chinese while maintaining consistency in input texts and settings. Contextual words, indicative of context sensitivity due to multiple meanings or interpretations, are manually identified within the translated texts and recorded as key contextual terms. The translation accuracy of each tool is then calculated for these terms. Statistical analysis and visualization tools are utilized to compare translation performance, including common errors among the translators. The discussion of findings addresses the first research question, characteristics of popular contextualized translators, particularly ChatGPT, and implications for the field of globalized translation, with a consideration of future translation technology advancements.
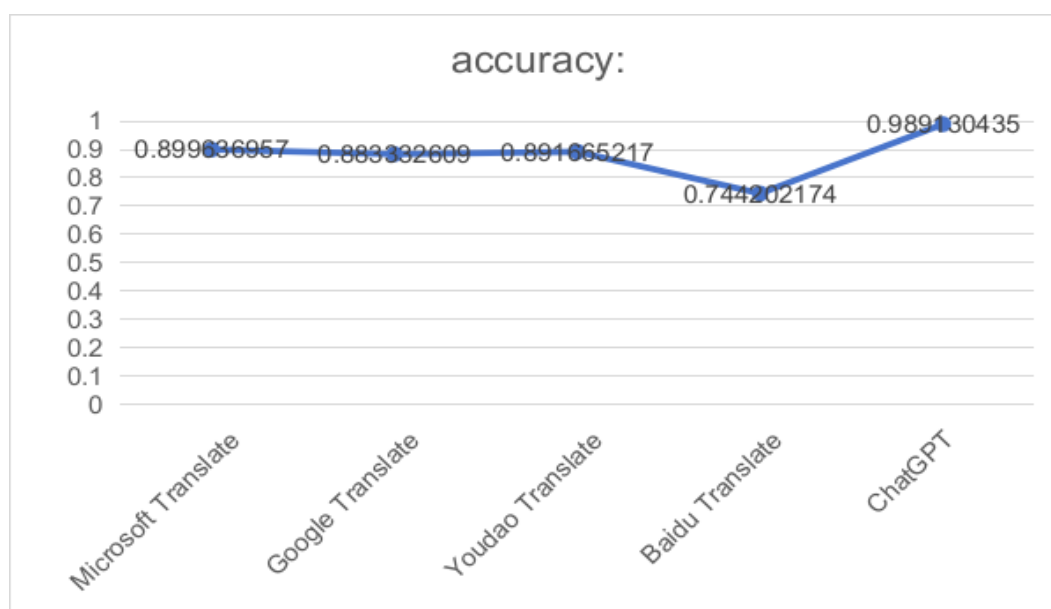
Result

Figure 2. Translation accuracy.

ChatGPT, as a highly advanced artificial intelligence, consistently demonstrated superior translation accuracy and an enhanced situational understanding ability, particularly when provided with relevant context. It excelled in translating segmented texts, including those related to poker techniques, where different paragraphs exhibited logical connections despite differing central themes, as well as general content such as film production and music. ChatGPT exhibited an impressive capacity to accurately grasp the relationship between segmented text points, notably when dealing with contextualized words like "hand" (手牌) and "dolly" (摄影小车).

Nevertheless, it is important to note certain limitations. ChatGPT tended to retain content within double quotation marks without translation. For instance, it occasionally translated "dolly" as a name before appending "摄影小车" in the translation.

In high-context situations, such as the translation of article paragraphs and general paragraphs within the context of frontier poems, ChatGPT consistently demonstrated higher translation accuracy and an ability to render text content in a reasonable and smooth manner within the specific context. However, when translating proper

nouns, particularly specific theoretical names, ChatGPT often left them untranslated. Additionally, content enclosed within parentheses, including (...), could occasionally lead to misunderstandings where the enclosed content might be perceived as secondary.

When compared to traditional machine translation, ChatGPT proved to be advantageous in high-contextualized translation scenarios, especially when supported by background information and research context. Its superior accuracy in terminology translation was evident, contributing to translations that closely aligned with the nuances of the original Chinese text. The translation quality of ChatGPT was notably more fluent and closely aligned with academic Chinese.

Discussion

Large language models, such as ChatGPT, exhibit exceptional proficiency in text-based translation tasks. In contrast to traditional machine translation methods, they demonstrate superior capabilities in translating content characterized by high contextual complexity, yielding heightened precision. In the current era of globalization, characterized by frequent international business interactions and population migrations, there is an urgent need for efficient and accurate cross-cultural communication tools. The relentless expansion of the Internet has underscored the critical importance of real-time translation, establishing it as an essential component of large-scale cross-cultural interactions within the global social network sphere.

Translation inherently carries cross-cultural implications, and the intricacies of language present numerous challenges for machine translation. A considerable portion of translations still relies on manual processes, inherently limiting the efficiency of cross-cultural communication to a certain extent. As globalization continues to evolve, the demand for cross-cultural communication is steadily increasing. Simultaneously, the availability of proficient translators well-versed in diverse cultural languages and customs remains limited, hindering effective communication among culturally diverse parties.

High-context artificial intelligence translation significantly alleviates the challenges posed by contextual nuances in automatic translation. It possesses the capacity to adapt the same vocabulary to various terminologies within the target language, contingent upon the specific domains of discourse. Furthermore, it excels in generating textual content tailored to precise situations and seamlessly adjusts its tone to align with distinct styles and usage contexts. Its text-centric approach, in contrast to a mere sentence-focused one, enables artificial intelligence to genuinely "comprehend" the text during translation, thereby enabling it to craft contextually appropriate textual content.

From both economic and cultural globalization perspectives, these advancements have led to a reduction in translation costs, a crucial element in facilitating seamless communication among trading partners involved in cross-border trade. Concurrently, they have also reduced associated communication expenses, such as time and financial investments, ultimately resulting in diminished transaction costs. This, in turn, serves as a catalyst for enhancing cross-border trade and further propelling economic globalization.

The real-time and precise capabilities of artificial intelligence translation position it as a promising bridge in large-scale cross-cultural communication, particularly within the context of the Internet. It empowers individuals from diverse cultural backgrounds to communicate and engage in discussions, transcending language barriers and effectively dismantling cultural divides. In doing so, it aligns with Habermas's vision of fostering a communicative state, where subjects can engage in discourse, seek common ground, and establish widely

accepted foundations and consensuses. This, in turn, fuels cultural globalization while preserving the distinctive cultural characteristics of our own nation.

In summary, the artificial intelligence language model, exemplified by ChatGPT, enables precise real-time translation, thereby enhancing specialization within the translation industry. Beyond the translation of highly intricate texts, it can effectively handle more fragmented content as its primary focus, significantly boosting productivity. This streamlining process has the potential to reduce transaction costs within the economic sphere. In the realm of culture, it serves as a catalyst for intercultural communication, dismantling cultural biases, and facilitating the emergence of a global cultural consensus in line with the ongoing trend of globalization. Consequently, it further contributes to the process of globalization.

Conclusions

In this study, ChatGPT is compared with popular machine translation, and the results show that ChatGPT performs more accurately and fluently as an AI translator in complex contexts. Compared to popular machine translation, AI translator demonstrates greater logical coherence in translating segmented text. It can correctly translate the same vocabulary in different paragraphs, while popular machine translation may produce errors with multiple meanings.

AI translation holds tremendous potential for facilitating global communication, helping people overcome language barriers, and promoting cross-cultural exchange and cooperation. This is crucial for societies and business interactions in the era of globalization.

However, it's important to recognize that globalization also presents some challenges for translation, especially the increasing cultural conflicts. To address this issue, translation systems are required not only to accurately translate text based on context but also to have a clear understanding of the cultures behind the target and source languages, reducing cultural gaps and mitigating cultural conflicts.

In conclusion, the findings of this study indicate that AI translation, such as ChatGPT, has significant potential in the field of global translation, and future technological advancements will further propel progress in this area.

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