

Original Research Article

The Exploration of context sensitivity in large language models — A Comparative study of translation practice with Tencent Hunyuan and ChatGPT 4 as examples

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Abstract: This research compares Tencent Hunyuan and ChatGPT 4 in translation. While these models excel in long-text processing and multilingual translation, they still struggle with capturing deeper meanings, tones, and culturally specific expressions. Context sensitivity affects translation accuracy and fluency, and each model has pros and cons in complex contexts. The study offers references for improving model translation and understanding language - processing mechanisms.

Keywords: Large language model; Context sensitivity; ChatGPT 4; Translation practice

1. Introduction

AI technology has advanced large language models in natural language processing. Translation is a key way to measure model performance. Context awareness, crucial for accurate machine translation (MT), enables understanding of environmental, cultural, and situational context. Tencent Hunyuan and ChatGPT 4 draw attention for handling context in translation. This paper compares their context sensitivity in complex texts to find model characteristics and contribute to the field's development.

2. Context awareness

2.1. Definition

Context awareness, also known as context consciousness, refers to the ability to understand and consider the environment, background, and related situations in which a text is situated during language communication, translation, or any form of text analysis. This capability enables AI systems to go beyond a literal translation or interpretation, more accurately grasping and conveying the true intent and meaning of the information.

2.2. Context awareness in AI translation field

2.2.1. Overview

Context awareness is the capability of an AI system, especially in translation and interaction, to not only understand and interpret text based on the direct meaning of words but also to consider the broader context. This includes the language, situation, and cultural background that influence the interpretation and appropriateness of translation.

In the article “Context-Aware Machine Translation for Software Localization,” the authors highlight the importance for translators to utilize the visual elements of the user interface (UI) to resolve semantic ambiguities in translation^[1]. The paper points out that when a term like “Access” is used on a button, it should be translated into a verb form, such as “Accedi” in Italian, rather than being translated as a noun “Accesso”. This approach ensures that the translation is not only linguistically correct but also contextually fitting within the UI.

This translation strategy demonstrates the translator’s profound understanding of the target language’s conventions, cultural differences, and principles of interaction design. When selecting the most appropriate translation, translators must take into account the functionality, placement of the user interface (UI) components, and the expected interaction from the user. This requires not only the ability to convert languages but also the capacity to comprehend and interpret the intentions and context behind the UI design.

2.2.2. Significance

In artificial intelligence and language processing models, the importance of context awareness is clear. It significantly enhances the precision of machine translation by resolving ambiguities that traditional literal translation methods cannot address. During the process of software localization, integrating contextual information from the user interface greatly refines semantic clarity, ensuring the accuracy of translations and their appropriate adaptation to the target language and cultural context.

3. Discussing context awareness from the perspective of large language models

Large language models, such as GPT and its iterations, integrate context awareness by employing sophisticated algorithms and extensive datasets that encompass a wide range of language, situational, and cultural backgrounds. These models utilize contextual cues from surrounding texts or specific language use scenarios to generate more accurate, relevant, and nuanced translations and responses. By analyzing vast amounts of textual data, these models learn to recognize patterns, understand subtleties, and appreciate the importance of context in language. This enables them to apply this understanding in real-world applications, such as translating texts while preserving the original meaning, tone, and cultural relevance. Moreover, these models are regularly updated and refined with new data, enhancing their context awareness capabilities over time.

4. Comparative discussion on context awareness in large models from the practice of Tencent Hunyuan and ChatGPT translation

4.1. Application of Tencent Hunyuan in translation practice

Tencent’s Hunyuan model, developed by Tencent, has cross-domain knowledge and natural language comprehension capabilities. Based on full-chain proprietary technology, it shows its strength in processing long texts. It can quickly generate thousands of words based on topic and word count requirements and supports multilingual and multi-domain translation.

4.2. Main features and characteristics of ChatGPT

The application of ChatGPT in the field of translation may influence the development of future translation practices and theories. Its application in translation practice demonstrates its powerful capabilities in understanding and generating language.

4.3. Criteria for comparison

This direct comparison aims to evaluate their performance in capturing the nuances, style, and aesthetic essence inherent to literary works, thereby elucidating their respective strengths and weaknesses within this demanding aspect of translation practice.

How is the translation quality of the two large language models? The criteria for comparison primarily hinge on the reliability of translation quality, assessed through several dimensions encompassing three broad categories. First, word sense selection: 1) Correctness of meaning, 2) Collocation of meaning; Second, syntactic understanding issues: 1) Logical structure, 2) Position of adverbs; 3) Semantic coherence; Third, rhetoric and implied meaning: 1) Rhetorical color: Style and emotional tone, 2) Metaphorical vehicle and metaphor words. Our discussion here focuses on the context awareness of the two large models, that is, context sensitivity.

4.4. Chinese-English selection

4.4.1. Pre-translation preparation

Firstly, when choosing the discourse, the author decides to select paragraphs with strong literary and cultural contexts. The fragments of the novel “Blossoms”^[4] can meet this condition. First we see the translation version of Michelle Yeh and Christopher Smith^[5].

1) Alone on the attic, preferably at night. 2) In the ending of “Days of Being Wild,” Leslie Cheung rides a horse to find a horse, a hero growing old in the shadows. 3) Under the electric light, he counts a stack of banknotes, puts them into his suit pocket, counts another stack, 4) takes out a pack of poker cards, spreads them out to examine closely, and then takes out another pack. 5) Next, he combs his hair, parts it on the side, near the three-seven line, combs it smooth before a mirror, stands upright, 6) exuding a natural nonchalance. Finally, he turns off the light. 7) This half-minute is the distilled essence of Shanghai.

Then, conduct background research and synchronize the information with the large model. This passage is from Jin Yucheng’s novel “Blossoms.” “Ah Fei” is from Wong Kar-wai’s classic film “Days of Being Wild”. Here, it shows a solo scene of the character played by Tony Leung Chiu-wai. The text has a strong sense of cinematography. The protagonist of “Blossoms”, Bao, is an “Ah Fei” living in Shanghai in the 1990s. The motif of his story, as a prototype, represents the common human predicament, life experience and historical experience. Although the narrative prototype changes in different times and societies, its depth pattern has similarities.

At the same time, break the sentences of the text. The original text is in a prose style. Due to a series of consecutive actions, the small sentences are often separated by commas. In view of the characteristics of English and for the convenience of analysis, we have numbered the sentences. Then, the original text for translation was respectively input into two large models.

4.4.2. Comparative discussion

To Tencent Hunyuan, the instruction is relatively simple: “Translate the following text into Chinese, requiring accuracy and fluency”.

1) Ascend the attic alone, preferably at night. 2) In the ending of “Days of Being Wild,” Tony Leung rides a horse in search of another steed, a hero growing old in secret, counting banknotes under the electric light. 3) He counts one stack, slips it into the inner pocket of his suit, then counts another. 4) He takes out a deck of playing cards, fans them open to examine them closely, then pulls out another deck. 5) Next, he combs his hair, parting it, and brushes it neatly in the mirror, his entire body upright yet leisurely at heart. 6) Finally, he turns off the light. 7) This

half a minute is the essence of Shanghai flavor.

Under the same instruction, the text was given to ChatGPT, and the output is as follows:

1) Ascending the attic alone, it's best at night. 2) At the end of "Days of Being Wild," Tony Leung mounts a horse in search, a hero now shadowed by age, counting banknotes under the light. 3) He counts a stack, slips it into his suit pocket. 4) counts another, then pulls out a deck of cards, peeks at it, then takes out another. 5) Next, he combs his hair, a three-to-seven part, aligns it with the mirror, stands tall and straight, with a leisurely air in his bones. 6) and finally, turns off the light. From nadir to zenith. 7) these half a minute, embody the essence of Shanghai.

For the second sentence: there are several problems.

Firstly, the translation of "looking for a horse while riding a horse" is unsatisfactory in the assignments of both large models. Both Tencent Hunyuan and ChatGPT translated it literally without translating the cultural code behind the words. Style and rhetoric are difficult points in the translation of large models. Moreover, the connection between the sentences in the latter's translation is wrong, while the former's sentences are correct interlingually. The deficiency in the cultural sensitivity of large models is manifested.

Secondly, the two versions are similar, and the inter-sentential relationship is not reflected. The "looking for a horse while riding a horse" in the first half of the sentence is a phenomenon, and the part describing a hero becoming old in the second half is a summary. The previous four-character expression precisely reflects the this part mentioned in the following sentence: No matter how dashing and charming a person is, they are prone to aging under the erosion of time. Four-character idioms or expressions carry profound Chinese cultural significance, and the correctness of the translation of such expressions is based on an in-depth understanding of the connotations of Chinese culture.

Once again, the color of words is one of the difficulties. The meaning of the Chinese character "an" is "imperceptibly", so "in secret" in the first version is precise, and it can be seen that the code-switching understanding of converting a noun to an adverb is very correct. In the latter version, the translation of "shadow" is inappropriate. The meaning of it is not the noun "shadow"; the original text is the usage of converting a noun to an adverb, and here it is the usage of converting a noun to a verb. ChatGPT correctly realized the issue of part-of-speech conversion, but its context sensitivity is obviously insufficient. In contrast, "Tencent Hunyuan" clearly prevails in the awareness of the Chinese context.

For the third sentence, both chose the word "slip" for "put" into the suit pocket. This word is more in line with the cultural context of the original text and shows the style of old Shanghai businessmen who pursue exquisite dressing and act proficiently and capably.

For the fourth sentence, in the translation of "twiddle open", the former used "fans", which is more in line with the context and presents a clearer visual sense, but there is room for improvement; the latter used "pull out", which lacks the sense of rhetoric. The word choice is not as good as the former.

For the fifth sentence, Tencent Hunyuan couldn't translate the hair style part and directly presented the original Chinese text, showing insufficient cognition of the cultural code and insufficient context sensitivity. The latter translated it correctly and had a high matching degree with the code of the target language. The translation of "leisurely and aloof at heart" is more appropriate ---- "with a leisurely air in his bones", which has an appropriate sense of rhetoric.

For the sixth sentence, there are many problems.

The relationship between the sentences was not translated. The first half of the sentence is the condition of

the second half. This point requires a deep understanding by putting the discourse into the context to know, and neither of the two large models has achieved it.

For the seventh sentence, for the “is” in “is the essence of Shanghai flavor”, the former directly translated it as “is”, lacking consideration of the context; the use of “embody” by the latter is more rhetorical and relatively accurate.

Overall, compared with Tencent Hunyuan, ChatGPT has its strengths and weaknesses in the rhetorical aspect of words, and the same is true for the background language code of sentences. The accuracy of both is not high, indicating that there is insufficient input of contextual and stylistic information.

4.5. English-Chinese selection

4.5.1. Pre-translation preparation

Firstly, choosing a discourse.

“Short days, long nights, freezing temperatures, Christmas a swiftly fading memory and the prospect of spring remote—“the cruelest month” is not April, as T.S. Eliot wrote, but January. The garden harvest of frost-tipped kale and collards, and perhaps some beets, carrots and parsnips, is scant if often delicious.”

Then, the initial task is to organize the background materials, including the purpose of writing and the style of the text. In terms of rhetoric: in terms of tone, “The Economist” is a magazine published by the London Economist Newspaper Limited, founded in September 1843 by James Wilson. Most articles in the magazine are written with wit, humor, and strength, serious yet humorous, and focus on conveying the most information to readers in the shortest space. By reading the text as a whole, it can be found that in terms of emotional color, there is a sense of complaint in the text, with words like fade, cruel, remote, scant, indicating that the author is constantly criticizing the season.

The main points that are prone to errors in the translation of this text are threefold, and we can verify these three points. First, in terms of syntax: in English texts, parenthetical phrases usually modify the preceding part, so the poet thinks the most cruel is “April,” while the author thinks it is “January.” Due to the complexity of the sentence structure, attention should be paid to the issue of reference in the context, which is prone to misinterpretation. Second, in terms of word meaning, the translation of compound modifiers is prone to errors, such as “frost-tipped kale.” The third point is the emotional trend at the end of the text, whether it is to emphasize “scarcity” or “deliciousness.” From the overall tone, it is the former.

4.5.2. Comparative discussion

The first version is the Output of Tencent Hunyuan Large Model. Next is the Output of ChatGPT 4.0. Then the last is the Output of editGPT.

Comparison between the Three Versions:

The first point, in the first version, the most cruel month is considered January by the author, and the understanding of the parenthetical phrase modifying forward is correct, which makes the translation logic clear. In the second version, the identification of the attributive reference is incorrect; the poet thinks it’s April, while the author believes it is January. The third version is the same as the second.

The second point, in the first version, the translation “frost-tipped kale.....” is accurate. In the second version, the meaning of the word is not fully translated, and the noun that is the subject of the compound structure is missing. In the third version, this point is still incorrect

For the third point, in the first version, the translation “is scant if often delicious” means it is acceptable, but not the best. The conjunction “but” has an emphatic function, so in terms of tone, the accuracy is not enough. It should be translated as “Although it can be said to be delicious at times, it is pitifully scarce.” which is the exact opposite. The emphasis should be on the first subject of the two in the sentence, not the latter. In the second version, similar to the translation by Tencent Hunyuan, the translation of the text is acceptable but not good. In the third version, there is no progress.

Additionally, in the first version, the description of the scenery is quite antithetical, all composed of modifiers plus nouns, which is in line with the literary nature of the text, and is quite good. The content that needs to be translated in the Chinese quotation marks should be in the original text. In the second version, the sentences are of uneven length. In the third version, the sentences are quite antithetical, which, as a plugin specifically for editing functions, demonstrates its specialized and powerful capabilities.

In general, in Chinese texts, Tencent Hunyuan has a better grasp of the Chinese language, whether in terms of attributive reference issues or the handling of lexical relationships, it performs better. However, the GPT plugin highlights its professional functional features. It is evident that the former is more sensitive to the Chinese context.

5. Conclusion: How to solve the problem of insufficient context awareness of large models in the translation process

During the translation process, it is essential to provide the large model with multiple doses of contextual knowledge and conduct extensive training to enhance its contextual sensitivity. Firstly, feeding contextual information to the model multiple times plays a crucial role. By doing so, the model can better understand the text's background, cultural nuances, and specific language usage, which helps it generate more accurate translations. For instance, when dealing with literary works, providing details about the author's style, the historical period, and the cultural background can significantly improve the translation quality. Secondly, repetitive training of the model is of great significance. Each iteration allows the model to learn from its previous translations and adjust its algorithms and parameters accordingly. This continuous learning process helps the model to improve its understanding of different language structures and semantic expressions, thereby increasing the accuracy and fluency of the translations. In addition, changing instructions or offering supplementary background hints can also have a positive impact. Different instructions can guide the model to focus on specific aspects of the text, while additional background hints provide more comprehensive context, enabling the model to make more appropriate translation decisions.

Overall, a combination of providing rich contextual knowledge, repeated training, and flexible instructions and hints can effectively enhance the large model's ability to handle translations in various contexts and improve the quality and accuracy of the output.

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