

A Comparative Study of Traditional Translation Tools and Generative AI in Thai-to-English Translation: Evaluating Accuracy, Flexibility, and Contextual Understanding

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Abstract

This study compared the performance of traditional translation tools and a generative AI chatbot in translating Thai expressions into English. The generative AI chatbot consistently outperformed traditional tools in terms of accuracy, flexibility, and adaptability. It demonstrated superior ability to handle diverse text types and produce more accurate, nuanced translations. However, limitations such as dependence on training data and potential challenges with complex text were identified. Future research should address these limitations and explore the broader applications of generative AI in translation.

Keywords: AI in translation, Thai-to-English translation, Translation tool comparison, Contextual understanding,

1. Introduction

Traditional translation tools, particularly translation applications, have become integral to the language learning process. Research studies in application translation, Somnuek et al. (2022) and Thongruong et al. (2022) have found that translation applications often struggle with insufficient contextual clues provided by the users. Such deficiencies are especially evident in shorter texts that lack context and clarity, particularly when the source and target languages have significant cultural disparities, leading to mistranslations.

While in a research study in human translation, Sukwises (2019) emphasizes the critical role of cultural substitution and idiomatic translation techniques in aiding adult learners to navigate contextually specific colloquial expressions effectively. This underscores a fundamental limitation of traditional tools, which often depend on direct, literal translations that fail to capture the intricate nuances of language and culture.

Despite recent advancements in generative AI chatbots, there is a lack of research comparing their performance with traditional translation methods. Therefore, this study aims to compare the effectiveness of traditional translation tools alongside a generative AI chatbot in translating Thai-to-English. By analyzing factors such as accuracy, flexibility, and contextual understanding, this study seeks to identify which tool is more adept at addressing diverse translation needs, particularly in translating colloquial expressions that demand cultural sensitivity and idiomatic comprehension.

2. Research Objectives

Research Objective 1: To compare the accuracy of traditional translation tools and a generative AI chatbot in translating Thai texts into English, considering factors such as word-level accuracy, sentence-level fluency, and overall fidelity to the original meaning.

Research Objective 2: To evaluate the flexibility and adaptability of traditional translation tools and a generative AI chatbot in handling various Thai text types and contexts, including formal and informal statements,

3. Methodology

3.1 Data Collection

Dataset: A corpus of 80 Thai expressions was assembled, encompassing a diverse range of speech styles and usage scenarios.

Translation Tools: Three translation tools were selected for comparison: two traditional translation tools and one generative AI chatbot.

Translation Process: All 80 Thai expressions were input into each translation tool, ensuring consistent conditions for input. The traditional tools were used without prompts, while the generative AI chatbot was provided with the single prompt: "please execute this task on the default mode basis and translate these into English: [Thai expressions]."

3.2 Data Analysis

Evaluation Criteria: Three evaluation criteria were established: accuracy, flexibility, and adaptability.

Expert Evaluation: Two professional translators were tasked with evaluating the quality of the translated English sentences. They were provided with a table containing one column of Thai expressions as the source language and three columns of English translations, each labeled with a random number to enhance reliability. The translators assessed the overall fidelity to the original meaning, the ability to handle various text types and contexts, and the appropriateness of the translated expressions for each column.

Quantitative Analysis: The expert evaluations were analyzed quantitatively to identify patterns and trends in the performance of the different translation tools.

Comparative Analysis: The results from the expert evaluations were compared across the three translation tools to determine their relative strengths and weaknesses in terms of accuracy, flexibility, and adaptability.

4. Results

The expert evaluations revealed notable differences in the performance of the three translation tools across the evaluation criteria: accuracy, flexibility and adaptability.

Accuracy:

Traditional Tool 1: Received an average accuracy score of 7.2 out of 10, indicating moderate accuracy.

Traditional Tool 2: Achieved an average accuracy score of 7.5 out of 10, demonstrating slightly higher accuracy than Traditional Tool 1.

Generative AI Chatbot: Outperformed both traditional tools with an average accuracy score of 8.3 out of 10, suggesting a potentially significant advantage in accuracy.

Flexibility and Adaptability:

From the Table 1, Traditional Tool 1: Demonstrated limitations in handling diverse text types and contexts, scoring an average of 6.8 out of 10 for flexibility and adaptability.

Traditional Tool 2: Showed some improvement in flexibility and adaptability, with an average score of 7.2 out of 10.

Generative AI Chatbot (GenAI Chatbot): Exhibited significantly higher flexibility and adaptability, earning an average score of 8.5 out of 10. This suggests its ability to effectively handle a wider range of Thai expressions.

Table 1 : Average score from the evaluation

Type of tools	Average accuracy (out of 10)	Average flexibility and adaptability (out of 10)
GenAI Chatbot	8.3	8.5
Tool 1	7.2	6.8
Tool 2	7.5	7.2

Overall Performance:

Based on the expert evaluations, the Generative AI Chatbot consistently outperformed both traditional tools in terms of accuracy, flexibility, and adaptability. However, further research is necessary to fully understand its strengths and limitations, particularly in terms of scalability and generalization to different domains.

Statistical Significance:

A paired t-test revealed statistically significant differences ($p < 0.05$) between the Generative AI Chatbot and the traditional tools in terms of accuracy and flexibility/adaptability. This indicates that the observed differences were unlikely due to chance.

Limitations:

This study was limited by the size and nature of the dataset. The use of only 80 Thai expressions, which were relatively short, may not fully capture the complexities of Thai-to-English translation. Additionally, the focus on a limited range of text types may not reflect the full capabilities of the translation tools in handling more diverse and challenging content. Future research could address these limitations by using a larger and more diverse dataset

5. Conclusion

The findings of this study suggest that the Generative AI Chatbot may offer advantages over traditional translation tools in certain contexts. However, additional research is necessary to fully understand its strengths and limitations, particularly in terms of scalability and generalization to different domains.

6. Discussion

The findings of this study have important implications for the field of translation technology. The increasing capabilities of generative AI chatbots suggest that they may play a significant role in the future of translation services. By automating routine translation tasks and improving the quality of translations, generative AI chatbots may be capable of enhancing efficiency and accuracy in cross-cultural communication.

However, it is essential to recognize that generative AI chatbots are not a complete replacement for human translators. While they can provide valuable assistance, human judgment and expertise remain crucial for ensuring the quality and appropriateness of translations, particularly in complex or culturally sensitive contexts.

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