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Analysis of Errors at the Lexical Level in Post-editing for Medical Texts

Shen Yajie

Xi'an Fanyi University, Xi'an, Shaanxi, China

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Abstract: The progress of Artificial Intelligence brings about profound developments in Computer Aided Translation (CAT). Therefore, many language service providers use CAT tools to improve translation efficiency while ensuring quality. With people's attention to health deepening, popular medical texts are becoming mainstream. This article studies the translation of medical texts in the mode of Machine Translation and Post-editing (MTPE). The source text *This Is Your Brain on Food* is pre-translated by Google Translate and post-edited by the translator. Based on this practice, the Machine Translation (MT) errors are summarized, and Post-editing (PE) solutions are illustrated at the lexical level. There are MT errors about mistranslation and omission. Several PE solutions are presented in the article, which cover replacement, supplementation and conversion of part of speech. It is shown that the MTPE mode can improve the efficiency of medical translation. Post-editing can ensure the translation effect as equal as possible while faithfully conveying the original information, so as to improve the quality of the target text and assist medical development through translation.

1. Introduction

This chapter provides a comprehensive review of the development of Machine Translation (MT) and Post-editing (PE), which has become a mainstream translation approach. The selection of translation materials and the translation process are also introduced.

1.1. The Development of Machine Translation and Post-editing

In an experiment at Georgetown University in 1954, a computer successfully translated over forty Russian sentences into English, marking a milestone in machine translation history and the start of modern machine translation. William John Hutchins[1] states that "The term 'machine translation' (MT) refers to computerized systems responsible for the production of translations with or without human assistance". Kalchbrenner and Blunsom[2] introduces Neural Machine Translation (NMT) with models that grasp syntactic and semantic information, surpassing Statistical Machine Translation (SMT) by 2016 and becoming key in systems like Google Translate. As machine translation advances, scholars like Maarit Koponen[3] highlight the growing overlap between machine and human translation, suggesting that they should complement each other. The MTPE model is now a popular approach to balancing translation quality and efficiency.

Jeffrey Allen[4] states that Post-editing is the "term used for the correction of machine translation

output by human linguists/editors". Cui Qiliang[5] believes that the combination of machine translation and post-editing can fully utilize the efficiency of machine translation and the accuracy of human translation.

Many scholars engage in extensive research on the types of errors in machine translation and the strategies for post-editing. Wei Changhong and Zhang Chunbai[6] point out that errors requiring correction during post-editing include redundancy or mistranslation, syntactic structure confusion, misuse of language-specific words, and wrong forms. They argue that human translation is the essential method of enhancing translation quality, and post-editors can effectively enhance the efficiency of it. With the continuous development of computer science, post-editing of machine translation will gradually become the mainstream of the translation market.

1.2. Introduction to the Translation Project

This Is Your Brain on Food by Dr. Uma Naidoo explores the powerful connection between diet and mental health. Dr. Naidoo, a psychiatrist, nutrition specialist, and trained chef, uses cutting-edge research to demonstrate how what we eat can impact conditions like depression, anxiety and dementia. The book offers practical nutritional advice, backed by science, and includes 40 brain-healthy recipes. It's an essential guide for anyone looking to improve their mental well-being through food.

In his book, *Approaches to Translation*, Peter Newmark[7] categorizes text functions into six types, with the primary types being the expressive text, the informative text and the vocative text. According to Newmark's text type theory, *This Is Your Brain on Food* not only conveys a lot of professional information in the medical field, but also has a calling function, inspiring readers to adjust their diet structure to ensure health. Therefore, when translating this best-selling English book into Chinese, the translator needs to consider the readers' acceptance, make the translation accurate and clear, and try to make the target language's expression effect on the target language readers close to the source language's expression effect on the source language readers. In addition, the translator also hopes to minimize the time cost required for translation so as to maximize the translation efficiency. Therefore, the MTPE mode is the best choice for the translator.

2. Translation Process

The translator completed the translation of the full text of *This is your Brain on Food* in the MTPE mode. The main steps include text preprocessing, parallel text collection, translation tool selection and translation platform construction, and a lot of time is spent on post-editing. In the post-editing and proofreading stage, the machine translation errors are summarized to form cases for exploration.

2.1. Pre-translation

First, the translator completed the pre-processing of the file. Then, the translator built a "Trados Software + Google Translate Engine" platform, which best met the needs of this translation practice, and used MultiTerm Extract and MultiTerm software to build a terminology database, which is the key to pre-translation.

2.1.1. Text Preprocessing

First, the translator opted to use Adobe Acrobat Pro for the conversion, as it effectively converts the original PDF file into a DOCX file with high accuracy in recognizing words, images, and tables, ensuring efficient conversion. After converting the source text, the translator manually reviewed it,

correcting issues like recognition mistakes, improper segmentation, incorrect punctuation, extra spaces, and spelling errors. Additionally, the translator removed unnecessary blank lines, excluded images, and saved the final document as plain text in a DOCX format.

2.1.2. Translation Platform Construction

First, the translator used Adobe Acrobat Pro software to complete the pre-processing of the file. Then, the translator built a "Trados Software + Google Translate Engine" platform, which best met the needs of this translation practice, and used MultiTerm Extract and MultiTerm software to build a terminology database, which is the key to pre-translation work.

2.2. While-translation

The translator used the pre-translation function in SDL Trados to automatically translate the text, storing it as bilingual Chinese-English sentences in the translation memory and displaying it in the editing interface. Despite Google Translate's generally high accuracy, issues like punctuation errors, mistranslations of terms, and confusion in word order and logic persisted. During post-editing, the translator corrected these errors, adjusted the logical flow to fit Chinese expression, and improved readability. Technical documents and dictionaries were also referenced to ensure accurate terminology.

2.3. Proofreading

For the translator, self-proofreading is crucial for enhancing translation quality. The translator first reviewed the machine translation output sentence by sentence against the source text to ensure completeness. Next, the translator read through the entire text, adjusting any translations that didn't align with Chinese expression habits to improve readability. Finally, the translator completed the final formatting of the translation.

3. Lexical Errors

Vocabulary is the basic unit of language. Lexical errors refer to the errors of the translation which may arise from machine translation with respect to nouns, verbs, adjectives, adverbs, conjunctions, prepositions, among others. In addition, this category encompasses cases of under-translation and mistranslation of terminologies. These errors can be readily identified and remediated by post-editors. Analyzing from the perspective of vocabulary is beneficial to grasping the difference between Chinese and English in vocabulary.

3.1. Mistranslation of Polysemy

Polysemy is a linguistic phenomenon that widely exists in natural languages, that is, there are two or more interrelated meanings about a word. Since the multiple meanings of an English word are often similar, machine translation that lacks in-depth consideration of the contextual meaning is often prone to choosing the wrong word meaning.

In the translation of Chapter 3 of the source text, Google Translate translated the word "Myth" in the title of Chapter 3, Anxiety: Fermented Foods, Dietary Fiber, and the Tryptophan Myth, into "shén huà" in Chinese characters, which means "tales of legendia". After searching, it is found that the word "myth" does have two meanings in Oxford Dictionary: a story from ancient times, especially one that was told to explain natural events or to describe the early history of a people; something that many people believe but that does not exist or is false. However, in the text of Chapter 3, the author carefully introduced the experiments and conclusions of researchers on "the

impact of tryptophan on people's anxiety level", confirming that for humans, supplementing with purified tryptophan can increase brain serotonin. It effectively dispelled the rumor that "tryptophan intake will make people doze off", and changed people's consistent impression of tryptophan. In addition, there is no content related to fairy tale in the entire chapter. If the machine translation is retained, it will lead to errors in the meaning of the text.

3.2. Omission of Proper Nouns

A proper noun is a noun that serves as the name for a specific place, person, or thing. Some proper nouns in English are very unfamiliar to Chinese readers. If they are omitted in the translation, it will affect the conveyance of the original information and make readers feel half-knowledgeable.

The word "MIND diet" appears in the title of Chapter 6. Google Translate retains "MIND" and only translates the word "diet". "MIND diet" is actually a term in the field of nutrition, which means a healthy diet for the aging brain. Therefore, omission of this word will cause great reading difficulties for readers.

4. Post-editing Solutions at the Lexical Level

The lexical errors are about the precise significance or interpretation of a given word within a text. Post-editing (PE) methods that correct the wrong meaning of a word or terminology are classified into this category. PE methods at the lexical level include replacement, supplementation and conversion of part of speech.

4.1. Replacement of Mistranslation

Replacement refers to the act of substituting the incorrect or improper translation in the machine translation version with the appropriate one. This method is frequently used when the translation engine misjudges a word's meaning. Mistranslation at the lexical level can have a significant impact on the accuracy and clarity of the target text.

When there is an error in the translation of a terminology, the translator should verify it rigorously, and correct the translation of it. And such mistakes are very common. For example, in Chapter 7 of the text, there is an expression: "Yan Li and his colleagues". Google Translate retains the name "Yan Li". The translator believes that the correct translation should be used to replace this mistranslation of the terminology. After verification, it was found that the researcher involved here is Dr. Li Yan from the Ruijin Hospitai of Shanghai Jiao Tong University School of Medicine, so "Li Yan" should be directly translated into the two Chinese characters.

4.2. Supplementation of Hidden Information

Supplementation means to complement the text that should be conveyed to target readers but cannot be accomplished by machine translation. Google Translate sometimes misses some parts of the target text, and it cannot add some necessary components after reading between the lines as humans do, so the translators should judge the problem and add words or expressions in the proper place.

There is a proverb in the text that expresses "have butterflies in one's stomach". Google Translate only retains the literal meaning, but this proverb refers to the feeling of uneasiness and anxiety in a person's heart. Therefore, the translator here uses the free translation method to translate the hidden information of this proverb.

4.3. Conversion of Part of Speech

English and Chinese differ in many aspects, such as vocabulary, grammar, expression habits, and logical thinking forms. It is important for translators to have an understanding of the grammar rules in both languages. Therefore, during the course of English-Chinese translation, a word-for-word translation approach should not be adopted. A strategy of part of speech conversion should be used to ensure that the translation adheres to the conventions of Chinese expression habits and rules, while being faithful to the original meaning. For example, nouns, prepositions, adjectives, and adverbs in English can be converted into verbs in Chinese, while adjectives, verbs, adverbs and pronouns in English can be converted into nouns in Chinese, so that the translation can be smooth and natural.

For example, the title of Chapter 11 is "Cooking and Eating for Your Brain", which has two present participles. Google Translate retained the literal translation, which is very stiff and greatly weakens the appeal and inspiration of the title. The translator converted the word "Eating" into a noun and associated it with the previous "MIND Diet", translating it as "starting a journey of healthy brain diet" in Chinese, which cleverly resolved the translation difficulty and appealed to readers to "cook by yourselves and eat healthily", conveying the original information to the target language readers to the greatest extent.

5. Conclusion

Upon the completion of this practice, the translator reviews the translation process and concludes the following major findings. Firstly, the MTPE mode is very suitable for translating medical texts, and the machine translation platform of "Trados Software + Google Translate Engine" is accurate and powerful. What's more, medical texts involve unfamiliar professional fields and contain a lot of specialized terminologies and knowledge generally, which is time-consuming if the translator verifies them one by one. Machine translation can save a lot of time for translators because only the problems need to be checked and modified in post-editing. Therefore, the translation efficiency is greatly improved. Thirdly, flexible translation methods should be adopted in practice.

In addition, searching for information is an essential skill for translators. Searching for professional knowledge of unfamiliar fields can help the translators quickly understand relevant knowledge and thus better understand the source text. At the same time, translators can also verify whether the translation of professional terminologies by machine translation is proper by searching and reading parallel texts. Finally, the development of machine translation is inevitable. Machine translation is a technological innovation in the field of translation, which is also conducive to social progress.

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