

Study on the Subjective Role of Human Translator in the Development and Application of Computer-Aided Translation

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Abstract: Computer aided translation is the basic mode of artificial intelligence translation, and the development of computer aided translation technology has made remarkable progress so far. Learning to use this technology is of great significance for people to improve their work and learning efficiency and realize barrier-free communication in life scenarios. This paper mainly analyzes the representative cases in the development history of computer-aided translation, and through comparison, understands the human-computer interaction mode behind this technology. This paper puts forward the significance of the subjectivity of the human translator to computer-aided translation and what the human translator should do in order to improve the quality of translation learning.

Keywords: Computer Aided Translation(CAT Technology); Human-Computer Interaction; Translator's Initiative; Translation Memory; AI Translation

1. Introduction

Now science and technology are developing rapidly, there is new information, new knowledge and an "information explosion". Experts estimate that the amount of data we transmit on the Internet every day is greater than the sum of all the data in the nineteenth century. The amount of knowledge we have to deal with in the twenty-first century will be greater than the total amount of knowledge accumulated in the past 2,500 years, so the translation market is in short supply. In this case, traditional manual translation has difficulty meeting the growing demand for translation. Thus it is necessary to use electronic tools to increase translation efficiency. Electronic tools enable translators to double their powers.[1] In recent years, the

demands for translation services have been increasing rapidly and the amount of tasks for translators continuously increase. The emergence of computer-aided translation technology provides a great help to translators, yet computer-aided translation is not enough to replace the manual translation. In the process of translation, the translator is still the main body. Thus, how to make the best use of computer-aided translation has become a prominent problem. In the process of computer-aided translation, the translator needs to be the main body not only before the translation, in the translation process, but also during the editing stage. Only in this way, can this technology really benefit translators.

2. The Leading Position of the Human Translator in the Application of Human-Computer Interaction

Because of globalization, the demand for translation is increasing rapidly and the requirements for the timeliness of translation continuously increase.[2] In this case, computer-aided translation technology is pretty important because it provides a great convenience for the translation process. Computer-aided translation technology allows the translator to give a simple mechanical work to the computer or AI and then to focus on more dynamic and creative work. But computer aided translation has not yet reached the level of human intelligence and the translation itself is a complicated process. Therefore, computer-aided translation technology can provide help to translators, but it cannot replace human translation. Therefore, in the process of translation, Human translator is still dominant.

3. The Advantages of Computer-Aided Translation

On September 27th, 2016, Quoc V. Le and Mike Schuster, two scientists from "Google brain

group” posted a blog on Google Research, “A product which is applied to neural network of computer-aided translation in a large scale.” Since Google launched Google Translate based on phrases ten years ago, it made another large breakthrough. It launched GNMT, a new neural machine translation system after former PBMT.

Testing results basing on data from Wikipedia and news corpus showed that compared with classic phrase-based machine translation, GNMT significantly reduced errors in translation between key languages by 55% to 85%. As the Figure1 and Table 1 below show:

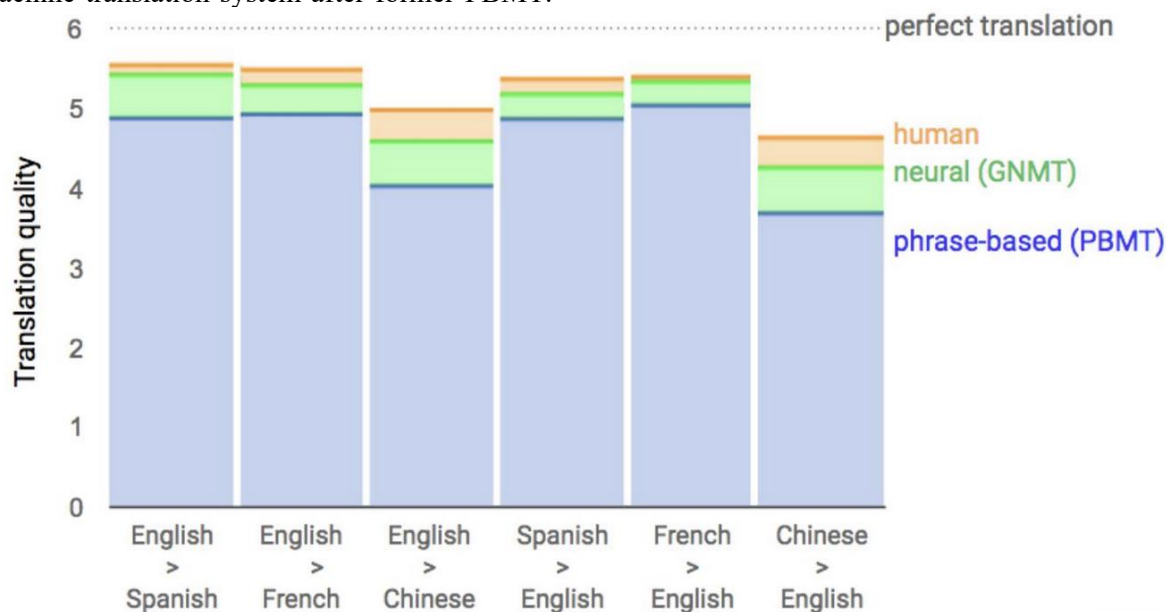


Figure 1. Quality Comparison Among PBMT, GNMT and Human Translation (6 is perfect)

Table 1. Mean Of Side-By-Side Scores On Production Data

	PBMT	GNMT	Human	Relative Improvement
English→Spanish	4.885	5.428	5.55	87%
English→French	4.932	5.295	5.496	64%
English→Chinese	4.035	4.594	4.987	58%
Spanish→English	4.872	5.187	5.372	63%
French→English	5.046	5.343	5.404	83%
Chinese→English	3.694	4.263	4.636	60%

Computer-aided translation qualities of “French to English” and “English to Spanish” are quite close to those done by human translators. Just like AlphaGo beat the world top chess player, this work from Google once again caused a sensation and buzz in the world.

As we know, computer-aided translation technology is the core of translation memory technology. The working principle of the translation memory is that the translator uses the original text and the target text to establish so-called translation memory. In the process of translation, the system will automatically search for translation resources which are the same or similar. At the same time, the memory bank in the background requires continuous learning and automatic storage of the new translation, so does the establishment of language database. Computer-aided translation technology also

supports the sharing of the memory bank and the term database, which makes it possible to cooperate with the remote translation. Computer-aided translation technology has the following advantages:

3.1 To Avoid Duplication of Work and Improve Efficiency

With the help of computer-aided translation technology, translators can draw on the achievements of predecessors and avoid duplicating work, reducing the burdens and improving translation efficiency.[3] Recently, Open AI's launch showcases GPT-4o's real-time translation capabilities, enabling seamless conversion between English and Italian with almost no response latency. The new AI translation from GPT-4o uses a new word divider that is not only more efficient in English

(1.1 times less tokens), but also more efficient in many other languages. According to Greg Brockman, OpenAI, they also have significantly improved non-English language performance quite a lot, including improving the tokenizer (word segmentation) to better compress many of them. OpenAI now supports more than 50 languages, and we can see from the image released by Greg Brockman, the number of tokens in several languages, including Arabic, Russian, and Hindi, has been reduced.[4]

3.2 Helpful for the Translators to Create A Personalized Translation Environment

At present, there are many professional translation materials, thus some vocabulary are relatively uncommon. If there is no knowledge of a certain field, the lack of professional background of the translator will be very difficult for him or her to do a good job in a professional field of translation.[5] By using computer-aided translation tools, translators can accumulate their own translation corpus in the field of translation and can be tailored to their individual translation environment. Because many terms and sentence structures are relatively fixed and the repetition rates are high, thus with the translator's memory bank and the term library continues to accumulate, there will be more repeat contents so that translation work will become more relaxed. The translation memory bank records translator's footsteps. In other words, it grows with translators.

3.3 Facilitating Translation Cooperation

Some large projects include a huge amount of work, and it is difficult to complete the work by the individual. When multiple translators work on the same translation project, they can share a translation memory and a terminology database with computer-aided translation tools. Using computer-aided technology is conducive in the sharing of resources, brainstorming, in order to avoid duplication of work and enable remote translation cooperation.[6]

Computer-aided translation technology has provided the translator with more choices and references, which greatly enriched the translator's translation resources, making it easier for the translator to get the help that he or she needs. With the aid of this technology, the translator can reserve the personalized translation corpus and complete the translation task.

4. Advantages of Computer Aided Translation in Education

The advantages of computer-aided translation in education are mainly reflected in the following aspects:

4.1 To Help Students Form a Discovery Learning Method

First of all, it helps students form a discovery learning method. The traditional translation teaching mode is mainly taught by teachers, and students are in a passive state of acceptance. However, the application of computer-aided translation has changed this situation, making students become the main body of learning. Through computer training, students can have an in-depth understanding of the current application status of computer-aided translation in the translation industry, and master the skills of using a variety of computer-aided translation software and data analysis methods. [7] In the virtual teaching environment, students can freely control the resource base, freely integrate information knowledge, and build knowledge framework, so as to cultivate the ability to master new technologies and think independently.

4.2 To Help Students Learn and Manage Terms

Secondly, computer-aided translation technology provides automatic term translation and management functions, which helps students to quickly and accurately identify and translate important terms, improve their professional terminology application ability and understanding of domain knowledge. In addition, the function of term management can also help students build a term base and improve the ability of memorizing and using terms.

In addition, computer-aided translation technology provides online resources and tools, so that students can more easily access dictionaries, corpus and other translation resources, so as to broaden the channel of knowledge, improve the use of translation materials and reference tools.

4.3 To Help Users Improve the Speed and Quality of Translation.

In addition, computer-aided translation tools can also improve the efficiency of translation. Compared to human translation, CAT tools can automatically process repetitive content, manage

translation in a unified way, and reduce the probability of translation errors and omissions. These tools provide features such as automatic completion and suggested translation, which can simplify translation operations and further improve the speed and quality of translation.

4.4 To Help Reduce Translation Time and Educational Costs.

Finally, the use of computer-aided translation tools can also save educational costs. While the purchase and use of these tools may require a certain amount of investment, their high efficiency and automated nature can significantly reduce translation time and thus educational costs.

To sum up, the application of computer-aided translation in education has many advantages, which not only improves students' learning efficiency and translation ability, but also helps cultivate their independent thinking and innovation ability.

5. Limitation of Computer Aided Translation

As its name suggests, computer-aided translation technology in the translation plays an auxiliary role. At present, computer-aided translation still cannot replace manual translation. Memory bank and the construction of the term database is a long-term accumulation process. When the translation materials are involved in a new domain, a translator is also faced with the process of constructing the memory bank and the term database from scratch. Therefore, the help of computer-aided translation some times can be uncertain. So there are also the following limitations which bring the fact that computer-aided translation still can not replace human translation:

5.1 Language Is Not Rich Enough or Incorrect

Because the memory bank and the term database are limited, the vocabulary sentence patterns of the translation are generally relatively fixed; and if the translator is only based on the reference translation, the translation may make the expression of the target simpler and lack diversity. What's more, the meaning of languages sometimes can be wrong. Therefore, the use of computer-assisted translation should not be so inflexible, thus it needs the translator's creative efforts to analyze the exact meaning and personalize the text that be translated by

machine.[8]

Now let's take an easy example,
"The box was in the pen."

Here the "pen" has at least two meanings, a tool for writing or a rail. In the context below, people can easily distinguish that the meaning of "pen" should be a "rail" or a "fence",
"Little John was looking for his toy box. Finally he found it. The box was in the pen. John was happy."

comparison is like:

"The pen was in the box."

So there are something never can be done only by computer.

5.2 The Translation Function Needs to Be Improved

Another case is the translation function of OpenAI, it is not impeccable, and many netizens questioned the Italian language generated by ChatGPT at the recent press conference. Opinions from a native speaker is "It's not actually an accent, it's just the AI voice inserting gaps between words. In English it's fine, but in Italian it sounds very strange and dull because it disrupts the rhythm."

5.3 The Problem of Data Pollution Needs to Be Solved

Also, in GPT-4o word segmentation corpus, Chinese data pollution is very serious. A user said that "I wrote a script to filter the 100 longest Chinese characters in ChatGPT's new words list, and found that most of them were ads for gambling websites, and a small number were ads for porn websites."

6. The Structure, Style and Order Need to Be Adjusted by the Human Translator

There are many differences between different languages. With the Chinese language, the sentence structure sometimes needs to be coordinated; with the English language, sometimes need to master the structure more. In English, there are a large number of connections within the logical relations. In Chinese-English translation, if the original logical connectives appear one by one, translation may seem to be verbose and expression will be not authentic, fluent or prone to translations; and in Chinese-English translation, if link words are not appropriately added, the translation logic won't be clear and the expressions won't be coherent. Because there are many differences

between languages, in the translation process we should often use the methods of translation and other translation techniques. For example, the original text of a sentence may be divided into multiple sentences, or a text which is made up of a number of sentences may be translated into only one sentence.[9]

Between different languages there are different word orders, so translation will change the original word order in many cases. The translator in the translation will often follow the expression in the target language structure and word order and need to adjust the computer-aided translation results.

In addition, computer-aided translation software generally divides the text into smaller units. In the process of translation, the translation materials are cut into smaller units, the article may not be smooth, or the style may not be unified, which requires the translator to make some micro adjustments.

For example, if the input the same sentence, the translations from computer and human are different. For example, Machine translation (GNMT) is "The Prime minister will start the annual dialogue mechanism with Prime Minister Trudeau of Canada and hold the first annual dialogue between the two premiers." However, human translation is "The Prime minister will initiate the annual dialogue mechanism between premiers of China and Canada during this visit, and hold the first annual dialogue with Premier Trudeau of Canada." So the details often need to be adjusted.

7. Translator Should Be the Main Body in the Translating Process

Translator should be the main body means that translators should be equipped with subjectivity or initiative in the translation activity; and its basic characteristic is cultural awareness, humanistic character and culture, aesthetic creativity of the translation subject. Translation is not a mechanical language conversion, translation also requires the translator's emotional, aesthetic and intellectual investment. Reflection of personal temperament, style in the translation process is a concrete manifestation of a translator's subjectivity.

Compared with the traditional translation mode, in computer-aided translation, translators are also restricted by translation software. Such as the function of computer translation software, memory bank, the reserve of the term database

will affect translators' translation behavior. Therefore, in the early stages of preparation, a translator should pay attention to the search and accumulation of the corpus of memory and share the resources with other translators by choosing a powerful and easy operating translation software. In the process of translation, the translator should make a proper choice according to the results of the software. When there is no reserve of memory in the material and the memory bank, and it does not necessarily apply to the new version of the new target, it is necessary for the translator to exert the subjective initiative to carry out the creative translation. As for the editing stage in translation, the translator needs to have a strong sense of responsibility, to translate by careful editing. If it is using the translation mode of multi-person cooperation, we should pay more attention to the unity of translation style.[10]

Translators are the subject of computer-aided translation and they should be the main body in the whole process of translation. Therefore, translators should have strong sense of subjectivity. Although there are some help of software in computer-aided translation, translators should be emphasized in practice; in addition to the ability to use translation software, translators' language level and translation ability still cannot be ignored.

8. Human-Computer Interaction Model in Computer-Aided Translation

Computer-aided translation (CAT) is a kind of translation production mode that highly integrates "human intelligence" and "machine intelligence". The core of this interaction model is the real-time interaction between the translator and the machine, aiming to improve the efficiency and quality of translation.

In the human-computer interaction mode, translators can use computer-aided translation tools for real-time translation, and edit and adjust the machine-generated translation according to needs. At the same time, these tools also have automatic memory and search mechanisms, which can automatically store the content of the user's translation, and provide translation references and suggestions when the user translates similar sentences. This interactive approach makes the translation work more efficient and convenient.

In addition, with the continuous development of artificial intelligence technology, the application

of human-computer interaction mode in the field of translation is also deepening. For example, AI can improve the accuracy and fluency of translation by learning large corpora, and can also optimize itself according to the translator's operating habits and preferences, further enhancing the user experience.

Specifically, human-computer interaction patterns are used in various forms in translation. On the one hand, the translator can have a real-time dialogue with the machine to give Prompt for specific translation difficulties or specific contextual needs, and the machine will generate the corresponding translation according to these prompts for the translator's reference or direct adoption. On the other hand, the machine can also provide translators with more accurate word selection and sentence adjustment suggestions by automatically analyzing the grammar and semantic information of the original text.

In general, the application of human-computer interaction model in computer-aided translation has brought revolutionary changes to translation work. It not only improves the efficiency and quality of translation, but also makes the translation process more flexible and personalized. With the continuous progress of technology and the continuous expansion of application scenarios, human-computer interaction mode will play a more important role in the future.

9. Summary and Perspective

Computer-aided translation technology has brought great convenience to human translation, which provides translators with help and reference, however translators are still the main body in the whole process of translation. The construction of translation memory requires that translators make choices if the text cannot meet the requirement for translation initiative or lack of creativeness; thus in translation editing, translators also need to collate and do some proofreading. As the main body of translation, translator is not only playing the key role in early preparation, translation, but also in later editing in order to mobilize the initiative and so on. In a word, only by doing so, can we make the best use of the advantages of computer-aided translation technology.

This paper explores the subjectivity of human translators in the process of computer-aided translation (CAT). Through an in-depth analysis

of the core functions of CAT technology and the translator's role changes in the process of translation, this paper reveals the translator's subjective characteristics such as initiative, passivity and egotism in the CAT environment. At the same time, this paper also discusses how to give full play to the translator's subjectivity in order to improve the quality and efficiency of translation.

With the rapid development of information technology, computer-aided translation has become an important tool in the field of modern translation. CAT technology, with its powerful translation memory, term management and other functions, has greatly improved the efficiency and quality of translation. However, in this process, the translator's subjectivity has also been widely concerned. This paper will discuss the role and status of the human translator in the CAT environment from the perspective of translator's subjectivity.

CAT technology is a strategy of replacing part of the human translation process with a computer program. Its core functions include translation memory, term management, enhancement tools, etc. Translation memory technology can automatically store the content translated by users, and automatically give the previous translation results or reference suggestions in the subsequent translation. The term management function can help translators save and reuse terms, improve work efficiency and translation consistency.

The translator's subjectivity refers to the translator's active, active and self-serving characteristics in the translation process. In the CAT environment, the translator's subjectivity has been more prominently reflected. First of all, translators need to actively select translation tasks, decide translation strategies and purposes, and actively use the functions of CAT tools in the translation process. Secondly, translators are also restricted and influenced by CAT technology, such as automatic reminder of translation memory and standardized use of term base. Finally, translators need to give full play to their subjectivity in the post-translation editing stage to polish and perfect the machine-generated translation.

About how to give full play to the translator's subjectivity:

In the CAT environment, to give full play to the translator's subjectivity, it is necessary to start from the following aspects: First, improve the

translator's CAT skill level, so that he can master and use the functions of CAT tools; Secondly, to cultivate the translator's cross-cultural awareness and critical thinking, so that he can accurately grasp the intention and cultural connotation of the original text in the translation process; Finally, the synergistic effect between translator and machine is strengthened, so that CAT technology can be a helpful assistant for translators to improve translation quality and efficiency.

Computer-aided translation technology provides strong support for human translators, but the subjectivity of translators cannot be ignored. In the CAT environment, translators need to give full play to their subjective characteristics, such as initiative, passivity and self-sufficiency, and work with machines to jointly improve translation quality and efficiency. At the same time, with the continuous development and improvement of CAT technology, it is still necessary to further explore how to better play the translator's subjectivity and promote the progress of translation.

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