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Artificial Intelligence and the Specialized Translator: A Relationship of Complementarity or Erosion?

الذكاء الاصطناعي و المترجم المتخصَّص: علاقة تكامل أم تآكل؟

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Abstract:

Today's world is experiencing a rapid pace of technological progress, in which machine has notably replaced humans in performing various tasks assigned to them across all aspects of life. Translation, especially specialized translation, as many other disciplines, currently faces major challenges and significant stakes in light of what is termed Artificial Intelligence. This latter constitutes a real revolution in the domain of digital technology. Its applications are now utilized in converting specialized texts from one language to another without the assistance of a human translator. This change resulted in minimizing the role of this human translators and most importantly putting their future to the test. Accordingly, this paper seeks to shed light on the challenges posed by Artificial Intelligence applications, and to determine the nature of the relationship between the specialized translator and these tools, in an attempt to answer the following questions:

- What are the challenges posed by artificial intelligence in the field of specialized translation?
- can AI replace the specialized human translator?
- what is the nature of the relationship between specialized translation and artificial intelligence? Is it a relationship of complementarity or erosion?

Keywords: Specialized translator; Artificial intelligence; Efficacy; Techniques; Complementarity.

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الملخص:

يشهد عالم اليوم حركة متسارعة في وتيرة التقدّم التكنولوجي، حيث حلّت الآلة محلّ الإنسان بشكل ملفت للانتباه، و أضحت تؤدي المهام المنوطة به أيّما آداء في شتى ميادين الحياة، و على غرار غيرها من التخصّصات، تواجه الترجمة عموما و الترجمة المتخصّصة بشكل خاص حاليا تحدّيات جسيمة، و رهانات عدّة في ظلّ ما يصطلح عليه بالذكاء الاصطناعي الذي يعدّ ثورة حقيقية في مجال التكنولوجيا الرقمية، حيث أصبحت تطبيقاته تستخدم في نقل النصوص المتخصّصة ؛ حيث تم تقزيم دور الإنسان و باتت النصوص تنقل من لغة إلى لغة أخرى دون الاستعانة بالمترجم، الأمر الذي وضع مستقبله و آدائه على المحكّ . سنحاول من خلال هذه الورقة البحثية، تسليط الضوء على التحديات التي باتت تفرضها تقنيات الذكاء الاصطناعي مع تحديد طبيعة العلاقة التي تربط المترجم المتخصَّص بالذكاء الاصطناعي في محاولة للإجابة على التساؤلات التالية :ما هي التحديات التي يفرضها الذكاء الاصطناعي في مجال الترجمة المتخصّصة؟هل يمكن للتطبيقات الذكية أن تحلّ محل المترجم البشري المتخصَّص؟ما طبيعة العلاقة التي تربط الترجمة المتخصَّصة بالذكاء الاصطناعي؟ أهي علاقة تكامل أم تآكل؟

كلمات مفتاحية: المترجم المتخصَّص، الذكاء الاصطناعي، الفعالية، التقنيات، التكاملية

Introduction

In contemporary times, translation plays a crucial role in the pace of scientific and technological advancements, which is accelerating at an unprecedented rate. It has become an essential tool that researchers across various fields use to access the scientific achievements attained by other scholars around the world, without the language barrier that has long impeded the most effective exploitation of the new scientific developments, within what is commonly referred to as "specialized translation". This latter is deemed the most successful means, and the most effective tool for achieving purposeful exchange and communication among researchers from various disciplines. It has become an urgent necessity imposed by the scientific and technological development that characterizes today's world. Scholars today place significant concern on specialized translation given its importance in helping them accessing other researchers' expertise and contributions on the one hand, and to present and globalize their achievements on the other hand.

Specialized translation targets technical texts. Therefore, the specialized translator must possess specific skills and competences, such as accuracy in selecting the most appropriate terms, clarity in conveying meaning, and linguistic integrity in the language used. Thus, the translator's task is difficult: their role shifts from being a mere intermediary between languages to becoming an expert in the field of terminology and a researcher in the branches of specialization. This is what characterizes them as particular category of translators compared to non-specialized translators.

This has remained the case for a long time, until new challenges emerged and several stakes arose from the technological revolution that took place in the field of digital technology. The first of these challenges was posed by machine translation, in which the machine attempted to minimize the human role, as texts started to be converted from one language to another without the translator's involvement. This has put the translator's future and performance to the test. Some linguists seized on this as an opportunity that strengthened their beliefs and claims that translation is a linguistic activity that any competent bilingual

linguist can carry out. Yet these ideas were progressively refuted: machine translation proved limited in many cases. Automated translations were not accurate or correct, and it was shown that they cannot be applied to all types of texts—especially those with purely cultural terms that only the human translator can decode.

Afterwards, the rules of the game have changed. Machine translation—considered a traditional approach—was replaced by neural translation, which is mainly based on artificial intelligence. Neural translation works by developing neural networks using algorithms that analyze translation units with a very high degree of precision, correctly, and at a lower cost and within record time.

Through this study, we attempt to uncover the reality of specialized translation and the position of the human specialized translator in the era of artificial intelligence, thereby aiming to address the following concerns:

- What are the challenges posed by artificial intelligence in the field of specialized translation?
- Can AI application replace the specialized human translator?
- what is the nature of the relationship between specialized translation and artificial intelligence? Is it a relationship of complementarity or erosion?
- Will AI applications eliminate the role of the human translator?
- To what extent can AI application be relied upon in specialized translations?

1- Specialized translation

Translation has made huge advances in almost every area of human life and has became a basic requirement of life in today's world due to the latest developments that took place in the last century. The world is now a much smaller place than it used to be, and countries and people from different countries are able to easily communicate with each other without having to worry about language or cultural barriers. It cannot be denied that translation plays a very important role in allowing scholars and researchers from all over the world to communicate with one another, each according to their field, through specialized translation.

Before discussing the concept of specialized translation, it is worth noting that the term “specialized translation” is used to refer to non-literary translations. Its concept was defined as the counterpart to general translation. In this regard, Lavaut-Olleon states:

“The appellation was created in opposition to general translation as it was practiced in language learning, in its forms of translation into and out of the language—forms inherited from classical education with a dominant literary character” [2].

When it comes to specialized translation, researchers have generated new terms to define this discipline. Some authors refer to it as ‘technical translation’, while others might use the term ‘professional translation’. Other researchers have suggested the use of the terms ‘utilitarian’ or ‘pragmatic translation’[3].

Generally speaking, specialized translation is a category of translation that deals with the translation of texts from a given field of study, whether scientific, literary, or technical. For example, Al-Khoury describes specialized translation as "the translation of pure and basic sciences: mathematics, physics,

[2] Lavault-Olléon, E. (2007). *Traduction spécialisée : pratiques, théories, formation*. Peter Lang.
[3] Delisle, J. (1980). *L’analyse du discours comme méthode de traduction*. Éditions de l’Université d’Ottawa.

chemistry, life sciences (biology); earth sciences (geology); botany; zoology; as well as all 3 types of sciences (applied) sciences: including medicine, pharmacy, engineering, and technology books[4]".

According to this definition it is also possible to consider specialized translation as being a form of what is called techno-scientific translation[5]. The translation theorist Jean-René Ladmiral defines techno-scientific translations as those translations that fall within the realm of technology and/or related scientific fields and disciplines.

In translation studies, Jean-René Ladmiral states the following:

"Technical translation is nothing other than specialized translation"[6].

This means that any translation within a specialized field is essentially "technical" translation. It is worth noting in this regard that the term "technical" does not imply that the translation itself is technical in nature, but rather refers to texts of a technical character.

This idea is further confirmed by the researcher Jean-Claude Miroir, who states:

"Specialized translation consists in the translation of specialized texts, that is, texts belonging to a specific field of knowledge such as administration, law, economics, sociology, etc"[7].

In short, we might say that the concept of specialized translation is limited to the translation of texts belonging to a specific field of knowledge. There is no disagreement that each domain is characterized by a set of terminology and stylistic features that the specialized translator must know and master in order to carry out the translation process in the best possible way.

During the translation process, the translator must also take into account the expectations of the target reader, who is likewise a "specialist," as such translation is primarily directed at experts in the field rather than the general public.

2- The specialized translator

It is said that literary translation is the most difficult type of translation in terms of practice, while specialized translation has often been considered the easiest to perform, as it is viewed as merely a process of replacing terms in the source language with their equivalents in the target language. So, to what extent are these claims actually valid?

Specialized translation requires a set of competencies and qualifications that must be available in the specialized translator. They must possess particular skills that enable them to reproduce specialized and technical texts in the target language in a way that can serve as a scientific reference for many researchers and scholars in a given field. As a result, the specialized translator evolves from an ordinary translator into a terminologist and lexicographer as well. Their role shifts from merely transferring terms from the source language to the target language to becoming a scholar of terminology—responsible above all for selecting

[4] Shahada Al-Khoury. (1989). *Studies in translation, terminology, and Arabization* (Vol. 1). Dar Tlass for Studies, Translation and Publishing.

[5] Litots Texts. *Apprendre à traduire des textes spécialisés*. Retrieved December 20, 2025, from https://studiidegramaticacontastiva.info

[6] Ladmiral, J.-R. (n.d.). *Traduction philosophique et traduction spécialisée : même combat*. Université de Paris X–Nanterre.

[7] Miroir, J.-C. (2013). *La traduction spécialisée : approche professionnelle à l'enseignement de la traduction*. Presses de l'Université d'Ottawa.

the most appropriate terms in the target language, especially in light of the terminological disorder that the world is experiencing today. In no case can they content themselves with what terminologists produce; they must delve into the deep meanings carried by terms so as to choose the most accurate equivalent—one that most clearly reflects the term in the source language. Only then will their translation be successful and correct, and readily accepted by the reader, who will not feel its wording is strange. This is what translation scholar El-Gilani emphasized when he said:

"The translator must make sure of the correctness of their translation, and there must be nothing in it that the target language would find surprising, or that would make it seem weaker than the original"[8].

Ballard also spoke about the conditions of the specialized translator, saying:

"To translate a chemistry text, one must be a chemist or have studied chemistry; to translate a literary text, one must be literary—or at least know literature"[9].

This means that the specialized translator must be proficient in the field in which they translate. This is what makes their training distinct: it goes from knowledge of the language of specialization to understanding the particularity of texts, which are marked by specific stylistic features. In this regard; El-Gilani further listed the conditions of the professional specialized translator, stating:

"The tools of the successful translator are personal knowledge, mastery of two languages, the acquisition of linguistic and specialized references, the handling of the issue of transfer from languages that have their own syntactic characteristics, which differ partially or wholly from those of Arabic—and that, if not discovered, may lead to semantic dilemmas that distort the meaning or misrepresent it"[10].

Thus, in addition to proficiency in the source language and the target language—an obvious requirement that cannot be ignored—the specialized translator must also have in-depth knowledge of the field they are translating. They must also equip themselves with specific material means that help them perform their work. Furthermore, they are required to grasp most—if not all—of the meanings expressed, whether explicit or implicit, in order to ensure that the specialized reader receives the translation as if it had originally been written in the target language. Given this, the training of the specialized translator requires a set of competencies, which the researcher Daniel Gouadec summarized as follows[11]:

Initial competences: These consist of command of the two working languages (the source language and the target language), terminological competence, and mastery of the technical tools that assist translation.

Technical competences: These refer to familiarity with everything related to the field of knowledge with which the specialized translator deals—its concepts, terminology, rules, standards, and value systems.

Revision competences: These include the translator's ability to use revision techniques in order to assess the quality of their work.

Information/IT competences: These concern the core skills needed to use computer-based programs such as databases, artificial intelligence applications, and search engines, etc.

[8]Al-Jilani, I. B. (1996). *Translation studies and the superiority of Arabic over other languages*. Al-Maktab Al-Arabi lil-Maʿarif.

[9] Ballard, M. (1995). *Relations discursives et traduction*. Presses Universitaires de Lille.

[10] Al-Jilani, I. B. Op. Cit, P. 47.

[11] Gouadec, D. (2007). *Traduction / traducteur technique : marchés, enjeux, compétences*. In *Traduction spécialisée : pratiques, théories, formation* (pp. 173–175). Bern: Peter Lang.

3- Specialized Translation and Artificial Intelligence

Translation is currently facing major challenges and multiple stakes in light of what is known as artificial intelligence, which has brought about a true revolution in digital technology. Its applications are now used in learning foreign languages, analyzing texts, compiling dictionaries and lexicons, and even in translating from one language to another.

The origins of artificial intelligence date back to 1956, when the computer scientist John McCarthy organized a two-month workshop at Dartmouth College with the aim of studying artificial intelligence and investigating the extent to which a machine could imitate human intelligence. Scientists broadly agreed to define it as a method for creating a computer-controlled robot, or as a program that thinks in the same way as intelligent human beings. It also refers to a set of techniques or applications that enable machines or computers to simulate the cognitive functions of the human brain[12].

In the translation field, AI-assisted translation is defined as the process of using artificial intelligence systems and machine learning to translate texts from one language to another automatically. This technology relies on advanced algorithms such as deep neural networks, which are now able to produce highly accurate, high-quality translations in record time. As a result, the entire world has turned toward these modern technologies.

Large economic companies increasingly rely on AI translation applications such as ChatGPT, DeepL, Gemini, Systran, Reverso, and other advanced tools. These are used to transfer various documents related to their international business dealings, such as transactions, contracts, agreements, etc., as an alternative to the human translator, even when the translator is specialized in the relevant field. They see AI as more effective in the job market because it allows for translating vast quantities of text in the shortest time with less effort. It has also demonstrated an ability to handle many of the world's languages—even rare ones, which are difficult to find specialized human translators for. Moreover, it facilitates the translation of different types of multimedia content such as videos and audio segments with ease and high accuracy. Finally, AI translation is generally low-cost and offers translation services at modest prices compared to the fees and compensation of a specialized human translator.

One cannot deny that the adoption of AI technologies increasingly threatens the future of the human translator. It even seems to signal the "death of the translator"[13], a development that is radically transforming the profession, especially when analyzing the translator's role and how it is being replaced by AI.

AI has evolved from being merely an auxiliary tool into a force capable of unsettling the translator's stability in their professional functions, particularly in specialized fields such as medical translation, technical translation, economic translation, political translation, and even legal translation. In these types of texts, often composed of highly standardized terms translated by fixed equivalents in the target language, human intervention is sometimes no longer necessary.

[12] Ben Mars, H., & Makhansha, M. (2003–2004). *Applications of artificial intelligence in the field of public procurement* (Master's thesis). University of 8 May 1945, Guelma, Algeria.
[13] Blelit, S. (2025). *Translation and artificial intelligence: The dialectic of reality between application and localization*. Arab Democratic Center. Retrieved December 25, 2025, from https://democraticac.de.

Despite that, there still exists many instances where the assistance of a human translator is still mandatory. There are various problems that arise when only utilizing AI to provide translations of documents. This is especially true when working with texts which have a figurative meaning, i.e., literary works, in which AI cannot translate the tone properly and does not maintain the artistic expression or style of the text as written in its original version. This often results in a translated text having no character or aesthetic quality. Due to the degree of limitation, AI will also not be able to produce an accurate translation of any text due to their inability to understand cultural, social or historical context. There are many more issues with AI translation such as the unethical use of AI translations regarding confidentiality in specific industries such as the military field. Another issue associated with AI translation is that they will not provide accurate representations of objective facts because the individuals who create these platforms, by providing the information and data that is used on these platforms, do so according to their ideologies, particularly in political contexts. A clear example of this is the resignation of one of AI developers at Carnegie Mellon University, where the Pentagon was funding his researches.

4- Prospects for Specialized Translation in the age of Artificial Intelligence

Artificial intelligence has made a qualitative leap in specialized translation. The growing demand for its applications and the increasing use of AI tools to translate specialized texts are invading the global market. This is becoming a preferred option among users and companies. However, AI-based translation remains dependent on the quality of the software designed for it. Its translation ability is limited to the surface lines of the text—it cannot grasp what remains unsaid. It also cannot analyze contexts. This highlights the real position occupied by the human translator and the central role they play in reviewing translations produced with AI. The human translator's role has not yet definitively overcome the challenges posed by a set of extra-linguistic factors that require human intervention.

The likelihood of replacing human translators with AI technologies is extremely unlikely. Human translators must adapt to this new reality: they are required to use AI tools to improve their productivity, and to invest these technologies to produce high-quality translations. In this way, an effective blending of machine power and human creativity becomes possible. This approach is a "hybrid" method in which AI-supported translation combines with human expertise, ensuring accurate translations produced quickly. This is what some leading companies in many fields rely on. Research has shown that mixed translation accounts for 60% adoption rates among institutions that aim to balance speed and quality. These institutions rely on neural machine translation while pairing it with specialized human review, so that the editing and correction process can begin. Hence, the relationship between AI and the specialized human translator is, in essence, a complementary relationship—one that seeks integration rather than erosion.

Conclusion

In light of the rapid development of artificial intelligence technologies seen in the last decades, within specialized translation, which has kind of opened promising horizons, the accuracy and speed of this translation approach when it comes to specialized terms still, not entirely settled. Even if AI tools show quite good results in translating specialized texts, they still cannot simply replace the human translator, who

has a key role in grasping specialized contexts, improving contextual accuracy, and making sure the usage of specialized terminology stays consistent.

AI-assisted translation methods and language processors still must be reviewed and corrected by human translators because there are many limitations (such as not being able to work with specific text types) that are present in specialized translation.

Based on the aforementioned, in order to address the challenges posed by AI application for specialized translation, this paper presents the following recommendations:

- Encourage specialized translation to benefit from Artificial Intelligence and the solutions it offers to review and correct translated texts.
- Enhancing training databases with specialized terminology and texts from all areas of knowledge.
- Providing more than one translation option; allowing the human translator the ability to pick from multiple options the most appropriate, and which term best meets the context of what needs to be translated.
- Ensuring the accuracy of all translated texts, particularly scientific texts, through human revision by specialized translators.
- Providing increased accuracy in translated texts as artificial intelligence-based technology continues to evolve.
- Increasing the volume and quality of data available to improve the functionality of algorithms used by artificial intelligence.
- Integrating artificial intelligence into both translator training and translation education.
- Encouraging translators to use machine translations as a medium of assistance in the revision process.
- Developing artificial intelligence-based technology under the guidance of specialized human translators.
- Support an interdependent relationship between artificial intelligence and specialized human translators, and to move away from the concepts of "replacement" or "substitution" of one for the other.
- Creating hybrid models that possess both human and artificial intelligence, functioning together.
- Stressing the necessity for human translators to master artificial intelligence tools and to reshape their role accordingly.

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