Artificial Intelligence–Facilitated Translation as a Process and a Product

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Abstract

This paper explores the extent of the usability of Artificial Intelligence in Translation as both a process and a product, emphasizing the prospects and limits of such a use of AI tools in the field of translation. Facilitated by AI technologies, particularly machine learning and Natural Language Processing, translation has become a cost-effective and a time-economical process. AI substantially enhances the translation process by automating routine tasks and allowing human translators to focus on more complex issues of meaning, style, function and cultural subtleties. Such AI-Human collaboration in translation is likely to raise questions regarding the nature of translation equivalence and the level of accuracy of AI-facilitated translations. The remoter the language pairs semantically, syntactically and culturally are, the higher the degree of loss in AI- facilitated translation. Human revision phase is ultimately required and deemed indispensable for making the AI-generated translation process somehow reliable and able to provide an end product that can immediately be used as a final draft. Novice translation methods are recommended to qualify the AI-driven

translation product, such as the constraints on the input (Source Text), and that is by depriving the source text -intended to be rendered by means of an AI-based translation widget- from any special cultural trait, namely, preparing it for some kind of culture-free purely linguistic processing. This paper recommends that incurring some cultural loss on the product is assumed as less jeopardizing for TL receptors than exposing them to any counter-cultural effect. The evaluation of AI-generated translation product requires both quantitative metrics and qualitative assessments to ensure fidelity and quality. This paper argues that understanding AI- facilitated translation necessitates imposing cultural constraints in the input in order to free the translation process from the cultural nuances. AI-Human collaboration during the translation process also raises questions regarding product authorship and authenticity. Further research is necessary to investigate this complex area of human-machine collaboration.

Key Words: Human Translator, Machine Translation, Translation Process, Translation Product

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1. Introduction

Translation is undeniably an indispensable service in todays' life matters. Without translation, nations are prone to live in a deserted reality, culturally and linguistically alienated from the other human congregates. People, speaking their varied languages, still have many things in common, as translation facilitates and strengthens such bonds. Amidst an eminent boom in knowledge, culture and living demands, the need for broader translation services is getting more acute. Human translators cannot, indeed, provide the required service under severe constraints of 'variety and volume' of the translation product. The larger the need for translation services, the more critical the situation is likely to be. The advent of technology provided the long-dreamt of solution of automated translation, giving the timely, as well as the ever-largest translation product.

Translation not only serves to maintain basic human needs for communication, rather it also serves to enhance the permanence and existence of a particular culture among other cultures. Arnold (1994, 4) observes that, "Since the loss of a language often involves the disappearance of a distinctive culture, and a way of thinking, this is a loss that should matter to everyone." Arnold further stresses that, "… translation is necessary for communication — for ordinary human interaction, and for gathering the information one needs to play a full part in society." The emergence of the extensive use of Artificial Intelligence (AI) in the various domains of life, translation is no exception, things are seemingly becoming more accessible. The development of AI and discourse in the recent years, according to Moneus and

Sahari (2024, 2), has "…influenced various sectors, including academia, industry, media, and politics." In the same source, Moneus and Sahari further states that, "This interdisciplinary field is at the forefront of technological advancement, influencing a myriad of sectors and reshaping understanding of the world…"

1.1. Literature review

Despite the fact that the role AI performs in the life of individuals, it's unfortunate to claim that we must not take AI-facilitated products, including translation, for granted. Hutchins (2007, 1) states that, "…what is often needed is not a 'perfectly' accurate rendition but something that can be produced quickly (sometimes immediately) conveying the essence of the original text, however grammatically imperfect, lexically awkward and stylistically crude", referring to what is often referred to as, "…'machine translation for assimilation' in contrast to the production of publishable- quality translations, called 'machine translation for dissemination'. Hutchins also refers to "…a third application has been identified where MT is used in social interchange (electronic mail, chatrooms, etc.) where again high-quality is not essential: 'machine translation for communication'."

Crisostomo et. al (2022, 188) assert that, "…the study of translation has turned out to be one of the thriving fields in language study." The same source adds that, "Ever since James Holmes provided a framework and historiography for this discipline, it has not lost its relevance even to modern-day translation works." Needless to say, Machine Translation (MT), being one of the AI- based translation tools, often fails in rendering varieties of texts such as 'abbreviations, idioms, metaphor, borrowings, calque and culture-specifics', to name a few, drastically affecting the translation product because of a particular limitation in the automated process of handling natural languages. Human intervention in some phases of the translation production is a must in such cases of machine inefficacies. Crisostomo et. al (2022, 188) refer to natural language processing (NLP), being it a 'well-known concept under AI', as "…the automatic (or semi-automatic) managing of human language, and it is dedicated to helping people understand the text and receive invaluable insights (Copestake, A., 2008)"

The reliability of human translators on AI tools in translation, is considered as a highly assistive technology that enhances human capabilities, yet, such tools can never entirely replace humans due to a number of reasons this paper tries to highlight. Despite the fact cited in Moneus and Sahari (2024, 2), that "Zuckerberg, the founder of Meta, has expressed a strong belief in the transformative power of AI, claiming that AI is perhaps the most important foundational technology of modern times", but it is a debatable issue whether the 'power of AI' can -one day, be completely automated! That's, can it self-learn and self-solve problems associated with the process of natural languages' processing and production?

Crisostomo et. al (2022, 188) denote that, "The development of artificial intelligent programs for language translation is growing exponentially, with a neural machine translation of language offering more precise interpretation", comparing that to what they call 'statistical machine translation', "which interprets sentence fragments", while 'neural machine translation' "…translates complete sentences." Yet, a machine is, but a machine that does not, and is not assumed to, have entirely replace humans when it comes to idealize the translation 'product'. The translation process highly affects the translation product, a matter that ever continues to hang on human translators as the natural reference in relation to natural language processing.

1.2. Research questions

This paper seeks to answer the following questions:

1. To what extent does the use of Artificial Intelligence (AI) facilitate translation as a process?

2. To what extent does the use of Artificial Intelligence (AI) facilitate translation as a product?

3. To what extent can AI replace human translators?

2. Discussions

2.1 Artificial Intelligence (AI)-facilitated translation

Boucher (2020, 1) defines AI as, "…systems that display intelligent behaviour by analysing their environment and taking action – with some degree of autonomy – to achieve specific goals." Highlighting this sort of 'intelligence', a definition of the word 'intelligence' is sought to develop some kind of understanding for the mechanism of operation adopted by such artificially-intelligent tools. 'Intelligence' might be defined as, "the ability to learn and perform suitable techniques to solve problems and achieve goals, appropriate to the context in an uncertain, ever-varying world", according to Manning (2020, 1), who further states that, "A fully pre-programmed factory robot is flexible, accurate, and consistent but not intelligent."

Automated translation which is based on computational processes and algorithms, has greatly affected the translation industry, both at the level of 'process' and 'product'. Human translators have short-cut the too many hours' task by getting their initial drafts in a 'click of a button'. The automated process provided a great support for human translators, without entirely getting rid of them. Human translators will always be in demand, as long as the texts produced by other humans are not identical to those taught to machines, and as long as such texts are produced by various individuals in highly varied situations and fluctuating life demands, then machines still are in need to have text pairs that are first produced and cross-checked by human translators to ensure their accuracy.

Moreover, accuracy sometimes goes beyond linguistic barriers to more acute cultural and abstract ones. Such machine intelligence thence, being an artificial one, wouldn't suffice to finalize the product.

2.2. AI-facilitated translation as a process

Arnold (1994, 4) states that, "The problem is that the demand for translation in the modern world far outstrips any possible supply", highlighting that, "Part of the problem is that there are too few human translators, and that there is a limit on how far their productivity can be increased without automation." In the same vein, Hutchins (2007, 1) a type of demand for the translation product, namely; "…the traditional need for translations of 'publishable' quality, particularly the production of multilingual documentation for large corporations." Hutchins asserts that, "Here the output of MT systems can save time and costs by providing draft translations which are then edited for publication – this mode of use being called human-aided machine translation (HAMT)."

Considering translation as a process entails two different languages, with two different cultural realities. The variation in the means of expression along various linguistic codes, makes the full automation of the 'process' somehow sophisticated. A machine automatically performs the translation process, while a human translator 'thinks' about the whole aspects of the text in question. In the same respect, Russell and Norvig (2021, 2) observe, "To say that a program thinks like a human, we must know how humans think." The researchers further stipulate that, "We can learn about human thought in three ways: introspection—trying to catch our own thoughts as they go by; psychological experiments—observing a person in action; brain imaging—observing the brain in action." Russell and Norvig, then asserts that, "If the program's input–output behavior matches corresponding human behavior, that is evidence that some of the program's mechanisms could also be operating in humans." Yet, is this the case in all language-related situations where 'thinking' itself needs to be thought about.

The issue then, might go beyond language, to the philosophy of that language and how can it be perceived in the various speech settings. Filman (2012, 160) states that, "Philosophers have been grappling with the nature of reasoning and knowledge since the time of the ancient Greeks",adding that, "This tradition, formalized in the last half of the 19th century with the work of Boole,Frege, and Russell and expanded and amplified in the current century by philosophers like Quine, Carnap, and Tarski, is an important part of Western intellectual history and has developed into the philosophical and mathematical study of logic."

2.3. AI-facilitated translation as a product

AI-facilitated translations cannot be used as an immediate final product, rather, they need to be reviewed by human translators for qualitative judgments to identify 'vulnerable points', e.g. abbreviations, idioms, …etc.), in addition to the adoption of automated metrics (such as BLEU scores). Vashee (2021) simply states that "BLEU" (…is a "quality metric" score for an MT system that is attempting to measure the correspondence between a machine translation output and that of a human with the understanding that "the closer a machine translation is to a professional human translation, the better it is"." Then, any metrics that is used to qualify machine translation products, ought to heavily rely on human-generated evaluations. This issue highlights the importance of feedback loops where users can contribute to the improvement of AI systems through corrections and suggestions.

In the "laws of thought" approach to AI, Russell and Norvig (2021, 4) indicate that, "…the emphasis was on correct inferences", emphasizing that, "Making correct inferences is sometimes part of being a rational agent, because one way to act rationally is to deduce that a given action is best and then to act on that conclusion." In the same respect, Wilks (2009, 11) states that, "…workers in natural language in the field known as Artificial Intelligence (AI) began to make distinct claims about the need for their approach if there is ever to be general and [high-quality] MT (Wilks, 1973a; Charniak, 1973; Schank, 1975a)."

Crisostomo et. al (2022, 188) observe that, "Having various disciplines associated with translation studies, it is therefore imminent that artificial intelligence will find its way to become a subject in cross-cultural language translation." Computational linguistics is, therefore, has presented an indispensable reality in association with translation both as a process, as well as a product. As cited in Wilks (2009, 12), Bar-Hillel reviewed the situation in 1971 (Lehmann and Stachowitz, 1971, p. 72): "It is now almost generally agreed upon that high-quality MT is possible only when the text to be translated has been understood, in an appropriate sense, by the translating mechanism".

In the same vein, Turian et. al (2003, 3) indicate that, "One of the main sources of variance in MT evaluation measures is the multitude of ways to express any given concept in natural language", adding that, "A candidate translation can be perfectly correct but still very different from an equally correct reference translation." Candidate translations, indeed, are prepared based on human intuition and analysis of the source text in question. Crisostomo et. al (2022, 188) remarks: "With all these developments in AI translation permeating the business, tourism, healthcare, legal, and even educational industries, it can be interesting to find out what challenges does it pose to cross-cultural translation studies,

particularly with the continuous research in NLP and the pervasiveness of AI translation in various industries, and what answers can be drawn that would guarantee the relevance of translation studies in an era that is dominated by technology."

"To achieve a desirable degree of accuracy", Dorr (1993, 1), states that, "…such a system must capture language-independent information while still systematically processing many types of language-specific phenomena in each of the individual languages."

2.4. Facilitation vs replaceability

Vashee (2021) asserts that, "We should say up front, that the most assured way to determine the best MT system from competing alternatives is to have an assessment done by competent human translators." He additionally emphasizes that, "Preferably using a team of translators who run a

diverse range of relevant content through the MT systems after establishing a structured and repeatable evaluation process", despite the fact it is, "…slow, expensive, and difficult even if only a small sample of 250 sentences are evaluated", he added. According to Koehn (2012, 179), "Automatic metrics suffer from the fact that a handful of human reference translations cannot expected to be matched by other human or machine translators, even if the latter are perfectly fine translations", adding that, "Machine translation output is then matched against this network using string edit distance, and the number of edits is used as a metric."

Referring to the translation of scientific and technical documents, Hutchins (2007, 1) observes that in such texts, "…the difficulties of cultural differences and variable contexts are less acute than in the more 'culture-bound' translation of literature, legal texts, and many areas of sociology." Hutchins further indicates that, "In science and technology, the demand for translation has almost always exceeded the capacity of the translation profession, and these demands are growing rapidly", adding that, "…the coming of the Internet has created a demand for immediate

online translations, which human translators cannot possibly meet."

3. Conclusion

The multifaceted nature of AI-facilitated translation, necessitates a comprehensive understanding of its influence on translation as both a process and a product. The evolving landscape of translation in the age of AI, represents huge opportunities despite the imminent challenges. Further research could involve empirical studies to evaluate the AI-Human collaborative efforts, defining better practices for integrating AI into translation workflow in

a way that supports the translation process from the one hand, and enhances the translation product on the other. To conclude, as long as language production has no fixed identity, and that text production is genuinely human-based, then translation can only be rendered by means of a machine, if a human translator stands at the very frontline following up the early deep learning processes, ending up with the final revisions and vital fine touches on the end product.

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