Problems of machine translation of specialized discourse. The case of concepts in medical biology.

Les problèmes de traduction automatique d'un discours spécialisé. Cas des concepts en biologie médicale.

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Abstract:

Translation is a linguistic operation that serves to transmit a message from one language into another as faithfully as possible. It is a human activity that is carried out with the help of linguistic and extralinguistic cues. The translation is in fact much more than the knowledge of two languages. It also requires knowledge of the culture, traditions, implicit and explicit of a language and, not least, knowledge of one's native language and the ways of saying things in that language. A successful translation is one that is comprehensible and coherent in restoring the meaning of the text and the meaning of the author. Our paper is effectively oriented towards the operation of machine translation for the treatment of medical texts, in particular concepts in medical biology by raising its qualities and its failures. Ultimately, in this paper, our aim is to demonstrate the extent to which machine translation can be used as an effective tool, and what steps are necessary to guarantee high-quality translation, highlighting the irreplaceable role of the human translator in this process.

Keywords: Machine translation; specialized discourse; medical discourse; medical biology.

Résumé :

La traduction est une opération linguistique qui sert à transmettre un message d'une langue à une autre le plus fidèlement possible. C'est une activité humaine qui s'exerce à l'aide d'indices linguistiques et extralinguistiques. La traduction est en effet bien plus que la connaissance de deux langues. Elle nécessite également la connaissance de la culture, des traditions, des explicites et des implicites d'une langue et, surtout, la connaissance de sa propre langue maternelle et de la façon de dire les choses dans cette langue. En particulier, une traduction réussie est une traduction compréhensible, cohérente et qui restitue le sens du texte et celui de l'auteur. Notre article est orienté vers l'exploitation de la traduction automatique pour le traitement des textes médicaux, en particulier les concepts en biologie médicale en soulevant ses qualités et ses échecs. En bref, notre objectif est de démontrer dans quelle mesure la traduction automatique peut être utilisée comme un outil efficace et quelles sont les étapes nécessaires pour garantir une traduction de haute qualité, en soulignant le rôle irremplaçable du traducteur humain dans ce processus.

Mots-clés : Traduction automatique ; discours spécialisé ; discours médical ; biologie médicale.

Introduction

Translation, being an act aiming at making others understand a message written in a language they do not know, requires many skills, know-how and understanding as a first step. It should be noted that the translator must understand to be understood. However, he is a reader before becoming a writer. Secondly, translation is certainly one of the most difficult language exercises there is.

To analyze the results of this study, we have adopted a comprehensive and structured methodology aimed at ensuring a clear and logical presentation of our findings. Specifically, we have employed a comparative and analytical approach to examine the collected corpus of concepts in medical biology. This methodology involves systematically comparing different translations of medical terms and phrases to identify patterns, discrepancies, and areas of improvement. By analyzing these translations, we can evaluate the accuracy and reliability of machine translation tools in the medical field. Our approach includes both quantitative and qualitative analysis to measure the performance of translation software against established linguistic and medical standards. Additionally, we have incorporated expert reviews from professional medical translators to validate our findings and provide insights into the nuances of medical terminology. This meticulous methodology allows us to thoroughly assess the effectiveness of automatic translation in conveying precise and meaningful medical information.

In this context, our research aims to address a critical question: To what extent can automated translation reliably convey medical discourse without compromising accuracy or introducing translation errors, given the stringent standards that prohibit approximation or linguistic inaccuracies?

In this article, to effectively address the challenges surrounding machine translation of specialized discourse, particularly focusing on concepts in medical biology, our plan entails a systematic and comprehensive approach. Initially, we will identify and delineate the specific linguistic and technical intricacies inherent in medical biology terminology. Subsequently, we will critically evaluate existing machine translation systems to discern their limitations and shortcomings in accurately rendering such specialized concepts. Following this, we will conduct rigorous comparative analyses between machine-generated translations and human-translated equivalents to ascertain the degree of accuracy and semantic fidelity achieved by automated systems. Additionally, we will seek insights from domain experts, including medical professionals and linguists, to validate our findings and gain a deeper understanding

of the nuances within medical terminology. Finally, based on our comprehensive assessment, we will propose potential strategies and enhancements aimed at improving the effectiveness and reliability of machine translation in handling specialized discourse within the realm of medical biology.

In this article, we will try to understand if a machine translation software would be adequate as a translation tool to translate a medical speech with efficiency and relevance.

Moreover, the quality of the translation of medical discourse depends on the linguistic and cognitive skills of the medical translator as well as the mastery of the terminology of medical discourse. In fact, it isn't enough to know how to translate, but it is necessary to know how to translate well. Therefore, it isn't only a matter of mastering the various theories, approaches and strategies of translation, but of knowing how and when to apply them adequately. This is the essential problem that every specialized translator is confronted with. This makes the challenge more complex when it comes to translating medical documents in a complex and sensitive field.

In short, to translate a text from one language into another, it is necessary to have a good knowledge of the lexicon in both languages. Therefore, it is very useful to read regularly in both languages and to learn this lexicon. Learning doesn't only mean translating one word into another, but also knowing how to give a definition of the term in each of the two languages.

1. Machine translation definition:

Machine translation can be defined as the translation of texts from one language to another using programs that do not require the intervention of human translators. It is a sub-field of computational linguistics, which studies using software to translate text or speech from one natural language to another. It also refers to the raw text translation carried out entirely by one or more computer programs. Moreover, according to Pierrette Bouillon (1993) :

> La traduction automatique (TA) se définit comme l'application de l'informatique à la traduction des textes d'une langue naturelle de départ (ou langue source LS) dans une langue d'arrivée (ou langue cible LC). (p. 15).[1]

Machine translation (MT) involves the theory and practice of using computer tools to translate text from one language into another. The notion of machine translation refers to a kind of

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[1] Machine translation (MT) is defined as the application of computer technology to the translation of texts from a natural source language (or SL source language) into a target language (or TL target language)." (Our translation).

translation that is performed with the help of computer programs or software without any human intervention.

In the same vein of thought, machine translation can be defined as the fact of translating a text entirely, with the help of one or more computer systems, without a human translator having to intervene in the process. In other words, we define machine translation as any kind of translation done with the help of computer software.

2. Types of machine translation:

Divided into three types in relation to human intervention in the translation process:

2.1. Purely automatic translation (Direct Machine Translation): which relies entirely on computer translation programs without any human intervention.

2.2. Human-assisted machine translation: carried out by computer programs computer programs, with human assistance.

2.3. Computer-aided human translation (CAHT): performed by a human translator, using programs, also known as interactive machine translation.

3. Machine translation approches :

Machine translation approaches have evolved significantly, offering more sophisticated and accurate solutions to the challenges of multilingual communication. From traditional statistical translation to more recent neural translation, each approach brings its own advantages and innovations. Statistical translation, using huge corpora of data, has enabled smoother, more contextualized translations. However, neural translation, thanks to deep learning and a deeper understanding of linguistic structures, has gone a step further, producing translations that are more natural and faithful to the original meaning.

3.1. L'approche statistique:

The statistical approach to machine translation is revolutionizing multilingual communication by analyzing correspondences between words and phrases in different languages from large bilingual datasets. Although it can sometimes produce literal translations, it offers valuable fluency and contextualization. This method has paved the way for new advances, such as neural translation, making global communication more accessible and efficient.

3.2. The example-based approach:

The example-based approach to machine translation takes advantage of concrete examples of human translations to guide the algorithms. By exposing the system to a variety of quality translations, this method results in smoother, more accurate and more natural translations. It offers a promising solution for improving machine translation and facilitating intercultural communication.

3.3. The example-based approach:

Hybrid approaches to machine translation combine statistical or example-based methods with rule-based linguistic methods. This fusion allows the advantages of each method to be exploited, resulting in more accurate and natural translations, particularly for morphological and syntactic analysis.

4. Comparative analysis: machine vs. human translation in specialized medical discourse

In any translation, whether human or automated, the meaning of a text in the source language must be fully transferred to its equivalent meaning in the target language, even if at first sight this seems simple and easy, but it's not always obvious, so it's more complex.

The human translator interprets and analyzes all the elements in the text (grammar, syntax, semantics, etc.), either in the source language or in the target language.

Machine translation finds it difficult to interpret the context or cultural elements of a text and is even unable to decipher the connotative meaning and make a good reading of the meaning located between the lines (collocations, proverbs, idiomatic expressions...etc.).

In contrast, translations carried out by human translators generally demonstrated better quality and greater fidelity to the source text. Human translators were able to capture contextual nuances and select the most appropriate terms for the medical field concerned. Their intervention avoided common translation errors and ensured accurate, comprehensible communication.

To illustrate these differences, let's take a concrete example. Suppose an original text mentions "une hypertrophie bénigne de la prostate". A MT program might translate this literally as "a benign hypertrophy of the prostate", which is technically correct but not idiomatic in French. A human translator, on the other hand, would probably opt for a more natural formulation such as "a benign prostatic hypertrophy", which is both medically accurate and linguistically fluent.

In addition, this study revealed that human translations were often accompanied by greater stylistic consistency and better adaptation to the target audience. Translators were able to adjust the level of technicality of the language to suit the recipients of the text, be they healthcare professionals or patients.

In conclusion, the results obtained indicate that, despite constant progress in the field of machine translation, translations produced by human translators remain generally superior in terms of quality, accuracy, and fidelity, especially in specialized fields such as medicine. Although machine translation software can be useful for simple tasks or for obtaining a general understanding of a text, it cannot yet rival human expertise in specialized, nuanced translation.

4.1. The problem of machine translation of medical speech:

Today, we are faced with a multiplication and diversification of the tools offered to the translator, which lead to changes in the translator's profession, and this thanks to translation assistance tools. The use of machine translation saves time. On the other hand, the modern translator must see machine translation as an ally, not an enemy, because it is undeniably present in his professional environment.

For the human translator, there are no problems with the ambiguity of meaning due to formal similarity, or ambiguity due to double semantic updating, but for the machine, the problem of ambiguity of meaning is the main barrier to a correct translation. But are these programs always reliable for translating medical texts?

In our study, which questions the automaticity of so-called machine translation, our aim is to verify the hypothesis that machine translation could replace humans, sooner or later, in the translation process.

Indeed, machine translation is not so automatic. In this regard, Herbulot (2004) points out that: *« La traduction n'est pas un travail sur la langue, sur les mots, c'est un travail sur le message, sur le sens.»* (p. 307). [2]

Translation aims at the faithful transmission of the message from one language to another with clarity, precision, and concision. However, the notion of translation as a discipline has been well and truly defined by several theorists and translators. So, "What is human translation versus machine translation?

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[2] Translation is not a work on the language, on the words, it is a work on the message, on the meaning." (Our translation).

It is important to note that human translation is the form of translation where a human translator renders the source text into a target language without the intervention or assistance of a machine such as a computer and the software it hosts. It is, quite simply, translation done by humans without the intervention of a machine.

In this light, it seems relevant to us to point out that, unlike human translation where the translator must spend a lot of time and energy, depending on the volume of work to be done and the deadline that is allocated to it, machine translation, on the other hand, allows to accomplish in no time, a large quantity of texts. This is why, today, many people do not hesitate to use it to save time by facilitating their tasks.

4.2. Limitations of machine translation of medical speech:

In this section, we will expose with the help of some empirical examples, the obstacles to be overcome during the process of machine translation of medical speech. As we have already mentioned, translation in any form (human/automatic) faces both linguistic and extra-linguistic challenges.

Machine translation from a source language to a target language poses lexical, syntactic, semantic, and even morphological problems resulting in structural ambiguity. This tendency is due to the linguistic inadequacy and lack of natural intelligence of natural language translation tools.

Medical language is particularly technical and complex. In their approach to medical language and its sociolinguistic and social implications, Sara Vecchiato and Sonia Gerolimich address communicative difficulties and speak of "hypercomplexity" (Vecchiato, et al., 2013). They explain that :

> [...] la complexité de la langue médicale n'est pas seulement une caractéristique inhérente à cette langue, mais que son appréhension comme telle dépend aussi du destinataire du texte en question ainsi que de certains choix rédactionnels. Car si la communication s'avère difficile entre médecin et patient, la complexité de la langue médicale est en revanche fonctionnelle entre spécialistes du domaine. » (p. 83).[3]

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[3] ...The complexity of medical language is not only an inherent characteristic of this language, but that its apprehension as such also depends on the recipient of the text in question as well as on certain editorial choices. For if communication is difficult between doctor and patient, the complexity of medical language is functional between specialists in the field. (Our translation).

Yet, the complexity of medical language is increasingly perceived as a potential barrier to good communication with the patient, so in recent years, several public and private organizations have been working to develop useful simplification strategies, which are supposed to ensure good quality medical information.

Therefore, the complexity of language is not only an inherent characteristic of medical language, but its apprehension as such also depends on the recipient of the text in question as well as on certain editorial choices. While communication between doctor and patient is difficult, the complexity of medical language is functional between medical specialists. Certainly, when translating medical speech, several difficulties must be overcome. The specialty language and medical terminology present the major challenge for the medical translator because they are of different natures, such as facts known by the readers of the source language, but unknown by the readers of the target language.

On the other hand, medical language is a specialty language that works hand in hand with the general language.

Sara Vecchiato, et al., (2013), illustrate this point by making this argument : *« Comme dans toute langue de spécialité, les textes médicaux contiennent au moins deux tiers de mots de la langue générale »*. (p. 89)[4]

Moreover, the multiplicity of terms designating the same concept in the medical field is a real difficulty for the human translator and the machine as well as for the terminologist, who is forced to make a choice. The existence of multiple terms for the same concept is a common pitfall in medical discourse.

Due to the complexity and diversity of the medical knowledge acquired by physicians during their training, the knowledge of extralinguistic is colossal. Indeed, most of the terms used in medical discourse call upon a specific cognitive background, implicitly implied. It is therefore difficult to translate, when one does not have all the keys in hand and when one sees various notions appearing from one term to another, all of which are intertwined and whose understanding is essential to provide a good translation.

Rouleau (1994) show that :

> La compréhension d'un texte de spécialité est la résultante de deux compétences, distinctes mais complémentaires : la capacité de faire l'analyse des structures

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[4] As with any specialty language, medical texts contain at least two-thirds of words from the general language. (our translation).

> linguistiques et celle d'interpréter ces structures en fonction de ses connaissances extralinguistiques. [...] L'énoncé linguistique sera d'autant plus transparent à la première lecture que les connaissances extralinguistiques du traducteur seront vastes. Ce n'est donc qu'après avoir analysé le texte et en avoir dégagé le sens que le traducteur peut se permettre d'en commencer la traduction. » (p.173)[5]

By analyzing the quotation, we see that the best medical translators are those with knowledge of medicine or doctors with knowledge of translation. We have shown that there is sometimes a shift and a rapprochement of meaning because some statements or translations lack coherence while others are eloquent. Since all translation depends on context and the computer does not have the cognitive gift, the system will work according to what the human creates as software to translate. In fact, machine translation is commendable on one level, because translation, as a human activity, is not definitive since it is always subject to review and proofreading.

5. Corpus analysis: translation problems and solutions

In recent years, new information and communication technologies have been advancing at a dizzying pace, and consequently this technological revolution has generated the current revolutions, namely: the information superhighway, the electronic web, virtual libraries, automatic language processing, and above all the translation revolution with the advent of translation assistance tools.

We are now proceeding to the analysis of the result provided for our text by machine translation software (Google translation and Bing translator). Firstly, our objective is to evaluate the result to see to what extent this kind of translation could answer an urgent and unceasing need in the medical field. Secondly, another objective is to show how machine translation can be improved to make medical discourse more accessible to non-specialist translators, so that they can easily process texts belonging to the medical field.

Furthermore, another objective of this study is to expose the lack of correct cohesion features in Google Online Translation and Bing Translator of medical texts from French to Arabic. Here are some practical examples:

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[5] The comprehension of a specialized text is the result of two distinct but complementary skills: the ability to analyze linguistic structures and the ability to interpret these structures according to one's extralinguistic knowledge. [The more extensive the translator's extralinguistic knowledge, the more transparent the linguistic statement will be at first reading. It is therefore only after having analyzed the text and identified its meaning that the translator can begin to translate it. (Our translation).

We have used tables to highlight medical terms, which are in bold, so that the reader realizes as soon as he reads the examples and their translation that there is a problem somewhere:

Table N°1 : Machine translation comparaison :

Google Translation vs Bing Translator

The source text in English language	Translation to Arabic language by Google translation	Translation to Arabic language by Bing Translator
Chronic myeloid leukemia is a hematologic malignancy belonging to the group of myeloproliferative syndromes.	ابيضاض الدم النخاعي المزمن هو ورم دموي خبيث ينتمي إلى مجموعة متلازمات التكاثر النخاعي.	سرطان الدم النخاعي المزمن هو ورم خبيث دموي ينتمي إلى مجموعة متلازمات التكاثر النقوي.
It is characterized by the presence of an acquired genetic abnormality in the hematopoietic stem cells, the Philadelphia chromosome.	يتميز بوجود شذوذ وراثي مكتسب في الخلايا الجذعية المكونة للدم، وفيلادلفيا كروموسوم.	يتميز بوجود خلل وراثي مكتسب في الخلايا الجذعية المكونة للدم، وكروموسوم فيلادلفيا.
Tyrosine kinase inhibitors, led by imatinib, have profoundly changed the treatment and prognosis of this hemophilia.	لقد أحدثت مثبطات التيروزين كيناز ، وقائدها إيماتينيب ، ثورة عميقة الإدارة العلاجية والتنبؤ باعتلال الدم هذا.	مثبطات التيروزين كيناز بقيادة إيماتينيب قد أحدثت ثورة عميقة الإدارة العلاجية وتشخيص هذا الاعتلال الدموي.
Imatinib treatment failures are due to resistance mechanisms that are not all fully characterized.	يعود فشل علاج إيماتينيب إلى آليات المقاومة التي لا تتميز جميعها بشكل كامل.	يرجع الفشل في علاج إيماتينيب إلى آليات المقاومة التي لا تتميز جميعها بشكل كامل.

Source: adapted from (KHARMOUM and ATMANI, 2022)

Comparing a text in French and its translation into Arabic, we note that in the two translations proposed, neither software gave a correct translation on all levels.

The morphological and syntactic properties of the Arabic language being complex, this language is difficult to master in the medical field, and the recourse to the machine to carry out the transfer from French to Arabic complicates the task even more.

For the first translation, the terminology used in the sentences, related to "chronic myeloid leukemia", considerably disturbed the functioning of the tool. Thus, apart from the terms

"myeloid" and "chronic" which were translated correctly because they are widely used, the rest of the terms were either rendered by correspondents that do not render the meaning and are different from those proposed by the specialized lexicons, or they are not translated, but taken from the source language.

In addition, numerous language errors are noted, mainly due to literal translation, which gives rise to terminological and semantic errors making the text unusable.

Secondly, in the above MT, we also note errors of different types: this is also the case with the terms "myeloproliferative syndromes", which have also been incorrectly translated as " متلازمات التكاثر النقوي "

Secondly, "myeloproliferative hemopathies" are tumor diseases of the bone marrow which means in Arabic: " الاعتلالات الدموية "

In another step, from the above MT, we also note errors of different types: The first translation for "hemopathy proposes": " ورم دموي "

This proposed Arabic correspondent does not render the expected meaning knowing that hemopathies group a heterogeneous set of cancers of blood cells and their precursors which means in Arabic: " سرطان "

We think that the automatic translator which is programmed for several languages has confused the word "cancer" which means " سرطان " in Arabic with the word "tumor" which has the meaning: "ورم" in Arabic language.

In the second translation, we find that the two automatic translators translated the words, "the Philadelphia Chromosome" using the layer, that is, they did not translate the words from the source language, and they left them as they are in the target language.

The two Google translation Bing translator propose: "كروموسوم فيلادلفيا " i.e. a borrowing in the source language without even transcribing into Arabic letters.

Therefore, borrowing (الاقتراض) is considered the simplest of all translation processes. It consists of borrowing or using, in the target language, a term or expression from the source language when there is no equivalent term in the target language culture. It is a process of not translating the source language word and leaving it as it is in the target language.

Regarding the provided statement, "This process is sometimes accompanied by a phonetic modification to make pronunciation easy," it describes how certain terms undergo phonetic modifications during translation to ensure easier pronunciation in the target language. This practice is common in cross-linguistic communication, particularly when translating technical or specialized terms.

Regarding the term "genetic abnormality", the Google translation incorrectly translated it as "شذوذ وراثي" while its supreme equivalent exists "خلل وراثي " which was translated well by the Bing software.

Even better, the translator translated the term "the prognosis" as "التنبؤ" This is a correct translation, but the Google translation software could not translate this term as "التشخيص" which means the diagnosis in French language which is not quite correct. Rather, it could have been translated by its equivalent which is much more used in Arabic language nowadays.

However, the two automatic translators transferred the term "Imatinib" as it is pronounced in the language "إيماتينيب ", using the borrowing technique.

All this leads us to note that for the structure of phrases: although they are short, the order of words does not obey the syntactic rules of the Arabic language for both software, which gives rise to nonsense.

As a result, when the results are analyzed, the result is an incomprehensible translation that must be carefully reviewed and corrected by the human translator. Then, since the translation engine cannot establish this order, it is up to the human translator, using known conventional means: encyclopedias, lexicons, dictionaries, manuals, etc., to review this translation and make the necessary corrections, since it is not only translated in an incorrect style, but also remains incomprehensible.

We deduce from the above that this non-respect of the word order gives us grammatically incorrect and semantically incomprehensible translations. In this regard Guidère (2016), postulates : « *Qu'il ne suffit pas de réfléchir à l'ordre des mots dans une phrase mais également aux relations que les mots entretiennent entre eux au sein de chaque système linguistique »*[6]

According to Guidère, we can conclude that failure to respect word order in translation leads to grammatically incorrect and semantically incomprehensible results. This perspective demonstrates the importance of a thorough understanding of linguistic structures to improve the quality of machine translations.

This is why, at the translation stage, the translator must understand the text in the source language. He or she has all the tools and clarifications needed to translate.

As a result, machine translation is an extremely complex field because the meaning of words depends on the context in which they are used. Setting up a fast and efficient machine

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[6] "That it is not enough to think about the order of words in a sentence but also about the relationships that words have with each other within each linguistic system." (Our translation).

translation service may still take some time and money. The machine has not managed to translate all the medical terms even incorrectly, but it has confused the singular with the plural in several cases. This is the case of concept "chess" (plural noun) which was translated into Arabic as "الفشل" (singular noun).

To this end, we can solve the terminology problem through useful documentation by finding correspondents for the terms that the machine failed to translate. Also, we can easily solve the semantic problem to obtain a correct and efficient translation.

Throughout this study, we notice that software is not able to recognize the exact meaning of a text, so there is always the risk of making mistakes, and above all, translating means finding the right word more efficiently and quickly to practice the act of translation without having to perform repetitive tasks. A machine does not yet have this ability and could not replace humans. In the English language, translating medical discourse from English to Arabic often involves phonetic modifications to make pronunciation easier and ensure medical terms are clear and meaningful. This challenge is more pronounced when translating from French to Arabic due to differences in phonetic structures. However, translating between French and English generally poses fewer issues regarding meaning or syntax, making machine translation effective. Despite this, human revision is essential to ensure accuracy and clarity, as human translators can make necessary adjustments that machines might miss.

Conclusion

In short, it is necessary to emphasize that machine translation will not give a perfect and faithful translation. It will be a good guide but a bad servant. A bad servant if we want to rely entirely on its performance in the target language, but a good guide if it is used for a pre-translation phase, necessarily followed by an intensive revision stage, especially by a skilled translator, to make the target text understandable.

However, the analysis of the machine translation of medical biology concepts expressed in French and their translation into Arabic is the central part of this research. Translation into Arabic face many problems with machine translation sites. The difficulty lies not only in the vocabulary and terms that do not cover all fields and areas of science, but also in the limited use of language on the net. Statistics show that the number of Arabic texts available on the Internet is ridiculous.

Similarly, this means that the translations received are characterized by repeated errors in terminology and meaning, require serious corrections in syntax, vocabulary, meaning, etc., and

cannot be used even if the meaning is understood. To produce a high-quality medical text, the product is ultimately proofread more than necessary.

Of course, machine translation is not completely useless. Professional translators know how to take advantage of it. In addition to being a significant time saver, this initial translation is considered a deciphering effort that facilitates the production of the final work. In short, summarizing these various contributions, machine translation systems should accept that they only do the easy part of the job. Everything else depends on the translator.

Thus, the translator's knowledge of the specific terminology of the concerned domain will not be enough to start his translating work, but rather must have a cognitive background that encompasses all the possible tools that help to present a good quality final product. As for the future, our perspectives aim at optimizing the machine translation (MT) of medical discourse in a way to minimize medical accidents and professional risks.

The results of this research are many and significant. Firstly, it highlights the limitations and challenges inherent in machine translation, particularly in the specialized field of medical biology. By identifying problems such as insufficient terminology coverage and frequent translation errors, the study highlights areas for improvement in machine translation systems. This information is invaluable to researchers and developers looking to improve the accuracy and efficiency of machine translation tools, thereby helping to advance language processing technologies. In addition, the study highlights the indispensable role of human intervention in the translation process, emphasizing the importance of skilled translators in ensuring the quality and accuracy of translated texts. This underlines the need for interdisciplinary collaboration between linguists, computer scientists and domain experts to develop more sophisticated and reliable translation solutions. In addition, the study highlights the importance of optimizing machine translation systems to minimize medical errors and occupational hazards, which has implications for patient safety and healthcare delivery. Overall, the results of this research have significant implications both for the field of translation studies and for the wider fields of technology and healthcare. So, is medical translation a skill exclusive to doctors, or can individuals from various backgrounds effectively and efficiently undertake it?

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