Human vs Machine Translation:
A Comparative Study

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Abstract

Starting from the fact that any translation activity requires a thorough knowledge of the general subject to be translated as well as an intimate familiarity with both cultures together with an extensive vocabulary in both languages and dexterity in manipulating it, this comparative study investigates the extent to which human and machine translation can deliver the original text focusing on the Machine translated version. It also attempts to see whether machine translation displays an apparent ease and ability to express thoughts clearly and concisely in both languages to really supersede human intervention.

The present article seeks to investigate the issue of human as opposed to machine translation challenge through a comparison between human and Google translation. But before dipping into the human and Google translation, it is important to have an overview of what translation is about. The concept of translation generally refers to the act of transmitting the language of the source text (ST) into the language of the target text (TT) taking cultural and linguistic differences into consideration. As a process, it requires understanding prior to explaining. In this regard, it is necessary for the translator to have a clear linguistic, semantic and cultural understanding of the source text to deliver the real intended meaning into the target language. When it comes to importance, no one can deny it as far as human endeavors are concerned, yet it remains a complex process characterized by difficulties that translators meet.

Broadly speaking, the evolution of literature on translation has gone through five overlapping stages. The first four periods have been already raised by Steiner (1998). In Iraq and antique Egypt were some of the first ancient translated documents found around the 3rd and the 2nd millennium B.C. Yet, many scholars including Steiner relate to the Romans the launch of works on translation ranging from the testimonials of Cicero and Horace to printing of Tytler's <u>Essay on the Principles of Translation</u> in 1792 (see ibid). This first stage is featured by Cicero and Horace's differentiation between word for word translation and sense for sense translation. Translators focused on the aesthetic side of the Target Language more than the fact of being faithful to the original text. On the other hand, Baker (2005) ascribes to the Arabs the historical commencement of the basic well-ordered translation attainment. From the Umayads (661-750) to the Abbasids (750- 1258), translation activities bore flourishment especially after their foundation of translation centers like Bayt Al-Hikma (House of Wisdom) in Iraq.

The 40's (20th c) is the period of the second stage known for the rise of Hermeneutics. The latter concept is named after the Greek word hermeneuein, with meaning of 'to understand'. For this, researchers like Dolet (1540) and Chapman (1598) (in Bassnett, 1988) have talked about the translators' principles with special emphasis on the prominence of understanding the text to be translated. For example, the proficiency in both Source Language (SL) and Target Language (TL) is recommended and the word-for-word translated versions should be sidestepped. As for the third stage, it overlaps with the second stage since it has to do with the first publishing in the field of automatic translation during the forties, and has lasted for almost three decades. The translators have hence started taking advantage of the emergence of such fields as contrastive studies, structural linguistics and applied linguistics

in their systematic comparison between SL and TL. Overlapping is also attested between the third stage and fourth one which has its roots in the 60's.

This fourth phase is mainly characterized by the appearance and contribution of theorists, computer specialists and linguists in broadening the field of translation. From the second half of the 70's, the Russian literary group's polysystem theory, as an illustration, has helped analyze the literary systems (linguistic, social, cultural) in terms of function and development in both SL and TL. The last stage is contemporary and mainly covers machine (or automatic) translation. SL is introduced into the machine that is expected to give a semantically corresponding text in TL.

Scholars versed in this field made great attempts challenging man's language faculty by designing machines to do such a delicate human expertise activity. Zarechnak (1979) identifies different reasons for the drive towards machine translation among which, one is mainly for extending the use of computers to the humanistic field while the other is motivated by the "natural desire of mankind to extend its physical and intellectual organs artificially, following the historical pattern of the telescope extension to the human eye, the car to the human leg, the telephone to the human ear… the computer might free man from the mundane tasks and allow him to apply his creative power to the results produced by computers."(5)

For Newmark (1991), it is "filling up the gaps between languages." (25). This is the case when any two languages have some untranslatable lexical items or culture specific items, and given their importance in the source language , they must be translated using words or phrases from the target language, or as Bassnett (2013) argues, it is "bridge-building across the space between source and target" (11). This reveals

272

the translator's creative contribution to language expressive potential. Quoting Bell (1991), translation is "the transformation of a text originally in one language into an equivalent text in a different language retaining, as far as is possible, the content of the message and the formal features and functional roles of the original text." (qtd in Marion Kremer 1997:135). As regards the issue of equivalence, Catford, J. C (qtd in Mohit K. Ray, 2008) described translation as "the replacement of textual material in one language (SL) by the equivalent textual material in another language (TL)" (20). For Eugene A. Nida and Charles R. Taber (2003) "translation consists in reproducing in the receptor language the closest natural equivalent of the source language message, first in terms of meaning and secondly in terms of style". (12)

Other scholars conceive translation as a creative practice far from being a simple equivalence from one language to the other. By way of illustration, Pratima Dave Shastri (2011) argues that:

> Translation is not just a photocopy of the original, but a creative act. This act is not a static but a dynamic one. The difference between the translations of the same text by two translators reflects the difference in their perception. An individual's perceptive process culminates with the actualization of the text, which is, then expressed through language. Though translation is a linguistic activity, the role of sociolinguistics and culture cannot be denied. The translator has to read the lines, read between the lines and read beyond the lines to reach to the inner core of the meaning of the text, then only will he be able to do justice to the creative process of translation. (17-18)

However, Morry Sofer (2006) believes translation a "… decision-making process involving a judgment regarding every single word translated and the best way to translate it."(p45). Translation is also an exacting activity. Similarly, for Schaffner and Wiesemann (2001), translation is not a mechanical process but rather a complex social and cognitive activity which requires decision-making. Moreover, it is the professional expertise of human translators and translation scholars"(1). They then break this structure down into elements that can be easily translated to be recomposed on the basis of the same structure in the target language. This method may seem correct, but the quality of the translation is much lower than a human translation, because languages do not share exactly the same structures if they have any, an aspect that machine translators don't seem to take into account. Pratima Dave Shastri believes the act of translation to be "…a complex one. It involves the transfer of message from one language into another… as the languages concerned (SL and TL) are linguistically and extralinguistically different. Complete equivalence is not available between them at the phonological, graphological, lexical, syntactical and semantic levels. Culturally too, they follow different semiotic systems" (ibid 19).

In terms of practice and given the fact that language is a human only natural asset and being the only language user and manipulator, it seems really challenging for a machine to supersede man in some language activities mainly in translation which remains a quite delicate activity that only a human expert in at least the source language and the target language can perform to some extent. Certainly machine translation can be a solution for a mass production perspective as a result of technological development and global world's demands of knowledge transfer from one language to the other. For Schaffner and Wiesemann 2001) "the process of globalization and internationalization of political, economic,

educational and cultural communicative practices are accompanied by increasing demands for translation…" (1). yet there is still a doubt to whether machine translation can really perform the way a human translator does. Torrens (1994:384) quoted in Wolfram Wilss (1996) argues that "human can translate; computers only appear to translate"; they produce "pseudo-translations" (212).

In terms of language use J. C Sager (1997) sees no equation between "the language produced by the computer with that produced by human translators… the language used by human translators is a "natural language" , the language produced by a computer is a form of" artificial language"… a language whose rules are explicitly established prior to its use."(36) For JC Sager "the human translator "understands" a document, whereas the computer simply processes linguistic information" (ibid). In contrast to "the human translator [who] has to deal with implicit information not contained in the document, … the computer can only deal with what is "explicit" in the input of linguistic information." As a result Sager (ibid) speaks of text types in that a computer produces a "translation-specific text type … written in the code of an artificial language invented by the system designers on restricted model of a natural language." (37) Radegundis Stolze (2011) argues that

> Translating is understood as the human task of faithfully presenting a text's message in another language for readers of a different culture. What is needed for the translating person is to know how to

> cope with any new text to be translated, independently from its domain. A strict methodology for this strategic process has not yet been found in translation studies, and maybe it isn't even possible in human translation. If so, machine translation systems could easily take over. (9)

When it comes to language and its communication potential, Morry (2006) reveals that "As long as language continues to communicate more than the immediate literal meaning of words, as long as there are shades of meaning that keep changing all the time, as long as people have to make value judgments about meaning and intent of a text, one will continue to need human translators to get the job done." (83) As regards Joseph Olive (2011), argues

> … knowing the usual meaning of word is not enough. To translate, it is necessary to convey the meaning of the entire message, not just transfer of words from one language to the other. Because people can perform this task so adeptly, it is easy to underestimate the challenge it poses to computers. Although computational capabilities of machines exceed those of humans in many ways, even the most advanced of today's computers cannot match the language ability that humans acquire naturally. To translate and extract information conveyed through language, humans take advantage of a variety of cognitive abilities that no computer can currently emulate (vii)

As human translation requires understanding of the text before getting started, the translator needs to have knowledge of words as used both in their semantic and syntactic levels as well as the pragmatic one given the fact that words acquire a different load of meaning according to the context in which they are used avoiding thus the problems of the pseudo-synonymy. While the translator goes through these cognitive processes to produce publishable quality translations, the machine simply operates mechanically by breaking down translatable elements using the same structure in the target language, even though languages do not have generally the same structures.

To evaluate the quality of machine translation with that of the human translation and the source language, an extract is taken from Emile Zola's Germinal[1] originally written in French and translated in the English language by Raymond N. Mackensie (2011). The human and machine translation are compared mainly focusing on the machine version to see to what extent the quality of the source language is preserved. The Google version is retranslated into French to see if the French original text is exactly recovered proceeding as follows:

1. A) Emil Zola's text / Mackensie English translation
2. B) Emil Zola's text / Google English translation
3. C) Google English translation / French Google translation recovery

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[1] Dans la plaine rase, sous la nuit sans étoiles, d'une obscurité et d'une épaisseur d'encre, un homme suivait seul la grande route de Marchiennes à Montsou dix kilomètres de pavé coupant tout droit, à travers les champs de betteraves. Devant lui, il ne voyait même pas le sol noir, et il n'avait la sensation de l'immense horizon plat que par les souffles du vent de mars, des rafales larges comme sur une mer, glacées d'avoir balayé des lieues de marais et des terres nues. Aucune ombre d'arbre ne tachait le ciel, le pavé se déroulait avec la rectitude d'une jetée, au milieu de l'embrun aveuglant des ténèbres.

L'homme était parti de Marchiennes vers deux heures. Il marchait d'un pas allonge, grelottant sous le coton aminci de sa veste et de son pantalon de velours. Un petit paquet, noue dans un mouchoir a carreaux, le gênait beaucoup ; et il le serrait contre ses flans, tantôt d'un cote tantôt de l'autre, pour glisser au fond de ses poches les deux mains a la fois, des mains gourdes que les lanières du vent d'est faisaient saigner. Une seule idée occupait sa tête vide d'ouvrier sans travail et sans gite, l'espoir que le froid serait moins vif après le lever du jour. Depuis une heure, il avançait ainsi, lorsque sur la gauche, deux kilomètres de Montsou , il aperçut des feux rouges , trois brasiers brulant en plein air , et comme suspendus . D'abord, il hésita, pris de crainte ; puis, il ne put résister au besoin douloureux de se réchauffer un instant les mains.

Before dealing with human Vs machine translation[2], Computer assisted correction was made to see the type of mistakes the computer identifies. The following correction were suggested

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[2]　　On the flat, empty plain, under a starless night as thick and dark as ink, a solitary man was walking the highway from Marchiennes to Montsou, a paved road running straight for ten kilometers through the beet fields. He could not make out even the black earth in front of him, and he could only sense the vastness of the flat horizon around him by the gusty March winds, great bursts of wind as big as an ocean, and icier for having swept over the marshlands and the empty fields. No tree's shadow stood out against the sky, and the road unrolled ahead of him as straight as a jetty running into a sea of blackness.

The man had left Marchiennes around two o'clock. He walked with long strides, shivering under the thin cotton of his jacket and his corduroy trousers. His little bundle, wrapped up in a checked handkerchief, was a hindrance to him; and he pressed it up against his hip, sometimes with one elbow, sometimes with another, in order to keep both his hands deep in his pockets, his numbed hands whipped almost raw by the east wind. A workingman but one with neither a job nor a home, he had just one thought in his mind, and that was his hope that the cold would lessen once the sun came up. He had been advancing thus for about an hour when, on his left , about two kilometers from Montsou, he was able to make out red flames , three fires burning in the open air , seemingly suspended in the air . At first he hesitated out of fear; but then he could not resist the painful need to warm his hands for a moment. (Raymond N. Mackensie)

In the open plain, under the starless night, a darkness and an ink thickness, a single man followed the highway from Marchiennes to Montsou ten kilometers of pavement cutting straight through the beet fields. Before him, he could not even see the black soil, and he had the sensation of the immense flat horizon by the blasts of March wind, large bursts as a sea ice have swept leagues marshes and barren land. No tree shadow stained the sky, the pavement was held with straightness of a pier in the middle of the blinding spray of darkness.(Google translate)

The man had gone to Marchiennes to two hours. He walked with a longer, shivering in cotton thinned his jacket and his corduroy trousers. A small package, tied in a handkerchief tile, much embarrassed; and held him against his flanks, sometimes on one side then the other, to slide to the

278

1. **Marchiennes** (not recognized)
2. **Montsu** (not recognized)
3. **A** darkness wrong determiner use)
4. **a** longer **;** (suggesting a semi colon instead of the comma)
5. **then** (instead of Then) the full stop was replaced by a semi colon

   In General the human translation corresponds to the original text i.e. the source text, but the machine translation sounds odd at different levels. These oddities show how mechanically machine translation proceeds on the basis of a literal meaning. The failure of machine translation appears clearly at the level of semantics as far as word choice is concerned, syntax when it comes to structure, and pragmatics as regards the use of words in context. This can be clearly recognized when comparing the French original version to the one recovered from the Google English version.

In the first paragraph, which is a machine translation using Google services , we can notice some inadequate equivalent vocabulary items such as 'open ' single' ,'followed' and 'cutting' with a wrong determiner use . The two other sentences are simply incorrect.

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bottom of his pockets both hands at once, hands gourds that the strips of the east wind were bleeding. One idea occupied his head empty of workers without work and without lodging, hoping that the cold would be less keen after sunrise. For an hour he walked and when on the left, two kilometers Montsou he saw red lights, outdoor three fires burning, and as suspended. First he hesitated, made of fear; Then he could not resist the painful need to warm a moment hands. (Google translate)

In the Second paragraph as well, other oddities appear. In the first sentence, machine translation failed to select the appropriate preposition 'to' according to context. It is rather about or around two o'clock. In the second sentence the equivalent word for 'pas' is dropped resulting in a wrong use of the gerund as a noun or an adjective. The machine considered 'shivering' as a noun, hence the appearance of the article 'a'. Within the same sentence, we observe a wrong translation of the expression 'le cotton aminci' which rather stands for worn-out jacket and trousers. The compound adjective 'cotton thinned' gives rather the idea that the clothes are made of cotton thinned cloth. In the third sentence there is a problem of anaphora. Instead of 'much embarrassed', it is rather 'much embarrassed him'. The object pronoun 'him' in the phrase 'and held him against his flanks' refers to the package and must be replaced by a relative pronoun. Thus the sentence must be 'A small package, which was tied in a handkerchief tile and held against his flanks much embarrassed him. This shows that the machine cannot process complex sentences. Within the same sentence the machine not only failed to translate the word 'gourds' but applied the rule of adjective agreement of the target language in addition to another anaphora confusion. In fact, the strips of the east wind made or caused the bleeding of the hands, which is not the case when reading the translated phrase. The fourth sentence shows the incapacity of the machine to make a distinction as regards combination of nouns and adjectives in both the source and the target languages. The placement of adjectives in French obeys some rules depending on their classification, their use in the figurative or literal meaning and their use as related to an inherent quality of the noun. However in English the adjective practically always are used before the noun. Another mistake within the same sentence concerns the use of the noun 'worker' in the plural form. The machine cannot identify the determiner

'de' which is contracted indicating the singular form. Mackensie's translation of the sentence is rather closest to that of Emile Zola's. The fifth sentence shows failure to translate an adverbial time clause selecting the equivalent adverbial expressions as is the case of 'for an hour 'instead of' for about an hour', in addition to a confusion between the use of compound nouns and the object of a noun which is different in the case of French and English as shown in the case of 'two kilometers Montsu' here 'Montsu becomes a noun referring to a material. Furthermore the terms 'outdoor' and the expression 'as suspended' demonstrate again lack of appropriate equivalent expressions related to context. The last sentence of the paragraph, 'pris de crainte' is translated 'made of fear' which does not render the source text meaning and is not even correct in English ; 'fearful' or 'haunted by fear' relatively suggest what Zola means .

As a conclusion and to show that machine translation is far from replacing the human translation, an attempt is done to recover the machine translated version to see if the machine is able to render the source text. An input –output[3] exercise is

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[3] Dans la plaine, sous la nuit sans étoiles, une obscurité et une épaisseur d'encre, un seul homme a suivi la route de Marchiennes à Montsou dix kilomètres de trottoir de coupe droite à travers les champs de betteraves. Avant lui, il ne pouvait même pas voir le sol noir, et il a eu la sensation de l'immense horizon plat par les coups de vent Mars, les grands éclats comme la glace de mer ont balayé des ligues des marais et des terres stériles. Aucun arbre ombre tachée le ciel, la chaussée a eu lieu avec la rectitude d'une jetée au milieu de la pulvérisation aveuglante des ténèbres.

L'homme était allé à Marchiennes à deux heures. Il marchait avec une plus longue, grelottant dans le coton aminci sa veste et son pantalon en velours côtelé. Un petit paquet, attaché dans une tuile de mouchoir, fort embarrassé; et le tint contre ses flancs, tantôt d'un côté puis de l'autre, de glisser vers le bas de ses poches les deux mains à la fois, les mains gourdes que les bandes du vent est saignaient. Une idée occupait sa tête vide des travailleurs sans travail et sans logement, en espérant que le froid serait

attempted giving the following result which appears as a randomly done translation.

Replacing human Translation totally by machine translation is but a failure for the time being since no machine translation that is capable of interpretation. Let alone the fact of keeping the same effect the source text leaves on the reader. If only the effect left by the alliteration and consonance use of present in Zola's text is taken into consideration, program designers would sense how far machine translation spoils some of the aspects that only a human translation can maintain. And so to speak, the human translator is the only one to understand the different cultural, linguistic and semantic factors to more or less faithfully render the same effect that is left in the source text, a task, which requires language expertise in both languages. Given the fact that machine translation obeys the constraints of an artificial dictionary organized according to situational limitations set by the program designers, it remains only a tool that helps in very simple translation activities or as a preliminary step in any process of translation.

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moins vif après le lever du soleil. Pendant une heure, il marchait et quand sur la gauche, à deux kilomètres de Montsou il a vu des lumières rouges, en plein air trois feux allumés, et comme suspendu. D'abord, il hésita, fait de la peur; Ensuite, il ne pouvait pas résister à la nécessité douloureuse pour réchauffer un instant les mains.

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