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THE LIMITS OF NEURAL MACHINE TRANSLATION IN TRANSLATING QUR'ANIC ARABIC INTO ENGLISH: A CASE STUDY OF SŪRAH AL-KAWTHAR

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Abstract

The emergence of Artificial Intelligence (AI) has transformed a wide range of global activities including translation. Neural Machine Translation (NMT) is increasingly used to process large data within short period. However, translating Qur'anic Arabic into English poses some challenges because of the richness of Arabic vocabulary, the complexity of its syntactic structures, the significance of context, and the cultural and religious meanings embedded in the Qur'anic text. The divine nature of the Glorious Qur'an further increases the need for accurate interpretation. This paper examines the limitations of NMT in translating Qur'anic Arabic into English, using Sūrah Al-Kawthar as a case study. The study aims to highlight the linguistic challenges that may affect NMT, and examine the extent to which NMT conveys the meanings of the Qur'anic expressions when compared with selected human translations. The paper is divided into four main parts. The first part introduces the study. The second part examines the limitations of NMT at the level of Qur'anic vocabulary. The third discusses the challenges of NMT at the level of Arabic syntactic structure. The fourth compares NMT for translating Sūrah Al-Kawthar with the four selected human translations in order to identify similarities and differences in translating the three verses. This study adopts a qualitative descriptive design and select (4) human English translations of the Glorious Qur'an to compare between NMT and human translations. The research concludes that NMT cannot replace human translators, but collaboration of both is needed for effective translation, especially when translating divine scripture like the Glorious Qur'an.

Keywords: Artificial Intelligence, Neural Machine Translation, Qur'an translation, Surah al-Kawthar, ellipsis (al-hadhf)

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INTRODUCTION

Artificial Intelligence (AI) has become increasingly important in various aspects of life, transforming industries and revolutionizing the way we live and work. AI enhances decision-making by leveraging vast data to identify patterns and trends often invisible to humans. AI is a constellation of many different technologies working together to enable machines to sense, comprehend, act and learn with human-like levels of intelligence.

Gordon (2024) named AI used in translation works as Neural Machine Translation (NMT) systems such as Google Translate, DeepL Translator and Microsoft Translator, and those are just a few of the NMT systems that translation companies and professionals often use. NMT aims to create algorithms that can translate text between different languages.

AI solutions could be deployed at every step of the production process, from research and development to production, distribution, repair and recycling. The future wealth of nations could depend on having a broad base of AI services that strengthen participation in existing global value chains. AI Technology has become increasingly important in the modern world due to its numerous applications and benefits, and is quickly changing how we live our lives, and helping organizations in reducing costs, as well as users to improve their experience and achieve better efficiency. AI technologies are a great assert to humans, and are programmed to reduce human's effort as much as possible.

In 1954, the world witnessed the rise of Machine Translation (MT), which had successfully translated more than 60 sentences from Russian to English automatically. All that created a widespread belief that MT would spread within a few years. There are many translators who know that their job is to replace words, sentences, and texts from one language to another concerning the context, meaning, style and other important elements of communication which are very important for the process of translation. The machine came to replace those who translated like machines. So, the translation from ST to TT needs an efficient translator who knows both languages, experience and an understanding of culture. (Khalati & Al-Romany, 2020)

In translation works, NMT plays a significant role, transfiguring the way we communicate across languages. Its tools analyze the source text and translate it into the target language within few seconds. NMT has become an important part of the language translation industry, resulting in faster and more accurate translation. NMT ultimately ensures that translated text represents the meaning and intent of the original material, rather than a word-for-word translation.

NMT is a method of AI translation that utilizes algorithms and models to enhance the translation process.

Regarding the Arabic language and Artificial Intelligence (AI), many computer scientists and researchers seek the field of humanities to produce computer programs that read the Arabic texts accurately and translate them into a digital formula. This remains a demanding task, although there are continuing attempts to train the word browsers to achieve the best Arabic language tasks. Khalati and Al-Romany (2020) believe that the machines have a linguistic capability to imitate the human capability to understand and produce speech, which makes it smarter and enable it to do the required tasks and sustain communication with humans. And the required tasks include translation of Arabic texts.

The most important challenges faced by Artificial Intelligence (AI) in the Arabic text are the presence of synonymy, antonymy and other linguistic phenomena. And Sharabi (2023) argues that although AI translations are a useful option for those who need to translate huge volumes of content quickly, even the best machine translation system go only so far when it comes to capturing context. In fact, the most advanced translation technology still struggles when it comes to understanding the nuances of language and emotive aspects. And translating the Glorious Qur'an is beyond capturing of context, and this makes many Islamic scholars believe that the Glorious Qur'an is untranslatable, and researchers including Madadizadeh and Bahariniya (2023) concluded that accurate translation and interpretation of the Qur'an is a challenging task due to linguistic subtleties and cultural contexts.

Four selected human English translated versions of Sūrah Al-Kawthar are:

(i) George Sale's Translation (1734); being the first English translated version of the Glorious Qur'an,

(ii) Marmaduke Pickthall's Translation (2005); being the earliest widely circulated version by a British convert to Islam,

(iii) Yusuf Ali's Translation (1987); being one of the earliest versions translated by Muslim who is fluent in Arabic language. And this translation became widely renowned.

(iv) Al-Hilali & Khan's Translation (1437A.H); being translated by (2) professors of Islamic studies, and adopted by King Fahd Glorious Qur'an Printing Complex.

LIMITS OF (NMT) IN TRANSLATING QUR'ANIC ARABIC VOCABULARY

The Arabic language is one of the most enriched languages in terms of vocabulary. It is one of the important languages on the global level, because it carries the pillars of the civilizational and cultural heritage of the world, which include writing, pronunciation, grammar and morphology. There are many linguistic phenomena relating to the vocabulary, include synonymy and antonymy. Synonymy is the existence of two or more distinct word form that share the same or closely related

meaning. Auto-antonymy (Al-Adâd), by contrast, is the phenomenon whereby a single word carries two opposing meanings.

In Sūrah Al-Kawthar, (الْكَوْثَر) "Al-Kawthar" is "A lot of goodness", and also means "A river in Paradise" (Ibn Mandhuur, 1419 A.H ك ث ر). Google Translate as one of NMT tools couldn't translate this word as at the time of this study, because its meaning cannot be adequately conveyed by a single English word. Thus, NMT may retain the Arabic term through transliteration or provide an English equivalent such as "abundance", but either choice may leave some of the broader interpretative meaning unexplained.

As mentioned in different studies, Arabic has a rich morphology, in addition to being inflected for number, gender, voice and case. Words attach to various units for conjunction (wa=and), the definite article (al=the), preposition (bi=by/with), pronouns of possession (hum=their/them). (Khalati and Al-Romany, 2020). And sometimes, pronoun that signifies the subject may not be visible, but embedded in the verb.

Another example is found in the second verse of the Sūrah: ﴿فَصَلِّ لِرَبِّكَ وَانْحَر﴾, the verb (انْحَر) "In'har" is derived from the Arabic root (نَحَر) "Naharo", and occurs in the verse as an imperative verb. It is traditionally understood in relation to sacrificial worship. Ibn Mandhuur (1419 A.H) explains the verb (نَحَر) "Naharo" in relation to the slaughtering of a camel by striking or cutting at the upper part of the chest or throat, he said:

"ونَحَرَ البَعِيرَ يَنْحَرُه نَحْرًا: طَعَنَه في مَنْحَرِه، حيث يبدأ الحلقوم من أعلى الصدر"

Meaning: "He slaughtered the camel, stabbing it in the throat, where the throat begins at the top of the chest". Therefore, translating (انْحَر) "In'har" simply as "slaughter" may not communicate the full cultural and contextual meaning of the Arabic verb.

This limitation, however, should not be attributed entirely to a failure of NMT. It is also related to the semantic richness of the Arabic language. The English verb "slaughter" does not by itself specify the particular method or type of animal associated with the Arabic verb (نَحَر) "Naharo". A translation can therefore be mitigated by specifying the slaughtered animal in brackets to make the intended meaning clearer to the target reader.

Jnaidi (2022) stated that the Arabic writing system was distinguished by the representation of consonants from spoken speech, while vowel sounds were not represented at all. Although, some linguists have considered the absence of the vowels' written representation to be a deficit, another group has justified this absence and noted that it is not limited to Arabic writing alone, but include Semitic writing systems in general.

Writing Arabic vocabulary without diacritics that denote the short vowels can also create a word-level ambiguity, because vowels determine the type and meaning of the word. For example: (سنة) can only be pronounced with vowels, by putting "fat'ha" vowel on the first letter "Sanah" means "A year", and putting "kas'ro" on the first letter "Sinah" means "Drowsiness". Another example is (أحر), the first letter can

be pronounced with three Arabic short vowels, with "fat'ha": "Harru" which means "Heat", with "kas'ro": "Hirrun" which denotes the female genitalia, with "dhommah": "Hurrun" which means "Free" (Ibn Malik, 1329A.H). Hence, Artificial Intelligence (AI) is confused in translating Arabic words that are free of vowels.

Second verse of Sūrah Al-Kawthar starts with (فَصَلِّ) "Fasolli", if the expression is written in Google Translate without any vowel, it can be pronounced as "Fas'lu" which has many meanings in Arabic language, including: season, disconnect, separation, and so on, as translated by NMT.

(فَصَلِّ) "Fasolli" is composed of two morphemes, (فَـ) "Fa" which most exegetes identify as fâ' as-sababiyyah (a resultative particle) linking the first verse to the second, and means "So". And (صَلِّ) "Solli" which is an imperative verb addressed to the Prophet Muhammad (ﷺ) means "Pray".

Sūrah Al-Kawthar starts with (إِنَّا) "Innaa" which also composed of two morphemes; (إِن) particle of emphasis (Har'f Tawkīd wa-nas'b) used for emphasis, and can be translated as "Indeed" or "Verily" and (نا) pronoun that means "We" or "Us". Google Translate failed to recognize morphemes of (إِنَّا), and translated it as "I" which is (أنا).

All these show that involvement of human intelligence in translating some Arabic vocabulary is required.

LIMITS OF (NMT) IN TRANSLATING QUR'ANIC ARABIC SYNTACTIC STRUCTURE

Arabic grammar distinguishes between two types of sentences, verbal and nominal. Verbal sentences start with a verb followed by a subject, and nominal sentences have two parts: a subject (المبتدأ) (Mub'tada) and a predicate (الخبر) (Khobar). When the nominal sentence speaks about being, i.e., if the verb of the sentence is "to be" in English, this verb is not given in Arabic (Bassam et al., 2014).

There are many characteristics of the Arabic language, Khalati and Al-Romany (2020) mentioned among others: deletion and brevity, variety of vocabulary, distinction between the feminine and the masculine, Arabisation which is the arrangement of the word for Arabic scales, accuracy of expression, characteristics and sounds of letters. All these features and others prevent NMT from overcoming the difficulty of understanding the meaning of the expression as speakers and readers do. Despite the fact that NMT facilitated many aspects of human daily practical life, it is still unable to perform the job of understanding the particular meaning of many expressions.

One syntactic feature that presents a particular challenge is ellipsis (Al-Hadhf). Ellipsis refers to the omission of a linguistic element whose meaning can nevertheless be understood from the context. Ellipsis is recognized by ancient and modern Arab grammarians as transformations affecting the structural description of most Arabic sentences. Sībawayh (1988 ed.) argues that although ellipsis is a common feature of Arabic syntax, constructions with omitted grammatical elements are not base forms in Arabic; on the contrary, they are derived structures. However, in Arabic,

particularly in highly concise and rhetorically rich texts such as the Qur'anic text, an element may be omitted, because it is understood by the reader or because its omission contributes to the rhetorical structure of the verse. When translating such a structure into English, the translator must determine whether the omitted element should remain implicit or whether it should be made explicit for the target reader.

In verbal sentences, omission of the object is highly noticeable, according to Al-Jur'jâniy (1992 ed.), object deletion may be a function of: (a) the speaker's need, (b) the nature of the structure, (c) the relationship between lexical items. The relationship between the transitive verb (الفعل المتعدّي) such as: (وانحر) in the second verse of Sūrah Al-Kawthar and its object –that has been omitted - is identical to that of the verb and its subject, and that omitted object is not a subordinate or peripheral element which is liable to the omission in all cases. Al-Jurjaniy adds that in spite of the importance of the object, it may be omitted when the speaker intends to attribute the verbal action to the subject/doer and confirm it, or else to focus on the verbal action without making reference to either the subject or the object.

In Sūrah Al-Kawthar, the object of the verb (وانحر) in the second verse was not mentioned, hence the Arabic scholars and interpreters of the Glorious Qur'an recovered a plausible object, most commonly "Camel", derived from the verb. Al-Halabiy (1406A.H) said in his interpretation of this verse and this verb precisely: "(وانحر) (And sacrifice): This is a command from the root word for sacrifice, referring to camels, similar to the slaughtering of cattle and sheep. It has also been said: Place your hands at your throat or under your throat during prayer". The availability of contextual clues ensures the recoverability of the deleted element when necessary and the awkwardness and redundancy of its being mentioned in the stretch of speech (Al-Salman,1990).

Determination of the omitted element in the sentence is beyond NMT capability, especially when it comes to Arabic syntactic structure that is so flexible in words order, and Qur'anic text is more complex, because each word and sentence in it has deep and exact meaning that requires critical thinking when analyzing, interpreting and translating.

Ibrahim and Mohamed (2017) concluded that the translation of omitted parts in the Glorious Qur'an poses various problems which relate to the extent of adding what did not exist in the source text through approximating the meaning related to the assumed deletion. The human translators of the Glorious Qur'an have not been in agreement in dealing with the assumptions of deleted words; some added words and phrases assumed from the context while others left them by preserving what is apparent in the original, and NMT arguably belongs to the latter group. And leaving the gap without assumption can lead into sloppiness and intricacy in the translated texts, hence, the readers will not understand the meaning of the text as it is in the source.

COMPARISON BETWEEN (NMT) AND HUMAN TRANSLATIONS OF SŪRAH AL-KAWTHAR

Sūrah Al-Kawthar consists of three verses, Qur'an 108: 1-3 in the reading of Haf's from Âsim. The first verse is ﴿إِنَّا أَعْطَيْنَاكَ الْكَوْثَرَ﴾, it appears as if it consists of just three words, but in fact it comprises six morphemes: (i) (إن) (Inna) which means "Indeed/Verily", (ii) (نا) (Naa) means "We/Us", (iii) (أعْطَى) (A'tâ) means "Give/Grant", (iv) (نا) (Naa) means "We/Us", (v) (ك) (Ka) means "You/Your", pronoun of one male, (vi) (الْكَوْثَر) (Al-Kawthar) means "A lot of goodness", and also means "A river in Paradise".

Google Translate as one of the NMT tools can only provide the meaning of the verse while written completely, (Indeed, We have granted you Al-Kawthar), and the translation of the last word (الْكَوْثَر) (Al-Kawthar) presents a particular challenge because the word has a broad semantic range. The term is associated with abundance and plentiful goodness. In Qur'anic interpretation, it is also associated with the special favour granted to the Prophet Muhammad (ﷺ), including the river of Al-Kawthar in Paradise. Consequently, the translators have adopted different approaches in translating the term into English.

George Sale translates the verse as: (VERILY, we have given thee al Cawthar). He retains the Arabic term rather than replacing it with a direct English equivalent. The approach preserves the original Qur'anic term, but may require additional explanation for the readers who are unfamiliar with the meaning of the term.

Marmaduke Pickthall translates the verse as: (Lo! We have given thee Abundance). He translates Al-Kawthar using the English word "Abundance". This translation communicates the lexical meaning associated with the root (ك-ث-ر), but it may not fully convey the additional interpretative meanings associated with the term in Qur'anic exergesis.

Yusuf Ali translates the verse as: (To thee have We granted the Fount (of Abundance)). The addition of "fount" reflects the interpretation of Al-Kawthar as a special source or river of abundance. This approach attempts to communicate more than the basic lexical meaning of the Arabic term.

Al-Hilali and Khan translate the verse as: (Verily, We have granted you (O Muhammad صلى الله عليه وسلم) Al-Kauthar (a river in Paradise)). This translation retains the Arabic term Al-Kawthar and provides an explanatory gloss in parentheses. The approach allows the original term to be preserved while giving the English reader additional information about its interpretation. Measured against the criteria adopted in this study, only Al-Hilali and Khan's translation is judged adequate among the four selected human translations.

It is worth noting that this translation puts in brackets who is meant by the pronoun (ك) (Ka) which is translated by "You", because this pronoun in English refers to both singular and plural, and both male and female. And this translation also keeps the last word with its pronunciation in Arabic language, and puts the favorite meaning in brackets.

The second verse is ﴿فَصَلِّ لِرَبِّكَ وَانْحَرْ﴾, it also appears as if it consists of just three words, rather, it has nine morphemes: (i) (فَ) (Fa) means (So), (ii & iii) (صل) (Solli) a

command verb with its subject, means (Pray) i.e., you, (iv) (لِـ) (Li) means (For), (v) (رّب) (Robb) means (Lord), (vi) (كَ) (Ka) means "You/Your", pronoun of one male, (vii) (وَ) (Wa) means (And), (viii & ix) (اِنْحَر) (In'Har) a command verb with its subject, means (Slaughter) i.e., you.

First three morphemes of this verse were joined together in writing, and look like a word of three letters (فَصَلّ) (Fasolli). (NMT) tools couldn't bring the proper meaning of this compound word, except after writing the verse completely, unlike human intelligence that only needs accurate vowels to determine the type, nature and meaning of the word. When translating the last two morphemes of this verse (اِنْحَر) (In'Har) a command verb with its subject, Google Translate brings (Slaughter) i.e., you, but this meaning changes when the verse is written.

(Separate for your Lord and sacrifice) is the meaning brought by Google Translate for this verse when writing the verse alone, but when it is written with the first verse, Google Translate provides (So pray for your Lord and sacrifice). This suggests that the system's output is highly sensitive to the size of the input context.

The verse presents a syntactic and semantic challenge, because the of (اِنْحَر) (In'Har) is not explicitly stated. The Arabic text does not directly specify what should be sacrificed. The meaning is understood through the context and the interpretations of Qur'anic exegetes. This implicit element creates different translation possibilities.

George Sale translates the verse as: (Wherefore pray unto thy LORD, and slay the victims). Translation of the last expression as: (and slay the victims) is far from the real Qur'anic meaning. Though, (فَـ) (Fa) can mean (Wherefore: لهذا السبب), but (So) is preferable, because it preserves the resultative function of the Arabic particle. And translating (لِـ) (Li) by (unto) is not accurate in the verse, because this English word sometimes means (إلى) (Ilaa) in Arabic language.

By using the phrase (the victims), Sale makes explicit an object that is not directly stated or meant in the Arabic text, and the assumed object (the victims) needs to be reviewed, because it can make the today's reader think that the Glorious Qur'an commands the Prophet of Islam (ﷺ) to slay human being, since the victims can be human being and animal, whereas the nature of the Arabic verb in this verse indicates the omitted object which is camel.

Likewise NMT, Pickthall's translation comes as: (So pray for your Lord and sacrifice). This translation does not explicitly mention the object of the last verb. As well as Yusuf Ali's translation: (Therefore to thy Lord turn in Prayer and Sacrifice).

Al-Hilali and Khan also say: (Therefore turn in Prayer to your Lord and Sacrifice (to Him only)). This translation adds what some scholars observe that has been deleted (to Him only).

A number of Arab Qur'ranic exegetes and linguists hold that this verb (اِنْحَر) is a command to slaughter camel (Al-Halabiy, 1406A.H). Hence, its translation is:

(So, Pray (O Muhammad صلى الله عليه وسلم) to your Lord and slaughter (camel to Him only)).

Third and last verse of Sūrah Al-Kawthar is ﴿إِنَّ شَانِئَكَ هُوَ الْأَبْتَرُ﴾, which consists of just five morphemes: (i) (إِن) (Inna) which means "Indeed/Verily", (ii) (شَانِئَ) (Shaaniha) means "the one who hates/detests you", (iii) (كَ) (Ka) means "You/Your", pronoun of one male, (iv) (هو) (Huwa) functions here as Ḍamīr al-fas'l (a pronoun of separation) conveying restriction/emphasis, (v) (الأَبْتَر) (Al-Ab'tar) literally means "docked, cut off at the tail", hence "one served from progeny and from every good" (Ibn Mandhuur, 1419 A.H ب ت ر).

Google Translate provides good translation for the vocabulary of this verse, and when written completely (Your hater is the one who is cut off), the meaning of the last word changed, and the reader should expect the completion of the adjective. Therefore, Yusuf Ali says: (For he who hateth thee, he will be cut off [from Future Hope]). The translations of both Google Translate and Yusuf Ali fail to render the emphatic particle of first morpheme that opens this verse; hence, both translations should be reviewed.

George Sale says: (Verily, he who hateth thee shall be childless). He changes the adjective to the verb, and this is sometimes accepted due to the nature of both source and target languages. Translating the last word by "childless" limits its meaning.

Pickthall says: (Lo! It is thy insulter (and not thou) who is without posterity). The meaning of the last word is beyond having posterity.

Al-Hilali and Khan's translation puts the completion of the meaning of the last word in brackets, which distinguishes it from other selected human translations in this paper:

(For he who hates you (O Muhammad صلى الله عليه وسلم), he will be cut off (from posterity and every good thing in this world and in the Hereafter)).

CONCLUSION

In this paper, the limitations of Neural Machine Translation (NMT) were explored, specifically in the course of translating sacred texts, using Sūrah Al-Kawthar as a case study. Sharabi (2023) emphasized that NMT can be used to facilitate the real-time translation of large volumes of the source text. Machine learning and translation technology can be used to support the work of human translators. For in-house teams struggling with urgent deadlines and increasing workloads, Artificial Intelligence (AI) translation can help boost productivity and automate more basic translation tasks.

While NMT technologies have made remarkable progress in overcoming language barriers, this study highlights several significant challenges that remain. NMT tools lack the ability to incorporate the interpretative traditions (taf'sīr) that are often necessary to fully understand Qur'an verses. Arabic language has features that make translating its text into English more challenging, and to preserve the sanctity of the Arabic language in which the Glorious Qur'an was revealed, translating its message into English encounters lexical and grammatical challenges with respect to adequate structure of the source language.

The findings of the study indicate that the limitations of NMT are particularly evident in the translation of the Qur'anic vocabulary and Arabic syntactic structures. In Sūrah Al-Kawthar, at the lexical level, expressions such as: (الْكَوْثَر) ,(إِنَّا) and (الأبْتَر) demonstrate that Qur'anic words and expressions may carry meanings that cannot always be adequately conveyed by a single English equivalent. The translation of such expressions requires consideration of their linguistic context, semantic range, and, where necessary, the explanations of the Qur'anic exegetes.

The study also demonstrates that Arabic syntactic features, specifically, ellipsis may create challenges for NMT, the second verse of Sūrah Al-Kawthar illustrates this aspect, NMT tools cannot replace the human translator; it can, at best, help capture the content and bring the meaning closer to the translator.

In conclusion, while NMT tools continue to improve; this case study emphasizes the importance of human oversight, especially in translating Qur'anic texts. Future developments in NMT should focus not only on enhancing linguistic capabilities, but also on incorporating cultural sensitivity and interpretative flexibility to ensure more accurate and meaningful translations. Translation of the Glorious Qur'an requires a competent translator who is equipped with required knowledge of both source and target languages, and Islamic teachings.

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