Academic Journal of Nawroz University (AJNU), Vol.12, No.3, 2023
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Copyright ©2017. e-ISSN: 2520-789X
https://doi.org/10.25007/ajnu.v12n3a1690

Assessing the Quality of Machine Translation from Kurmanji Kurdish into English

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ABSTRACT

The assessment of quality by the current most widely used on-line machine translation systems such as Google Translate and Bing Translator has always been a hotly debated and controversial topic. This research endeavors to assess the translation quality of the already referred to on-line machine translation systems and to highlight the level of their inadequate quality, if any. Yet, due to the nonexistence of a unique quality assessment method as far as the translation by the two systems is concerned, the current research sets out to utilize an error analysis method for assessing the quality of the translation of two specialized texts, namely political and economy, from Kurdish into English by Google Translate and Bing Translator systems. The error analysis of the chosen texts reveals that both systems achieved excellent results in the orthography category, with 100 and 98.7 percent accuracy for Google and Bing, respectively. Additionally, the results of 98.8% for Google and 97.5% for Bing concerning lexis, reflected positive outcomes for both systems. The analysis also shows that the two selected systems were successful in the translation of the selected texts with reference to English rules of grammar achieving outstanding results that are 99.6 accuracy for Google and 99.4 for Bing. Because both systems recently adopted NMT (neural machine translation) method, which simulates the way human brain functions to produce translation and learns from texts formerly translated by human translators, the two systems performed very well with these two types of texts. For further research, the study recommends conducting further assessment on the translation of more types of Kurdish texts through conducting linguistic error analysis.

KEY WORDS: machine translation, quality assessment, Google Translate, Microsoft Bing Translator, error analysis, political texts, economy texts.

1. Introduction

Understanding the contents of the international publications in languages other than one's own demands mastery of the languages of such publications. This claim is further supported by the constant changes in the surrounding world conditions. On this basis, human translations of adequate quality have been required; a task that is seemingly quite possible but not always easy. To support human translation and give it more credibility, many Machine Translation (MT) systems or 'engines' introduced by researchers and industry over the years are currently in use. They range from those that are linguistic-knowledge-based to statistically rooted ones.

1.1 Aims of the Study

It is widely claimed that Machine translation (MT) does not come out with target translations of precise quality from source texts (in our case from English into Kurdish) (Hassan & Hassan, 2018). As such, this research aims at assessing the quality of two selected translated texts from Kurdish into English by means of MT. MT refers to the use of machines (computers) to translate linguistic materials from a natural language to another. Academically speaking, MT is a branch of computational linguistics that is widely studied in many universities over the world and includes translation software, linguistics and translation.

1.2 Research Questions

- To bring about the preceding aim, it is hypothesized that, on using MT, there are differences and mismatches between the source text and the target text in terms of the translation quality. To enhance the posed hypothesis, the following research question has been forwarded:
- To what extent is the error analysis method precise and reliable in assessing the quality of Kurdish machine translated texts into English?

1.3 Scope of the Study

The proposed quality assessment method is confined to that applied to two non-literary Kurdish Kurmanji texts that have been machine translated into English by two systems, namely Google Translate and Bing Translator.

1.4 Value of the Study

The current study indicates that using error analysis is vital in assessing and developing MT systems. Hence, it can be one of the crucial elements for testing the capabilities of MT systems and outlining the improvements necessary for any system to provide better translation quality. It is further expected to be of some significance in terms of its final outcomes to those users of MT, namely researchers, students, and professional translators who need to know which engines are better recommended to use so as to come out with adequate quality translations from Kurdish into English. Also, assessment of MT is beneficial to system developers and researchers in terms of verifying the effectiveness of MT, and to Kurdish users of MT by providing them with feedback on the quality of the translation by the utilized MT systems. For researchers, the research is expected to fill in the gap in their knowledge of the language of MT and to work as a useful dependable reference for further research in this field.

2. Literature Review

2.1 Machine Translation: Definition and Importance

MT was created by researchers in the field of natural languages in an effort to support human translators. MT is defined by Hutchins (1986, p. 15) as "the use of computers to translate documents from one natural language into another." LISA (Localization Industry Standards Association) defines MT in its "Best Practice Guide on Implementing Machine Translation", as "a method for translating something from one language to another automatically, without human intervention" (LISA, 2010).

MT has also been viewed as a computational linguistic phenomenon in the past decade. As a recent branch of computational linguistics, MT is described as "the process that uses computer software to translate text from one natural language to another" as a topic of study (Alawneh and Sembok, 2011: p. 343). Despite some of its shortcomings, using MT on PCs and smartphones for Lee (2020) "has grown more prevalent in a variety of settings because of its convenience, multilingualism, immediacy, efficiency, and free cost."

According to Hutchins and Somers (1992), the goal of MT is to produce useful automatic translation within a specific context that requires a minimum number of changes to the output to make it acceptable by users. According to Hovy, King, and Popescu-Belis (2002), MT is a worthy topic for academic research and the development of commercial products. Researchers need to apply their theories in order to identify any differences produced by machine translation systems. Developers will find it simpler to identify and address the most challenging problems if they follow this procedure. Undoubtedly, the goal of commercial developers is to attract potential customers who are interested in purchasing their products. Users who are interested in using MT will in turn choose the product that best suits their needs.

2.2 Machine Translation vs. Manual Translation

MT and human translation both have distinctive characteristics. First of all, human translation is often completed at a far slower rate than MT translation. However, MTs require post-editing, which must be done by human translators. Human translation is edited by humans, either the translator or the editor. Furthermore, there is no human intervention during human translation. Additionally, it is widely accepted that machine translation is assessed in comparison to professional human translation (Papineni, Roukos, Ward, & Zhu, 2002).

Humans are now assisted by technology in the translating process. Every aspect of life has been profoundly impacted by technology. It covers every facet of human existence (Pérez, 2001). Technology is developed and constructed with the intention of simplifying life for people from all walks of life. The translation industry has been affected by technological advancements too. MT has been developed to make human work in the translation sector more convenient (Sjahroni and Ahmad, 2013). The demand for the use of MT has increased at an unseen rate. A human translator handles every aspect of the translation process by himself. Only translators utilize translation tools to speed up the translation process. Tools like Translation Memory (TM) devices, electronic dictionaries, Terminology Management Applications, word processor programs, spell checkers and grammar programs, etc. are some examples of typical computer software types.

2.3 - Types (Systems) of Machine Translation

MTs typically fall under one of four categories or paradigms: statistical, rule-based, example-based, or neural machine translation (Jurafsky and Martin, 2009). The first one statistically maps the characters between two languages. In rule-based, the computer is given knowledge about lexical, morphological, functional, and syntactical information (Hartley, 2009) and produces translations based on this information. An analogous translation of a sentence is used in example-based MT. Examples of existing source and target sentence translation pairs are shown. The examples are retrieved to locate similar source sentences when a new source sentence is translated. The most recent method of MT is called neural machine translation (NMT), which is based on the machine learning paradigm. The neural networks used by NMT are made up of nodes that are conceptually modeled after the human brain.

2.3.1 Google System

The aim behind developing Google Translate, a free multilingual neural MT service, by Google company was to translate any word, text, document, or webpage from one language into another. Google Translate provides a translation website interface, iOS, and Android mobile apps, and an API (Application Programming Interface) that assists programmers in creating software apps and browser add-ons (Ulatus, 2020).

Google Translate is one of the most widely used translation services since it is a free web-based service and translates a variety of languages more than any other competitors. Google has also released a free smartphone app called Google Translate (Groves and Mundt, 2015).

Over 500 million people used Google Translate in April 2016, translating more than 100 billion words per day, according to Google Translate (Turovsky, 2016). At various levels, Google Translate supports 109 languages as of April 2022.

With adding of 13 new languages, Google Translate now supports 109 languages overall, including Amharic, Corsican, Frisian, Kyrgyz, Hawaiian, Kurdish (Kurmanji and Sorani dialects), Luxembourgish, Samoan, Scots Gaelic, Shona, Sindhi, Pashto, and Xhosa. A set of Kurdish dialects known as the Kurmanji are mostly spoken in Turkish

Kurdistan, Iranian Kurdistan, Syrian Kurdistan, and Iraqi Kurdistan.

Google Translate was first introduced in April 2006 as a statistical machine translation (SMT) service and since 2016 it converted to a Neural Machine Translation system. This new strategy can make intelligent estimates as to what a good translation should be by finding similar patterns in the documents which have already been translated by human translators (Google, 2022).

2.3.2 -Microsoft Bing System

Microsoft Bing Translator, like its rival Google, was developed in 2002 for Microsoft's own uses for documentation and developing post-edit software. Later on, in 2007, Bing was released for public users at the Bing Translator website (Wendt, 2010). The system currently supports 107 different languages and it is intended to function with any combination of the supported languages (Microsoft, 2022).

Bing Translator offers free text and website translations online. It was formerly known as Windows Live Translator. While websites are translated using the Bilingual Viewer capabilities, the text is translated directly within the Bing Translator webpage. Through the usage of a cloud-based application programming interface in 2011, the service was expanded to include a number of Microsoft Translator products that are accessible to business users and consumers.

In March 2016, a new speech translation feature was released (Datta, David, Mittal, & Jain, 2020). An update to the API was released in May 2018. The default technique of translation in this new edition was NMT. The updated version includes transliteration in addition to translation and a bilingual dictionary that can be used to search for words, find alternative translations, and view each example in a sentence. In September 2018, Microsoft Speech services integrated speech translation, offering end-to-end, text-to-speech, and speech-to-text translation (Microsoft Translator, 2022).

2.4 Language Ambiguity in Machine Translation

The complexity of languages makes understanding them challenging. Natural languages are ambiguous, allowing for numerous ways to understand the same message. They are also expressive which means allowing for numerous ways to communicate the same message. For example, different words in any sentence may have different meanings, and sentences may still have different readings even when the meanings of all the words are understood. Furthermore, non-compositional interpretations of these readings are possible. Since the inception of the field, the effect of language ambiguity on MT has been extensively researched (Kaplan, 1955; Koutsoudas & Korfhage, 1956; Harper, 1957). According to Crosson, "Time flies like an arrow" is the most well-known example in MT literature (1970). This statement can be interpreted in a number of ways, including I that (1) time passes by quickly as an arrow does, (2) that you should time the flies the same way you would time an arrow, and (3) time flies in the same way an arrow would time them, (4) time those flies that are like arrows, (5) that time flies (as a kind of insect) However, based on our understanding of how language is used, the first interpretation—that the line is a metaphor rather than a literal description—is the most logical. A fact that only a human translator can realize, but not a machine translator. However, the two systems under study in this research have interestingly translated this sentence correctly.

2.5 Meaning in Machine Translation

According to Wilks (1972, p. 3), the structural meaning of any language affects both human and MTs. Here, the grammatical structures of the input and output languages are switched over, and the input words are then translated exactly into the

output language (target language). He emphasizes that every word in his study, which is in Russian, is based on a direct translation from English. According to Toma (1976, p. 249), when translating a source text into a target text, MT systems must have an analogous concept to human translation. The meaning of each word is determined by its context and the function it serves in each phrase when the source material is read in order to determine what each word means. He further states that the target language synthesis analysis, suitable vocabularies, syntactic analysis programs, and semantic analysis methods are all requirements for MT.

Delavenay (1960, p. 51) asserts that the word selections, meaning, potential word formations, and links between the words determine the meaning of the outputs produced by machine translation (i.e. morphology, syntax, semantics). The computer must recognize all of the grammatical forms and syntactic structures of the target text in order to determine the meaning of the source text and to ensure that the sentence is understandable in the target language.

The lexical, syntactic, and semantic aspects listed above are related to the meaning of translation outputs created by MT. Depending on the functions and text kinds, some of the mistakes made by the MT damage the meaning because of inappropriate word placement or poor word choice.

2.6 Assessing Machine Translation Output

Determining whether a system reacts appropriately to certain needs and limits is the goal of an assessment. Users must choose which system to use and what to expect from it, users must decide which MT system to use, and commercial developers want to please customers, but first, they need to know how well the system performs in real-time (Talaván, 2005). Assessment of MT systems is important for everyone involved in the field. In reality, the assessment of MT systems is crucial since its findings reveal the level of output reliability and are used to improve the system (Dorr, Snover & Madnani 2011).

In terms of MT quality, it is often governed by the same definitions as those for human translation quality; in fact, its primary goal is to achieve a level that is comparable to that of humans (Papineni et al. 2002). The topic of human parity of MT has arisen as a result of recent advancements in the area. According to Hassan et al. (2018), machines achieve human parity if there is no statistically significant difference between human quality scores for a test set of candidate translations from a machine translation system and the scores for the corresponding human translations.

2.7 Why Assessing Machine Translation?

System developers must look for and evaluate potential error sources in each loop of the cycle. They eventually zero in on a particular sub-issue and consider potential solutions. They then put one of these techniques into practice and evaluate it. The mechanism is added to the system if that improves the system behavior (i.e., declining the number of mistakes without impairing the performance of the system as a whole). If not, it is tossed away. Assessment is required in the context of MT system development for three key reasons:

- Users want to know if they can rely on the quality of the MT systems and their output.
- Finding out and analyzing possible errors through conducting error analysis, which involves finding out and analyzing potential error cases. For the system to behave better, a thorough understanding of its capabilities is necessary.
- Comparison, i.e., to measure the effectiveness of the suggested mechanisms by contrasting different versions of the same system. Also comparing translations made by various systems is also a popular practice, allowing system designers to learn

from one another's effective processes. As a result, research can advance together.

• System optimization, also known as internal parameter adjustment. Usually, these settings are changed to maximize the system quality as determined by the chosen assessment method.

2.8 Machine Translation and Kurdish Language

Few researches have hitherto addressed the Kurdish language in the context of MT. The Apertium project (Forcada, Ginest-Rosell, Nordfalk, O'Regan, Ortiz-Rojas, Pérez-Ortiz, & Tyers, 2011) is one of the leading initiatives in developing a rule-based MT system for Kurmanji and Sorani. For the Kurdish language, a number of tools and resources, such as bilingual and morphological dictionaries, structural transfer rules, and grammars, are being produced as part of this open-source effort. InKurdish[1], which employs dictionary-based techniques for translation, is a further preliminary attempt to develop a machine translation system for Kurdish. According to Taher & Kaka-Khan (2017), this system is unable to translate due to the length and level of idiom in the input sentences. Kaka-Khan (2018) compares the two primary MT systems for Sorani Kurdish and finds that while Apertium's rule-based approach performs noticeably better, its lexical and transfer rule restrictions result in inaccurate translations, making it challenging to generalize across domains. Due to the recent refugee crisis, numerous humanitarian groups, like Translators Without Borders (TWB)[2] and Tarjimly[3], to name a few, have shown an interest in Kurdish language translation (Balkul, 2018). Some of these groups offer mobile applications that let refugees connect with interpreters for things like meetings with authorities or other translation needs. A machine translation system is developed for TWB based on the Apertium

2.9 Previous Related Studies

The most important task in the life cycle of any MT system is its evaluation. Hutchins and Somers (1992) state that manual (human) evaluation is viewed subjectively; just opposite to automatic evaluation which is objective as relevant studies have shown that the automatic evaluation provides objective results based on the text's affinity. However, evaluation based only on textual similarity cannot provide feedback on the capacities of MT systems because it just analyses the correspondence between words, not quality in terms of language style and the semantic cohesion. Contrariwise, manual evaluation includes error analysis and suitably provides consistent results. Much of research is conducted on MT translation quality following automatic evaluation metrics, but a manual evaluation, specifically error analysis, is still scarce.

Though there have been very few studies that have addressed the Kurdish language in the MT realm, there are still some studies that have investigated the same area of MT quality assessment. Taher and Kaka-Khan (2017) evaluated, in Kurdish, an MT system for Kurdish that uses dictionary-based methods for translation. They reported that this system fails to translate due to the length of the input sentences and the degree of idiomaticity.

Condon, Parvaz, Aberdeen, Doran, Freeman & Awad (2010) inspected errors in MT of English- Iraqi Arabic dialogues and found that errors mainly include addition and deletions. The results revealed a high frequency of errors in subject-person inflection in translation into Iraqi Arabic and also pronouns-related errors in the translation into English. They also found errors in word order and plurality.

Daniele (2019) quantitatively evaluated the efficacy of a free online medical translation tool in translating English-to-Italian medical literature. By examining the quantity and frequency of translation errors in original research abstracts from the medical area, translation efficacy was assessed and established. This study also examined the percentage of translation errors as well as their relationship to lexical density. Lexical density and the overall number of errors were also found to be correlated directly. The results also showed that in translating

words in highly academic publications like medical abstracts, Google Translate performed rather well.

In a similar context, Popović and Ney (2011) conducted an assessment of the machine-translation output. They categorized the errors they found into five types, viz. lexical errors, reordering errors, inflectional errors, word insertions, and word deletions.

Hannouna (2004) assessed the capacity of Google Translate in translating legal texts. He found out that Google Translate provided limited acceptable legal translation as such a job requires maximum accuracy and precision that Google Translate lacks. However, Google Translate could help in providing the general meaning of the text.

According to Almahasees and Mustafa (2017), one of the primary issues is the context and the specialized domain terminology, which MT is unable to provide owing to the uniqueness of each cultural context.

2.10 Methodology

2.10.1 Selection of the Corpus

After selecting a corpus that comprised two types of Kurdish texts, namely political and economy, each text was entered into Google Translate and Bing Translator. Then, the researcher examined the output texts to pinpoint the errors committed by the two systems. As the current study adopts the framework of error analysis suggested by Costa et al. (2015), the errors were categorized into three types: orthography, lexis and grammar. Each category was then presented in percentages in order to make a fair comparison between the two systems.

The first text, published on July 1, 2022, is a political one taken from Rudaw Media Network which is a media network in the Kurdistan Region of Iraq that broadcasts in Kurmanji, Sorani, Arabic, Turkish, and English. The second text is economic and taken from K24, a Kurdish news broadcasting station based in Erbil in the Kurdistan Region of Iraq. The text was published on June 29, 2022.

2.10.2 Corpus Analysis

Given the above, the analysis of the corpus was conducted on the basis of the three core categories of linguistic error analysis. The three categories are orthography, lexis, and grammar. Orthography studies the rules of writing such as capitalization, spelling, hyphenation, punctuation, and word breaks. Lexis is the study of the vocabulary of a language, as distinct from its grammar; the total stock of words and idiomatic combinations of them in a language. Lexical error analysis includes words that are omitted, added, and untranslated, in addition to lexical collocations, mistranslation, and word choice. Lastly, grammar is the study of language structure. As such, it focuses on word constructions with regard to subject-verb agreement, clauses, verb conjugation, collocations, and the like.

The two texts were translated by Google and Bing from Kirmanji Kurdish (source) into English (target) and segmented into sentences for the purpose of analysis (Appendix 1).

2.10.2 Discussion

The analysis of errors committed by the online systems, Google Translate and Bing Translator in translating Kurmanji Kurdish selected texts into English provides insights into how these two systems deal with the linguistic challenges (Orthography, lexis, and grammar) based on a framework of error analysis introduced by Costa et al. (2015). The framework was adopted to identify, classify and determine the errors found in the output translation of the said texts. The three categories were analyzed separately and results for each of the two systems are presented individually below:

A. Orthography

The orthographic errors are categorized, counted, and their percentages are calculated. The results are presented in Table 1.

Table 1: Orthographic errors

Error type	MA system

	Google	Bing
Capitalization	0	1
Punctuation	0	3
Spelling	0	0
Hyphen	0	0
Word Break	0	0
Errors total	**0**	**4**
Word count	504	550
Percentage	0%	1.3%

In Figure 1, the way Google Translate and Bing Translator dealt with the translation at the level of orthography is stated. The study's analysis illustrates that Bing Translator made capitalization errors. It translated the Kurdish word (یه شەرمەزاری"), for example, which is the first word of a quotation correctly but without capitalizing it as supposed. Furthermore, it did not place a comma in two different positions and replaced a full stop with a comma in another one. Google Translate, on the other hand, did not commit any orthographic errors at all.

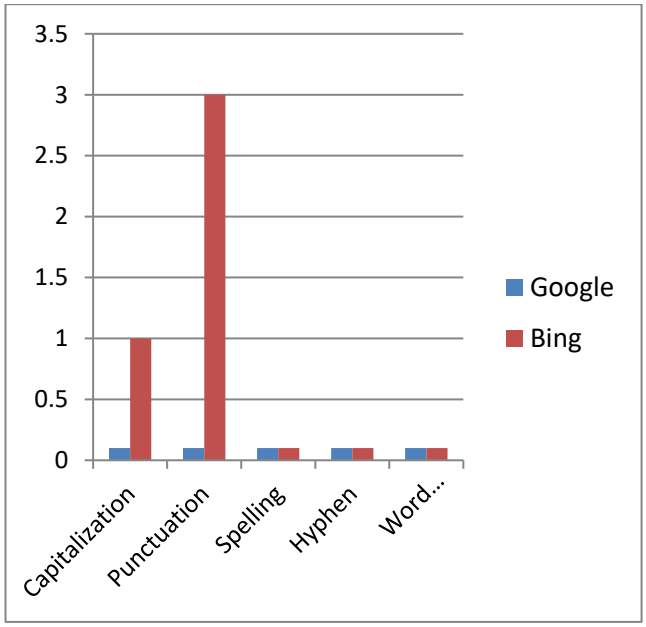

Figure 1: Orthography errors

The total number of errors in each system is totaled up and divided by the total number of words in the two texts. The result is given in percentage (PER %) according to the following formulae:

Google Result: 0/504= 0.0%

Bing Result: 4/550= 1.3%

Results of both systems show that orthography errors are zero with the Google system while it is 1.3% with the Bing system. This indicates that Google Translate came out with excellent results with >100% accuracy in rendering Kurdish into English. Even the orthographic error rate of 1.3% committed by Bing Translator is relatively a normal rate of errors for systems that deal with language processing.

B. Lexis

Lexis is the study of the vocabulary of a language that has grammatical function and meaning. McArthur (1992) describes lexis as the area concerned with the nature, history, meaning, and use of words. According to Summers & Stock (1993), lexis is the linguistics branch that focuses on the use of words and meaning. Likewise, Ashby (2000) argues that lexis is "another term for vocabulary and lexis is all the words and phrases of a particular language." Since they can change the meaning and accordingly hinders the intelligibility of the text, lexis errors are usually considered major errors. Table 2 illustrates the lexical errors made by the two systems.

Table 2

Lexical errors

Error type	MA system	
	Google	Bing
Omission	2	4
Addition	0	0
Mis-translation	4	10
Lexical collocation	0	0
Un-translated	0	0
Errors total	**6**	**14**
Word count	504	550
Percentage	1.2%	2.5%

Figure 2 displays a rise in the number of errors compared to orthographic errors. Results of lexis errors included omission and mistranslation. Whereas omission accounts for the lowest percentage of lexis errors, mistranslation represents the highest percentage of errors. While Google

Translate omitted two words in two different places, Bing Translator omitted words in four places.

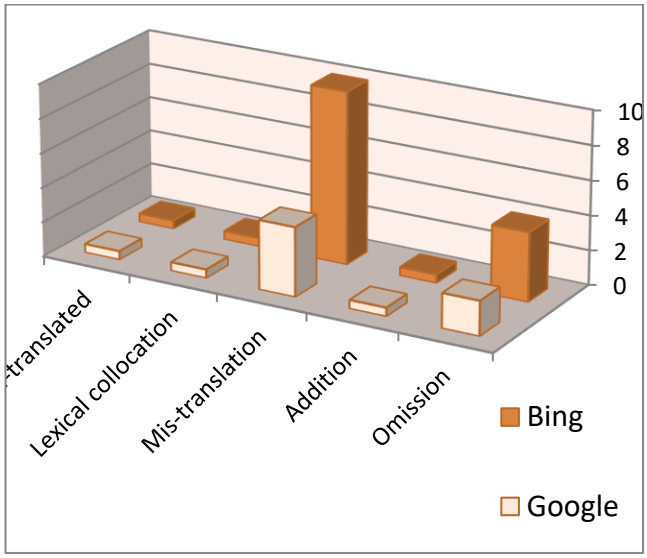

Figure 2: lexical errors

Despite the number of lexical errors committed by the two systems, Google Translate and Bing Translator however, came out with good results of correctness with 98.8% for Google and 97.5% for Bing.

C. Grammar

Grammar is the study of the grammatical rules that govern the way words, phrases, and clauses. It covers the relevant areas of phonology, morphology, syntax, semantics, and pragmatics.

According to the BBC English dictionary (1992), grammar is a set of features of any existing language including sounds, words, as well as word formation and arrangement. The grammar analysis in this study includes verb tense, concord (subject-verb agreement), and use of definite and indefinite articles. Table 3 lists all grammar errors found in the two selected texts.

Table 3: Grammatical errors

Error type	MA system	
	Google	Bing
Verb tense	2	0
Concord	0	1
Use of articles	0	2
Errors total	**2**	**3**
Word count	504	550
Percentage	0.04	0.60

Figure 3 shows the two system's capacity in conforming to English grammar conventions in the translation of the selected corpus.

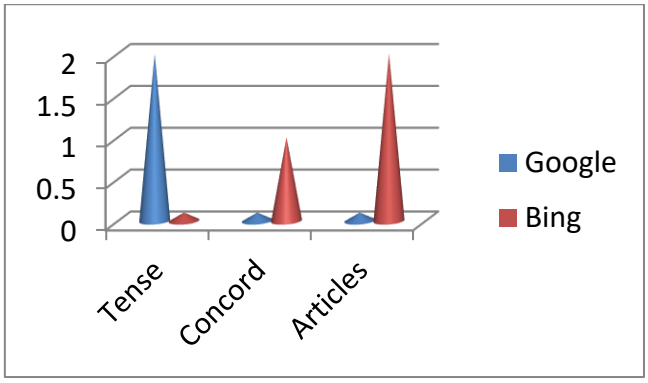

Figure 3: Grammatical errors

The results show that both systems achieved good results in providing a translation with reference to English rules of grammar. In this respect, it is worth noting that RBMT (Rule-Based Machine Translation) – which was developed based on the corpora and linguistic dictionaries that cover the primary morphological, syntactic, and semantic regularities of the source and text languages – is one of the early approaches that MT adopted at the early days. The RBMT is basically grammar rules dependent unlike NMT (Neural Machine Translation) approach which simulates the way the human brain deals with such linguistic activities. The research hence assumes that NMT, which is the most recent and advanced approach of MT, can handle grammar more precisely and efficiently.

In English grammar, tenses are not used to only indicate the relationship between the action and the time but they also have some specific uses that are different from tense to tens. For instance, the present is used in English to refer to actions that are repeated as a kind of habit on a regular basis. Bing was more successful in translating all verbs with the correct tense. However, Google was not lucky as its competitor as it committed two errors of the same type, using past tense instead of the present. Concord means the agreement between the verb and the subject. In English, for example, is/was must be used with a singular subject like "he was" (but not *"he were"). No concord errors are detected with Google but one such error was committed by Bing. The last type of grammatical error is the use of articles. In English, either a definite or indefinite article is

used with nouns in certain positions. Bing failed to add the definite article "the" in two places where they were supposed to be used as Google did.

The overall assessment of the MT of political and economic Kurdish texts into English is presented in Figure 4.

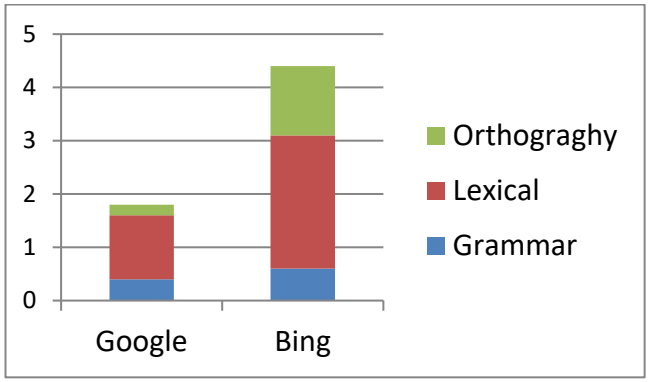

Figure 4: Overall errors

The figure reveals that both systems produced excellent orthography results and respectable lexis and grammar outcomes. Specific cultural and contextual terms may result in making errors that are challenging for MT to handle correctly. The use of neural machine translation, on the other hand, helped the two systems achieve successful outcomes since it tries to create a bigger neural network that forecasts the likelihood that a sequence of words would be read aloud in a sentence and provide an accurate translation as an output.

Conclusion

Results of this study revealed that the two selected systems achieved overall results of correctness; 99.5% and 98.5% by Google and Bing respectively at the orthography, lexical and Grammar levels. It is however worth mentioning that the obtained results are limited to a small size and limited types of the corpus. Further work planning aims at including more types of texts to verify the quality results of MT in translating Kurdish texts into English. The study furthermore recommends more cooperation between MT technologies developers and linguists in order ensure a more accurate translation of the MT systems. Although this research is conducted to identify the errors in the MT output, more studies are needed to investigate errors found in the MT output of the different subgenres of informative texts such as news, medical, legal, etc.

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Appendices

Appendix 1: Text Analysis

Text 1 (Political)					
#	**Source text (in Latin alphabet)**	**Source text (in Kurdish alphabet)**	**Google (EN)**	**Bing (EN)**	**Error type**
1	Rêberê Tevgera Sedr Muqteda Sedr bi tundî Serokomarê Iraqê Berhem Salih rexne kir.	رێبەرێ تەڤگەرا سەدر موقتەدا سەدر ب تونديى سەرۆكۆماريێ عيراقێ بەرهەم سالهـ رەخنه كر.	The leader of the Sadr Movement, Muqtada Sadr, strongly criticized the Iraqi President Barham Salih.	Sadr Movement leader 1 Muqtada Al-Sadr 2 strongly criticized **1 Iraqi President Barham Salih.	**Grammatical**[1] (article "the" is missing)
2	Sedrî ragihand, "şermezarî ye ku Serokkomarê Iraqê qanûna tawanbarkirina asayîkirina peywendiyan bi Îsraîlê re red dike û îmze nake".	سەدری ڕاگەهاند، "شەرمەزاری یە کو سەرۆککۆماریێ عیراقێ قانوونا تاوانبارکرنا ئاساییکرنا پەیوەندیان ب ئیسرایلێ ڕە ڕەد دکەت ئوو ئیمزە ناکە".	Sadr declared, "It is a shame that the President of Iraq rejects and does not sign the law accusing the normalization of relations with Israel".	Sadr stated that "3 it is a shame that the Iraqi President rejects and does not sign the law on **2 the normalization of relations with Israel".	**Omission**[2] (the word "accusing" is missing)
3	Herwasa diyar kir, "Şerm e bo milletekê ku serokê wê alîgirê normalîzekirinê û kesekî ne nîştimanî be."	هەر ووسا دیار کر، "شەرمە بۆ مللەتەکێ کو سەرۆکێ وێ ئالیگرێ نۆرمالیزەکرنێ ئوو کەسەکی نە نشتمانی بە".	He also stated, "It is a shame for a nation whose president is in favor of normalization and be a non-national **3. "	"It is a shame for a nation whose president is a supporter of normalization and a non-national person," he said.	**Omission**[3] (the word "person" is missing)
4	Muqteda Sedir îro 28ê Hezîrana 2022an li ser hesaba xwe ya di tora civakî ya twitterê de ragihand: "Gelek gelek şerm e, ya jê re dibêjin Serokomarê Iraqê (Berhem Salih) red bike ku qanûna tawanbarkirina asayîkirina peywendiyan bi Îsraîlê re îmze bike."	موقتەدا سەدر ئیرۆ 28ێ هەزیرانا 2022ان ل سەر هەسابا خوە یا د تورا جڤاکی یا توتێرێ دە ڕاگەهاند: "گەلەك گەلەك شەرمە، یا ژێ ڕە دبێژن سەرۆکۆماریێ عیراقێ (بەرهەم سالهـ) ڕەد بکە کو قانوونا تاوانبارکرنا ئاساییکرنا پەیوەندیان ب ئیسرایلێ ڕە ئیمزە بکە".	On June 28, 2022, Muqtada Sadir announced on his Twitter account: "It is very shameful that the so-called President of Iraq (Barham Salih) **refused**[5] to sign the law accusing him of normalizing relations with Israel."	Muqtada Sadr said on his Twitter account on June 28, 2022: "It is very shameful that the **4 Iraqi President (Barham Saleh) refuses to sign the law on the normalization of relations with Israel."	**Omission**[4] (the word "so-called " is missing) **Grammatical**[5] (wrong tense)
5	Sedr herwasa dibêje, pir eyb e ji bo gelekî ku serokê wê li gel asayîkirina pêwendiyan û neniştimanî be û dûvikê rojava yan jî rojhilat be.	سەدر هەروسا دبێژە، پر ئەیبە ژ بۆ گەلەکی کو سەرۆکێ وێ ل گەل ئاساییکرنا پێوەندیان ئوو نەنشتمانی بە ئوو دووڤکێ ڕۆژاڤا یان ژی ڕۆژهلات بە.	Sadr also says it is very embarrassing for **many**[7] that its president is **in the process**[8a] **of** normalizing relations and nationalism and is the tail of the west or the east.	Sadr also says it is very strange for **many**[6] that its president is with the normalization of relations and nationality and is the tail of the west or **8b east.	**Miss-Tr.**[6] (wrong word choice) **Miss-Tr.**[7] (wrong word choice) **Miss-Tr.** [8a] (wrong word

					choice) **Grammatical** [8b] (article "the" is missing)
6	Sedr herwiha destnîşan dike, ji ber berbijêrkirina Berhem Salih bo posta Serokkomariyê di demên berê û paşerojê de, ew lêborînê ji gelê Iraqê dixwaze.	سەدر هەروها دەستنیشان دکە، ژ بەر بەربژێرکرنا بەرهەم سالح بۆ پۆستا سەرۆککۆماریێ د دەمێن بەرێ ئوو پاشەرۆژێ دە، ئەو لێبۆرینێ ژ گەلێ عیراقێ دخوازە.	Sadr also said that he **apologized**[9] to the Iraqi people for the election of Barham Salih as President in the past and in the future.	Sadr also points out that he apologizes to the Iraqi people for electing Barham Salih to the post of President in the past and in the **past**[10].	**Grammatical** [9] (wrong tense) **Miss-Tr.** [10] (wrong word choice)
7	Roja 26ê Gulana 2022an, parlamentoya Iraqê bi piraniya dengan navê qanûna "Qedexekirina Asayîkirin û Damezrandina Têkiliyên bi Statuya Siyonîst re" bo qanûna "Tawanbarkirina Asayîkirina Peywendiyan bi Statuya Siyonîst re " guherand û ev qanûn pesend kir.	ڕۆژا 26ێ گولانا 2022ان، پارلامەنتویا عراقێ ب پرانیا دەنگان ناڤێ قانوونا "قەدەغەکرنا ئاساییکرن ئوو دامەزراندنا تێکلییێن ب ستاتویا سیۆنیست ڕە" بۆ قانوونا "تاوانبارکرنا ئاساییکرنا پەیوەندیان ب ستاتویا سیۆنیست ڕە " گوهەراند ئوو ئەڤ قانوون پەسەند کر.	On May 26, 2022, the Iraqi parliament changed **[11] the name of the law "Prohibiting Normalization and Establishing Relations with the Zionist State" to the law "**Prohibiting**[12] Normalization of Relations with the Zionist State" and approved this law.	On May 26, 2022, the Iraqi parliament voted by a majority to amend the law "Prohibition of Normalization and Establishment of Relations with Zionist **Status**[13a]" to the Law on "Criminalizing The Normalization of Relations with the Zionist **Status**[13b]" **[14].	**Omission** [11] (the word "by majority" is missing) **Miss-Tr.**[12] (wrong word choice) **Miss-Tr.** [13a] (wrong word choice) **Miss-Tr.** [13b] (wrong word choice) **Omission** [14] (words "and approved this law" are missing)
8	Pêşnûmeya qanûnê di 24ê Nîsana 2022an de ji aliyê Fraksyona Sedr ve hatibû pêşkêşkirin û 11ê Gulanê di civîna parlamentoya Iraqê de xwendina yekem jê re hatibû kirin.	پێشنوومەیا قانوونێ د 24ێ نیسانا 2022ان دە ژ ئالیێ فراکسیۆنا سەدر ڤە هاتبوو پێشکێشکرن ئوو 11ێ گولانێ د جڤینا پارلامەنتویا راڤێ دە خوەندنا یەکەم ژێ ڕە هاتبوو کرن.	The draft law was presented by the Sadr faction on April 24, 2022, and it was given the first reading on May 11 at the Iraqi parliament meeting.	The draft law was submitted by the Sadr Faction on April 24, 2022 and the first reading was made at the Iraqi parliament meeting on May 11.	
9	Ev yasa hemû corên têkiliyan bi Îsraîlê re qedexe dike, eger ew têkilî ji aliyê hemwelatiyên Iraqê yên li hundirê welat an jî li derveyî welat be yan jî ji aliyê berpirsên sivîl û leşkerî be, yan jî ji	ئەڤ یاسا هەموو جۆرێن تێکلیان ب ئیسرایلێ ڕە قەدەخە دکە، ئەگەر ئەو تێکلی ژ ئالیێ هەموەلاتیێن عیراقێ بێن ل هوندرێ وەلات ئان ژی ل دەرڤەیی وەلات بە یان ژی ژ ئالیێ بەرپرسێن سڤیل ئوو لەشکەری بە، یان ژی ژ ئالیێ بیانییێن کو ل عیراقێ ئاکنجی نە.	This law prohibits all types of contacts with Israel, whether those contacts are by Iraqi citizens inside the country or abroad, or by civil and military officials, or by foreigners residing in Iraq.	This law prohibits all forms of contact with Israel if it is contacted by Iraqi citizens inside or outside the country or by civilian and military officials, or by foreigners residing in Iraq.	

	aliyê biyaniyên ku li Iraqê akincî ne.				
10	Iraq yek ji wan dewletan e ku heta niha jî Îsrîalê nas nake û ti peywendiyek di navbera Bexda û Tel Avîvê de nîne. Piraniya hêzên siyasî yên Iraqê jî normalîzekirina têkiliyan bi Îsraîlê re red dikin.	عیراق یەك ژ وان دەولەتانە کو هەتا نها ژی ئیسریالێ ناس ناکە ئوو ت پەیوەندیەك د ناڤبەرا بەخدا ئوو تەل ئاڤیڤێ دە نینە. پرانیا هێزێن سیاسی یێن عیراقێ ژی نورمالیزەکرنا تێکلیان ب ئیسرایلێ رە رەد دکن.	Iraq is one of the states that still does not recognize Israel and has no connection between Baghdad and Tel Aviv. Most Iraqi political forces also reject the normalization of relations with Israel.	Iraq is one of the states that still does not **know**[15] Israel and has no connection between Baghdad and Tel Aviv. Most Iraqi political forces also refuse to normalize relations with Israel.	**Miss-Tr.**[15] (wrong word choice)
Text 2 (Economy)					
11	Rêveberê Giştî yê Bazirganiya Herêma Kurdistanê Newzad Şêx Kamil ji K24ê re ragihand: “Heta niha li hemû deverên Herêma Kurdistanê 158 hezar ton genimê cotkaran hat wergirtin.”	رێڤەبەرێ گشتی یێ بازرگانیا هەرێما کوردستانێ نەوزاد شێخ کامل ژ ك24ێ رە راگەهاند: "هەتا نها ل هەموو دەڤەرێن هەرێما کوردستانێ 158 هەزار تۆن گەنمێ جوتکاران هات وەرگرتن."	Kurdistan Region Trade Director General Newzad Sheikh Kamil told K24: "Until now, 158,000 tons of **grain**[16] have been received from farmers in all parts of the Kurdistan Region."	Kurdistan Region Trade Director-General Nawzad Sheikh Kamil told K24: "So far, 158,000 tons of farmers' wheat have been received in all parts of the Kurdistan Region."	**Miss-Tr.**[16] (wrong word choice)
12	Newzad Şêx Kamil diyar kir: “Weke qonaxa destpêkê, niha 35 milyar Dînar ji bo wergirtina genimê cotkaran hatiye, ji wê beşê, 10 milyar hatiye dabeşkirin, ewên mane di vê hefteyê de bi ser cotkaran de dê were dabeşkirin.”	نەوزاد شێخ کامل دیار کر: "وەکە قوناخا دەستپێکێ، نها 35 ملیار دینار ژ بۆ وەرگرتنا گەنمێ جوتکاران هاتیە، ژ وێ بەشێ، 10 ملیار هاتیە دابەشکرن، ئەوێن مانە د ڤێ هەفتەیێ دە ب سەر جوتکاران دە دێ وەرە دابەشکرن."	Nowzad Sheikh Kamil explained: "As the initial stage, 35 billion dinars have been allocated to farmers' grain, of which 10 billion have been distributed, and the rest will be distributed to farmers this week."	Nawzad Sheikh Kamil stated: "As an early stage, 35 billion dinars **have now come to receive farmers' wheat**[17], from which 10 billion have been **divided**[18], and those left will be **divided**[19] into farmers this week."	**Miss-Tr.**[17] (wrong meaning transferred) **Miss-Tr.**[18] (wrong word choice) **Miss-Tr.**[19] (wrong word choice)
13	Kamil destnîşan kir: “Îsal hemû genimê cotkaran li sayloyên Herêma Kurdistanê tênе radestkirin û naçe bajarên din ên Iraqê.”	کامل دەستنیشان کر: "یسال هەموو گەنمێ جوتکاران ل سایلۆیێن هەرێما کوردستانێ تێنە رادەستکرن ئوو ناچە باژارێن دن ئێن عیراقێ."	Kamil stated: "This year, all the grain of the farmers is delivered to the Kurdistan Region's silos and will not go to other cities in Iraq."	Kamil stated: "This year, all farmers' wheat is delivered **in the fields**[20] of the Kurdistan Region and will not go to other Iraqi cities."	**Miss-Tr.**[20] (wrong word choice)
14	Li ser radestkirina genimê cotkaran, Rêveberiya Çandiniya Ranya ragihand: “Heta îro 25ê Hezîrana 2022yan, zêdetirî 18	ل سەر رادەستکرنا گەنمێ جوتکاران، رێڤەبەریا چاندنیا رانیا راگەهاند: "هەتا ئیرۆ 25ێ هەزیرانا 2022یان، زێدەتری 18 هەزار تۆن گەنم ژ جوتکاران هاتیە وەرگرتن ئوو 82 جوتکاران پەرمیێ گەنمێ	Regarding the delivery of grain **to**[21] farmers, the Ranya Agriculture Administration announced: "Until today, June 25, 2022,	"As of June 25, 2022, more than 18,000 tons of wheat have been received from farmers and 82 farmers have received their wheat	**Miss-Tr.**[21] (wrong word choice - meaning)

	hezar ton genim ji cotkaran hatiye wergirtin û 82 cotkaran pereyê genimê xwe wergirtine.”	خوه وەرگرتنە."	more than 18,000 tons of grain have been received from farmers and 82 farmers have received their grain money."	money **4** ," Ranya Agriculture Administration said on the delivery of farmers' wheat.	
15	Îsal Hikûmeta Herêma Kurdistanê kevirê bingeha projeya bazarkirina genimê cotkaran danî.	ئیسال هکوومەتا هەرێما کوردستانێ کەڤڕێ بنگەها پرۆژەیا بازارکرنا گەنمێ جۆتکاران دانی.	This year, the Kurdistan Regional Government laid the foundation stone of the farmers' grain marketing project.	This year, the KURDISTAN REGIONAL GOVERNMENT laid the foundation stone for the farmers' wheat marketing project.	
16	Proje ji çêkirina çendîn sayloyên modern û depokirin û berhemanîna xurek û bazarkirina genim û dirustkirina berhemên xurek pêk tê, ku bi teknolojiya herî nû û bi standardên cîhanî hat çêkirin.	پرۆژە ژ چێکرنا چەندین سایلۆیێن مۆدەرن ئوو دەپۆکرن ئوو بەرهەمانینا خورمك ئوو بازارکرنا گەنم ئوو دروستکرنا بەرهەمێن خورمك پێك تێ، کو ب تەکنولۆژیا هەری نوو ئوو ب ستانداردێن جیهانی هات چێکرن.	The project consists of the construction of several modern silos and the storage and production of food and the marketing of grain and processing of food products, which was built with the latest technology and with global standards.	The project consists of the construction of several modern **cylinders**[22], storage, food production, wheat marketing, and the manufacture of food products, which **were**[23] built with the newest technology and by global standards.	**Miss-Tr.**[22] (wrong word choice) **Grammatical**[23] (subject-verb disagreement)
17	Evê jî hêsankariya zêdetir ji bo cotkaran kiriye û îsal kêşeya radestkirina genim dernakeve holê.	ئەڤێ ژی هێسانکاریا زێدەتر ژ بۆ جۆتکاران کریە ئوو ئیسال کێشەیا ڕادەستکرنا گەنم دەرناکەڤە هۆلێ.	This has made it easier for farmers and the problem of delivering grain does not arise this year.	This has also facilitated more **[24] farmers and this year the problem of wheat delivery will not arise.	**Omission** [24] (the preposition “for” is missing)
18	Salên berê, cotkar ji bo firotina genimê xwe, çavê wan li sayloyên Iraqê bû û heqê genimê xwe jî di dema xwe de nikaribûn werbigrin.	سالێن بەرێ، جۆتکار ژ بۆ فرۆتنا گەنمێ خوە، چاڤێ وان ل سایلۆیێن راقێ بوو ئوو هەقێ گەنمێ خوە ژی د دەما خوە دە نکاربوون وەربگرن.	Years ago, farmers used to look at Iraqi silos to sell their grain, and they could not get the payment for their grain on time.	In previous years, farmers were looking at Iraqi silos to sell their wheat and could not get their wheat fees in time.	