



فعالية استخدام الترجمة الآلية في ترجمة العناصر الخاصة بالثقافة اليمنية
إلى اللغة الإنجليزية: اللهجة صنعانية أنموذجاً

Effectiveness of Machine Translation in Rendering Yemeni Culture-Specific Items into English: Sana'ani Dialect as a Case-in-Point

Saleh Abduh Naji Ali Khoshafah

*Researcher- Department of English
Faculty of Languages- Sana'a University -Yemen*

صالح عبده ناجي علي خشافه

*باحث - قسم اللغة الإنجليزية
كلية اللغات - جامعة صنعاء - اليمن*

Ibraheem N.A. Tagaddeen

*Researcher- Department of English
Faculty of Languages- Sana'a University -Yemen*

إبراهيم ناجي أحمد تاج الدين

*باحث - قسم اللغة الإنجليزية
كلية اللغات - جامعة صنعاء - اليمن*

المخلص:

مما لا شك فيه أن العناصر الثقافية في أي مجتمع تظهر جلية في كل نواحي الحياة، ففي عصر العولمة لاقت ترجمة العناصر الثقافية اهتماماً متزايداً، لكن بسبب أن لكل ثقافة خصائصها اللغوية وجوانبها الاجتماعية الخاصة بها، فقد أصبحت العناصر الثقافية قضية معقدة في مجال الترجمة الآلية. على الرغم من التطورات التكنولوجية الحديثة، فلا تزال الترجمة الآلية تفتقر إلى القدرة على إنتاج ترجمة ذات جودة عالية من حيث دقة الترجمة في نقل مقاصد المؤلف ومراعاة الجانب الثقافي القائم على ذائقة وسياق القارئ. تهدف هذه الدراسة إلى تقييم فعالية الترجمة الآلية في ترجمة العناصر الخاصة بالثقافة اليمنية إلى اللغة الإنجليزية من خلال مقارنة نتائج ترجمات البرامج الثلاثة (Google Translate – Yandex – Bing Translator) وذلك لتحديد البرنامج الذي يستطيع أن ينتج أقرب ترجمة إلى النص الأصلي. وتهدف الدراسة أيضاً إلى معرفة مشكلات ترجمة العناصر الخاصة بالثقافة اليمنية الناتجة عن الترجمة الآلية. ولتحقيق هذه الأهداف فقد اتبع الباحثان طريقة البحث الوصفي والنوعي القائم على المقارنة. تضمنت عينة الدراسة 14 عنصراً خاصاً بالثقافة اليمنية والتي تم اختيارها قصدياً بسياقاتها من كتاب "قضايا اجتماعية في الثقافة الشعبية اليمنية" للكاتب اليمني عبدالرحمن مطهر وتم ادخالها إلى البرامج الآلية الثلاثة الأنفة الذكر. وتوصلت الدراسة إلى أن الترجمة الآلية تفتقر القدرة على ترجمة عناصر الثقافة اليمنية بشكل دقيق ومناسب، فقد فشلت برامج الترجمة الآلية في ترجمة معظم العينة المختارة بشكل مناسب، حيث أن **Google and Yandex** لم تتجح في ترجمة 13 مثلاً من العناصر الثقافية بدقة، بينما أنتج برنامج **Bing** 12 خطأً في ترجمة نفس العناصر. وأظهرت النتائج بأن الترجمة الآلية لديها مشكلات معجمية ودلالية وبرجماتية عند ترجمة العناصر الثقافية اليمنية.

الكلمات المفتاحية: الترجمة الآلية، العناصر الثقافية، الثقافة اليمنية، مشكلات الترجمة، القبول الثقافي.

Abstract:

Undoubtedly, in any given society cultural elements are manifested in all aspects of life. In this globalized age, efforts have been exerted in translating cultural elements. However, since each culture has its own linguistic peculiarities and social aspects, it has become a complicated issue in the field of MT. Despite the recent technological developments, MT still lacks the ability to produce adequate translation in terms of author-based accuracy and reader-oriented cultural acceptability. This study aims to assess the effectiveness of MT in rendering Yemeni culture-specific items into English by comparing the translation outcomes of three MT programs (*Google Translate*, *Yandex Translate* and *Bing Translator*) to find out which program can produce the closest translation to the source text. Moreover, the study aims to identify translation problems of Yemeni culture-specific items resulting from MT. To achieve these aims, the researchers followed a descriptive qualitative method within a comparative framework. The study sample includes 14 Yemeni culture-specific items in their contexts taken from the book *Social Issues in Popular Yemeni Culture* by Abdu Al Rahman Mutahar and inserted into the three MT systems. The study concluded that MT lacks the ability to translate Yemeni culture-specific items adequately. The three programs failed to render most of the selected sample adequately. *Google* and *Yandex* failed to translate 13 cultural items whereas *Bing* made 12 errors in translating the same cultural items. The study results also showed that MT faced challenges in translating Yemeni culture-specific items, resulting in lexical, semantic and pragmatic problems.

Keywords: Machine translation (MT), Culture-specific items, Yemeni culture, Translation problems, Cultural acceptability.

Introduction

The recent years have witnessed a lot of impressive developments in many fields due to scientific advancement and technological developments. Thousands of electronic devices and communication tools have emerged. Notably, machine as a fruit of technology has started to replace human being in many fields of life. These recent changes have had a great impact on all walks of our life, economically, culturally, politically, socially, etc. They provided facilities for different users. Besides, a considerable amount of information has been emerging in different fields of knowledge, such as scientific information, textbooks, newspapers, medical reports and legal documents. Consequently, a human being inevitably needs to interact with these changes in his/her life to cope with these new developments of modern science and technology.

Information technology acquires significance in translation especially scientific and technical translations and this has increased the need for professional translators to deal with the new translation technologies. In other words, translators should be able to use information technologies to achieve their tasks faster and more appropriately. These technologies allow translators to save time and effort required for the process of the translation. Accordingly, translators adopted MT because they think that kind of translation increases their productivity when they need to translate a large amount of scientific and technical information (Al-Samawi, 2014).

The main aim and dream of MT are fully automatic high-quality MT. However, this goal has been reached only for limited domain applications. The complexity of language caused many unsolved problems in MT. In other words, MT systems today are mostly designed for scientific and technical documents. The growing demand of MT in the world is not only for translating particular texts such as literary texts; rather MT is needed in translating scientific and technical texts, business and commercial transactions,

administrative memoranda, instruction manuals, legal documentation, agricultural and medical texts, industrial patents, publicity leaflets and newspaper reports. Translating a large amount of technical materials is too boring for human translators, so they look for assistance from computers. In addition, many users and translators resort to automatic translation because using MT guarantees consistency of terminology (Koehn, 2010).

Statement of the research problem

MT has become an important part of the translation process. It is being used widely throughout the world. However, MT still faces many challenges. This study is focused on investigating the effectiveness of MT in rendering Yemeni culture-specific items into English. It intends to check to what extent MT is able to render dialects with special focus on Sana'ani dialect as one of the most common varieties of Arabic language.

Objectives of the study

The study aims to

- Assess the effectiveness of MT in rendering Sana'ani Yemeni culture-specific items into English adequately.
- Compare the translation results of the three MT programs (*Google Translate*, *Yandex Translate* and *Bing Translator*) to find out the closest one to the source language meaning.
- Identify the types of translation problems of Yemeni culture-specific items resulting from MT.

Questions of the study

The study attempts to answer the following questions:

- To what extent is MT effective in translating Yemeni culture-specific items?
- Which one of the MT programs under-studies can produce the closest translation to the meaning of the source language text?
- What are the types of translation problems of Yemeni culture-specific items resulting from MT?

Significance of the study

The significance of this study lies in its great contribution to the body of literature in the fields of translation and MT, since it focuses on a critical issue of MT, namely the use of MT in translating culture-specific items. Many translators, researchers and students have been using MT for various purposes. To the best knowledge of the researchers, there are many studies that have been conducted on MT, but no research has highlighted the use of MT in translating Yemeni culture-specific items into English. Thus, this study provides a clear picture of the real situation of Yemeni culture output of MT and its reliability, showing the effectiveness of using MT systems in translating Yemeni culture-specific items into English. More importantly, it is necessary to provide some suggestions for MT software developers in order to improve the quality of MT.

Hypotheses of the study

It is hypothesized that MT lacks the ability to translate Yemeni culture-specific items and this can be attributed to:

- Cultural differences between Arabic and English languages.
- MT programs inability to recognize the contextual meaning of the item.
- Lack of specialized MT systems for translating dialects and language varieties.

Delimitations of the study

MT is a wide field of research but this study is limited to assess MT effectiveness in translating Yemeni culture-specific items into English. Due to the limitation of time, only fourteen Yemeni culture-specific items will be selected purposefully from the book *Social Issues in Popular Yemeni Culture* by the Yemeni radio author Abdu Al Rahman Mutahar (2002). The second sample will include three common MT programs (*Google Translate*, *Yandex Translate* and *Bing Translator*) that will be used to translate the chosen Yemeni culture-specific items. The study will also explore the problems of MT when rendering Yemeni culture-specific items.

Methodology of the study

Like most humanistic studies, this study followed a descriptive analytical method within a comparative framework. To answer the main question of the study, two types of samples were used: fourteen Yemeni culture-specific items were purposefully selected from different parts of the book *Social Issues in Popular Yemeni Culture* by the Yemeni radio author Abdu Al Rahman Mutahar (2002). This book includes many episodes which represent Sana'ani dialect. Sana'ani Arabic is one of the most common dialects in Yemen, which gained its prominence as it is the dialect of the Capital City. It refers to that dialect of the original people in the Old City of Sana'a and its traditional suburbs. There are approximately one hundred thousand speakers in and around the Old City of Sana'a. "Sana'ani dialect belongs to the Eastern Muslim dialect type" (Watson, 2009, P. 1, as cited in Versteegh et al., 2009). The selected items were classified into five categories according to Newmark's (1988) classification of cultural words. Then three common MT systems, namely, *Google Translate*, *Yandex Translate* and *Bing Translator* were chosen. The cultural items were inserted into the three programs for translation online. The results were copied, tabulated, analyzed, discussed and compared with each other and also with the professional human translation (Watson's translation) as a standard translation. In addition, some MT approaches and types of translation problems resulted from the three MT programs in translating Yemeni cultural items were discussed.

Literature review

MT is a branch of artificial intelligence which is a part of computer science that concerns using computer to emulate human thinking (Sofer, 2009). MT can be defined as "computerized systems responsible for the production of translations from one natural language to another, with or without human assistance" (Hutchins & Somers, 1992, p. 3). Manning and Schütze (1999) also define MT as "the automatic translation of text or speech from one language to another" (p. 463). Similarly, Baker and Saldanha (2009) see MT as a scientific discipline which involves the

application of computer programs to translate different texts or languages into other languages. In 1949, Warren Weaver established the idea of using computers in translation and it became one of the non-numerical applications. Many efforts and attempts were made to develop MT, so program designers attempted to construct systems for MT in the first half of the 20th century; new attempts emerged after the Second World War for modern computer technology. By the early 1990s, the need for automatic translation increased for international communication especially with existence of the Internet and advanced telecommunication systems (Hutchin, 2010).

Although they have many advantages such as wide coverage, high speed and high economic benefits, MT systems face many problems during the process of translation. Many studies tried to analyze MT problems. With regard to the main issue of MT, Al-Zebary (2012) discussed MT in terms of lexical and structural ambiguity. As a sample, *Google Translate* is not accurate and is not able to produce high quality MT. It has many lexical and structural problems related to deletion, homographs, collocations, non-vocalization, acronyms, wrong word order and subject-verb agreement. Nirenburg (1989), for example, states that MT systems depend on linguistic knowledge as rules. Thus, MT programs come across many linguistic problems during translation, such as, new words, misspellings and complex words (terms). Thunes (2011) explains that ambiguity in natural language causes many linguistic challenges and he divided ambiguity into three types: lexical ambiguity, structural ambiguity and referential ambiguity. Homonymy, homography and polysemy, for example, pose lexical problems for MT. For Hutchin (1992), lexical problems are considered the most common in MT. Furthermore, MT problems can be caused by the social and cultural differences. Vilar et al. (2006) classified MT errors into inflectional errors, word order error, missing words, incorrect lexical choice and extra words. MT errors were also classified by Keshavarz (1999) into grammatical, semantic and pragmatic errors. In the same course, Baker

and Saldanha (2009) classified MT problems into linguistic problems and extra-linguistic problems. From a linguistic point of view, linguistic problems include grammatical, semantic and pragmatic problems. These problems refer to some ambiguities in the source language and lexical, structural differences between languages. Word groupings as idioms and metaphors can also cause linguistic problems. Extra-linguistic problems refer to lack of knowledge about the real world. That is to say, translating extra-linguistic elements is a hard task because non-linguistic knowledge is required. Extra-linguistic problems are problematic during the process of translation and can be attributed to the cultural signs. Abdulaal (2022) conducted a study in which he compared between MT and human translation in translating the stories: *The Siege of Berlin* and *The Bad Zouave*. Both MT and human translators made some errors related to (a) homonymy, (b) polysemy, (c) syntactic ambiguities, (d) fuzzy hedges, (e) synonyms, (f) metaphors and symbols. Moreover, Soori and Awab (2016) investigated and evaluated the translation of English verb-noun collocation into Arabic using online translation engines. Some sentences were inserted into both *Google* and *Bing* engines. The study also used human translations represented by three bilingual speakers as a standard. They found that *Google* and *Bing* MT programs have not resolved the verb-noun collocability problem in their Arabic outputs. Ghazala (2015) found that language is a cross-cultural activity and translation is a process of transference of one culture into another. Translation is not only a linguistic activity; it is also a cultural act. However, culture constitutes a huge problem of translation especially when translating culture-specific items, terms and expressions. Additionally, Sekhri (2019) argued that translating cultural items requires cultural transplantation rather than using MT which may not render the message. Therefore, it is necessary to review the text to find equivalents for the cultural items. Hutchins (2010) asserts that MT quality is poor especially when translating colloquial language since it is full of allusions and pun. In addition, Basal (2019) estimated various MT applications in

translating Danish prose and poems. He pointed out that MT applications can be employed in literary translation. It has been contended that MT has advantageous potentials for language users in relation to literary interpretation. Cultural context is considered as expressive to be spread worldwide. Latief et al. (2020) asserts the role of *Google translate* in translation; it is one of the technological tools that can achieve better translations when translating written documents but it faces difficulties in translating images. Alawi and Abdulhaq (2017) asserted that when MT is used to translate cultural expressions from English into Arabic for example by *Google Translate*, it cannot reflect the implied meaning of the source text and it does not add any explanation to the text. In some cases, MT adopts the literal strategy in translating complicated idiomatic expressions. Furthermore, Al-Salman (2022) claims that MT is still premature in dealing with contextuality, culture-bound expressions, lexical and structural ambiguity, and idiomatic expressions, hence, computers cannot perform correct translations as human translators in most types of translation. Besides, Al-Khresheh (2018) noted that translating proverbs as cultural-specific expressions, poses linguistic and cultural problems to human translators and MT. *Google Translate*, as one of the most common MT programs, is not accurate in translating English proverbs into Arabic. It has also been asserted that human intervention is essential in translation (post-editing) to solve the problem of accuracy. This means that the source text with its linguistic and cultural aspects should be modified to suit the target reader (Sekhri, 2019).

In the context of culture-specific items, Aixela (1996, as cited in Alvarez & Vidal, 1996) proposes a definition for culture-specific items. He believes that a cultural item is the result of conflict caused by linguistic reference in the source language when there is no equivalent in the target language and this nonexistence may lead to a problem in translation. Culture-specific concepts are also defined by Baker (1992) as "source-language words [that] express concepts totally unknown in the target

culture" (p. 21). This concept may be abstract or concrete, it may relate to a social custom, a religious belief, or a type of food. Wong and Fernandini (2011) used the term 'traditional cultural expressions' instead of 'cultural-specific items' and defined it as "forms, whether tangible and intangible, in which traditional culture and knowledge are expressed, appear or are manifested" (p. 1). In the same line, Nord (1991) uses the term 'cultureme' to refer to these culture specific items. He defines cultureme as "a cultural phenomenon that is present in culture X but not present (in the same way) in culture Y" (p. 34). Newmark (1988) classified the culture-specific items into the following five categories: 1) Ecology; 2) Material life; 3) Social culture; 4) Organizations, customs, social, legal, religious, artistic; and 5) Gestures and habits.

Practically speaking, in their study *Analysis of Culture-Specific Items and Translation Strategies Applied in Translating Jalal Al-Ahmad's by the Pen*, Daghoughi and Hashemian (2016) aimed at analyzing the culture-specific items in translation of Jalal Al-Ahmad's *By the Pen* and describing strategies suggested by Newmark (1988). The study found that the translator has used almost all of Newmark's translation strategies for translating culture-specific items in the story *By the Pen*. Similarly, the study *Culture Specific Items in Literary Texts and their translation based on "foreignization" and "domestication" strategies* conducted by Kuleli (2020) aimed to identify culture specific items in the novel *Baba Evi* by Orhan Kemal and to discover the strategies used in translating these culture-specific items into English. The analysis process displayed that foreignization strategies were dominant in translating the culture specific items in the novel. According to Ghadap (2013), literary language includes culture-specific issues that might cause some difficulties when translating from Arabic into English. These items depend on the context and cannot exist off the context of the source text and the target text. To overcome these difficulties, some specific procedures, techniques and strategies such as domestication and foreignization recommended by Venuti

(2004) and paraphrasing, omission, transliteration suggested by Watson (2002) should be adopted in rendering the aspects of culture-specific issues. Baker (1992) also contributed to resolving the problem of translating cultural items; she suggested some techniques including translation by cultural substitution, translation using a loan word or loan word plus explanation. Moreover, many translators encounter difficulties in translating culture-specific items because they refer to a certain culture which has its own linguistic structure and semantic denotation (Banikalef & Naser, 2019). Untranslatability can be caused by intercultural non-equivalence because these cultural features relate to the source text and are not existed in the target text (Catford, 1965). In all, these items reflect the source culture and a good translation often depends on the translator's effectiveness to use the cultural approach and think of translation as a process of communication between cultures, as well as between languages.

Typology of machine translation (MT) systems

It is important to point out that the issue of non-Arabic MT process and development in the discipline of MT for systems not made up of Arabic has been a vital field for a long time. In the course of this period, a number of MT systems have been developed. To begin with the most common system, *Google Translate* is a free multilingual [translation](#) website. It is a service designed by *Google* Company to instantly translate texts and websites from one language into another. In reality, *Google* program appeared in 2006 and it is capable of translating into more than 80 languages. It is considered a statistical MT system, i.e. it searches for patterns in data sets to make a decision on the best translation. In 2014, *Google Translate* was developed and became able to scan a text or an image and translate them instantly ("Google Translate," 2023).

Amongst the common MT programs is *Yandex Translate*. It is provided by [Yandex](#) Company. Like *Google Translate*, *Yandex Translate* uses a statistical method and was developed to translate natural language texts or web pages

from one language into another. Based on analyzing millions of texts, it constructs single-word translation dictionary. Practically, *Yandex Translate* compares the text to a corpus (database) of words and decides the suitable expression in the text. In 2017, *Yandex Translate* started using a hybrid approach incorporating both statistical MT and neural MT approaches ("Yandex Translate," 2023).

Bing Translator is another MT program. It started in 2007 and it is considered a multilingual MT service. *Bing Translator* is one of the most widely used on-line Machine Translation systems, which was designed by Microsoft Corporation to work on over 60 languages, based on a statistical machine translation technology. Besides, it provides the service of speech translation. Denkowski (2015) added that *Bing Translator* has made significant advances to allow users to read content in other languages. Furthermore, *Bing Translator* program contributed to maximizing human understandability of MT output. It allows users to translate only 2 million characters per month (Soori & Awab, 2016).

Babylon is a MT program and a [computer dictionary](#). *Babylon Translator* was established in 1997, and the company has developed thirty-six dictionaries in twenty-one languages. In 2011, *Babylon Program* was widely used and known as the seventh most popular website in Libya, Algeria and Tunisia. It includes different types of dictionaries such as, general and technical dictionaries, monolingual dictionaries, encyclopedias, etc. ("Babylon (software)," 2023).

Systran Translate was also one of the earliest MT systems. In the 1950s, it targeted Russian-to-English translation. This program was concentrated on Russian-to-German translation during the late 1960s and early 1970s (Zantout & Guessoum, 2000). *Systran* works with scientific and technical texts. It is available as a translation program between 10 pairs of the European Union Languages (Hutchin, 1992).

PROMT is a free online translator. It is software which has been developed for

businesses and private users since 1991. The company provided an edition based on neural technologies. PROMT dictionary was designed in a specific format to be speedy. In 1998, PROMT launched a free online translation edition (PROMT.One) which used rule-based MT. Then, in 2011, the software was developed and it applied a hybrid MT method. This approach incorporates rule-based MT and statistical MT technology. In 2019, PROMT started using neural MT approach and now it translates 45 languages from and to English, German, and Russia ("PROMT," 2023).

Basic Approaches to Machine Translation (MT)

Based on Sahin (2015), there are four main approaches to MT:

1. Direct translation: This type is the most basic approach of MT systems. It uses a large bilingual dictionary to enable translations. In direct translations, the source language text is translated word-by-word using the well-developed bilingual dictionary, i.e. source language words are replaced by target language words. This method also applies morphological analysis before and after the words are translated. Besides, some slight grammatical adjustments or rearranging rules can be involved (Jurafsky & Martin, 2008).

2. Rule-based MT: This approach works on the analysis of morphological, syntactic and semantic information of the source and target texts. In other words, it represents an analysis of linguistic rules and depends on bilingual dictionaries (Carl & Way, 2004).

3. Corpus-based MT: It requires a huge data of both the source and the target texts. Then, the parallel corpus is used for translation by matching a number of examples extracted from the corpus (Carl, 2000). It is used widely because of its high-level accuracy.

4. Statistical-based approach: This approach refers to corpus-based MT. It involves the segmentation of the source text and then comparing the segments to those aligned bilingual information. Thus, this statistical

approach is based on probability without linguistic knowledge (Carl & Way, 2004).

Discussion and analysis

Yemeni culture is one of the richest areas of cultural items and expressions. The concept of culture has a crucial role in understanding the importance of culture-specific items in translation (Larson, 1984). To answer the study questions, many culture-specific items have been identified and categorized according to Newmark's (1988) classification into the following five types of cultural items:

- 1) Ecology: this includes names of animals, plants and geographical features that have cultural meanings. The first example below displays one of the ecological culture items. This item is related to animals.

Example (1)

SLT	
الديمة هي غريمك الأول والأخير (Mutahar, 2002, p. 94)	
Translator	TLTs
Google	The <u>doll</u> is your first and last rival
Yandex	The <u>doll</u> is your first and last rival
Bing	The <u>blood</u> is your first and last opponent
Watson	It was the <u>cat</u> that did it and no one else! (Mutahar, p. 95)

As it can be noted in example (1), *Google*, *Yandex* and *Bing* translators distorted the meaning when they mistranslated the cultural word "الديمة". The problem is that they could not produce the cultural equivalent of the word "الديمة". In Sana'ani dialect, the cultural item "الديمة" is usually used to mean "القط", (the cat). Unlike MT programs, Watson is familiar with Sana'ani dialect so she used cultural translation to render the item into "the cat".

Another example of ecological cultural items is "جربة". It was extracted and put in the example below with its translations.

Example (2)

SLT	
عمة ولا جربة على غيل (Mutahar, 2002, p. 143)	
Translator	TLTs
Google	Aunt nor <u>scab</u> to wash
Yandex	Aunt and don't <u>try</u> it on Gail
Bing	Aunt or <u>try</u> it on Gail
Watson	A good mother-in-law is better than a <u>field</u> by a stream (Mutahar, p. 145)

The word "جربة" can be of three forms; different diacritics can be used with "جربة" for example, "جربة", "جربة" and "جربة". The short vowels with the Arabic word cause a homograph. Homographs in Arabic are identical words in spelling but carry multiple pronunciation and meanings if they are not vowelized (Abu-Rabia, 2002). The word "جربة" with a short /i/ vowel diacriticized with *kasra* (كسرة) under the first letter 'ج' has ecological connotation. In Yemeni culture, it refers to a big land used for agriculture. Similarly, Watson translated the item "جربة" into "a field" whereas MT could not deal with the short vowel "كسرة" under the letter "ج" and used literal translation out of the context which resulted in poor translation.

Likewise, it can be seen in example (3) below that the plant item "البر" belongs to ecology category of Yemeni cultural items.

Example (3)

SLT	
...ما عترجعي من السوق إلا واتي محملة بالبر والسمن... (Mutahar, 2002, p. 152)	
Translator	TLTs
Google	...you don't come back from the market unless you're loaded with <u>wheat</u> and ghee.
Yandex	...You only come back from the market when you are loaded with <u>beer</u> and ghee...
Bing	... You will not return from the market unless you are loaded with <u>wheat</u> and margarine ...
Watson	...you'd be coming back from the market laden with <u>wheat</u> and ghee... ("Mutahar, p. 154)

The underlined word "البر" (if not diacriticized) has three meanings due to diacritic markers attached to it. If there is "fatha" on the letter "ب", the word "البر" means "land". However, if the word is diacriticized with "kasra" under this letter, the word "البر" means "performance of good deeds". The word "البر" has "damah" on the letter (ب) so it means "wheat" which is a kind of grain crop; it is used for making bread. Accordingly, *Google Translate* and *Bing Translator* were able to render this cultural item into English correctly and they used the strategy of cultural equivalent. On the other hand, *Yandex Translate* mistranslated the word "البر" and committed a lexical error. By

translating the word "البر" into 'beer', *Yandex Translate* resulted in cultural misunderstanding by Yemeni Muslim readers. Such a translation fails to account for the reader-oriented acceptability within the context of Islamic culture in Yemen.

2) Material culture, for example food, clothes, houses, towns, and transport:

The next example shows one of the traditional clothes in Yemen.

Example (4)

SLT	
اشترى لش ثنتين زنين من حق العشرة ألف ريال (Mutahar, 2002, p. 85)	
Translator	TLTs
Google	Buy for two <u>pounds</u> from the right of ten thousand riyals
Yandex	Buy for two <u>Zn</u> from the right of ten thousand riyals
Bing	Buy you two <u>rich</u> of the ten thousand riyals
Watson	You want me to buy you two 10000-riyal <u>dressess</u> (Mutahar, p. 87)

As it is obvious above, all the three MT programs mistranslated the cultural material item "زينين". Their results are completely wrong because they lack awareness of this cloth item in their dictionaries and databases. The translation problem here is cultural. In fact, the word "زينين" is a plural noun of the singular "زينة" which means "الدشداشة" among the nomads (Al-Iriyani, 1996). This term is a type of dress which is put on by Yemeni women especially in the past. Watson was able to provide approximate comparable term for this item.

Food is also one of the most important features of the national culture of any society. It is part of people's identity because your food tells others about who you are (Hamouda, 2019). Thus, it is important to translate food items. The following extract has an example of food word.

Example (5)

SLT	
ما عاد بيهناني زاد من قلقي عليها (Mutahar, 2002, p. 48)	
Translator	TLTs
Google	Behnani no longer <u>increased</u> my anxiety for her

Yandex	What no longer behnani <u>increased</u> my concern for her
Bing	He no longer congratulates me, he <u>increased</u> my worry about her
Watson	I've totally <u>lost my appetite</u> worrying about her. (Mutahar, p. 50)

The focus in this example is on the item "زاد". In Standard Arabic, the word "زاد" means food for travel; however, the programs translated this food item as a verb "increased" which is not suitable for the context. The phrase "بيهناني زاد" has a pragmatic meaning and the speaker meant by this phrase that she could not eat because of worrying. Furthermore, the word "زاد" is a polysemic item; it has more than one meaning so Watson used domestication strategy and she adapted the meaning.

As mentioned before, material culture includes names of houses. In Yemeni dialect, houses and their parts are given culture-specific names which distinguish Yemeni culture from other cultures. One of the material culture items will be discussed in example (6) below.

Example (6)

SLT	
[...] وفي الجُبا حقه ست صحون من حق الستاليت! (Mutahar, 2002, p. 49)	
Translator	TLTs
Google	[...] And in <u>the jabba</u> he is entitled to six satellite dishes!
Yandex	[...] And in <u>the Gabba</u> he has six plates of satellite right!
Bing	[...] And in <u>the forehead</u> he has six plates of satellites!
Watson	[...] and six satellite dishes on <u>the roof!</u> (Mutahar, p. 50)

It is common in many Yemeni societies that parts of a house have dialectal names, for instance, "الطاقة، الجبا، الدئمة، المفرج" which mean "a rectangular sitting room on the top of a house, kitchen, roof, window" respectively (Al-Iriyani, 1996). The culture-specific item "الجُبا" in the source text above was not translated correctly by MT. To put it another way, *Google Translate* and *Yandex Translate* resorted to the foreignization strategy of translation (transliteration) which made the target text meaningless. *Bing Translator* also distorted the meaning of the word "الجُبا" when it used literal translation. In fact, the cultural material item "الجُبا" is known among Yemeni people as "سطح"

(roof of a house). This term requires a kind of domestication strategy such as cultural substitution. Thus, Watson's translation suggested "roof" as an appropriate equivalent.

3) Social culture is one of the areas that differentiates between Arabic and English cultures and causes translation problems. It includes work and leisure. According to Al-Iriyani (1996), the word 'اشغب' in example (7) below is an agricultural term which means in standard Arabic "يحرث الارض". This word is related to social culture and work items.

Example (7)

SLT	
واشغب على الثور الابيض، (Mutahar, 2002, p. 170)	
Translator	TLTs
Google	And <u>riot</u> against the white bull,
Yandex	And <u>riot</u> over the White Bull,
Bing	And <u>riot</u> on the white bull,
Watson	That I could <u>plough</u> with a white ox, (Mutahar, p. 172)

As shown in example (7), a lexical problem is clear in the outputs of the three MT programs. In other words, the programs used statistical MT approach in which the word "اشغب" was compared to the existing large aligned bilingual information in their corpora; however, this approach depends on probability and thus they got translation of a similar word "شاعب" which is totally different from "اشغب". Their corpora lack the cultural term 'اشغب'. Watson translated the word "اشغب" on the basis of its contextual meaning in the sentence and she provided the correct cultural equivalent which is "plough".

Moreover, the first word in the following excerpt is considered one of the cultural items which relates to work.

Example (8)

SLT	
مِهْرَة في اليد أمان من الفقر (Mutahar, 2002, p. 36)	
Translator	TLTs
Google	<u>A filly</u> in hand is safety from poverty
Yandex	<u>A skilled</u> hand is safe from poverty
Bing	<u>A filly</u> in the hand is safe from poverty
Watson	<u>A skill</u> with your hands will protect you from poverty (Mutahar, p. 38)

As can be noted in example (8), the underlined word "مِهْرَة" in the source extract is a culture-

specific item; it is related to work and activity. It is worth mentioning that this word is diacriticized with "كسرة", a short vowel, under the letter "m, م". Thus, contextually, it means "craft or skill". *Google Translate* and *Bing Translator* rendered it literally and failed to provide the appropriate cultural meaning. They have only one translation and they recognized it as "مُهْرَة" with "*Damah*" on the letter "م" which means "young female horse". Conversely, *Watson* and *Yandex Translate* were close to the correct cultural meaning of the item.

4) Organizations, customs, traditions, ideas (social, legal, religious, artistic).

The example below displays that religious expressions are among the most problematic areas that face MT.

Example (9)

SLT (Mutahar, 2002, لكن انت محجور بحجر الله تكون تقسي على ابنك p. 39)	
Translator	TLTs
Google	But you are <u>quarantined with God's stone</u> , you will be hard on your son
Yandex	But you are <u>trapped in the stone of God</u> , you are being cruel to your son
Bing	But you are <u>stoned by God's stone</u> to be your son
Watson	<u>God forbid</u> that you be so unkind to your son (Mutahar, p. 41)

The source religious expression "محجور بحجر الله" needs much more precision during translation on the part of translator. The three machine programs used literal translation and they mistranslated and foreignized the expression in the target language. Their translations fail to account for author-based accuracy of the ST and the reader-oriented cultural acceptability of the TT. They did not reflect the semantic meaning of the religious expression. Their outputs resulted in lexical and semantic problems that caused ambiguity. However, human translator, represented by *Watson*, translated the spirit of the religious expression; she did not stick closely to the source words and translated it into "God forbids".

Sana'ani dialect contains many cultural terms that reflect customs and traditions in the

Yemeni society. The following example includes one of the custom items.

Example (10)

SLT (Mutahar, 2002, p. 190) الشكمة	
Translator	TLTs
Google	<u>The complaint</u>
Yandex	<u>Skepticism</u>
Bing	<u>Shakma</u>
Watson	<u>Shikma</u> (Mutahar, p. 192)

Based on Al-Iriyani's (1996) *Al-Mu'gam Al-Yamani fi Lughat wa-Turath*, the word "شكمة" is a custom in many places in Yemen. Thus, it can be suggested that the semantic meaning of the term "الشكمة" is *the short ceremony that takes place after marriage in the house of the bride's parents*. In this example, lexical and semantic problems resulted from the three translation programs. The programs mistranslated and foreignized the cultural term "الشكمة". *Google Translate* and *Yandex* mistranslated the word, whereas *Bing* used the strategy of transliteration in transferring the meaning. Their results are incomplete and not understandable for the readers. Even *Watson* did not clarify the meaning of "الشكمة". This term does not exist in the target culture so it requires to be familiarized to the target culture by using the strategy of domestication through paraphrasing or explication.

The following excerpt carries another culture-specific item; it is the concept "السكهة". This cultural item is usually used in some Yemeni societies to mean "peace of mind" as *Watson* claimed in her translation.

Example (11)

SLT (Mutahar, 2002, p. 48) السكهة هي نص المعيشة	
Translator	TLTs
Google	<u>Sukkah</u> is the text of living
Yandex	<u>Sikhism</u> is a living text
Bing	The <u>rail</u> is half of the living
Watson	<u>Peace and quiet</u> is at least half of life (Mutahar, p. 50)

For the cross-cultural communication purpose, the social item "السكهة" cannot be translated literally; it rather requires cultural background to get its functional meaning.

The mentioned machine programs followed different strategies in translating this kind of cultural items. *Google Translate* and *Yandex Translate* used foreignization strategy by transliterating the word "السكهة" but *Bing Translator* used deletion and literal translation strategies and committed a morphological and lexical error. It deleted the last letter "ة" of the item "السكهة". The three programs produced inaccurate translations with cultural problems.

Yemeni Arabic has a rich cultural tradition of its own. Endless social and cultural words can be found in Yemeni dialects. The underlined word in example (12) is a concrete example of social culture.

Example (12)

SLT	
(Mutahar, 2002, p. 143) "قالوا "تزوج يا خبير ترتاح"	
Translator	TLTs
Google	They said, "Marry, O <u>expert</u> , and you will rest."
Yandex	They said, "get married, you rest <u>expert</u> ."
Bing	They said, "Get married, <u>expert</u> , you will rest."
Watson	They said "Get married, my <u>friend</u> , have fun! (Mutahar, p. 145)

It is obvious that the underlined Arabic word "خبير" is an example of homonym (identical spelling and pronunciation but different meanings). In standard Arabic, it means "expert"; however, in Yemeni dialect, its meaning is similar to "صاحب" (a friend). The suitable translation is "a friend" or "buddy" as in spoken American English (Al-Mansoob, 2014). Thus, Watson used the strategy of cultural equivalent. Conversely, the three MT programs translated "خبير" as a standard Arabic word which does not coincide with the source context, so they produced flawed translations. The occurrence of homonymy caused a lexical problem of MT.

5) Gestures and habits refer to non-linguistic features. They are actions but refer to different cultural meanings. The following example can illustrate the point clearly.

Example (13)

SLT	
...وهي مهفوجة فوق المكينة بتشقى على اطفالها (Mutahar, 2002, p. 36)	
Translator	TLTs

Google	... while she was <u>hovering</u> over the machine, miserable for her children
Yandex	...And she's <u>freaking</u> out over the machine, having a hard time with her kids
Bing	... While she is <u>crashed</u> on the machine, she is complaining for her children
Watson	... <u>bent</u> over her sewing machine, just in order to make ends meet (Mutahar, p. 38)

The culture-specific item, "مهفوجة" in example (13) above is related to a gesture which is a category of the cultural words. The word "مهفوجة" in the source text describes a woman's posture working on sewing machine; it was used metaphorically in the sentence to connote the woman's continuous undistracted involvement on a machine. This item was translated wrongly by the three translation programs as "hovering", "freaking" and "crashing" respectively. Their translations are far from the intended meaning of the ST, which was rendered appropriately by Watson, "bent over her sewing machine". Obviously, she followed lexical substitution strategy.

Accuracy of MT in translating culture is a primary factor in rendering the message. The following sentence contains two cultural items. Both are related to gesture category of culture-specific items.

Example (14)

SLT	
...ومفتجع لا تتلعوز جبهته... (Mutahar, 2002, p. 125)	
Translator	TLTs
Google	...and a <u>grieving</u> one whose forehead does not <u>rise</u> ...
Yandex	...And the <u>heartbreak</u> does not <u>go beyond</u> his forehead...
Bing	... And a man whose forehead does not <u>get higher</u> ...
Watson	...and is <u>worried</u> that he'll <u>have lines</u> on his forehead... (Mutahar, p. 127)

The items "مفتجع" and "تتلعوز" are non-linguistic items but they are culturally loaded with meanings. Different translations were provided by MT programs but unfortunately all the results are not related to the source text culture. They mistranslated the gesture and habit items. That's why lexical and pragmatic problems

were resulted from MT outputs. The words "مفتجع" and "تتلعوز" mean "terrified"/ "worried" and "wrinkle" respectively. According to the source text context, the cultural equivalent of "مفتجع" is "worried". Thus, Watson used suitable cultural translation in the target language. In fact, the word "تتلعوز" conveys a connotative meaning related to deterioration in age. In other words, it is a metonymic word indicating that a person is getting old with a wrinkled forehead.

Findings and conclusion

Based on the translated versions resulted from the three MT programs (*Google Translate*, *Yandex Translate* and *Bing Translator*), the study found that Yemeni culture-specific items represent a great challenge to MT. Generally speaking, the three MT programs understudy failed to produce adequate and quality translations of culture-specific items that could account for author-based accuracy of the ST and reader-oriented cultural acceptability of the TT. This is mainly due to the fact that they could not understand the contextual meaning of the ST culture-specific items and thus failed to convey the appropriate cultural equivalent or comparable terms for these items in the TT. Comparing *Bing Translator* to *Google Translate* and *Yandex Translate*, *Bing* program could translate two of the chosen examples whereas both *Google Translate* and *Yandex Translate* rendered only one example correctly. Accordingly, *Bing Translator*, in this context, is to some extent better than the other two programs. On the other hand, the three MT programs showed some differences in their translations of linguistic and cultural elements and in using translation strategies. In the light of the analysis, it is clear that MT faced challenges in translating Yemeni culture-specific items into English and resulting in different lexical, semantic and pragmatic problems. For example, homonymy, homography and polysemy pose lexical problems. In addition, analysis results showed that MT programs adopted foreignization strategies such as literal and transliteration strategies in performing the process of translation. Therefore, it can also be said that MT does not have the basic cultural and

contextual knowledge about Yemeni cultural items and is still ineffective in dealing with Yemeni culture-specific items. To improve the quality of MT, it is recommended that MT systems should be further developed by enriching their memories and databases with culture-specific items, dialectal dictionaries and everyday language expressions.

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