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# *Adab Al-Rafidayn Journal*

**A refereed journal concerned with the publishing of scientific researches  
in the field of arts and humanities both in Arabic and English**

**Vol. Eighty- Eight / year Fifty- Second / Sha'ban - 1443 AH / March 2022 AD**

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**Editor-in-chief**

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## *Text typology and Lexical Problems in Machine Translation*

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### **Abstract**

This paper tackles the connection between text typology and machine translation from the point view of English to Arabic translation. It aims at clarifying the different results of machine translation renditions due to different text types. In theory, the paper gives a theoretical background on the topic. Then, practically, in order to test the hypothesis of the research which says that text typology affects the degree of appropriateness of renditions by machine translation, 6 different texts (2 informative, 2 expressive and 2 vocative) have been translated by MT (Google translate). Then the percentage of error has been calculated and compared for each text in both machine translation and human translation .

**Keywords:** Text,typology, Machine,Translation

### **1. Introduction**

There are many reasons for the need of machine translation (henceforth, MT).This need appeared as a result of the tremendous increase of materials published in a certain language and needed in others . Not only due to scientific progress but also in other fields of life . The main reason for the need of machine translation is the need for communication among scientists, engineers, economists, industrialists, businessmen and others who want to communicate in different languages, which they do not understand. Another reason is that translators are no longer capable of meeting the increasing need for the translation of lots of documents. The researchers are also looking for promoting the international cooperation trying to remove the barriers of languages. Another area in which MT is very

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important is military and intelligence . Also Recently, the commercial and economic stimulus plays a part in increasing the need for machine translation (Hutchins, 1985: 4).

## **2. literature review**

The area of Machine translation has been studied from different points of view since the need of MT in daily use has increased. Recent local studies have concentrated on studying errors of MT. For example, AL-Dabbagh (2000) studies some problems of English-Arabic Machine Translation; Amanah (2017) tackles the mistakes committed through Google Translate and how human translators correction them. Al Mutawa (2012) studies Machine Translation in Saudi Arabia . Al-Samawi (2014) studies Machine Translation from the perspective of language mistakes of encyclopedic texts from English into Arabic: problems in Google Translate.

## **3. Theoretical framework**

Machine translation is a part of computational linguistics which studies the utilizing of programs for conveying text or speech from one natural language to another. The beginning of machine translation may emerge from the work of AL-Kindi (9<sup>th</sup> century), the cryptographer of Arabic origin who improvement methods for systemic language translations, involving cryptanalysis, hesitancy analysis, and prospect and statistics which are utilized in recent machine translation (Dupont, 2018).

Machine translation idea emerged in the 17<sup>th</sup> century, Descartes (1629) suggested an international parlance, carried parallel thoughts with various parlances having one token (Knowlson, 1975). In the mid of 1930s, Artsrouni obtained patents for an automatic bilingual dictionary paper tape. (Mounin, 1964; Panova, 1960). Many universities in the United States started examines at MT field. In 1954, the IBM and Georgetown University collaborated to use highly finite units which involve two hundred fifty words and only six grammar regulations to translate forty nine Russian selected clauses into English. With slight scientific value to the system, but it gave a motivation to the government for supporting MT projects in United States (Hutchins, 1995: 433; Sini, 1997: 38).

During the 1980s , different MT systems started to emerge in different countries . There were a number of central systems, which are still in use to the present day. A part from systems which operate in lots of pairs of language, Legos (German-English and English-German); and the inwardly evolved methods in Pan American Health Organization (Spanish-English and English-Spanish); the Metal method (German-English);and main methods to English-Japanese and Japanese-English translation through Japanese software corporations. The characterized studies in the 1980s , were the GETA-Ariane (Gernoble),SUSY(Saarbrucken),MU(Kyoto), DLT (Utrecht), Rosetta (Eindhoven), the knowledge-based studied in Carnegie-Mellon University (Pittsburgh),and two globl studies: Eurotra, propped through the European states, and Japanese CICC study in cooperation among states of China, Indonesian and Thailand (Hutchins, 2014, article:3). The corpus-based methods emerged in 1990, stopping the dominance of rule-based approach during 1980s. (L. Bowker and J.B. Ciro ,2019:44-45).

#### **4. Systems of MT**

There are different systems of MT. These systems are classified in terms of the degree of human intervention with the production of the final result of MT. The first system is called Computer-Aided Translation System (CAT) . The second is called Machine-Assisted (Aided) Human Translation (MAHT). The third is Human-Assisted (Aided)Machine Translation (HAMT). The following sections give a brief account of these systems.

##### **4.1. Computer-Aided Translation System (CAT)**

The report of the ALPAC included one of its recommendations which were changing the orientation of research from developing FAHQT systems to improving other tools that can help translators in the translation process (ALPAC, 1966: 34).

Lawson (1989: 280) defines the term MAT as “a translation generated by a human with assistance from the computer”. The term CAT (Computer-Aided Translation) or (Computer-Assisted Translation) as Hutchins and Somers (1997: 147) explain, is usually utilized to include the totally kinds:

-MAHT implies that the computer-based programs are utilized to assist experienced translators. In other words a translator utilizes

one or more computer aids, such as word processing, term banks or other lexical data-bases, other computerized databanks, spelling checkers, grammar or style (Lawson, 1989: 280).

-HAMT depends on utilizing the MT systems for presenting translations by helping prior human renditions, while or next the computerized processes (Lawson, 1989: 280; Hutchins and Somers, 1997: 147).

CAT is the widest concept utilized for characterizing a field of computer techniques application which automatically helps the text translation action to a language differs from the source one. In present time "CAT" program is using commerce utilizers and experienced translators. Commerce transaction utilizers managing commerce universally are now getting utility from programs of translation when a connection across languages is needed and there is no interpreter to do so. Experience translators thought that "CAT" programs are very efficient in meliorating their translation output and fineness for the work that allows the scope for utilizing the diverse techniques (Language Partners International, 1998: 1-5).

#### **4.2 Machine-Assisted (Aided) Human Translation (MAHT)**

Sager defines MAHT as "a translation strategy whereby translators use computer programs to perform part of the process of translation" (Sager, 1994: 326).

In MAHT, the task of translator is to produce the whole translation, but he may take advantage of some computer-based devices, during the translation process. He may, for instance, look in a local dictionary, or have access to remote Terminology Databank (TD) (Slocum, 1985: 3). MAHT should involve a computer-based linguistic assist, as software for examining orthographic, grammar or manner of translation. The orthographic checker availability depends on TL. Grammar checkers and style are very complicated programs, operating basically through the pattern accordance, in spite of some utilized parsers of the computational linguistic type (Hutchins and Somers, 1997: 16).

MAHT tools are useful just to translators. The usefulness to translators can be important and necessary on fineness and volume of translation. Procedures needed for (MAHT) are like the MT procedures, in spite of the operations in every procedure are slightly

various. The “Interactive Translation” (IT) procedure considers one of these variations, whereas a translator is operating interactively as a part of the MATH program to finish an interpreted sentence (Language Partners International, 1998: 1-5).

### **4.3 Human-Assisted (Aided)Machine Translation (HAMT)**

Sager defines HAMT as “a technique of translation using the computer for certain aspects of the process and human participation intervention before, during or after the computerized translation phase” (Sager, 1994: 324).

The HAMT is the system itself that has the major liability to the translation, by human aided to support the operation when required. Translator engagement could be during the operation, by the “interactive” method, or outside the operation, by “per-editing” or “post-editing” procedures (Lawson, 1989:280. And Hutchins and Somers, 1997: 150).

## **5. Problems in Machine Translation**

There is no perfect interpretation for any text from any language done by machine translation unless there is human interference or help (Hutchins, 1995:431; and Hutchins and Somers, 1997: 1). The More significant problems in machine translation are the linguistic ones including four basic headings that are regarded difficult for a machine to solve: Lexical, Structural, Contextual and pragmatic or situational (Hutchins and Somers, 1992; Hutchins, 1992; 1993). One dream of human is to find quick, cheap, and accurate translation with the emergence of MT, but the operation of translation is not only a replacement words (lexical) of original language by words (lexical) of second language, the process of translation should follow the rules of translation. MT is considered a type of translation that should also follow such rules. The translation process in many cases cannot transfer the same feeling that is felt when reading the original one. When MT translates a text , many problems will appear, and to overcome these problems there are many strategies.

### **5.1. Lexical problems**

Lexical problems in MT are mostly due to ambiguity. Ambiguity can be divided into: Linguistic and non-linguistic ambiguity (Lyons, 1977: 398). Linguistic ambiguity relies on the construction of

language system. This ambiguity is a result of such linguistic factors as phonology, syntax and lexicon. While non-linguistic ambiguity is a type of ambiguity that can be attributed to non-linguistic elements like context of situation or referentiality of certain words in (Sigar, 1999: 11). Crystal points that the general concept of the term “ambiguity” refers to a lexical or phrase that has many senses (Crystal, 1985: 23).

Bennett maintains that the linguistic key to MT is resolution of ambiguity (Bennett et al., 1986: 79). Lexical and structural or (grammatical) ambiguity” should be distinguished .

### **5.1.1. Lexical Ambiguity**

Lexical ambiguity arises from the use of some word which has more than one interpretation. It results when machine cannot select the suitable equivalent for the terms or words that exist primarily in the source text. Because machines cannot understand the ‘meaning’ of what is translated. Bar-Hillel states that “ in a translation program, some steps have to be taken which directly or indirectly depend upon the machine’s ability to understand the text on which it operates, then the machine will simply be unable to make this step, and the whole operation will come to full stop”(Bar-Hillel, 1953: 217).

Hutchins and Somers indicated that “where one word can be interpreted in more than one way”. They classify lexical ambiguity in three main kinds: category ambiguities, homographs and polysemes, transfer or (translation) ambiguity ( Hutchins and Somers, 1992; 1997: 85).

They referred that “the first kind (category ambiguities), as the most explicit one of lexical ambiguity”, a certain item can be appointed to many grammatical or syntactic category (like noun, verb, or adjective) depending on context. Like the English word light that has many categories as (noun, verb, or adjective) (Ibid).

Homography as Palmer (1981: 101) discussed “ is a type of partial homonymy. Homographs are described as two or more distinct lexemes which have the same spelling and different pronunciation but different unrelated meanings. Balkan et al.; (1994: 150) refer to this problem saying “when a word has more than one meaning, it is said to be lexically ambiguous”.

Hutchins and Somers (1992; 1997: 86-87) said that “linguists distinguish between homographs, homophones and polysemes. Homographs are two or more words quite different meanings which have the same spelling. They added that the homograph could be disambiguated according to text-type, so that the unusual usage is simply excluded from the dictionary unless it is appropriate to the subject matter of the text to be translated”. For example the word club means (weapon and social gathering).

Palmer (1981: 101) said that polysemy means one word that has several meanings. Whereas Hutchins and Somers (1992;1997:86) explained polysemes as they are words that show scope of meanings connected by somehow to each other. Like metaphorical expansion or transmission (mouth of a river, flow of idea). They added that when expansion turns into too far more than the original the polysemes turn into efficiently homographs (Ibid).

Warner (1966: 252) pointed out that “one of the most difficult problems of MT is the resolution of homography”

In MT analysis homography and polysemy are frequently cured analogically, because the matter is determining a meaning in the context of a certain written “word”. Homographs of various grammatical categories are cured in accordance to previous mentioned, but homographs from one class syntactic only are not enough: semantic reference should be utilized (Hutchins and Somers, 1992; 1997: 87).

They also pointed out that transfer ambiguities in MT emerge when a single word can probably be translated by many various TL words or expressions. The SL word itself is unambiguous, or the native speakers of language may not understand that the word vaguely. Through other tongue's view the word is ambiguous (Hutchins and Somers, 1997: 87-88).

Like: The English item “uncle” means(خال أو عم) in Arabic, there is a various kinship relations between Arabic and English.

Lexis errors are not the same of spelling errors in that they relate to the manner that every word, as a whole, is translated. So, the lexis errors can be accounted on omission, addition and untranslated. However, lexis have meaning and grammatical function, where lexis are words which hold the content or the

meaning of a sentence such as (house, Ali) or adjectives (happy, old), whereas function words (grammatical words) which possess small lexical meaning, but instead they express grammatical function with other words in a sentence. Function words like preposition (in, on) and pronouns (she, it, everybody).

## 6. Text Typology

From the time of Catford (1965: 38), a want for getting a scope of categories to classify of diversities or “sub-languages” included language has been confessed. The concentrate of genre analysis in putting features specific kinds of text, whereas the notions of genre possess lengthy history in literary researches, the concern with analysis of non-literary types has a newer history (Swales, 1990; Bhatia, 1993). Texts can be orally or writing, also they can include text or many text-produces (Virtanen, 1990: 447).

Text genres perceived to be like specifics for universal aim to text, modern talks about translation involved parity for text genre to be one of the main shape of equivalence that should be targeted (Trosborg, 1997: 25).

The definition of text genre is “a conceptual framework which enables us to classify texts in terms of communicative intentions serving an overall rhetorical purpose” (Hatim and Mason, 1990: 140). Werlich’s (1976) typology involves 5 exemplified text genres or mods: description, narration, exposition, argumentation, and instruction. The typology has dependent on cognitive features to text kinds: differentiation and correlation of conception in space (description), differentiation and correlation of conception in time (narration), understanding of general notions by distinguishing through analysis or/and synthesis(exposition), judging, i.e. assessment of links between and among notions via the deriving of similarities, variances, and transformations (argumentation), drawing of future behavior (instruction) (Trosborg, 1997: 15-16).

The concept of text typology is rather tricky . There is an importance of distinguishing among three expressions that have been incorporated with its definition, namely: text, discourse and genre. Text typology is comprehended like a particular system of grouping texts counting on the subject they come from, their kind, purpose and the kind of discourse (Tomaszkiewicz, 2006: 112).

Text as Damska-prokop,( 2000: 230) defines “ is a certain communicative action of a complex structure that functions in a specific semantic space and is to fulfill specific functions, for instance: informative, esthetic, pragmatic function, etc.”. Relying on definition, the understood of text does not only depend on result of a particular attempt from a sender, but also, like an output able in performing its connection job through suitable interpretation operation that reader do (Karolina, 2011: 358).

While the concept of discourse as Tomasziewicz (2006: 35) points “it is a sequence of linguistic signs that are organized according to the rules of a given language and representing what the sender wishes to communicate to the addressee”. The notion discourse can be explained as a particular linguistic action that doing by language users in specific context ( Maingueneau, 1996: 28). Thus, when the text to be known like the result for a given operation that possess its special framework, thus discourse to be a mobile expression and points to an personal operation of text output and understanding ( Damska-Prokop,2000: 64).

Finally ,according to Trosborg (1997: 6),genre “is a text category readily distinguished by mature speakers of language”. Genre is to be distinguished as a system for performing social aims through pronunciation ways. The concept of genre points to texts which are completed (Karolina, 2011: 359).

### **6.1. Characteristics of Text Typology**

Kozłowska (2007: 26) mentions that the reality of text typology is a highly important matter to a translator; but usually ignored via those interested in translation researches.

There is no typology ranking of texts that practitioners or theoreticians can apply to MT, however, the text type is an element of the crucial parameters that help to realize success in MT generally. Since determining the type of text is an important step in translating, considering the subject field, register, style and purpose of the translation is the first action for human translator.

Reiss (1977) supposes that the production of translation language results from text kind or communicative attitude because various kinds of written discourse have various kinds of communicative functions.

Reiss differentiates four text kinds which result from text function, the kinds are:

1-Informative texts : those aiming at conveying knowledge.

2-Expressive texts: those concentrating on shape to execute an aesthetic value.

3- Operative texts : those aiming at guiding an appeal for text reader.

4-Audiomedial texts supplement the above mentioned functions with visual and audio images (Reiss 1977, as cited in Munday 2010).

The knowledge of text types will help to translate the individual texts with less effort which considers the knowledge of text type as a critical importance in communication in general. In this study, three types will be studied: scientific texts, literary texts and legal texts, each type of text has some features (characteristic) that differentiate from other texts.

### **7.1. Linguistic Knowledge**

The linguistic knowledge can help to remove the possible ambiguity of the sentences. There are different kinds of linguistic knowledge, but all of them are shared in using the knowledge in relation of words and the method integrate them, instead of proceedings with relation of actual life which sentences produce (Hutchins and Somers, 1997: 91).

The best method is to supply the analysts with the information about co-occurrence constraints, which refers to the existence of particular items in a structure affecting on the probability of other items existence (Ibid).

### **7.2. The Real World Knowledge**

In some cases, the syntactic analysis appears to be inaccurate, since MT systems are unable to handle and treat the difficulties that outcome from the sophisticates of languages. So , there is a need for semantic and even pragmatic analysis for dealing with linguistic problems relying on the context. This means the capability for solving such problems through the real world knowledge. Macdonald (cited in Dostert et al., 1979: 125) in this regard, pointed out that “machine translation will be practical only when the computer is provided with an encyclopedic store of information

about the manner in which both the source language and the target language categorize the real world, and about the manner in which the real world is structured, independently of language”.

This opinion was based on the fact that, if the computers are to translate sentences which point to things and events, these computers must realize something of reality.

Hutchins (1991: 9) introduced examples:

1- Old men and women.

مسنون ونساء

رجال

رجال ونساء مسنات

2- Pregnant women and children.

نساء حوامل وأطفال

In first example ,there is no idea, without the context, either old includes both men and women or just to men, and whether translation to Arabic is possible. Whereas in second example it is the fact that pregnant cannot apply to children, it is the fact (real knowledge) about women. This real knowledge requires to be integrated with MT dictionary in somehow, may be through determining the utilization of pregnant to nouns with semantic characteristic ‘female’ and ‘mature’.

In some cases, connecting semantic characteristics to the verbs perhaps be helpful, but in other cases it perhaps not. So, for the MT system that aims to present good quality translation, a type of human-like “understanding” of the reality behind what is being expressed is needed. This aim was accomplished, to some extent, through taking advantage of the technology of AI. Hutchins (1993: 737) pointed out that the improvements in AI have promoted later MT researchers to study knowledge-based systems and improve linguistic-based systems able to integrate AI ways as helpers to much classic techniques of syntactic and semantic analysis, transfer and generation.

## 8. Practical Part

### 8.1. The Method

In order to test the hypothesis of the research, 6 different texts (2 informative, 2 expressive and 2 vocative) have been selected as samples for analysis. Then , the MT renditions have been compared

with human professional published ones to detect lexical errors of MT for each type of texts. The following tables give a summary of these errors. Full texts are given in the appendix.

### 1. First Expressive text (Autobiography)

SL item	Lexical incorrect cases	
The Autobiography	MT	HT
recuperating	تتعافى	الاستجمام
discharged	تسريح	مغادرة
casual	غير رسمية	عرضية

Table (1) expressive text

	error percentage	correct percentage
The Autobiography	3	97

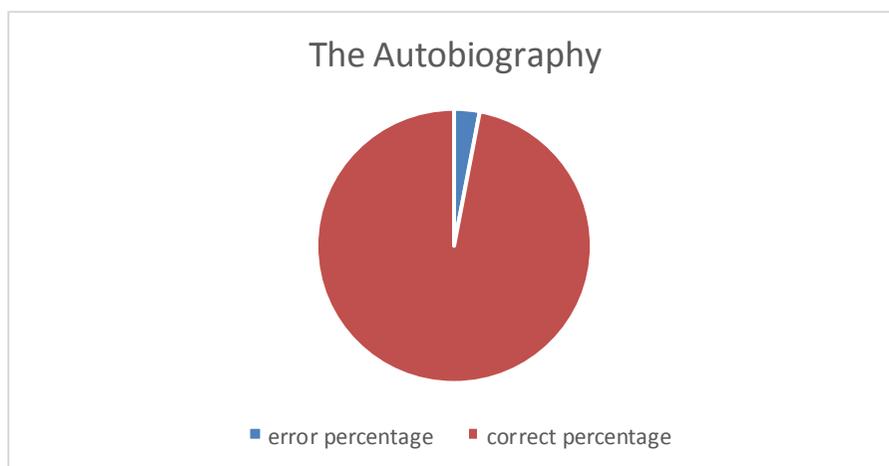


Fig. (1)

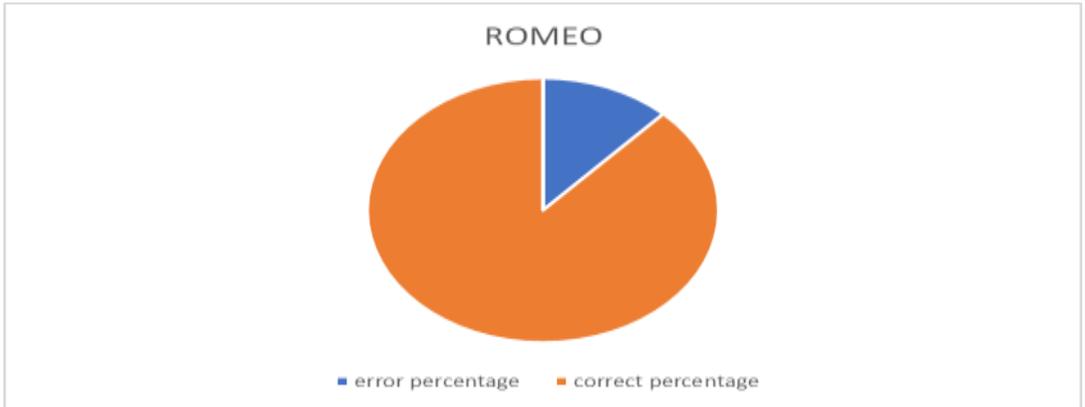
In expressive texts, machine translation has produced some inappropriate literal rendition as in the rendition of the word *discharged* into تسريح, because MT (Google Translate) does not take into consideration the intended meaning in the context. It also neglects cohesive devices to some extent. However, the general meaning of text has been conveyed.

## 2. Second Expressive text(play)

SL item	Lexical incorrect cases	
	MT	HT
Wilt thou	هلا	هل
Unsatisfied	غير راضي	الضما
satisfaction	الرضى	الضما
exchange	تبادل	تقدمي
vow	نذر	عهد
bounty	فضلتي	سخية
nurse	ممرضة	المربية
calls	مكالمات	تنادي
anon	أنون	حالاً
honourable	عازماً	شريفاً
procure	أشتري	سأرسله
lay	أستلقي	القي

**Table (2) expressive**

	error percentage	correct percentage
Romeo and Joliet	12	88



**Form (2) expressive**

The denotation of the SL lexical item refers to the literal meaning of the item whereas connotation depends on an inexplicit

or indirect sense. The human translator relies on his world knowledge to translate the meaning to other language.

MT (Google Translate) deals with words in the texts as isolated items to be translated out of their context, producing one equivalent, (the input words only), for this item. MT (Google translate) failed to produce the correct equivalents, since these equivalents are only the input equivalents in machine program. In other words, the machine provides one meaning for word, only what it is fed with.

### 3. Vocative texts (Advertisement)

SL item	Lexical incorrect cases	
	MT	HT
Carpets	Carpets	سجاد
miniature	منمنم	مصغر
grounds	أسطح	الخلفيات
heavy	الثقيلة	الكثيف
wear	التآكل	الأستعمال
situations	مواقف	مواقع
Finesse	صفات	سجاد فينس

**Table (3) Vocative**

	error percentage	correct percentage
Advertisement	7	93



### Form (3)

In vocative texts, machine translation has also produced the literal meaning only for each word since it cannot provide the appropriate contextual meaning simply because it neglects the context in which it used. It produces a literal translation. Machine translation has also failed to give a rendition of some items such as the word (Carpets), simply because this word is not loaded in this program of MT. Thus, the word (Carpets) remained in English in the (TL) text.

#### 4. Vocative text(Contract)

SL item	Lexical incorrect cases	
	MT	HT
Made on	صنع في	انه في يوم
volume	حجم	مؤلف
amount	مبلغ	عدد
amount	مبلغ	كمية
Executed	نفذت	حرر
counterparts	نظيرين	نسختين

**Table (4) Vocative**

	error percentage	correct percentage
contract	6	94



Form (4)

There is also a problem of literal translation produced by MT (Google Translate). The machine does not take into consideration the cohesive devices correctly to some extent. So the cohesive

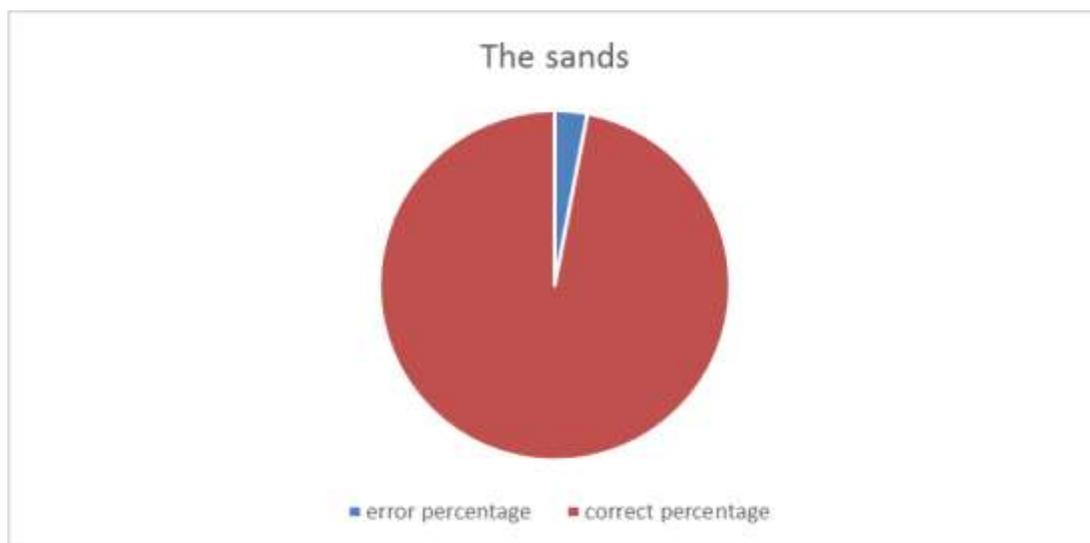
devices have not been rendered correctly in MT in contrary to the human translation.

### 5. Informative texts (scientific)

SL item	Lexical incorrect cases	
	MT	HT
frictions	الاحتكاكات	أجزاء
grain	الحبوب	جسيمات
Aeolian	الايولية	الريحية

Table (5) Informative

	error percentage	correct percentage
The sands	3	97



### Form (5)

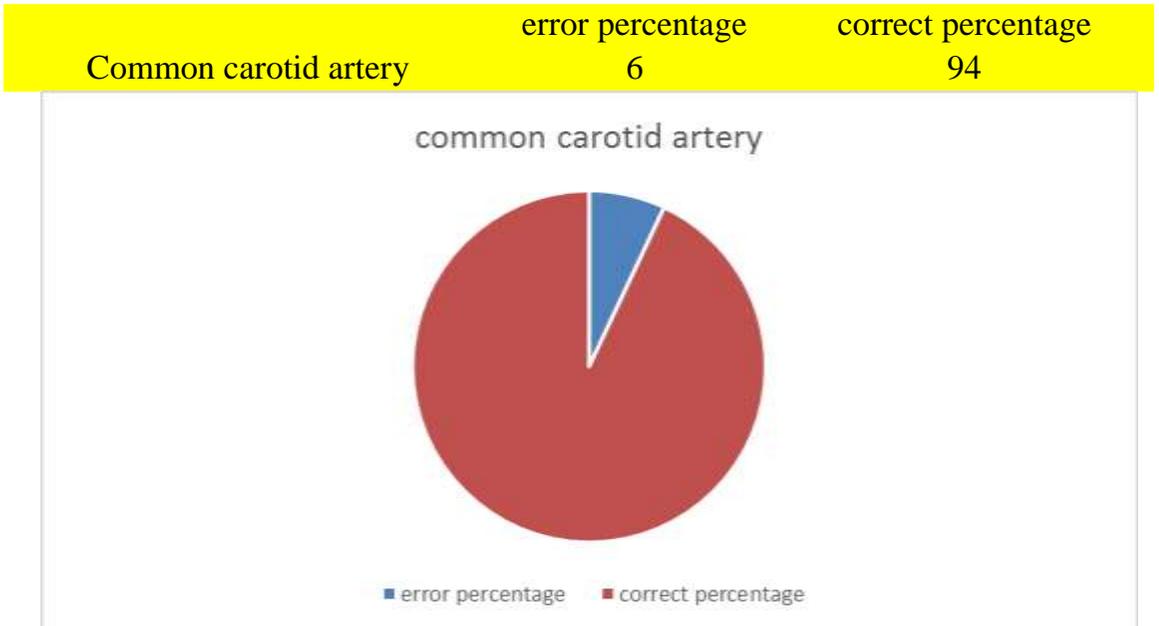
The informative texts also contain some lexical problems when translated by MT (Google Translate). These problems include the

literal translation and the wrong translation such as "Aeolian", because MT (Google Translate) has no world knowledge of the text.

### 6. Informative (medical)

SL item	Lexical incorrect cases	
	MT	HT
brachio-cephical	الكهفي الكهفي	العضدي الرأسي
common	شائع	الأصلي
sternocl-avicular	القصي العضلي	القصي الترقوي
tunica media	الغلالة الأنفية	القميص المتوسط
sinus	الرقبة	الجيب
adventitia	البرانية	القميص الخارجي

Table (6)



Form (6)

Again MT (Google Translate) failed to give an appropriate equivalent for some words since it translates literally because it ignores the context; also it produces a wrong equivalent like "adventitia". But MT (Google Translate) has improved by using neural systems which "builds on an encoder-decoder framework: the encoder transforms a source-language sentence into continuous-space representations through a recurrent neural network (RNN), from which the decoder generates a target-language sentence using another RNN" (Yong Cheng, 2019: 1-2).

<b>Text type</b>	<b>T-1 Percentage</b>	<b>T-2 Percentage</b>	<b>Total Percentage</b>
<b>Expressive</b>	3%	12%	7.5%
<b>Vocative</b>	7%	6%	7.5%
<b>Informative</b>	3%	6%	4.5%

**Table (7)**

The total percentage of lexical problems for the 6 texts

## **Conclusions**

The findings show that text typology affects the percentage of errors in MT in that less errors are noticed in informative texts compared with expressive and vocative ones. This is due to the fact that the language of informative texts is direct with almost no additional connotative meanings and context play less turn for defining the intentional meaning from lexical item whereas more errors have been detected in expressive texts because such texts are usually figurative ones with different connotations. It is also shown that lexical errors in Machine Translation (Google Translate) occur because machine cannot give alternatives or the appropriate equivalent according to the context or to the subject field, although that lexical errors are reduced, because the programs of MT have been developed over years, it still needs to be developed to be more accurate. In addition to that Machine Translation Software, whose concern is the English-Arabic pair, is still lagging to some extent. Since the interest in machine translation in the Arab World

needs more concern taking into consideration that Arabic grammar is considered difficult for the designers of such softwares.

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## نوع النص والمشكلات المعجمية في الترجمة الآلية

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المستخلص

تناول البحث العلاقة بين نوع النص المترجم وأثره في الترجمة الآلية من وجهة نظر الترجمة من الإنجليزية إلى العربية، ويهدف إلى توضيح النتائج المختلفة للترجمة الآلية لتتوع النصوص، ومن الناحية النظرية يقدم البحث خلفية نظرية حول الموضوع بعد ذلك من الناحية العملية، ومن أجل اختبار فرضية البحث التي تقول أن نوع النص يؤثر على درجة ملاءمة الترجمة عن طريق الترجمة الآلية؛ أُجريت تجربة على ٦ نصوص مختلفة (٢ إعلامي، ٢ تعبيرية، و٢ مهني) بواسطة ترجمة كوكل الآلية ثم حُسبت نسبة الخطأ ومقارنتها لكل نص في الترجمة الآلية والترجمة البشرية لمعرفة أثر نوع النص في الترجمة.

الكلمات المفتاحية : الأخطاء، المعلوماتي، الأدبي.

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