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Dedication

I dedicate this modest work to my beloved parents which I consider it as a way to thank them for the beautiful moments and everything they did to me or gave and still giving, to my dad the great man and the one who trusts me to represent all my family, to my mother the source of love and passion and to my grandmother whom I consider as my second mother.

I also dedicate this work to all my wonderful family (brothers, sisters, uncles and aunts) to my best friends: Hicham (Saleh), Abdelaziz, Bachir, Khalil, Abbas, Lakhdar, Abdelkader, Abdelkahar, Saleh, Ismail, Abdelbasset, Mehamad, Abdelali, Chikh (Youcef), Elalmi, Ahmad, Soumaya And all my friends without naming them whom I find a space in my heart but my paper could not include and whose friendship will rest the rest of my life. To everyone knows Sadek. I want to thank all my teachers and all the persons who help us in this work, I would like to say ¨thank you so much¨

Thanks to God

SADEK…

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I would like to extend my thanks and appreciation to all those who helped me in completing my research.

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Table of content:

List of abbreviations:

MT: Machine Translation

SL: Source Language

TL: Target Language

RBMT: Rule Based Machine Translation

CBMT: Corpus Based Machine Translation

SMT: Statististical Machine Translation

EBMT: Example Based Machine Translation

SVO: Subject , Verb , Object

WHO: World Health Organisation

MT-W: Machine translation for watchers

MT-T: Machine Translation for Translators

MT-R: Machine translation for revisers

MT-A: Machine translation for authors

INTRODUCTION

Translation has witnessed a significant development throughout the history in accordance with the significant developments in several spheres, such as economy, politics, education, medication and the mass media as well. These changes forcefully directed the world in search of all types of information in all domains. Many scholars strongly realized that the pressing necessity of the search of information could not be fulfilled between the countries of different languages without the innovative utilization of different means of translation.

A common thought is that translation is a mere word-for-word substitution between any two languages in the world, and that would be an upright mechanical operation, because the translation process must regard some constraints that include context, rules of grammar of both languages ,writing conventions, phrases and idioms.

The demand in the translation field is greater than ever before due to several reasons as the needs of business documentation consequent to the industrial revolution. Likewise, the legal field has the necessity for the translation of court records, petitions and dispositions. The medical field also frequently needs medical records and notes translated. On a personal level, some individuals are in need for translation of legal documents such as passports, birth certificates and so forth, as a result of their immigration to countries of a different language from their origins.

In recent years, research as well as software applications have been concentrating on Machine Translation (MT). This is due to many factors, the most important of which is the increasing need to create online communication between different parts of the world and between people speaking different languages. People felt the need for machine translation since the advent of computers, but the early attempts they made were completely dissatisfactory. It was based on a primitive idea of processing the source text through an electronic dictionary that included words of the source language and their equivalents in the target language, with no further manipulation either of the input or the output. The result they received at that time was disappointing. This led research in this field to be blocked for nearly a decade. However, with the modern insights in Linguistics and software engineering, natural language processing systems have witnessed remarkable advances.

Translating a human language to another one through the computer is never an easy task. A human language is a highly complicated system, and so MT involves a big deal of complicated manipulation and analysis. Despite the great advances done in the field of Computational Linguistics, MT is not accomplished and is still far from being satisfactorily accomplished.

This work is to answer a general question which is:

- Can MT replace the humans in translating the different kinds of text?

Through answering a number of questions along its three chapters which are the following:

1. What is machine translation?
2. What are the approach and strategies of MT?
3. When will the MT fail in rendering the meaning of the source text?

This research is an attempt to examine the credibility of the machine translation system "Google Translate" in translating some articles of the WHO constitution from English to Arabic.

The research aim is to examine the effectiveness of "Google Translate" in translating English to Arabic sentences and the difficulties that it faces ,thus , its importance lies on educating MT users ,especially students of languages , who need to translate documents, novels ,short stories and so forth ,about the grammatical and thus the semantic ,errors that occur during the translation process.

Introduction:

In this chapter which is entitled "an overview on machine translation" I will deal with translation in general then with machine translation. First, I will define it and give a historical overview on it then I will elaborate its architectures and types, and finally donate to the processes of the machine translation.

I-1 DEFINITION OF TRANSLATION:

Several definitions were given to translation as Nida suggested: Definitions of proper translating are almost as numerous and varied as the persons who have undertaken to discuss the subject.

It is quite understandable; for there are vast differences in the materials translated, in the purpose of the activity, and in the needs of the target audience.
While the definition which is not limited to the mere transference of the meaning first provided by Nida and Taber (1969: 12) who postulate

Translation consists in reproducing in the receptor language the closest natural equivalent of the source language message, first in terms of ***meaning*** *and secondly in terms of* ***style.***

Bell (1991: 5-6) seems to have pursued the same line of emphasis on meaning and style in his translation of the definition given by the French theorist, Dubois (1974):

Translation is the expression in another language (or the target language) of what has been expressed in another, source language, preserving semantic and stylistic equivalences.

T he above definitions also stress the significance of ‘equivalence’ which underlies the following definitions, among others: given by Meetham and Hudson (1972) and Catford (1965):

Translation is the replacement of a text in one language by a replacement of an equivalent text in a second language. (Meetham and Hudson, 1972)

Translation is the replacement of textual material in one language (SL) by equivalent textual material in another language (TL). (Catford, 1965)

O n the other hand, functionalists view translation differently:

Translation is the production of a functional target text maintaining a relationship with a given source text that is specified according to the intended or demanded function of the target text. (Nord, in shutttleworth and Cowie, 2007)

Nord, however, distinguishes between two senses of translation: wide and narrow.

Translation is, in a narrow sense, any translational action where a source text is transferred into a target culture and language.
According to the form and presentation of the source text and to the correctness of the target text we distinguish between oral translation (= 'interpreting') and written translation (= 'translation' in the narrow sense). (Nord, 2007)

Widening the above definitions, Sager maintains that translation should reflect the environment in which the professional translation activity takes place:

Translation is an extremely motivated industrial activity, supported by information technology, which is diversified in response to the particular needs of this form of communication. (Sager, 1994)

I n a similar vein, Koller describes translation as a 'text processing activity and simultaneously highlights the significance of 'equivalence':

Translation can be understood as the result of a text-processing activity, by means of which a source-language text is transposed into a target-language text.. Between the resulting text in L2 (the target language text) and the source text L1 (the source language text) there exists a relationship which can be designated as translational, or equivalence relation. (Koller, 1995)

I-2 **DEFINITION OF MACHINE TRANSLATION**

Machine translation (MT) means using a computer to translate a human language into another human language without (or with minimal) human intervention. It is the attempt to make the computer able to convey a meaning of a text. The computer needs to be provided with the appropriate procedures and routines to perform the translation process.

To process any translation, human or automated, the meaning of a text in the original (source) language must be fully restored in the target language, i.e. the translation. While on the surface this seems straightforward, it is far more complex. Translation is not a mere word-for-word substitution. A translator must interpret and analyze all of the elements in the text and know how each word may influence another. This requires extensive expertise in grammar, syntax (sentence structure), semantics (meanings), etc., in the source and target languages, as well as familiarity with each local region.

Human and machine translation each have their challenges. For example, no two individual translators can produce identical translations of the same text in the same language pair, and it may take several rounds of revisions to meet customer satisfaction. But the greater challenge lies in how machine translation can produce an acceptable translation.

On a basic level, MT performs simple substitution of words in one natural language for words in another, but that alone usually cannot produce a good translation of a text because recognition of whole phrases and their closest equivalent in the target language is needed. Solving this problem with corpus and statistical techniques is a rapidly growing field that is leading to better translations, handling differences in linguistic-typology translation of idioms and the isolation of errors.

Current machine translation software often allows for customization by domain or profession (such as weather reports), improving output by limiting the scope of allowable substitutions. This technique is particularly effective in domains where formal or formulaic language is used. It follows that machine translation of government and legal documents more readily produces usable output than conversation or less standardized text.

Good quality can also be achieved by human intervention: for example, some systems are able to translate more accurately if the user has unambiguously identified which words in the text are names. With the assistance of these techniques, MT has proven useful as a tool to assist human

translators and, in a very limited number of cases, can even produce output that can be used as is (e.g., some pragmatic text).

The progress and potential of machine translation have been debated much through its history. Since the 1950s, a number of scholars have questioned the possibility of achieving fully automatic machine translation of high quality. Some critics claim that there are in-principle obstacles to make an automatic translation process.

To successfully undertake a translation task, human translators need to have four types of knowledge:
1) Knowledge of the source language (lexicon, morphology, syntax, and semantics) in order to understand the meaning of the source text.
2) Knowledge of the target language (lexicon, morphology, syntax, and semantics) in order to produce a comprehensible, acceptable, and well formed text.
3) Knowledge of the relation between source and target language in order to be able to transfer lexical items and syntactic structures of the source language to the nearest matches in the target language.
4) Knowledge of "the subject matter". This enables the translator to understand the specific and contextual usage of terminology.
Ultimately, the translation process is not considered successful unless the output text has "the same meaning" as the input text. Therefore, the transfer of lexical items and syntactic structures is not considered successful translation if the overall meaning is not conveyed.
In addition to the types of knowledge mentioned above, translators must have a special skill in their craft. To a great extent, translation "is an intelligent activity, requiring creative problem-solving in novel textual, social and cultural conditions." Not only does the translation depend on linguistics, but it also "draws on anthropology, psychology, literary theory, philosophy, cultural studies and various bodies of knowledge, as well as on its own techniques and methodologies."
It is not so easy for the computer to translate as to conduct a mathematical operation. In order for the computer to translate, it must go through three complicated barriers: the language barrier, the cross-linguistic barrier and the translation barrier. These barriers have been perplexing philosophers and linguists for ages. "In order to act upon human input the computer must be able to take it apart and form a logical representation of what it is fundamentally saying – it must to some degree 'understand' the input." However, this understanding is not easily available because "human language is full of ambiguities, words and phrases that can mean several different things, shortened forms of words and sentences, and other factors that can serve to cloud

meaning." The meaning of a human utterance is "open to doubt, depending on such things as knowledge, context, association and background." If sometimes we need our addressor to explain or paraphrase what he means, we cannot expect the computer to outsmart us in our own media of communication.

MT can never be achieved by feeding the computer with a dictionary of the source language words and their equivalents in the target language.

Lexical equivalence is only a component among several components involved in MT today. After computer engineers and linguists were met with many failures in the beginning of MT application, they now understand the intricacy of the task. Many linguists and computer engineers today are directing their efforts towards MT research. MT has become a "testing ground for many ideas in Computer Science, Artificial Intelligence and linguistics".

Once a far-away dream, MT today has become a reality. Many advances have been made, many successes have been achieved and many translation applications are now available in the market. However, this reality is not as big as people hope. Commenting about the capacity and prospect of MT, Hutchins said, "There are no 'translating machines' which, at the touch of a few buttons, can take any text in any language and produce a perfect translation in any other language without human intervention or assistance. That is an ideal for the distant future, if it is even achievable in principle". Though these words are said a decade ago, they are still expressive of the state of the art of MT today. The translation process is so complicated for the machine to handle. The machine cannot deal with all types of texts in all fields. No MT manufacturer claims that his application can produce a total accurate and comprehensible output.

Some people argue that studies in MT are useless because the machine can never translate great literary works like those of Shakespeare or Dickens. However, translating literary works is not within the scope of MT, because "translating literature requires special literary skill" and creativity from the translator. It is usually a poet or a man of letters (not a customary translator) who attempts to translate such a kind of material.

The machine cannot and will not replace translators, but it helps them in a variety of ways. MT can handle the huge routine tasks. Technical manuals and periodicals, for example, are a perfect material for MT. They use no figurative or flowery language. They have specific subject fields and restricted styles, terminology, structures, and vocabularies. MT can also provide raw translation which can be revised or 'post-edited' to give a high quality translation in a shorter time.

I-3 **HISTORICAL OVERVIEW ON MACHINE TRANLATION:**

Machine translation had witnessed many changes through its history. Where Arnold et al stated in his book "There is some dispute about who first had the idea of translating automatically between human languages, but the actual development of MT can be traced to conversations and correspondence between Andrew D. Booth, a British crystallographer, and Warren Weaver of the Rockefeller Foundation in 1947, and more specifically to a memorandum written by Weaver in 1949 to the Rockerfeller Foundation which included the following two sentences.

"I have a text in front of me which is written in Russian but I am going to pretend that it is really written in English and that it has been coded in some strange symbols. All I need to do is strip off the code in order to retrieve the information contained in the text."

The analogy of translation and decoding may strike the sophisticated reader as simplistic (however complicated coding gets it is still basically a one-for-one substitution process where there is only one right answer — translation is a far more complex and subtle business), and later in the memorandum Weaver proposed some other more sophisticated views, but it had the virtue of turning an apparently difficult task into one that could be approached with the emergent computer technology (there had been considerable success in using computers in cryptography during the Second World War). This memorandum sparked a significant amount of interest and research, and by the early 1950s there was a large number of research groups working in Europe and the USA, representing a significant financial investment (equivalent to around £,20 000 000). But, despite some success, and the fact that many research questions were raised that remain important to this day, there was widespread disappointment on the part of funding authorities at the return on investment that this represented, and doubts about the possibility of automating translation in general, or at least in the current state of knowledge".
While W. John Hutchins stated that "The translation of natural languages by machine, first dreamt of in the seventeenth century, has become a reality in the late twentieth. Computer programs are producing translations - not perfect translations, for that is an ideal to which no human translator can aspire; nor translations of literary texts, for the subtleties and nuances of poetry are beyond computational analysis; but translations of technical manuals, scientific documents, commercial prospectuses, administrative memoranda, medical reports. Machine translation is not primarily an area of abstract intellectual inquiry but the application of computer and language sciences to the development of systems answering practical needs.

After an outline of basic features, the history of machine translation is traced from the pioneers and early systems of the 1950s and 1960s, the impact of the ALPAC report in the mid-1960s, the revival in the 1970s, the appearance of commercial and operational systems in the 1980s, research during the 1980s, new developments in research in the 1990s, and the growing use of systems in the past decade. This brief history can mention only the major and most significant systems and projects".

I-4 Architectures of machine translation systems

Different strategies have been adopted by different researchers at different times in the history of machine translation. The choice of strategy reflects one side of the depth and linguistic diversity but also the grandeur of ambition on the other side.

There are generally two types of composing structure for machine translation, which are:

I-4.1. Linguistic Architecture

In the linguistic architecture there are three basic approaches being used for developing MT systems that differ in their complexity and sophistication. These approaches are:

I-4.1.1 **Direct approach:** In direct translation, translation is direct from the source text to the target text. The vocabularies of SL texts are analyzed as needed for the resolution of SL ambiguities, for the correct identification of TL expressions as well as for the specification of word order in TL. This approach involves taking a string of words from the source language, removing the morphological inflection from words to obtain the base forms, and looking them up in a bilingual dictionary between the source and the target languages. Components of this system are a large bilingual dictionary and a program for lexically and morphologically analyzing and generating texts.

I-4.1.2 **Transfer-based approach:** In the Transfer approach, translation is completed through three stages: the first stage consists in converting SL texts into an intermediate representation, usually parse trees; the second stage converting these representations into equivalent ones in the target language; and the third one is the generation of the final target text.

In the transfer approach, the source text is analyzed into an abstract representation that still has many of the characteristics of the source, but not the target, language. This representation can range from purely syntactic to highly semantic. In the syntactic transfer, some type of tree manipulation into a target language tree converts the parse tree of the source input. This can be guided by associating feature structures with the tree. Whatever representation is used, transfer to the target language is done using rules that map the source language structures into their target language equivalents. Then in the generation stage, the mapped target structure is altered as required by the constraints of the target language and the final translation is produced.

I-4.1.3 **Interlingua approach:** The Interlingua approach is the most suitable approach for multilingual systems. It has two stages: Analysis (from SL to the Interlingua) and Generation (from the Interlingua to the TL). In the analysis phase, a sentence in the source language is analyzed and then its semantic content is extracted and represented in the Interlingua form representation, where an Interlingua is an entirely new language that is independent of any source or target language and is designed to be used as an intermediary internal representation of the source text. The analysis phase is followed by the generation of the target sentences from the Interlingua representation. An analysis program for a specific SL can be used for more than one TL since it is SL-specific and not oriented to any particular TL. Furthermore, the generation program for a particular TL can be used again for translation from every SL to this particular TL since it is TL-specific and not designed for input from a particular SL.

I-4.2. **Computational Architecture**

In the computational architecture also there three basic approaches that deal with the MT systems in which each approach uses its processes and strategies in translating from one language into another; these approaches are:

I-4.2.1 **Rule Based approach:** rule-based MT has two approaches: Interlingua and transfer. Rule-Based MT Systems rely on different levels of linguistic rules for translation. This MT research paradigm has been named rule-based MT due to the use of linguistic rules of diverse natures. For instance, rules are used for lexical transfer, morphology, syntactic analysis, syntactic generation, etc. In RBMT the translation process consists of:

- Analyzing input text morphologically, syntactically and semantically.
- Generating text via structural conversions based on internal structures.

The steps mentioned above make use of a dictionary and a grammar, which must be developed by linguists. This requirement is the main problem of RBMT as it is a time-consuming process to collect and spell out this knowledge, frequently referred as knowledge acquisition problem. It is not just very hard to develop and maintain the rules in this type of system, but one is not guaranteed to get the system to operate as well as before the addition of a new rule. RBMT systems are large-scale rule based systems; whereas their computational cost is high, since they must implement all aspects whether syntactic, semantic, structural transfer etc. as rules.

I-4.2.2 **Corpus-based approach:** Corpus-Based Machine Translation , also referred a data driven machine translation, is an alternative approach for machine translation to overcome the knowledge acquisition problem of rule-based machine translation. There are two types of CBMT **Statistical Machine Translation (SMT)** and **Example-Based Machine Translation (EBMT**). Corpus based MT automatically acquires the translation knowledge or models from bilingual corpora. Since this approach has been designed to work on large sizes of data, it has been named

Corpus-Based MT. The MT system Google Translate which I will use hereafter in my thesis uses the statistical machine translation approach to translate between languages.

I-4.2.3 **Hybride approach:** Some recent work has focused on hybrid approaches that combine the transfer approach with one of the corpus–based approaches. This was designed to work with fewer amounts of resources and depend on the learning and training of transfer rules. The main idea in this approach is to automatically learn syntactic transfer rules from limited amounts of word aligned data. This data contains all the needed information for parsing, transfer, and generation of the sentences. The following section covers part of the MT literature that gives details of specific systems for deriving the appropriate translation using different approaches.

I-5 Types of Machine Translation

There are different types of machine translation according to the target audiences, these types are:

I-5.1. Machine Translation for Watcher (MT-W)

This is intended for readers who wanted to gain access to some information written in foreign language who are also prepared to accept possible bad translation rather than nothing. This was the type of MT envisaged by the pioneers. This came in with the need to translate military technological documents. This was almost the dictionary based translation far away from linguistic based machine translation.

I-5.2. Machine Translation for Revisers (MT-R)

This type aims at producing raw translation automatically with a quality comparable to that of the first drafts produced by human. The translation output can be considered only as brush-up so that the professional translator freed from that very boring and time consuming task can be promoted to revisers.

I-5.3. Machine Translation for Translators (MT-T)

This aims at helping human translators do their job by providing on-line dictionaries, thesaurus and translation memory. This type of machine translation system is usually incorporated into the translation work stations and the PC based translation tools.

“Tools for individual translators have been available since the beginning of office automation.” And those systems running on standard platforms and integrated with several text processors are the ones that attained operational and commercial success.

I-5.4. Machine Translation for Authors (MT-A)

This aims at authors wanting to have their texts translated into one or several languages and accepting to write under control of the system or to help the system disambiguate the utterance so that satisfactory translation can be obtained without any revision. This is an “interactive MT,

The interaction was however done both during analysis and during transfer, and not by authors, but by specialists of the system and language(s).” In short, there have been no operational successes yet in MT-A, but the designs are becoming increasingly user oriented and geared towards the right kind of potential users, people users and people needing to produce translations, preferably into several languages.

I-6 Processes of machine translation

Machine translation like human translation passes through three stages: analysis and transfer then generate: After the text is entered in the computer to be translated, the translation process starts.

- Phase I: Analysis; includes the following steps:
The translation process starts with the "pre-editing" where the initial review of the human for the text to be translated. The human translator revises the text to facilitate it to be understandable for the machine and then the computer starts the morphological analysis of the text to recognize the components and parts of words, then, it looks for words in the dictionary, then analysing the text words grammatically to distinguish the parts of speech, subject, verb, adjective,...etc.

Phase II: transport and it is on two levels:
* Lexical level: the computer transfers the words from the source language to the target language, depending on bilingual dictionaries available to him.

* Compositional level: at this level the computer tries to look for grammatical equivalents in the target language, for example subject and object ... etc.

Phase III: generating which means the formation and synthesis (form sentences in the target language) and it is also in two levels:
* Grammatical Level: applying the grammatical rules of the target language (word order) in accordance with the characteristics of the target language like starting the Arabic sentence with the verb... ect.
* Morphological level: the application of morphological and grammatical rules in the target language, as number, sex and time ...etc.

Conclusion:

In this chapter I have tried to elaborate the machine translation history and the different architectures of machine translation systems. I have tried to explain how each architecture deal with the language in the act of translating. I have finished

with explaining how the machine processes in translating from one language into another.

Introduction

In this chapter which is "machine translation into Arabic" I will treat the relationship between the language and the ability of translating it automatically. In this chapter I have tackled how Arabic makes a difficulty to the machine because of its characters, structure and word order. In this chapter I have tried to illustrate on the Arabic sentence structure and word order and how does these factors affect the correctness and the accuracy of the MT translation. In the end of this chapter I have given a hint about Google Translate which is the system that I have used as an example of the MT systems to assess its accuracy in translating from English into Arabic.

II-1 MACHINE TRANSLATION AND ARABIC LANGUAGE

Arabic is regarded as one of the major languages that interests machine translation (MT) researchers since the very early days of MT and specifically in the U.S because of the interest of the Americans about what is happening in the other countries after the end of the World War II. The language has always been considered "due to its morphological, syntactic, phonetic and phonological properties as one of the most difficult languages for written and spoken language processing."

"Arabic is extremely different in terms of its characters, morphology and structure from other languages." Accordingly researchers cannot always import solutions from other languages, and today Arabic machine translation still needs more efforts to be improved, mainly in the area of semantic representation systems, which are essential for achieving high quality translation.

Translation of Arabic sentences is a difficult task. The difficulty comes from several sources. One is that the Arabic sentences are too long. The average length of a sentence is 20 to 30 words and sometimes it even exceeds 100 words. Another difficulty comes from the sentence structure. The Arabic sentence is complex and syntactically ambiguous due to the frequent usage of grammatical relations, order of words and phrases, conjunctions, and other constructions (the most of languages are written in Latin alphabets and from left to right while Arabic is written in different alphabets and from right to left). Consequently, most of the researches in Arabic MT mainly concentrated on the translation from English to Arabic. An interesting study by (Rafea et al., 1992) is" the English to Arabic translator that translate sentences from the political news of the Middle East". A study of translating English noun phrases into Arabic is presented in (Mohamed 2000) this study shows the possibility of translating titles of theses and journals from the computer science domain. The translation of an English subset of a knowledge base is

described in (El-Saka et al, 1999). This tool translates English phrases to their equivalent Arabic phrases. On the contrary, little work has been done in developing Arabic to English MT system. "The big gap between Arabic and English, in both lexical and syntactic aspects, causes difficulties of building these systems". The lexical gab between Arabic and English is studied in (Al barhamtoshi, 1995). The syntactic gab is studied in (Farouk, 1999).

Another difficulty may face the automation of translation between Arabic and English is the translation of Arabic interrogative sentence into English. This includes also the (imperative) form of the verbal sentence that is commonly used for interrogating users of nowadays computer applications.

II-1.1 Arabic sentence structure and word order

Arabic grammar is amongst the most ambiguous in the world languages. It may occur in several structures and accepts different word order. It has 28 letters, many language specific grammar rules with a relatively free word order language. Each Arabic letter represents a specific sound so the spelling of words can easily be done phonetically. There is no use of silent letters as in English or French.

Similarly, there is no need to combine letters in Arabic to indicate a certain sound. For example, the 'th' sound in English as in the word 'Thinking' is reduced in Arabic to the character _ث_/Θ/_. In addition to the standard challenges involved in developing an efficient translation tool from Arabic to English, the relatively free word order nature of Arabic creates an obstacle. There is no copula verb 'to be' in Arabic, for example, the mere juxtaposition of the subject and predicate indicates the predicational relationship. The absence of the indefinite article, while not unique to Arabic still poses many difficulties within the context of the language structure.

Arabic do not use copula (auxiliaries) "to be" or "to have" do not exist. Instead of saying "my name is Khaled" the Arabic equivalent would read like "name mine Khaled" _ إسمي خالد _ "ismy Khaled". Instead of saying 'She is a student', the Arabic equivalent would be 'She student'; in Arabic _هي طالبة_*"hya talibat-un"*. The copula in Arabic is only realized in the past and future tenses and in negation. Regarding the verb 'to have', which in English can also mean 'to own'. Instead of saying "He has a house", the Arabic equivalent is 'To him a house' - _له بيت_*"laho bayt-un"*. Adjectives in Arabic have both a masculine and a feminine form. The singular feminine adjective is just like the masculine adjective but morphologically marked.

The Arabic number system includes the dual form, whereas other languages move from the singular to the plural form directly. In Arabic we need only to add two letters to the singular form to express the dual form, eg: "bab-un" _باب_ "door"; "bab-ani" _بابان_ "two doors".
The plural form, however, is obtained using a different mechanism.
Plurals are of two types:

(1) The sound plural. The sound plural is one in which the singular form of the word remains intact (sound) with some addition at the end. Examples;

Masculine in the nominative case e.g. engineers _مهندسون_*"muhandiss-una"* in which ون *"una"* is added to a singular noun. Masculine in the accusative and genitive cases e.g. engineers_مهندسين_ *"muhandiss-ina"* in which _ين_ *"ina"* is added to the singular noun.

Feminine in the nominative e.g: engineers _مهندسات_ "*muhandiss-at-un"* in which ات *"atun"* is added to the singular noun.

Feminine in the accusative and genitive cases engineers_مهندسات_ *muhandiss-at-in* in which_ ات_ *"atin"* is added to the singular noun.

(2) The broken plural. The broken plural is one in which the form of the singular word is broken, that is, changed. It has no fixed rule for making it. Sometimes letters are added or deleted and sometimes there is merely a change in the vowels. Examples "a book"_كتاب_ "kitab-un" ; "books" _كتب_"kutub-un",_رجل_ *"rajul-un"* man, _رجال_*"rejal-un"* men, _سنة_ "sanat-un" year _سنوات_ "sanawat-un" years.

Words are written horizontally from right to left. Most letters change form depending on whether they appear at the beginning, middle or end of a word or on their own. Arabic letters that may be joined are always joined in both hand-written and printed form.

In Arabic, all nouns must be either feminine or masculine, and the gender can be either grammatical or natural. The gender of inanimate objects is grammatical, examples:

Arabic masculine:

قمر	qamar-un	Moon
سيف	sayf-un	Sword
باب	bab-un	Door

Arabic feminine:

شمس	shams-un	Sun

عصا	assa	Stick
نافذة	Nafidat-un	Window

In this case the gender is a built-in lexical property of the word. Animate objects have a natural gender, and this gender can be either non-productive or productive. The non-productive gender is the case of nouns where the feminine and the masculine have different lexical entries, i.e., the feminine is not derived from the masculine, for example:

Arabic:

دجاجة	dajajat-un	Chicken
ديك	deek-un	Cock

By contrast, in the productive gender, the feminine is derived from the masculine, usually by adding a special suffix ‘ta marbuta’ to the end of the masculine form as shown below;

Examples:

معلم	muaalim-un	Teacher (M)
معلمة	muaalimat-un	Teacher (F)
ظالب	talib-un	Student (M)
طالبة	talibat-un	Student (F)

Arabic has no indefinite article while the definite article has the shape of "al" ال and it is attached to the beginning of the word.

Example;

Rajul-un رجل al-rajulu الرجل

II-1.2 The Arabic Word Order:

"Arabic has a relatively free word order"; this poses a significant challenge to MT due to the number of possible ways to express the same sentence in Arabic. In Standard Arabic., the following word order patterns are actually possible: (VSO),
(SVO), (OVS), (OSV), (VOS). However, Arabic employs two of these word orders most commonly: VSO and SVO. Using other word orders entails the emphasis and focus on a certain word. For the elements of subject (S), verb (V) and object (O), Arabic’s relatively free word

order allows the combinations of SVO, VSO, VOS and OVS. For example, consider the following word orders:

(1) Noun1 Verb Noun2

(2) Noun2 Verb Noun1

(3) Verb Noun2 Noun1

(4) Noun1 Noun2 Verb

Example:

Qays loves Layla.

May be written in Arabic as:

يحب قيس ليلى yuhibu Qays-un Layla

قيس يحب ليلى Qays-un yuhibu Layla

يحب ليلى قيس yuhibu Layla Qays-un

In Standard Arabic, partial agreement holds between the verb and the subject in VSO order; whereas in SVO order, full agreement holds between the subject and the verb.

Examples:

حضر الطلاب الندوة

hadhar-a at-tullaab-u an-nadwat-a (VSO)

The students attended the seminar.

الطلاب حضروا الندوة

at-tullaab-u hadhar-uu an-nadwat-a (SVO)

The students attended the seminar.

If the subject is pronominal, then it usually gets dropped in the course of computation, since Standard Arabic is a null-subject language:

حضرنا الندوة

Hadhar-na an-nadwat-a

We attended the seminar.

With taking in consideration that Arabic language is written from right to left.

This means that we have a challenge to identify exactly which is the subject and the object. In Arabic the subject agrees with the verb with appropriate morphological marking on the word to differentiate subject from object in these free word order sentences.

In Arabic grammar, sentences are divided to two types; Nominal sentence الجملة الاسمية aljumla aliismia, and the verbal sentence الجملة الفعلية aljumla alfeilia.

II-1.3 Nominal sentence /al-jumla-tu al-ismia-tu/ الجملة الاسمية

It consists of two parts the first can be a noun, a particle before noun or pronoun called subject mubtadaa مبتدأ . The second part is the predicate khabar خبر it can be a noun, adjective, preposition and noun, or verb.

Examples;

الولد جزائري Al waldu jazairi

_ The boy is Algerian

هو أستاذ Howa ostadun

_ He is a teacher

عندي كتاب Indi kitaabun

_ I have a book

II-1.4 The subject of a nominal sentence/ almubtadaa المبتدأ:

It is normally who or what is being discussed. Most verbs need a subject and the subject who decides the form or the ending of the finite verb in most languages.

Alternative structures for nominal sentence:

Form	Example	Transcription	Translation
Subject +predicate	الأرواح المتمردة	Al-arwahu al mutamarida-tu	Rebel spirits
Subject +verb +complements	الأب ذهب إلى السوق	Al abo dahaba ila a'ssouqi	The father went to the market
Complements +subject +verb +complements	كتابه الولد قرأ في المكتبة	Kitaaba-hu alwaladu qaraa fi al maktaba-ti	The boy read his book in the library
Subject +complements +verb	سارة السؤال أجابت	Sara-tun a'ssu'ala ajabat	Sarah answered the Question

Verbal sentence /al-jumla-tu al-fiilia-tu/ الجملة الفعلية:

It is a sentence that starts with a verb and the subject follows. The subject can be a noun, a pronoun, a demonstrative, particle before the verb, or a relative clause.

Examples:

سافر الولد Safara al-waladu

_ The boy travelled.

من فضلك افتح هذا الباب Min fadleka, iftah hada albaba

_ Open the door, please.

ما قرأت مريم القصة Ma qara'at meriem'u al Qissata

_ Meriem has not read the story.

بعد عودته من العمل ذهب الأب إلى المزرعة مع ابنه

Ba'ada awdati'hi mina alamali, dahaba al abo ila al mazra'a-ti ma'a a ebni'hi

_ After he came back from work, the father went to the farm with his son.

بكينا baka-y'na

_ We cried.

The subject of a verbal sentence /alfaeil/الفاعل:

The subject of a verbal sentence may not be always showing up. There can be apparent, attached and hiding subjects in verbal sentence.

Examples:

فعلت	fa'altu	I did
أعمل	a 'amalu	I work
يسافرون	yu'ssaferouna	They travel

Ps: the exception is the third person (singular .feminine .perfective) verb, which does have declension, but it is not an attached subject pronoun but rather a feminine marker. If the verb does not have an attached pronoun, the subject will be an unseen that follows the verb and that is called hidden pronoun. ضمير مستتر

Example: نريد أن نلعب nu'reedu an 'nal'aba we want to play.

Alternative structures for a verbal sentence:

Form	Example	Transcription	Translation
Verb +subject	قرأ الولد	Qura'a al-waladu	The boy read
Verb +subject +object	أكل أحمد الخبز	Akala Ahmadu al Khubza	Ahmed ate the Bread
Verb +subject +adverb	ستكون المعلمات حاضرات	Sa-takoonu al-mu allimatu haa'diraatin	The teachers will be present
Verb +subject +prepositional phrase	يذهب الرجل إلى عمله	Yath-habu ar-rajulu ilaa amali-hi	The man goes to Work
Passive verb+ agent	سرق المنزل	Soriqa al-manzilu	The house has been stolen
Verb +attached subject +adverb	كنت جاهزا	Kuntu jaahizan	I was ready
Verb +attached subject +object	عرفنا الجواب	Arafnaa al-jawaaba	We have found out the answer
Verb +attached subject +verb	كانوا يعرفون	Kannu ya'arifuna	They knew
Verb +hidden subject +prepositional phrase	خرجت من الغرفة	Kharajat mina alrurfati	She went out of the room
Verb +hidden Subject +object	نريد أن نتخرج	Nureedu an na'takharaja	We want to Graduate
Verb +hidden subject +adverb	كان يوما عصيبا	Kaana yawman a'seeban	It was a rough day

The voice:

It indicates the perspective of an event which is being adopted by the speaker. We have two type of voice; the active and passive voice.

Active voice: is the normal way of using a verb. The action is directed outwards from the subject, which means that, the subject performs the action but does not receive it.

Example:

أكل الولد التفاحة akala al-waladu a'ttufahata the boy ate an apple.

Passive voice: one can change the normal word order of many active sentences so that the subject is no longer active but is, instead, being acted upon by the verb or passive.

Example:

أكلت التفاحة okeelati a'ttufaha-tu the apple had been eaten .

II-2 Google Translate

Google Translate is one of the most common used automatic translators. It is a free, multilingual statistical machine-translation service provided by Google Inc, to translate written text from one language into another. It requires a post-edit from a human translator to supply an appropriate translation. Google Translate, like other automatic translation tools, has its limitations. While it can help the reader to understand the general content of a foreign language text, it does not always deliver accurate translations.It provides translation between about 50 languages. The user has simply to select the source and the target language then type the source text, and immediately, the result will appear.

Google Translate translates better between languages within the same family, for instance German into English or French into Italian.

Before October 2007, for languages other than Arabic, Chinese and Russian, Google used SYSTRAN based translator which is used by other translation services such as Yahoo! Babel Fish, AOL, and Yahoo.

On May 26, 2011, Google announced that the Google Translate API had been deprecated and that it would cease functioning on December 1, 2011, "due to the substantial economic burden caused by extensive abuse." The shutting down of the API, used by a number of websites, led to criticism of Google and to developers questioning the viability of using Google APIs in their products.

On June 3, 2011, Google announced that they were cancelling the plan to terminate the Translate API due to public pressure. In the same announcement, Google said that it would release a paid version of the Translate API.

Because Google Translate uses statistical matching to translate rather than a dictionary/grammar rules approach, translated text can often include apparently nonsensical and obvious errors, often exchanging common terms for similar but nonequivalent common terms in the other language, as well as inverting sentence meaning. Also, for the speech, it uses only European French as well as Latin American Spanish worldwide, but both European and Brazilian Portuguese (European for translate.google.pt and Brazilian for all other Google Translate sites)

In the most of times the translation of Google Translate from and into Arabic needs to be revised from the human translator in order to correct the prospective errors.

Conclusion

In this second chapter I have tackled the relationship between Arabic language and machine translation, and how the Arabic characters make a difficulty to the MT systems.
I have found that Arabic is one of the most ambiguous languages in the matter of grammar and syntactic because it differs from the most of languages in the world in terms of its alphabets, word order and the agreement between its components. This makes a big challenge to the machine to translate from English into Arabic.

Introduction

In this chapter which is the practical part I have chosen articles from the WHO (World Health Organisation) arbitrary and translated it through Google Translate into Arabic then comparing the translation of Google with the translated version of the WHO -downloaded from the net- then commenting the MT system. I have chosen Google in my work because it is the most used system especially among the students; it is available for free in the net and it functions simply by selecting the source and target language then inserting the source text.

III-1 the Translation of Some Articles From the WHO Chart Through Google Translate:

(1)

Source text:

The objective of the World Health Organization (hereinafter called the Organization) shall be the attainment by all peoples of the highest possible level of health.

Google Translate:

هدف منظمة الصحة العالمية (وتسمى فيما يلي المنظمة) هو أن تبلغ جميع الشعوب أرفع ممكن مستوى من الصحة.

Comment:

The original text is a simple sentence with a single verb; in this translation Google Translate gives a mere a word-for-word substitution, without paying attention to the Arabic language characters and word order. It gives the English order to the adjective and its qualifier ممكن مستوى whereas in English, in the most of cases, we have pre modifier but in Arabic we find an adjective with a post modifier so the order of the adjective and its modifier supposed to be مستوى ممكن.

The appropriate translation:

هدف منظمة الصحة العالمية (المسماة فيما يلي المنظمة)هو أن تبلغ جميع الشعوب أرفع مستوى صحي ممكن.

(2)

Source text:

(a) To act as the directing and co-ordinating authority on international health work;

Google Translate:

(أ)لتكون بمثابة سلطة التوجيه وتنسيقية على الدولي العمل الصحي.

Comment:

The original simple sentence is conveyed in meaning into the target text since the context in general can be understood. This translation is grammatically correct but syntactically poor because there is a need of respecting the Arabic word order. There should be an agreement between words (التوجيه وتنسيقية) which should be (التوجيه و التنسيق).

The appropriate translation:

العمل كسلطة التوجيه والتنسيق في ميدان العمل الصحي الدولي;

(3)

Source text:

(b) To establish and maintain effective collaboration with the United Nations, specialized agencies, governmental health administrations, professional groups and such other organizations as may be deemed appropriate;

Google Translate:

(ب)إنشاء والحفاظ على التعاون الفعال مع الولايات المتحدة الدول والوكالات المتخصصة والإدارات الصحية الحكومية، قد تعتبر الجماعات المهنية والمنظمات الأخرى التي المناسبة؛

Comment:

The machine face difficulties in translating long sentences; it adds a word which does not exist in the source text which is the word (الولايات).it made a mistake in translating the proper noun (United Nation) into المتحدة الدول instead of الأمم المتحدة with other mistakes at the syntactic level which lead to syntactically and grammatically poor translation.

The appropriate translation:

إقامة تعاون فعال مع الأمم المتحدة و الوكالات المتخصصة والإدارات الصحية الحكومية والجماعات المهنية وغير ذلك من المنظمات, حسبما يكون مناسبا, والحفاظ على هذا التعاون.

(4)

Source text:

(d) To furnish appropriate technical assistance and, in emergencies, necessary aid upon the request or acceptance of Governments

Google translate:

(د) تقديم المساعدة الفنية المناسبة، وفي حالات الطوارئ، من الضروري مساعدة بناء على طلب الحكومات أو قبولها؛

Comment:

This sentence is appropriate to some extent, except the deficiency at the syntactic level concerning the structure of the sentence which needs some modifications to meet the Arabic rules, the necessity of the Arabic definite article (ال) al in the word مساعدة which can, if it is added, fulfil better translation to the sentence**.**

The appropriate translation:

تقديم المساعدة الفنية المناسبة, وفي حالات الطوارئ, تقديم العون اللازم بناء على طلب الحكومات أو قبولها.

(5)

Source text:

(e) To provide or assist in providing, upon the request of the United

Nations, health services and facilities to special groups, such as the peoples of trust territories;

Google translate:

(ه)تقديم، أو المساعدة في تقديم، بناء على طلب من الولايات المتحدة الدول، والخدمات الصحية والتسهيلات لمجموعات خاصة، مثل شعوب الأقاليم المشمولة بالوصاية؛

Comment:

Google Translate face difficulty in meeting the needs of translation ,to render the exact meaning of the sentence , it has given only a hint about the meaning in unordered sentence to become looks like it is a mere word-for-word substitution. Again Google Translate adds the word الولايات in translating the word United Nations as if it has copula between the word United and states, it seems that it matches it automatically. Another problem Google faced is the punctuation of the sentence where it put it arbitrary without any rules.

The appropriate translation:

تقديم ,أو المساعدة في تقديم, الخدمات والتسهيلات الصحية بناءا على طلب الأمم المتحدة لجماعات خاصة, كشعوب الأقاليم المشمولة بالوصاية.

(6)

Source text:

(f) To establish and maintain such administrative and technical services as may be required, including epidemiological and statistical services**.**

Google Translate:

(و)لإنشاء وصيانة تلك الخدمات الإدارية والفنية كما قد يكون مطلوبا، بما في ذلك الخدمات الوبائية والإحصائية.

Comment:

This translation can convey the general meaning of the original sentence but it is syntactically poor. Although, it respects the Arabic rules in sense of apposition agreement but it still need a post-edit to achieve acceptable translation.

The appropriate translation:

إنشاء ما قد يلزم من الخدمات الإدارية والفنية, بما في ذلك الخدمات الوبائية والإحصائية, والحفاظ عليها.

(7)

Source text:

(g) to stimulate and advance work to eradicate epidemic, endemic and other diseases.

Google Translate:

(ز)لتحفيز وتعزيز العمل من أجل القضاء على الأمراض الوبائية والمتوطنة والأمراض الأخرى.

Comment:

This translation can be considered as a correct translation at many levels: syntactic, grammatical and lexical. It simply conveyed the desired meaning in a simple and very clear language. It has only to give attention to the aesthetic side that is put in the English version when translating eradicate into القضاء while استئصالis more powerful and more expressive.

The appropriate transaltion:

تشجيع واستحثاث الجهود الرامية إلى استئصال الأمراض الوبائية والمتوطنة وغيرها من الأمراض.

(8)

Source text:

(h) to promote, in co-operation with other specialized agencies where necessary, the prevention of accidental injuries;

Google Translate:

(ح)التشجيع، بالتعاون مع الوكالات المتخصصة الأخرى عند الاقتضاء، الوقاية من إصابات عرضية؛

Comment:

Again Google Translate relies on the literal translation which can serve the meaning but it doesn't give the prospective meaning, it renders the English punctuation into Arabic. The machine translation respects the English form rather than Arabic because Arabic prefers redundancy to explain intended meaning. This sentence is grammatically correct but syntactically poor.

The appropriate translation:

التشجيع,بالتعاون مع الوكالات المتخصصة الأخرى عند الاقتضاء,على اتخاذ الإجراءات المناسبة التي تؤدي إلى الوقاية من الأضرار الناجمة عن الحوادث.

(9)

Source text:

(i) to promote, in co-operation with other specialized agencies where necessary, the improvement of nutrition, housing, sanitation, recreation, economic or working conditions and other aspects of environmental hygiene;

Google Translate:

(ط)التشجيع، بالتعاون مع الوكالات المتخصصة الأخرى عند الاقتضاء، تحسين التغذية، والإسكان، والصرف الصحي، والترفيه، الظروف الاقتصادية أو العمل وغيرها من جوانب البيئية النظافة؛

Comment:

If we compare the translation of Google with the appropriate translation, we can observe that the sentence translated by Google can be considered as a correct translation nevertheless it needs some improvement since the machine in the most of cases respect the source language rules, it neglects the need of adding the preposition" على in the word "على تحسين because that without this preposition, the Arabic sentence can be meaningless.

The appropriate translation:

التشجيع، بالتعاون مع الوكالات المتخصصة الأخرى عند الاقتضاء، على تحسين التغذية والإسكان والإصحاح والترفيه والأحوال الاقتصادية وأحوال العمل و غيرها من نواحي صحة البيئة.

(10)

Source text:

(k) to propose conventions, agreements and regulations, and make recommendations with respect to international health matters and to perform such duties as may be assigned thereby to the Organization and are consistent with its objective;

Google Translate:

(ك) اقتراح الاتفاقيات والاتفاقات واللوائح، وتقديم توصيات فيما يتعلق بالمسائل الصحية الدولية وعلى أداء هذه الواجبات التي قد تعهد بذلك إلى المنظمة وعلى بما يتفق مع هدفه؛

Comment:

Google Translate find a difficulty in recognizing the gender in the word "its objective", it translated it into masculine "هدفه" while the intentional is the feminine "هدفها", except this point the translation was acceptable to a great extent.

The appropriate translation:

اقتراح الاتفاقيات والاتفاقات واللوائح ووضع التوصيات حول الشؤون الصحية الدولية، والقيام بالمهام التي قد تسند بمقتضاها إلى المنظمة وتكون متفقة وهدفها

(11)

Source text:

(*l*) to promote maternal and child health and welfare and to foster the ability to live harmoniously in a changing total environment;

Google Translate:

(ل)لتعزيز الصحة ورعاية الأمومة والطفولة، وتعزيز القدرة للعيش بانسجام في بيئة كلية متغيرة؛

Comment:

The outcome sentence is correct grammatically and syntactically and it convey the meaning of the original sentence however Google Translate finds a difficulty in giving the exact meaning of the preposition "to", it translated it into "ل" while the preposition "على"is more suitable.

The appropriate translation:

النهوض بصحة ورعاية الأم والطفل وتعزيز القدرة على العيش بانسجام في بيئة كلية متغيرة.

(12)

Source text:

(*m)* to foster activities in the field of mental health, especially those affecting the harmony of human relations;

Google Translate:

(م) لتعزيز الأنشطة في مجال الصحة النفسية، وخاصة تلك التي تؤثر على انسجام العلاقات الإنسانية؛

Comment:

This translation is appropriate to a great extent, since it conveyed the meaning of the source text in general in a simple language, correct well structured sentence.

The appropriate translation:

تشجيع الأنشطة في مجال الصحة العقلية.لاسيما ما يتصل منها بانسجام العلاقات الإنسانية,

(13)

Source text:

(*o*) To promote improved standards of teaching and training in the health, medical and related professions;

Google Translate:

(س) لتحسين مستويات التعليم والتدريب في الصحة، المهن الطبية وما يتصل به؛

Comment:

Google Translate applied the rules of English in the conjunction. While English put a comma to list a series of words Arabic use the conjunction "و " in the series ...in the health, medical and related professions. When it translated it into في الصحة, المهن الطبية وما يتصل به while the correct is في المهن الصحية والطبية والمهن المرتبطة بها.

The appropriate translation:

العمل على تحسين مستويات التعليم والتدريب في المهن الصحية والطبية والمهن المرتبطة بها,

(14)

Source text:

(*p*) to study and report on, in co-operation with other specialized agencies where necessary, administrative and social techniques affecting public health and medical care from preventive and curative points of view, including hospital services and social security;

Google Translate:

(ع) لدراسة وتقديم تقرير عن، بالتعاون مع الوكالات المتخصصة الأخرى حيث التقنيات اللازمة والإدارية والاجتماعية التي تؤثر على الجمهور الرعاية الصحية والطبية من النقاط الوقائية والعلاجية للعرض، بما في ذلك خدمات المستشفيات والضمان الاجتماعي .

Comment:

In long sentences Google face a difficulty in matching informations together. It doesn't respect the Arabic word order. It can't distinguish punctuation in Arabic and English, it seems to be a literal translation eg: to study and report on, لدراسة وتقديم تقرير عن.

The appropriate translation:

دراسة التقنيات الإدارية ولاجتماعية المتصلة بالصحة العامة والرعاية الطبية من الناحيتين الوقائية والعلاجية, بما في ذلك خدمات المستشفيات والضمان لاجتماعي وتقديم تقارير عنها, وذلك بالتعاون مع وكالات أخرى عند الاقتضاء.

(15)

Source text:

(*s*) to establish and revise as necessary international nomenclatures of diseases, of causes of death and of public health practices;

Google Translate:

(ق)لإنشاء ومراجعة التسميات الدولية عند الضرورة من الأمراض، من أسباب الوفاة وممارسات الصحة العامة؛

Comment:

Google Translate has given a general view about the meaning of the source sentence but it failed to give the prospective or the appropriate meaning. It produced poor structured sentence that can't be understood.

The appropriate translation:

وضع تسميات دولية للإمراض ولأسباب الوفاة,ولممارسات الصحة العامة, ومراجعة هذه التسميات كلما دعت الضرورة.

(16)

Source text:

(*u*) to develop, establish and promote international standards with respect to food, biological, pharmaceutical and similar products;

Google Translate:

(ش) لتطوير وإنشاء وتشجيع المعايير الدولية فيما يتعلق في الغذاء والبيولوجية والدوائية ومنتجات مماثلة؛

Comment:

The outcome sentence is semantically correct but syntactically and grammatically weak, Google الغذاء و البيولوجية doesn't respect the rules of agreement in Arabic.

The appropriate translation:

وضع معايير دولية للمنتجات الغذائية والحياتية والصيدلية وما شابهها, وتقريرها ونشرها.

(17)

Source text:

Article 4

Members of the United Nations may become Members of the Organization by signing or otherwise accepting this Constitution in accordance with the provisions of Chapter XIX and in accordance with their constitutional processes.

Google Translate:

المادة,4

قد تصبح أعضاء في الأمم المتحدة الأعضاء في المنظمة من خلال التوقيع أو قبول هذا الدستور على خلاف ذلك وفقا للأحكام الفصل التاسع عشر ووفقا الدستورية العمليات.

Comment:

Google failed to provide understandable sentence, all what it has done is to produce set of words grammatically, semantically, morphologically and syntactically poor.

The appropriate translation:

للدول الأعضاء في الأمم المتحدة أن تصبح أعضاء في المنظمة بتوقيع هذا الدستور أو بقبوله بأي طريقة أخرى, وفقا لأحكام الفصل التاسع عشر ووفقا لقواعدها الدستورية,

(18)

Source text:

Article 6

Subject to the conditions of any agreement between the United Nations and the Organization, approved pursuant to Chapter XVI, States which do not become Members in accordance with Articles 4 and 5 may apply to become Members and shall be admitted as Members when their application has been approved by a simple majority vote of the Health Assembly.

Google Translate:

المادة6

تخضع لشروط أي اتفاق بين الأمم المتحدة والمنظمة، وافق وفقا للفصل السادس عشر، والدول التي لا لم تصبح الأعضاء وفقا للمادتين 4 و 5 قد تنطبق على تصبح الأعضاء ويجب قبولها بصفة الأعضاء عند تطبيقها وقد وافق بتصويت أغلبية بسيطة من جمعية الصحة.

Comment:

Totally unstructured meaningless sentence, set of words that doesn't provide any meaning.

The appropriate translation:

المادة 6

مع عدم الإخلال بشرط أي اتفاق بين الأمم المتحدة والمنظمة, يتم إقراره طبقا للفصل السادس عشر, يجوز للدول التي لا تصبح أعضاء وفقا للمادة 4 و5 أن تطلب العضوية, ويقبل طلبها متى وافقت علبه جمعية الصحة بالأغلبية البسيطة.

(19)

Source text:

Article 7

If a Member fails to meet its financial obligations to the Organization or in other exceptional circumstances, the Health Assembly may, on such conditions as it thinks proper, suspend the voting privileges and services to which a Member is entitled. The Health Assembly shall have the authority to restore such voting privileges and services.

Google Translate:

المادة7

إذا فشل الأعضاء على الوفاء بالتزاماتها المالية للمنظمة أو في ظروف استثنائية أخرى، يجوز للجمعية الصحة، في مثل هذه الظروف استعادة هذه الامتيازات والخدمات التصويت التي تراها مناسبة، وقف امتيازات التصويت والخدمات ل التي يحق للعضو .يكون للجمعية الصحة سلطة

Comment:

Google produced understandable sentence but grammatically and syntactically weak; the translator ignored the rules of agreement in Arabic and mistakenly render the preposition إذا فشل الأعضاء على الوفاء بالتزاماتها shall be إذا فشل الأعضاء في الوفاء بالتزاماتهم

The appropriate translation:

في حالة عدم وفاء إحدى الدول الأعضاء بما عليها من التزامات مالية للمنظمة, أو في غير ذلك من الظروف الاستثنائية , يجوز لجمعية الصحة, بالشروط التي تراها مناسبة, وقف امتيازات التصويت , والخدمات التي يحق للدولة العضو أن تتمتع بها. ولجمعية الصحة سلطة إعادة امتيازات التصويت والخدمات هذه.

(20)

Source text:

Article 8

Territories or groups of territories which are not responsible for the conduct of their international relations may be admitted as Associate Members by the Health Assembly upon application made on behalf of such territory or group of territories by the Member or other authority having responsibility for their international relations. Representatives of Associate Members to the

Health Assembly should be qualified by their technical competence in the field of health and should be chosen from the native population. The nature and extent of the rights and obligations of Associate Members shall be determined by the Health Assembly.

Google Translate:

المادة8

الأقاليم أو مجموعات من الأراضي التي ليست مسؤولة عن سلوك علاقاتها الدولية قد قبولها بصفة الأعضاء المنتسبة من قبل جمعية الصحة بناء على طلب تقدم به نيابة عن مثل هذه الأراضي أو مجموعة من الأراضي من قبل الأعضاء أو السلطة الأخرى المسؤولة لعلاقاتها الدولية .ممثلي الأعضاء المنتسبة إلى جمعية الصحة يجب أن يكون مؤهلا من قبل الكفاءة التقنية في مجال الصحة، وينبغي أن يتم اختياره من السكان الأصليين .الطبيعة ومدى حقوق والتزامات الأعضاء المنتسبة يلي تحددها جمعية الصحة.

Comment:

Again Google failed in translating a long compound sentence, it gives a literal translation that doesn't serve the general meaning of the sentence, it made mistakes at all levels; grammatical, semantic, syntactic, and morphology.

The appropriate translation:

يجوز لجمعية الصحة أن تقبل الأقطار أو مجموعات الأقطار غير المسؤولة عن مباشرة علاقاتها الدولية أعضاء منتسبة, بناء على طلب يقدم نيابة عن القطر أو مجموعة الأقطار من الدولة العضو أو السلطة الأخرى المسؤولة عن العلاقات الدولية للقطر أو لمجموعة الأقطار. وينبغي أن يكون ممثلو الأعضاء المنتسبة لدى جمعية الصحة مؤهلين بكفاءتهم الفنية في ميدان الصحة, وأن يكون اختيارهم من بين السكان الأصليين. وتحدد جمعية الصحة طبيعة ومدى حقوق والتزامات الأعضاء المنتسبة.

Analysis:

After the analysis of Google Translate production we find that in the most of cases the translation was literal, which mean that all what the machine does is a mere word-for-word substitution. Google faced a difficulty in translating long sentences, where it produced meaningless and unordered sentences. The most of mistakes Google made were in the translation of prepositions, proper nouns, the placement of punctuation, and word order (it doesn't respect the agreement between subject and verb and between adjectives and their qualifier).

Arabic is simply too complicated for machines to understand all of the vocabulary, grammar, context and nuances as a source or target language.
The biggest flaw of machine translation is obviously the inability to use context of the text to be translated. Google Translate, at its best, automates the easier part of a translator's task, which is a word-for-word translation. Thus, it totally ignores the beyond meaning, as well as the grammatical, structural and lexical exigencies. Users of Google Translate –or any other translation program- should be aware of the mentioned limitations when they judge the translation. There are various means to improve the output quality of machine translation.
One of these is the back translation, also called as round-trip translation. It is a translation of a translated text back into the language of the original text without reference to the original text. Translators use this kind of operations to compare the back translation with the original text to check the accuracy and the correctness of the original translation.
The above results elucidate that we can use the translation of Google as assistance but we cannot trust it hundred percent to produce a full appropriate translation.

Conclusion

In this chapter I have tried to prove that even if Google Translate can convey the general meaning from English into Arabic, it cannot give the appropriate translation. Along the three previous chapters I have tried to give the evidence that MT systems cannot replace the humans in the task of translation.

General Conclusion

People think differently of machine translation (MT), some of them express fear from the project, others doubt its validity, while others are optimist about the project.

Those who express fear think that the machine will menace the human translators work, and in the long run translation as a human creative craft will decrease or come to an end. However, this is not a new attitude. The fear of the machine has risen since the Industrial Revolution. It comes to a peak each time the machine handles a new task which was previously managed completely by humans.

Regarding those who doubt the validity of machine translation and question the ability of the computer to undertake this task, the only answer that can be given to them is the many operational programs available in the market today. Desktop programs as well as Internet applications provide online translation from and into a large number of world languages. It is true that the MT output is rigorous and includes many mistakes, which are in the most of cases context ignorance, the choice of wrong word, the structural/grammatical errors and the mechanical way of translation. MT in general does not match up to the quality and accuracy of human translation, and this is why it is not yet put to a reliable use. However, the quality of MT output can be improved by many ways: improving system rules and formalisms, controlling the input language to make it clean from flowery and ambiguous words, and post-editing the translation to ensure the accuracy and readability of the output text. This means that the human intervention leads to better and more appropriate translation.

Some people overestimate the prospect of MT and believe that at some point in the future computers will be able to translate from one language into another as easily as they make mathematical operations. However, this idea is mistaken altogether. There is a big difference between mathematics and language. Language is a psychological and sociological phenomenon that has puzzled philosophers, philologists, linguists as well as computer engineers throughout ages. Let me mention only two of the problems faced by MT: firstly a word usually denotes more than one meaning, and there is no clear mapping between words and the intended meaning of the speaker. Secondly, translation requires understanding of the input text, and understanding requires making inductions and inferences and knowledge of the real word, which is to a great extent beyond the ability of the computer. If you can expect a robot to walk, you cannot expect it

to race an Olympics athlete. Similarly, you cannot expect the computer to translate all types of text or compete with the quality of human translation.

In conclusion, despite the fact that automatic translation has brought some innovative changes by improving the quality of output and decreasing all the uncertainty lying in multiple language translation, a simple machine cannot replace a human brain that figures out the sentiment of the language in a given context.

Abstract

I have tackled along these three chapters an actively researched issue which Is the assessment of Machine Translation production and demonstrated its successful and its failure. Based on the constructive theory, this research has been indirectly examining the difference between Human translation and machine translation, which undoubtedly, can never rival professional translators. This research was an attempt to cover most of the points machine deal within translating a given text, structural, grammar, contextual, and even cultural.

The first chapter is to identify translation in general then machine translation in particular, its emergence throughout the timeline , its architecture and types. The second chapter, was to tackle Arabic language in the field of machine translation, the different sentence structures, word order of Arabic language, moreover to give an idea about the machine translation system "Google Translate" and about the machine translation processes. The third practical chapter is to examine the "Google translate" in translating some articles from the WHO chart and to comment on in comparison with its Arabic translated version

In the last part, retailed analysis obtained the results. Hence, indentifying how can the sentence types and structures affect the machine translation, Therefore how can the translator intervene to amend and improve the machine translation product.

ملخـــــــــــص

لقد تناولت خلال الفصول الثلاثة هذه, قضية تقييم الترجمة الآلية وتقدير مدى نجاحها أو فشلها .على أساس نظريات بناءة، تم هذا البحث بواسطة دراسة غير مباشرة للفرق بين الترجمة البشرية والترجمة الآلية هاته الأخيرة التي لا يمكن, دون أدنى شك, مقارنتها بترجمة الإنسان المحترف, كان هذا البحث محاولة لدراسة معظم النقاط التي تسعى الآلة لتغطيتها ضمن ترجمة نص ما، من الناحية النحوية الصرفية والدلالية ومن ناحية السياق إضافة إلى الناحية الثقافية بمحور الفصل الأول حول تحديد الترجمة بشكل عام ثم الترجمة الآلية على وجه الخصوص، *ظهورها تاريخيا ، وتركيبتها وأنواعها إضافة إلى مراحلها*

لفصل الثاني،خصص لدراسة اللغة العربية في مجال الترجمة الآلية، تراكيبها المختلفة، وترتيب الكلمات فيها، إضافة إلى إعطاء فكرة عن نظام الترجمة الآلية "ترجمة جوجل "

الفصل الثالث خصص للدراسة التطبيقية حيث تم استعمال "ترجمة جوجل "لترجمة بعض المواد من ميثاق منظمة الصحة العالمية والتعليق عليه بالمقارنة مع النسخة العربية المترجمة له.

في الجزء الأخير، تم تحليل النتائج المحصل عليها وكشف كيف يمكن لتركيبة الجملة وبنيتها التأثير على سلامة الترجمة, وكيف يمكن للإنسان التدخل للرفع من مستوى أداء الترجمة الآلية.

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ملخـــــــــــــــــص المذكـــــــــــرة

مقدمـــــــــــــــــة:

شهدت الترجمة تطورات ملحوظة عبر التاريخ وذلك تبعا للتطورات الحاصلة في عدة ميادين كالاقتصاد والسياسة والتعليم والطب والإعلام . هذه التطورات أدت إلى البحث عن مختلف أنواع المعلومات في كافة المجالات, حيث أدرك العلماء أن البحث بين مختلف لغات العالم لا يمكن أن يتم إلا عن طريق الترجمة.

هناك فكرة سائدة بأن الترجمة ما هي إلا عملية نقل حرفية بين أي لغتين في العالم, أي أنها عملية ميكانيكية بحتة, غير أن المترجم يجب أن يأخذ في الحسبان الضوابط النحوية واللغوية وأسلوب الكتابة والسياق وغيرها من أجل إنتاج ترجمة صحيحة.

خلال السنوات الماضية, تم تركيز البحوث حول الترجمة الآلية لعدة أسباب لعل من أهمها ظهور التواصل الإلكتروني بين بلدان العالم مما يحتم استحداث وسائل وبرامج تسهل عملية التخاطب بين اللغات المختلفة.

غير أن التجارب الأولى للترجمة الآلية لم تكن مقنعة حيث تم اعتماد معاجم إلكترونية تحتوي على كلمات من اللغة المصدر ومقابلاتها في اللغة الهدف, إلا أن النتائج لم ترق إلى المستوى المطلوب. أدى ذلك إلى ركود البحوث في الترجمة الآلية, لكن النظرة العصرية للسانيات ولهندسة البرامج أعطت نفسا جديدا للترجمة الآلية,

ليس من السهل أبدا ترجمة اللغات الإنسانية آليا, بما أن اللغة الإنسانية تعتبر نظاما معقدا يصعب على الآلة التعامل معه. حيث وبرغم التقدم المهم في مجال الترجمة الآلية إلا أنه لا يمكن الاعتماد عليها بشكل تام لإنتاج ترجمة صحيحة كليا.

تم إنجاز هذا البحث لمحاولة الإجابة على التساؤلات التالية:

1. ما هو مفهوم الترجمة الآلية؟
2. ما هي آليات وأنواع الترجمة الآلية؟
3. متى تفشل الآلة في ترجمة المعنى؟
4. هل بإمكان الآلة أن تعوض الإنسان في ترجمة ميثاق منظمة الصحة العالمية؟

هذا البحث هو محاولة لدراسة مصداقية الترجمة الآلية من خلال نموذج "جوجل المترجم" وقدرته على ترجمة بعض مواد دستور منظمة الصحة العالمية إلى اللغة العربية.

مفهوم الترجمة الآلية:

المقصود من الترجمة الآلية هو استخدام الحاسوب للترجمة من لغة إنسانية إلى أخرى بشكل كلي أو بمساعدة بسيطة من الإنسان. وهي محاولة جعل الحاسوب قادرا على نقل محتوى نص ما عن طريق إجراءات معينة .

للقيام بأي ترجمة بشرية كانت أو آلية يجب نقل فحوى النص كاملا من اللغة المصدر إلى اللغة الهدف, غير أنها ليست بالعملية السهلة بما أنها ليست مجرد عملية نقل حرفي للنص المصدر. يجب على المترجم أن يفسر ويحلل عناصر النص المصدر من الناحية النحوية والبنيوية والمعنوية ويحاول تطبيقها بلغة النص الهدف.

كل ما تقوم به الآلة في الغالب هو عملية مبادلة الكلمات من لغة إلى أخرى, غير أن هذا لوحده غير كاف لترجمة نص ما ترجمة صحيحة لأنه يجب ترجمة عبارات, وليس مجرد كلمات, إلى مقابلاتها في النص الهدف.

يمكن لتدخل الإنسان أن يحسن من ترجمة الآلة إذا قام بتسهيل بعض العبارات أو تبيينها للآلة كتمييز الأسماء مثلا عن الأفعال وبين الكلمات العادية وأسماء العلم.

مظاهر الترجمة الآلية:

1.المظهر اللساني:

الترجمة المباشرة (direct approach): وهي عملية الترجمة المباشرة من اللغة المصدر إلى اللغة الهدف, حيث يتم تحليل كلمات اللغة المصدر وتبيين الكلمات الغامضة من أجل نقلها بدقة إلى اللغة الهدف. يتكون هذا النظام من معجم ثنائي واسع وبرنامج للتحليل الدلالي والبنيوي وتحويل النصوص.

الترجمة المبنية على النقل (transfer-based approach): وتتم فيها الترجمة على ثلاث مراحل: تحويل كلمات اللغة المصدر إلى وحدات لغوية كالاسم والفعل والصفة ثم ترجمتها إلى مقابلاتها في اللغة الهدف وبعد ذلك صياغة النص بشكل نهائي إلى اللغة الهدف.

مقاربة اللغة الاصطناعية (interlingua approach): وتستعمل غالبا في الأنظمة متعددة اللغات وتتم على مرحلتين ترجمة اللغة المصدر إلى لغة وسيطة ثم الترجمة من اللغة الوسيطة إلى اللغة الهدف.

2. المظهر الإلكتروني:

الترجمة المبنية على القواعد(rule-based approach): وتعتمد في الترجمة على المستويات اللسانية المختلفة: البنيوية والنحوية والصرفية...الخ, حيث يتم تحليل النص بنيويا ونحويا وصرفيا ثم محاولة صياغته إلى اللغة الهدف.

الترجمة المبنية على المدونة (corpus-based approach): وضع هذا النظام لتقويم النقائص الموجودة في الترجمة المبنية على القواعد ويعتمد على أسلوبين الترجمة الآلية الإحصائية statistical-machine translation والترجمة الآلية المبنية على الأمثلة example-based machine translation. نظام الترجمة الذي سأعتمده في بحثي هو نظام "جوجل المترجم" وهو يعتمد على الترجمة الآلية الإحصائية.

الترجمة الهجينة (hybrid approach): وتعتمد على دمج الترجمة بالنقل transfer-based approach مع إحدى أنواع الترجمة المبنية على المدونة corpus-based approach.

خطوات الترجمة الآلية:

تتم الترجمة الآلية على غرار الترجمة البشرية عبر ثلاث خطوات هي: التحليل ثم النقل فالتوليد حيث تبدأ عملية الترجمة بإدخال النص المراد ترجمته إلى الحاسوب.

المرحلة الأولى: التحليل ويشمل الخطوات التالية:

تبدأ عملية الترجمة بما يسمى التحرير المسبق حيث يقوم الإنسان بمراجعة مبدئية للنص المراد ترجمته وتعديله بما يسهل على الآلة فهمه ثم يشرع الحاسوب في التحليل الصرفي للنص بأن يتعرف على أجزاء الكلمات ومكوناتها ثم يبحث الحاسوب في المعجم عن هذه الكلمات, ليقوم بعدها بالتحليل النحوي للنص لاستخراج الفعل والفاعل ...الخ

***المرحلة الثانية*:** النقل و يتم على مستويين اثنين هما:

المستوى المعجمي :يقوم الحاسوب بنقل الكلمات من اللّغة المصدر إلى اللّغة الهدف، مستعينا في ذلك بالمعاجم الثنائية اللّغة المتاحة له.

المستوى التركيبي :و هنا يقوم الحاسوب بوضع المقابلات النحوية في اللّغة الهدف,مثل الفاعل و المفعول به...إلخ.

المرحلة الثالثة: التوليد أي التركيب و التوليف (تكوين الجمل في اللّغة الهدف) و يتم هو الآخر على مستويين اثنين هما:

المستوى النحوي: تطبيق قواعد النحو في اللّغة الهدف (كترتيب الكلمات) حسب مميزات و مقتضيات اللّغة المترجم إليها، كوضع الفعل في مقدمة الجملة العربية...إلخ.

المستوى الصرفي: تطبيق القواعد النحوية و الصرفية في اللّغة الهدف، كالعدد و الجنس و الزمن...إلخ.

اللغة العربية في الترجمة الآلية:

تعتبر اللغة العربية من بين أكثر اللغات التي استرعت اهتمام الباحثين في مجال الترجمة الآلية منذ بداياتها الأولى وذلك بسبب اهتمام الولايات المتحدة بما يحدث في البلدان الأخرى بعد نهاية الحرب العالمية الثانية.

تختلف اللغة العربية في مكوناتها اختلافا تاما عن معظم لغات العالم من الناحية البنيوية والنحوية والصرفية مما يشكل صعوبة بالغة في الترجمة منها واليها بشريا فما بالك بترجمتها أليا. تكمن صعوبة الترجمة من وإلى العربية في كون جملها طويلة جدا حيث يكون طول الجملة من عشرين إلى ثلاثين كلمة وقد تصل أحيانا إلى مائة كلمة. قد تواجه الآلة مشكلة مع ترتيب الكلمات كون اللغة العربية تقبل أكثر من ترتيب, تبدأ كتابة اللغة العربية من اليمين إلى اليسار عكس معظم لغات العالم مع حروف أبجدية تختلف في شكلها عن بقية لغات العالم.

تركيب الجمل في اللغة العربية:

يعتبر النحو العربي من بين الأكثر غموضا وتعقيدا بين لغات العالم, حيث أنه يقبل ترتيبا مختلفا للكلمات في نفس الجملة من دون المساس بمعناها. الترتيب الأكثر استعمالا في اللغة العربية هو فعل وفاعل ومفعول به في الجملة الفعلية, ومبتدأ وخبر في الجملة الاسمية غير أنه يمكن تغيير هذا الترتيب إلى أي ترتيب أخر مع مراعاة الحركة على الحرف الأخير.

هذا التنوع في القواعد النحوية هو ما يطرح الإشكال بالنسبة للترجمة الآلية حيث قد يسبب تغيير الترتيب التباسا للآلة في تمييز الفعل من الفاعل والمبتدأ من الخبر ...الخ.

مما قد يسبب التباسا أيضا للآلة هو وجود الضمائر المتصلة والمستترة وما إلى ذلك مثل: فعلتُ I did و فعلت she did وإمكانية اختيار الأصلح منها على حسب السياق .

جوجل المترجم Google Translate:

يعتبر جوجل من أكثر أنظمة الترجمة استعمالا, بما أنه مجاني ويترجم بين حوالي 50 لغة في العالم حيث أنه بإمكان المستعمل بمجرد اختيار اللغة المصدر و اللغة الهدف وإدراج النص المراد ترجمته أن يشاهد الترجمة. بإمكان جوجل أن يترجم إلى حد بعيد إذا كان النص قصيرا وخاليا من الغموض, غير أنه لا يخلو من نقائص على غرار جل نظم الترجمة الآلية و خصوصا في الترجمة من وإلى العربية.

تقييم ترجمة جوجل:

بعد تحليل نتائج ترجمة جوجل لبعض مواد ميثاق منظمة الصحة العالمية يتبين أن معظم التراجم كانت حرفية, حيث واجه جوجل عدة مشاكل وبخاصة في ترجمة الجمل الطويلة فكل ما قام به هو عملية إبدال الكلمات بمكافئاتها وأظهر جملا خالية من المعنى أحيانا .

أغلب الأخطاء المرتكبة كانت من الناحية البنيوية كما وجدت أخطاء في ترجمة حروف الجر وأسماء العلم وأخطاء في علامات الوقف وفي التوافق بين الصفة والموصوف.

يمكن التأكد من صحة ترجمة جوجل باستعمال الترجمة الراجعة back translation للنص المترجم

خاتـــــــــــــــــمة

يختلف الناس في رأيهم حول الترجمة الآلية , حيث يعبر بعضهم عن الخوف من التجربة فيما يشكك البعض في مصداقيتها في حين يبدي آخرون تفاؤلا بشأنها.

أولئك الذين يعبرون عن الخوف يعتقدون أن الجهاز سوف يهدد عمل المترجم الإنسان ويهدد الترجمة كحرفة إبداعية حيث أن عمل الإنسان في الترجمة سيقل تدريجيا إلى أن يختفي تماما , ومع ذلك هذا ليس موقفا جديدا,حيث ارتفع الخوف من الآلة منذ الثورة الصناعية. وبلغ الأمر ذروته في كل مرة ينجح النظام في معالجة مهمة جديدة كانت سابقا تدار من قبل البشر كلية.
في حين أن هناك فئة لا تؤمن تماما بقدرة الآلة على الترجمة وتعتبرها شأنا بشريا خالصا, وقد بكون أحسن رد على هؤلاء هو أنظمة الترجمة العديدة المتوفرة في الأسواق ومنها برامج الحاسوب فضلا عن توفير تطبيقات الإنترنت, حيث تم توفير برامج الترجمة على الانترنت من وإلى عدد كبير من لغات العالم.

من الواضح جدا أن إنتاج الترجمة الآلية غير دقيق ويواجه العديد من المشاكل خاصة في ما يتعلق بالسياق وتراكيب الجمل وترتيبها وفي الاختيار الخاطئ للكلمات ومرادفاتها وهو ما يدحض فكرة إمكانية الاستغناء عن الإنسان لصالح الآلة. غير أنه يمكن تحسين أداء الترجمة بواسطة عدة طرق لعل من أهمها تعديل النص الأصلي وتوضيح الغامض فيه كأسماء الأعلام وغيرها كما يمكن إجراء تعديلات بعد الانتهاء من عملية الترجمة.

البعض الآخر من المتفائلين يبالغون في توقعاتهم بالنسبة للترجمة الآلية ويعتقدون أنه سيأتي وقت ما في المستقبل يكون فيه بإمكان الآلة الترجمة من لغة إلى أخرى بالسهولة و بالدقة التي تنجز بها العمليات الرياضية. إلا أنه لا يمكن التصديق بهذا الاعتقاد بما أنه ليس هناك مجال للمقارنة بين العمليات الرياضية واللغات البشرية.