Machine Translation: Deficiency in Translating English Sentences with Different Temporal References into Arabic

Mohammad Al-khawalda¹, Ahmed Al-Oliemat²
1. Department of English Language and Literature, Mu’tah University, Jordan, P.O. BOX 7, e-mail: mkhawalda@yahoo.com
2. Department of Modern Languages, Alalbayt university, Jordan, e-mail: a_oliemat@hotmail.com

Abstract
The study investigates the accuracy of machine translation from English sentences with different temporal references into Arabic. Google translator (GT) was used in this experiment. 12 English sentences with different temporal references divided into 3 sectors, present, past and future sector, were given to GT to and translated into Arabic. The output was again given to Google were to retranslate them back into English (round-trip translation). Furthermore, Arabic equivalent sentences for the English 12 sentences were given to GT to check their English translation. Results suggest that instead of facilitating English language in general and temporal references in particular, GT is a source of confusion for nonnative English speakers. It turns out also that GT is inaccurate in its translation of English sentences with different temporal references into Arabic.

Keywords: translation, Machine Translation, Arabic, temporal reference, tense

1.1 Introduction
"Translation" generally refers to transfer data from a source language (ST) into a target language (TL). Equivalency is the main aim of translation. That is, the value of translation can be measured according to the degree of equivalency between the input language and the output. Translation appears to be of great potential interest to linguists. It is the primary means of transferring ideas, thought, etc. cross-culturally. It narrows the gap between languages, cultures, people, etc. Recently, globalization has affected the lives of people all over the world and brought nations, languages, and cultures together. Accordingly, developing intercultural communication has become a matter of great importance. Many people, while sitting in their homes, spend an enormous amount of their time communicating with people of different languages and cultures around the world using different sites such as Skype, Yahoo Messenger, etc.

The importance of translation comes from the importance of languages in human life. Mattsuura’s (2008), Director-General of UNISCO, states that “Languages are indeed essential to the identity of groups and individuals and to their peaceful coexistence. They constitute a strategic factor of progress towards sustainable development and a harmony between the global and the local context (Mattsuura, 2008: 11). Since the past few decades, machine translation (MT) has been the focus of much interest because of globalization, the rising of international trade, the expansion of mass media and technology, the increase of migration, the recognition of linguistic minorities, etc.

Informational technology, educational explosion and the wide spread of net and smart phones are among those advances that made MT one of the necessary issues in modern life. Moreover, the rapid rise of social networks such as Facebook, Yahoo Messenger, Skype, Google Talk, MSN Messenger, etc. which put people speaking different languages in communication with each other, increase the necessity for MT. Although MT has its root in the past, its importance has raised since the middle of the twentieth century. According to Wikipedia (2013) “The field of machine translation” appeared in Warren Weaver’s Memorandum on Translation (1949). The first researcher in the field, Yehoshua Bar-Hillel, began his research at MIT in (1951); In the same year a Georgetown MT research team followed with a public demonstration of its system in 1954. MT research programs emerged in Japan and Russia in (1955), and the first MT conference was held in London (1956). Since then, lots of work has been done either to improve or to evaluate MT. Many MT companies have been launched, i.e. ‘Trados’ which was the first which developed translation memory technology in 1998. ‘SYSTRAN’ offering a web free translation of small texts in 1996. ‘Alta Vista Babelfish’ a famous translation site launched in 1997. Google launched its MT translation and was considered the best in a competition in 2003. Actually, Google translation is the most famous among non-native speakers of English (personal observation as university Professors.).

There are various ways to evaluate the quality of the output of MT, one of which is human judgment. Another typical way to evaluate the accuracy or quality of MT is to translate from a source language to a target language and back to the source language with the same engine which is called round-trip translation (RTT) (Samor, 2005) in which a given text or sentence is translated into a foreign language by the MT system (the ‘forward translation’ (FT)), then translated back into the original language by the same system (the ‘back translation’, BT). Although round-trip translation is considered to be a poor predictor of quality (see Anoun, 2005), it shows the accuracy of MT. Since RTT means back translation of what was translated, it is assumed that it would be a
1.2 Methodology
This experiment consists of two inter-related processes. First, 12 English sentences were used in this experiment. They cover most, temporal references (see Comrei, 1985; Al-Khawalda, 1997). They were divided into three sectors:

- Firstly, present sector which includes simple present, present progressive, present perfect and present perfect progressive;
- Secondly, past sector includes simple past, past progressive, past perfect and past perfect progressive;
- Thirdly, future sector includes simple future, future progressive, future perfect and future perfect progressive.

These sentences were used as an input to Google translator to translate them into Arabic (forward translation). The output sentences (Arabic sentences) were the input to the same system to translate them back into English (back translation or round-trip translation).

Second, 12 Arabic sentences which are equivalent to the English sentences were used an input to the same translator (GT) to translate them into English.

1.3. Data and Discussion
1.3.1. Present sector
Table (1-a): This table shows Google translation of four sentences related to present sector. In column (A) the English sentences which were used as input for the translator, in (B), the Arabic translation and in (C) back translation of the Arabic sentences in (B).

<table>
<thead>
<tr>
<th>A- The given English sentences</th>
<th>B- Google translation of sentences in A</th>
<th>C- Google translation of sentences in B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-The student writes his homework.</td>
<td>udent writes his homework</td>
<td>The student writes his homework</td>
</tr>
<tr>
<td>2-The student is writing his homework.</td>
<td>The student writes his duty.</td>
<td></td>
</tr>
<tr>
<td>3-The student has written his homework.</td>
<td>The student writes his homework</td>
<td></td>
</tr>
<tr>
<td>4-The student has been writing his homework.</td>
<td>The student writing his homework</td>
<td></td>
</tr>
</tbody>
</table>

Table (1-b): this table shows Google’s translation for the Arabic sentences which are equivalent to the English sentences in A (Table, 1-a) above.

<table>
<thead>
<tr>
<th>D- The equivalent Arabic sentences to those in A</th>
<th>E- Google translation of Arabic sentences</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-كتبت الطالب واجبه الآن</td>
<td></td>
</tr>
<tr>
<td>6-كتبت الطالب واجبه الآن</td>
<td></td>
</tr>
<tr>
<td>7-كتبت الطالب واجبه الآن</td>
<td></td>
</tr>
<tr>
<td>8-كتبت الطالب واجبه الآن</td>
<td></td>
</tr>
<tr>
<td>9-كتبت الطالب واجبه الآن</td>
<td></td>
</tr>
</tbody>
</table>

As noted from the above table (1a), except the first sentence, the translation of the simple present, all others are ungrammatical. Simple present was translated into a grammatical Arabic sentence and then ‘perfectly’ back into English. The English present progressive (A2) was translated into Arabic simple present (B2) then back into English simple present (C2). The present perfect (A3) was translated into Arabic simple past (B3) and then back into English simple presents (C3). Present perfect progressive (A4) was translated literally into meaningless Arabic sentence (B4) and then ungrammatical sentence when translated back into English (C4). We have to admit that the difference between simple present and present progressive in Arabic is not expressed by the verb form, but rather by the usage of present adverb, i.e ‘الآن’ (now) (see Aziz, Y, 1989). For instance, if we say ‘yaktubu alTalbu wajebahu’, it can be translated into English as (the student write/is writing his homework). However, to restrict it to present progressive, we say ‘yaktubu alTalbu wajebahu al‘الآن’. Also the difference between present perfect and simple past is expressed by the present adverb rather than by the verb form (see Al-Khawalda, 1997, 2001). Since the outward journey is incorrect, it is expected that the return trip would be incorrect as well.

In the second step, Google translator was given the Arabic equivalent sentences to the English ones in (A-table-1a). None of the English translations is correct. That is, they were translated into meaningless English sentences.
It seems that Google translator translates the sentences word by word, thus it violates the norms of word order in English. Out of 12 processes carried out by Google translator in present sector, only two were correct. To be more specific the accuracy of Google translator in translating sentences from English into Arabic and visa versa was around 16.6%.

1.3.2. Past sector

Table (2a): this table handles the tenses of the past sector. In (A) the target English sentences. In (B), the Arabic translation of the English sentences in (A). Then in (C), the Arabic sentences were retranslated into English.

<table>
<thead>
<tr>
<th>A- The given English sentences</th>
<th>B- Google translation of sentences in A</th>
<th>C- Google translation of sentences in B</th>
</tr>
</thead>
<tbody>
<tr>
<td>9- The student wrote his homework</td>
<td>كتب الطالب واجبه</td>
<td>Student writes his homework</td>
</tr>
<tr>
<td>10- The student was writing his homework</td>
<td>كتب الطالب كتابة واجبه</td>
<td>The student writes his duty</td>
</tr>
<tr>
<td>11- The student had written his homework</td>
<td>كان الطالب كتب واجبه</td>
<td>And a student writing his homework</td>
</tr>
<tr>
<td>12- The student had been writing his homework</td>
<td>وكان الطالب قد كتب واجبه</td>
<td>The student may write his duty</td>
</tr>
</tbody>
</table>

Table (2-b): This table shows Google translation of the correct Arabic sentences which are equivalent to the original English sentences in (A) table (2a) above.

<table>
<thead>
<tr>
<th>D-The Arabic sentences which are equivalent to the English sentences in the past sector (in A-table 2a)</th>
<th>E- The Google translation of the Arabic sentences</th>
</tr>
</thead>
<tbody>
<tr>
<td>13- كتب الطالب واجبه</td>
<td>Student writes his duty</td>
</tr>
<tr>
<td>14- كان الطالب كتب واجبه</td>
<td>The student writes his duty</td>
</tr>
<tr>
<td>15- كان الطالب كتب واجبه</td>
<td>The student wrote his duty</td>
</tr>
<tr>
<td>16- كان الطالب مازال كتب واجبه</td>
<td>The student still writes his duty</td>
</tr>
</tbody>
</table>

The past sector includes four types of sentences, simple past, past progressive, past perfect and past perfect progressive. The first two sentences (8 & 9) were translated idiomatically into meaningful Arabic sentences but then translated back erroneously into simple present. However, GT failed to translate the past perfect and past perfect progressive (11-12) into correct Arabic sentences. Again, in RTT, from Arabic back into English, GT failed to translate both, it translated 11 (past perfect) into ungrammatical sentence and 12 (past perfect progressive) into simple present with ‘May’. Thus, the RTT was incorrect.

In the second step, in which the translator was given Arabic sentences equivalent to the original English sentences, GT failed to translate any of them correctly. The English simple present is used in all cases except in the case of past perfect where simple past is used.

The situation in the past sector was not better than the one in the present sector. Out of 12 processes, only two processes were correct (16.6%).

1.3.3. Future sector

Table (3a): tenses of the future sector: in (A) the target English sentences, in (B) the Arabic translation of the English sentences in (A). Then in (C), the Arabic sentences were retranslated into English.

<table>
<thead>
<tr>
<th>A- The given English sentences</th>
<th>B- Google translation of sentences in A Into Arabic</th>
<th>C- Google translation of sentences in B Back into English</th>
</tr>
</thead>
<tbody>
<tr>
<td>17- The student will write his homework</td>
<td>سيقوم الطالب كتابة واجبه النهائي</td>
<td>The student will write his homework</td>
</tr>
<tr>
<td>18- The student will be writing his homework</td>
<td>يكون الطالب كتابة واجبه النهائي</td>
<td>The student write his homework</td>
</tr>
<tr>
<td>19- The student will have written his homework</td>
<td>ولهد كتب الطالب كتابة واجبه النهائي</td>
<td>The student writes his homework</td>
</tr>
<tr>
<td>20- The student will have been writing his homework</td>
<td>وسيكون تم الطالب كتابة واجبه النهائي</td>
<td>The student will have been writing his homework</td>
</tr>
</tbody>
</table>
Table (3b): Google translation of the grammatical Arabic sentences which are equivalent to the original English sentences in (A) table (3a) above.

<table>
<thead>
<tr>
<th>D-The Arabic sentences which are equivalent to the English sentences in the future sector</th>
<th>E-The Google translation of the Arabic sentences</th>
</tr>
</thead>
<tbody>
<tr>
<td>سيكون الطالب واجبه واجيبه 21</td>
<td>Student will write his duty</td>
</tr>
<tr>
<td>سيكون الطالب يكتب واجبه 22</td>
<td>Student will be written and duty</td>
</tr>
<tr>
<td>سيكون كتاب واجبه 23</td>
<td>Books will be his duty</td>
</tr>
<tr>
<td>سيكون الطالب مازال يكتب واجيبه 24</td>
<td>Student will still write his duty</td>
</tr>
</tbody>
</table>

When translating sentences with future sector, GT failed to translate any of the four sentences correctly. All sentences were translated into meaningless Arabic sentences except sentence number 19, although incorrect, it makes sense. It is so strange that in all cases the nominal verb (equivalent to the English gerund) is used in translating the future expression. In its back translation, the output of sentence 17 (simple future) and 20 (future perfect progressive) was similar to the input. That is, in its forward translation, these two sentences were translated literally into meaningless Arabic sentences and then perfectly back into English. Whereas, the Arabic translation of the future progressive (18) and future perfect (19) were retranslated into simple present although the bare infinitive form of the verb is used in (19). Then, the Arabic sentences which are equivalent to the input English sentences were given to GT to translate them into English. Except the sentence in 21 (simple future) which was translated idiomatically into English, all other sentences were incorrectly translated. Moreover, the results were ungrammatical English sentences. Three processes out of 12 processes were correct.

1.4. Discussion

A close analysis of the above data at all levels, whether in forward translation from English into Arabic, round-trip translation from Arabic into English and forward translation from Arabic into English indicates that there are many serious problems facing MT when dealing with sentences with temporal reference.

The first is context. Comprehending the context of the original text is essential to translate it efficiently. Though MT has a larger quantity of vocabulary than human brain, MT’s disadvantages are getting more and more obvious under the scenarios in this study. It is expected that all the problems which could face human in translation such as translating ambiguous structure (Al-khawalda; Al-Saidat, 2012), translating cultural Expressions (Al-Khawalda and Assiri, 2011; Armellino, 2008), translating holy texts (Al-Khawalda, 2004) etc. are obstacles for Machine Translator.

The second serious problem is the structural differences between the source language and target language. Both languages English and Arabic, which are our concern here, differ significantly in many respects. For instance, Arabic has a free word order whereas English has a fixed word order (Alkhuli, M. 1999). The effect of this difference on the quality of MT is clear in our data. For instance, let us consider example number (5) above in (25):

\[
\begin{align*}
\text{His homework} & \quad \text{The student} \quad \text{Write-pres-he} \\
\text{“Writes the student and his duty”} &
\end{align*}
\]

The student writes his duty.

This Arabic sentence starts with the verb يكتب /yaktub/ (write-present-he) followed by the subject الطالب /ATTalib/ (the student) then the object واجبه /wajibah/ (his homework). This sentence is equivalent to the English present tense ‘the student writes his homework (everyday)’. But when Google translated it to English, it started with the verb ‘writes’ as Arabic, so the result is meaningless English sentence.

To cope with Arabic verb form and tenses can be considered the most serious problem which challenges Google translator. Arabic differs significantly from English in expressing tenses. For instance, in English tense appears on the first verbal element whereas the others are non finite. Let's consider the following example:

\[
\begin{align*}
\text{a-she has been writing} & \\
\text{b-she had been writing}
\end{align*}
\]

The difference between the sentence in (a) and the one in (b) can be picked up from the first elements (has & had). The first is said to be ‘present perfect progressive’, whereas the second is ‘past perfect progressive’. That is the difference appears on the first element since both sentences share the other elements (been writing). Moreover, we use different auxiliary verbs to express different temporal references. The situation in Arabic is different. In addition to the verb form the auxiliary ‘kana’ (Be-past-he) in Arabic is inflected for present ‘yakunu’ (Be-presnt-he) and ‘sayakunu’ (Be-future-he). The combination of this auxiliary with the verb form expresses a long array of tenses (see Al-khawalda, 1997; Comrie, 1985). For instance:
27- a-Kataba (wrote-he)  
Kaana kataba  
Be-past he write-past-he (past in the past)  ‘he had written’  
b-Sayakuunu kataba  
Fut-be-he write-past-he (past in the future)  ‘he will have written.’  
c- kaana yaktubu  
be-past-he write-pres-he  ‘he was writing.’

In addition to such combination, certain temporal references are expressed by the combination between the verb and adverbs. For instance, The combination between the past form of verb, i.e. /kataba/ (write-past-he) and the adverb /al?an/ (now) results in a meaning similar to the present perfect in English.

28- kataba al?an  
Write-past-he now  ‘he has written’

Google translator takes word by word without considering the whole structure or such combinations. Let us consider the following examples:

29-  
A- يكتب الطالب واجبه الآن  
B- now His homework The student Write-pres-he  
C- ‘Writes the student and his duty now’  
D- The student is writing his homework now

30-  
A- كتب الطالب واجبه الآن  
B- now His homework The student Write-past-he  
C- ‘Wrote the student and his duty now’  
D- The student has just written his homework

31-  
A- مازال الطالب يكتب واجبه  
B- His homework Write-pres-he The student still  
C- ‘Still a student writes his duty’  
D- The student has been writing his duty

In the above examples (29-31), A: is the Arabic sentence, B: paraphrasing it in English, C: Google’s translation and D is the equivalent English sentence. Sentence (29A) starts with the present form of the verb ‘write’ followed by the subject/agent ‘the student’, then the object ‘his homework’ and finally with the adverb ‘now’. As stated above in its translation, Google followed word by word translation so the result is the sentence in (29C) which is ungrammatical and meaningless English sentence. The same can be applied to all the sentences (29-31). The second important issue is that the combination between the present form and the adverb ‘now’ in Arabic expresses a meaning similar to the present progressive in English. But the translator ignored translating each sentence separately in (29C). The same problem appears in (30). The combination between the past form and the adverb ‘now’ is used to express a meaning similar to the English present perfect. Google translator has not recognized that and translates each sentence separately as in (30C). In (31A) the adverb ‘still’ is used with the present form of the verb. This combination results in a meaning similar to the present perfect progressive in English. But as can be noted from the sentence in (31C) such meaning was deteriorated by Google translator. To have a clear picture about the deterioration of the temporal reference by Google translator, compare the sentences in (C), the translation of Google, with those in (D), and the correct English sentences which are equivalent to the Arabic sentences in (A).

1.5. Conclusion

The results reached at in this paper show that MT faces serious problems when translating text with temporal references; the examples tested all through this paper show, beyond doubt, that Google translator translates Arabic sentences word by word which consequently leads to the violation of the norms of word order in English. Further, another serious problem that faces MT is the structural differences between the source language and target language. Both languages English and Arabic, which are our concern here, differ significantly in many respects. For instance, Arabic has a free word order whereas English has a fixed word order; MT seems to fail in handling such a problem. Results also show that to cope with Arabic form and tenses seems be considered the most serious problem which faced by Google Translator.
The research shows the limitations of MT. However, it could be effective when dealing with vocabulary and certain fixed collocation structures and expressions. Lots of work is required to overcome such problems and to make MT effective and beneficial. Moreover, human editing is still necessary to arrive at valuable, accurate, authentic translation. Further research is still needed to further examine the extent to which MT translation can succeed in translating texts beyond the sentence level, for example, sampling more sentences and introducing more languages.

References
Anon. (2005), Gotcha: Translation software. Software that translates text from one language to another may be a big help—or hindrance—to businesses and relief agencies alike. Baseline, May 2, 2005. www.baselinemag.com/arti-cle2/0.1397.1791588.00.asp
http://translate.google.com/