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A COMPARATIVE ASSESSMENT OF THREE ENGLISH-FARSI MACHINE TRANSLATORS

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ABSTRACT
The present article draws a comparison in the outputs of three machine translators – the Google Translate, the Bing Translator and the Free Translation – and asks in case the objective of the Persian users is to understand the meaning of a given source text (ST), which one the three packages will be the best to use. Taking a section of the English version of the Joint Comprehensive Plan of Action (JCPOA) between Iran and 5+1 on nuclear issue, approximately around 200 words, this article asks each of the chosen packages to translate it into Persian. The article, by applying principles of White's 2003 methodology for evaluating machine translation, makes assessment of the machine outputs and this way it responds to the above question.
Keywords: Machine translators, Google Translator, Bing Translator, Free Translation, JCPOA

INTRODUCTION

Translation, as described by John Catford, "is the replacement of textual material in one language by equivalent textual material in another language." Therefore, it is an important communicative tool between people, their businesses, and their culture and customs, and, finally between countries. Although the most ordinary way to get a document to be translated is through a translation agency and a human translator, in the past few years the emergence of a new type of translators has been witnessed: machine translators.

While focusing on three free online translation packages, namely the Google Translate (https://translate.google.com/), the Bing Translator (https://www.bing.com/translator) and the Free Translation (https://www.freetranslation.com/), the present article asks one key question that is if the Persian users are decisive to understand the meaning of a given source text which one they would be best advised to use? This article, in an effort to respond to this question which is more concerned with the semantic quality of the ST than its grammatical quality, takes three stages. In the first stage, it explains the ST to be used and the online packages to be surveyed. In the second stage, it outlines its proposed method for making assessment of the chosen packages, with particular reference to principles taken from White's 'How to evaluate machine translation' (2003). And in the third stage based on the empirical findings, it suggests which package produces the most effective output.

A brief history of machine Translation

The exact date of the emergence of this type of translation as stated in Olivia Craciunescu's article "Machine Translation and Computer-Assisted

Translation: a New Way of Translating" is believed to be "the beginning of the Cold War… in the 1950s competition between the United States and the Soviet Union". In the U.S., a large number of research groups involved in working on various MT tasks from Russian to English, with funding from defense and intelligence agencies. In the Soviet Union, there was a similar effort in which translations were made from English and French to Russian. But during the early days it was proclaimed that MT systems would be able to produce high-quality translations for general texts without any human intervention. Later, when a committee called ALPAC was set up in the U.S. to evaluate the MT research, it came to the conclusion that the research was not reliable. In its report in 1966, it said that basic research was needed and MT was not feasible in the near future.

The efforts of the MT community in the last century has started bearing fruits. The last decade has seen many usable products in the form of various online dictionaries, translation memory software to assist the human translators, several tools for language analysis, and of course online Machine Translation systems.

1- Design

In order to work with a text which was not too long for this study, it was decided to select a source text of approximately 200 words, above 150 words, as 150 is the word limit for a number of free online translation machines. Therefore, it was decided to take a section out of the Joint Comprehensive Plan of Action (JCPOA), an international agreement on Iran's nuclear program reached between Iran and 5+1. The objective behind choosing the text from the introduction part of the JCPOA was that it was less technical, it was from an international document the English and Persian versions of which enjoyed identical in value, and maybe of some interest for a wide scope of audience. (appendix 1 & 2)

Looking for machine translators, it was found out that most of the on-line machine translators do not translate texts in excess of 150 words, e.g. , www.babylon translator, and one, www.babelfish, did not offer Persian translation. Of all, these three packages:
(https://translate.google.com,
https://www.bing.com/translator,
https://www.freetranslation.com) would both translate a text in excess of 150 words and offer English translation to Farsi.

2) Method for evaluating translation output of three packages

It is admitted that evaluating machine translation can be a difficult task. Different users can use machine translators for different purposes; each of which requires different type of assessment (White 2003: 211). With multiple translation tasks, there are often different ways to translate a given SL word or phrase correctly and judgments over what is exactly correct are always subjective (ibid.: 213-14).

The present study is more concerned with the semantic quality than the grammatical quality of the source text that is translated therefore it was decided to adopt the following approach which is again inspired by the work of White (2003). The measurement is first concerned with 'fidelity' (accuracy of information conveyed) on a scale of 1-5, where:

1= translation conveys hardly any of the information explained in the source text (ST);
3=translation contains approximately half of the information of the ST;
5=the information of the ST is fully preserved in the target text (TT).

As far the intelligibility (TL fluency) is concerned, it is measured on a scale of 1-5, where:
1=translation is virtually unintelligible;
3=translation is intelligible after careful study;
5= translation is clear and perfectly intelligible.

It is important to notice that the purpose of this study is not to assess the TTs from a grammatical point of view, i.e. for their grammatical accuracy. Grammar will only become a point of concern if it obscures the message of the source text in the target text. As a qualified translator, the

author will make the judgment over the fidelity and intelligibility of the given translation outputs by the three machine translators. In order to make the assessment, it was decided to divide the ST into 'semantic chunks' which is employed according to the definition provided by Hacioglu and Ward (2003) which says, 'a sequence of words that fills a semantic role defined in a semantic frame'. The text was divided into 29 semantic chunks (Appendix 3). Each online translation machines could therefore score a maximum of 145 (29 x 5) points for fidelity and 145 (29 x 5) points for intelligibility for each output.

Translating terminology

In order to ensure that the semantic content of the source text is preserved, it is important to notethat the key terminology is translated accurately in the target language. Therefore, it was decided to choose the words which have been translated in a number of ways to find a comprehensive definition of them to determine acceptability of the range of translations and establish a 5-point mark for each. Below is an example of the mark allocated to some vocabularies translated by the machine translators in different ways.

'with the High Representative of the European Union for Foreign Affairs and Security Policy)' (chunk 2)

''با نماینده عالی اتحادیه اروپا در امور خارجی وسیاستهای امنیتی)''

www.mfa.gov.ir

Mark attributed	Exampels of Translations
1	با بالا نماینده اتحادیه اروپا برای امور بیگانه و سیاست امنیت)
2	با بالا نماینده اتحادیه اروپا برای امور خارجی و سیاست امنیتی)
3	با نماینده بالای اتحادیه اروپا برای امور خارجی و سیاست امنیتی)
4	با نماینده عالی اتحادیه اروپا در امور خارجه و سیاست امنیتی)
5	با نماینده عالی اتحادیه اروپا در امور خارجه و سیاستهای امنیتی)

Conclusion

On the basis of the following table (Evaluation of machine translate output), assessment was made over the output of three machine translators in translating a text with approximate 200 words which was a section of the Joint Comprehensive Plan of Action between Iran and 5+1 on nuclear deal. The scores of each machine translator for each chunk was calculated and the sum up is shown in the Evaluation of MTs output table.

Evaluation of MTs output

SL	Fidelity of TT	Intelligibility of TT	Total score
Google Translate	82/145	75/145	157/290
Bing Translate	93/145	87/145	180/290
Free Translator	78/145	72/145	150/290

The result shows that in brief the Bing Translator produced the best translation and therefore emerged as the most appropriate choice for free online translation for non-specialized end-users who wish to translate. As White suggests, there is a clear correlation between the fidelity and intelligibility of machine translation outputs (2003: 216).

References

Hacioglu, Kadri and Wayne Ward. (2003) 'Target word detection: Semantic role chunking using support vector machines'

White, John S. (2003) 'How to evaluate machine translation' in Harold Somers (ed.) (2003) Computers and Translation. Amsterdam, Philadelphia: John Benjamins, 211-244

Web References

www.state.gov

www.mfa.gov.ir

www. translationdirectory.com

shodhganga.inflibnet.ac.in/bitstream/10603/4239/../09_chapter%202.pdf

Appendix 1

The E3/EU+3 (China, France, Germany, the Russian Federation, the United Kingdom and the United States, with the High Representative of the European Union for Foreign Affairs and Security Policy) and the Islamic Republic of Iran welcome this historic Joint Comprehensive Plan of Action (JCPOA), which will ensure that Iran's nuclear program will be exclusively peaceful, and mark a fundamental shift in their approach to this issue. They anticipate that full implementation of this JCPOA will positively contribute to regional and international peace and security. Iran reaffirms that under no circumstances will Iran ever seek, develop or acquire any nuclear weapons.

Iran envisions that this JCPOA will allow it to move forward with an exclusively peaceful, indigenous nuclear program, in line with scientific and economic considerations, in accordance with the JCPOA, and with a view to building confidence and encouraging international cooperation. In this context, the initial mutually determined limitations described in this JCPOA will be followed by a gradual evolution, at a reasonable pace, of Iran's peaceful nuclear program, including its enrichment activities, to a commercial program for exclusively peaceful purposes, consistent with international nonproliferation norms.

Appendix 2

گروه ۵+۱ (چين، فرانسه، آلمان، روسيه، انگلستان و آمريكا با نماينده عالی اتحاديه اروپا در امور خارجی وسياستهاي امنيتی) و جمهوري اسلامی ايران از اين برنامه جامع اقدام مشترك (برجام) تاريخی كه تضمين خواهد نمود برنامه هسته اي ايران منحصرا صلح آميز است، و يک تغيير بنيادين در نگرش هاي اين كشورها به اين موضوع رقم می زند، استقبال می نمايند. آنها انتظار دارند كه اجراي كامل اين برجام در جهت مثبت به صلح و امنيت منطقه اي و بين المللی كمک نمايد. ايران مجددا تاييد می نمايد كه اين كشور تحت هيچ شرايطی در پی جستجو، توسعه و يا كسب سلاح هاي هسته اي نخواهد بود.

از منظر ايران، اين برجام به اين كشور اجازه خواهد داد تا در راستاي ملاحظات علمی و اقتصادي يک برنامه هسته اي بومی و منحصرا صلح آميز را با هدف اعتماد سازي، مطابق برجام پيش ببرد تا همكاري هاي بين المللی در اين زمينه ترغيب گردد. در اين زمينه محدوديت هاي اوليه اي كه به صورت دوجانبه تعريف و در اين برجام توصيف گرديده است، تكامل تدريجی برنامه هسته اي صلح آميز ايران از جمله فعاليت هاي غنی سازي آن براي يک برنامه تجاري براي مقاصد منحصرا صلح آميز و همسو با هنجارهاي عدم اشاعه بين المللی را با يک سرعت معقول دربی خواهد داشت.

Appendix 3

Evaluation of machine translate output

Sematic chunks	Fidelity (information conveyed)	Intelligibility (TL fluency)
1) The E3/EU+3 (China, France, Germany, the Russian Federation, the United Kingdom and the United States,		
2) with the High Representative of the European Union for Foreign Affairs and Security Policy)		
3) and the Islamic Republic of Iran		

4)welcome this historic Joint Comprehensive Plan of Action (JCPOA),		
5)which will ensure that Iran's nuclear program		
6)will be exclusively peaceful,		
7)and mark a fundamental shift in their approach to this issue.		
8)They anticipate that full implementation of this JCPOA		
9)will positively contribute to		
10)regional and international peace and security.		
11)Iran reaffirms that		
12)under no circumstances will Iran ever seek,develop or acquire any nuclear weapons.		
13Iran envisions that		
14)this JCPOA will allow it		
15)to move forward with an exclusively peaceful, indigenous nuclear program,		
16)in line with scientific and economic considerations,		
17) in accordance with the JCPOA,		
18)and with a view to building confidence		
19)and encouraging international cooperation.		
20) In this context,		
21)the initial mutually determined limitations described in this JCPOA		
22)will be followed		
23)by a gradual evolution		
24)at a reasonable pace		
25)of Iran's peaceful nuclear program		
26)including its enrichment activities		
27)to a commercial program		
28)for exclusively peaceful purposes,		
29)consistent with international nonproliferation norms.		
Scores		

Appendix 4

Evaluation of MT output

Translate.google.com

Syntactic chunks	Fidelity (information conveyed)	Intelligibility (TL fluency)
1)	3	3
2)	4	5
3)	5	5
4)	1	1
5)	3	3
6)	2	2
7)	1	1

8)	3	2
9)	1	2
10)	1	1
11)	3	2
12)	3	1
13)	1	1
14)	2	1
15)	3	2
16)	2	2
17)	1	1
18)	5	4
19)	1	1
20)	5	4
21)	1	1
22)	5	4
23)	3	3
24)	3	3
25)	5	5
26)	3	3
27)	5	5
28)	4	4
29)	3	3
Scores	82/145	75/145

Appendix 5

Evaluation of MT output

Bing.com/translator

Syntactic chunks	Fidelity (information conveyed)	Intelligibility (TL fluency)
1)	3	3
2)	2	3
3)	5	5
4)	1	1
5)	2	2
6)	5	4
7)	3	3
8)	5	4
9)	3	3
10)	3	3
11)	2	1
12)	1	1
13)	2	2
14)	1	1
15)	3	3
16)	5	4
17)	3	3

18)	3	3
19)	5	5
20)	4	4
21)	1	1
22)	3	3
23)	5	5
24)	3	3
25)	5	5
26)	5	3
27)	3	3
28)	3	2
29)	4	4
Scores	93/145	87/145

Appendix 6

Evaluation of MT output

Freetranslation.com

Syntactic chunks	Fidelity (information conveyed)	Intelligibility (TL fluency)
1)	3	3
2)	4	4
3)	5	5
4)	1	1
5)	5	4
6)	4	3
7)	1	1
8)	1	1
9)	1	1
10)	2	1
11)	1	1
12)	2	2
13)	1	1
14)	1	1
15)	2	2
16)	1	1
17)	1	1
18)	3	3
19)	5	4
20)	3	3
21)	1	1
22)	1	1
23)	5	5
24)	1	1
25)	5	4
26)	5	4
27)	3	3
28)	5	5
29)	5	5
Scores	78/145	72/145