

EVALUATING THE DIFFERENCES BETWEEN HUMAN TRANSLATION AND MACHINE TRANSLATION – AN IMPLICATION FOR TEACHING AND LEARNING TRANSLATION COURSE FOR CONSTRUCTION MATERIALS IN THE NATIONAL ECONOMICS UNIVERSITY (NEU)

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Abstract. This research offers a new insight into the strengths and weaknesses of machine translation and gives an objective comparison between machine (MT) and human translation (HT), thereby assisting individuals learning and teaching in the field of translation skills to utilize the machinery tools. Specifically, this research analyzes the translated words, sentences and paragraphs by both human and machine sources by three main criteria: Error rate, Translation quality index and Delivery to understand the differences between the two approaches. After that, linguistic criteria were carefully analyzed to assess the quality of translated objects. The researcher concludes that there are significant weaknesses in MT affecting the quality of translation. MT translated version often lacks consistency, as well as many expression mistakes owing to the reality that these softwares consist of strict systematic guidelines. However, HT also has the inevitable disadvantages. A translator in a particular field and language can only handle text that related to that language and field, while automated translation software can almost translate any text related to any field. MT has a long way to go before it can replace HT, but currently it still plays an important part in supporting human in terms of fast process and economic efficiency.

Keywords: Machine translation (MT), human translation (HT), quality of translation, linguistic criteria, strengths and weaknesses, construction and architecture sector.

1. Introduction

Translation plays a very important role in all aspects of life. Generally, translation acts as a powerful force with the mission of breaking the wall of language separation, sharing cultural values of excellence and interest to all over the world. More than half a century has passed since automatic translation (MT) was conceived as an independent scientific trend (Alison, 2017). While there are still a number of limitations to the possibilities of automatic translation systems (ATSs), MT is currently considered the crux of the international economic and social affairs in the era of international information communication.

On the purpose of making a comparison between the human and machine - translated versions, this study focuses on (i) identifying key criteria using to compare two versions of translations; (ii) evaluating the strengths and weaknesses of HT and MT; (iii) identifying the practical application of HT and MT in reality; and thereby (vi) helping students and lecturers in the

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translation subject to utilize their abilities. In this study, HT and MT version of chapter ten of The Manor Central Park (MCP) Project, which under the management of the Infrastructure Department of the VCC Engineering Consultants Joint Stock Company, was selected as the research's representative subject/content and location.

2. Content

2.1. Literature Review

2.1.1. Definition of Translation

From an academic viewpoint, translation can be defined as follow: "Translation can be defined as the result of a linguistic-textual operation in which a text in one language is re-contextualized in another language". As a linguistic operation, translation is, however, subject to, and substantially influenced by, a variety of extra-linguistic factors and conditions. It is this interaction between 'inner' linguistic-textual and 'outer' extra-linguistic, contextual factors that makes translation such a complex phenomenon" (House, 2014:9). In many cases, we cannot clearly distinguish the source text of a document. This may be happened because there are multiple versions of the same text written in various languages.

Based on the studies of Roman Jakobson (1966, p.223), a Russian-American linguist and literary theorist, in the 20th century, translation can be divided into these following categories: (i) "Intralingual translation or rewording is an interpretation of verbal signs by means of other signs of the same language; (ii) interlingual translation or translation proper is an interpretation of verbal signs by means of some other language; and (iii) intersemiotic translation or transmutation is an interpretation of verbal signs by means of signs of nonverbal sign systems". These categories are divided based on the concepts of semiotics, the science studying the idea of communicating through various systems of signs and symbols, of which translation is a subset.

2.1.2. Methods of Translation

The history of translation studies shows an ongoing debate from ancient times (from Cicero and Jerome, 106 BC) to now on how to translate properly. The main issue here is the balance between the two extremes: Literal translation and free text translation. These two translation paths are often referred to sematic translation and communicative translation.

Peter Newmark (1988) (1916 – 2011), proposed a system of eight translation methods based on dynamic equivalence theory. Among these methods, semantic and communicative translation are two major methods. Generally, there are significantly differences between the semantic and communicative translations. Semantic translation is more faithful and similar to the source language in the aspects of grammar, style, organizational form, and cultural expressions. Communicative translation, on the other hands, is intended to be easy for readers to understand with better communication efficiency. Larson (1984, p.15) classified translation from the principles of text's meaning and form. He claimed semantic translation as form-based translation and communicative translation as meaning-based translation. However, Newmark also noted that the method of translation also depends on the type of documents.

2.1.3. Vietnamese - English Translation in Practice

The system of methods proposed by Newmark is rather sketchy, simple and relies on the factual translation of some most common European languages. However, when considering the actual translation between the Vietnamese and English, it is difficult to analyze the specific methods as Newmark has pointed out. This may be due to differences between Vietnamese and English culture and language, but it is also possible that Newmark's methodology is not a comprehensive system for translation practice in general.

2.1.4. Machine Translation

2.1.4.1. Definition of Machine Translation

Automated translation, or MT, is a branch of natural language processing in the artificial intelligence subdivision, which is a combination of language, translation and computer science. As the name implies, the translation automatically translates one language into one or more other languages automatically, without human intervention in the translation process. At the fundamental level, MT executes an individual replacement of words in source language into target language, but normally it failed to create a good translation. As the fact is that a quality translation requires the entire phrases and their nearest equivalent expression in the target language to be recognized. Currently, MT is swiftly evolving to solve this problem by documenting statistics and neutral techniques, which can handle linguistic typology differences, idioms translation, and anomalies isolation.

2.1.4.2. Approaches

MT is now a very valuable field of study, which has resulted in the developing of approaches in building high-quality translation software. In particular, the most common methods used in the software are listed as follows (i) Statistics Machine Translation (SMT); (ii) Rule Based Machine Translation (RBMT); (iii) Example-Based Machine Translation (EBMT).

Modernly, domain or profession customization is regularly available in MT software. This feature will narrow the scope of allowable substitutions, by which can improve the quality of translation products. Human intervention is also a great way to enhance the quality of a translation output. As an illustration, some translation systems may improve the accuracy of translation in the subsequent times, if the user can suggest modifications for the mistakes it made.

2.2. Methodology

In order to solve the research objectives as well as to ensure the results of the study, data from the most popular automated translation tool which is Google will be collected to be the main comparison materials. Also, both English and Vietnamese construction consulting documents from the Infrastructure Department of the VCC Engineering Consultants Joint Stock Company will be collected as examples for reference. Basic criteria for evaluating the quality of a translation will be carefully selected through criteria of translation comparison.

Language is difficult aspect to measure, because it is one field with pragmatic feature. However, language also has many rules and standards about phonetics and syntax, so it is possible to build a measurement tool for it. In the localization industry, Linguistic Quality Assurance (LQA) assessments are often used to evaluate the quality of a translation. Normally, LQA will be reflected through the following key criteria (these may vary in terms): (i) Error rate; (ii) Translation quality index; and (iii) Delivery.

2.2.1. Error Rate

This index shows the ratio of total errors to total weighted words. It reflects the frequency of translation errors, one of the most serious factors which greatly affect the translation quality. The error rate is calculated by the following formula:

$$- ER = \text{Total Error} / \text{Total Weighted Word count} * 100\%$$

From the result, we have the following evaluation table:

Score	Error rate	Evaluation
A	0 ~ 0.29	Hardly any errors Translators do not need to explain the translation process

B	0.3 ~ 0.5	Small number of errors The translation is accepted
C	0.51 ~ 0.7	Errors occur frequently The translation is accepted, but need to be improved
D	0.71 ~ 1.3	The translation quality is insufficient Translators did not meet the requirements Translators needs to explain the translation process and make an improvement plan
F	>= 1.3	Translation quality is unacceptable Translators did not meet the requirements Translators needs to explain the translation process and make an improvement plan Translators could be fined and compensated if the translation quality is consistent at this level

2.2.2. Translation Quality Index

Translation Quality Index (TQI) is a method of evaluating the quality of a translation by classifying errors into different groups, assessing the severity of those groups, and weighting them. In TQI, it is often divided into the following groups of errors:

- Accuracy errors are which affect the semantics of the translation, such as incorrect translation, missing-meaning translation or incorrect spelling and typo;
- Language and style errors are errors in grammar, expressions and translation standards that vary from country to country;
- Error in technical term is a lexical error. These errors often cause words to lose their original meaning, raising confusion in the readability of the text.

For each error there will be different degrees of severity, for example:

Severity	Minus point	Evaluation
Critical	10	Unacceptable translation errors: completely mistranslation, change of meaning of original text
Major	5	Errors which do not affect the meaning of the text but unaccompanied with the standard of style or terms
Minor	1	Small technical errors such as punctuation errors

TQI scoring formula: $TQI = 100\% - \text{Weighted error rate}$.

With: $\text{Weighted error rate} = [\text{Minor} + (\text{Major} \times \text{Major Multiplier}) + (\text{Critical} \times \text{Critical Multiplier})] / \text{Weighted word count}$. Normally, a good quality translation must have a TQI score of equal or greater than 96%.

2.2.3. Delivery

Formula for delivery point calculation: $\text{Delivery} = \text{Total Delayed Deliveries} / \text{Total Assigned Projects}$

After compiling all three indicators, depending on each criterion, we can determine whether the translation is acceptable or not. However, this study will not delve into the detailed evaluation of quality or practicality of translation as described above. In addition, because the main purpose of the study is evaluating and comparing the strengths and weaknesses of MT and HTs, the whole process of linguistic quality assurance will not be applied. Instead, this study

only applies the TQI rating criteria to reveal which translation version is better, human or machine.

2.3. Text Analysis

To examine the quality of translation of human and machine, chapter 10 of The MCP has been chosen. There are several reasons for the selection of this written form. First of all, the MCP is a world-class project that brings together the world's top construction design contractors including EE&K, Carlos Zapata from USA and Kume Sekkie located in Japan. The project is currently under construction at the center of three main routes as follows Nguyen Xien Avenue – The ring road 3 – Pham Hung road. The MCP has major advantage in transportation as it is connected with chief urban areas of the city as well as airports or Road 1 linking Southern provinces.

Secondly, the design consultant documents of the project contain information that contributes to enhance the connection between the national and international investor and the construction contractor. Consultants actively assist investors in the following aspects of the project: Project planning and designing; construction supervising; materials purchasing; construction work accepting. In this study, the selected chapter 10 concentrates mainly on electricity supply for communication and lighting system. It will provide detailed consulting information in every phase of the building operation, ranging from material estimation to acceptance specification. Therefore, it can provide a common voice among concerned parties.

Finally, it is indispensable to consult my colleagues to reinforce the validity of the HT which is served as the contrasting document for the liability of the study.

2.4. Findings and discussion

2.4.1. Translator's Purpose

Because of the scale and importance of the project, the need for a detailed and accurate design and supervision consultant is essential. In addition, the project is being implemented by many companies around the world, which requires that this monitoring consultant be translated into suitable languages for each contractor. Serious mistakes must be avoided as they can affect the quality of project in general and the benefits of the company in particular. Due to this fact, it can be concluded that the translation of the translator is reliable to compare with the output of the automated translation software.

2.4.2. The Evaluation between Human Translation and Machine Translation

All of the examples used in this study are exacted from Chapter 10 of The MCP project and its translated version including a HT and a MT – processed by Google in this case. The pages in which these examples appear can be found in the analysis corpus attached to this paper. The sentences extracted from the corpus will be numbered according to their orders in the corpus.

2.4.3. Titles and headings

Titles and headings portray significant roles in a document as they are the first objects coming to the readers' eyes. As the result, most titles and headings must be literally translated and kept close to the source language counterparts.

The following table will evaluate titles and their translated correlatives in term of meaning and accuracy.

Table 1. List of titles and headings and the evaluation of their translated version

Original titles and headings	HT version	Evaluation	MT version	Evaluation
Thiết kế hệ	Power supply	Omit the	Design electrical	Despite being lack

thống cấp điện	system	verb “thiết kế”, but the translation is acceptable in terms of meaning	supply system (1)	of synchronization with (2) and (3) in terms of word order, the translation is acceptable
Giải pháp thiết kế	Design solution	Adequate translation (AT)	Design solution	AT
Phạm vi nghiên cứu và nguyên tắc thiết kế	Study scope and design principles	AT	Research area and design principles	Acceptable translation
Các tiêu chuẩn, quy phạm thiết kế	Design standards and regulations	AT	Design standards and norms	Acceptable translation
Tiêu chí thiết kế	Design criteria	AT	Design criteria	Adequate translation
Nhu cầu phụ tải	Electric load demand	AT	Load demand	Unclear meaning
Chỉ tiêu cấp điện	Power demand for supplying electricity	AT	Electricity supply norms	The word “electricity” is not commonly used in this context, otherwise it can be acceptable
Phương án cấp điện	Power supply method	AT	Power supply plan	Acceptable translation
Nguyên tắc cấp điện	Power supply principles	AT	Principles of electricity supply	Acceptable translation
Cơ sở tính toán phân chia mạch trung thế cấp điện	Fundamentals of medium voltage loop calculation	AT	Base calculation of the distribution of medium voltage power supply	Word for word translation Unclear meaning
Tính toán cáp hạ thế và ngắt mạch vòng	Calculating low voltage cable size and capacity of circuit breaker	AT	Calculation of low voltage cable and circuit breaker	Acceptable translation
Chọn tiết diện dây dẫn theo dòng làm việc tính toán	Selecting cable section based on calculated current	AT	Select the wiring section in the calculated work line	Word for word translation Unclear meaning

Kiểm tra tổn thất điện áp trên tuyến cáp 22KV	Checking voltage drop rate across the 22kV line	AT	Checking voltage losses across the 22KV line	Word choice mistake “loss”
Kiểm tra độ ổn định nhiệt của dòng ngắn mạch	Checking the thermal stability of the short circuit	AT	Check the thermal stability of the short circuit	Acceptable translation
Quy cách rải cáp	Regulation of cable running way	AT	Spreading method	Mistranslation
Nội dung thiết kế	Design contents	AT	Design content	Adequate translation
Thiết kế hệ thống chiếu sáng	Lighting system	Omit the verb “thiết kế”, but the translation is acceptable in term of meaning	Lighting system design(2)	Despite being lack of synchronization with (1) and (3) in terms of word order, the translation is acceptable
Tiêu chuẩn viện dẫn	Quoted standards	Acceptable translation	Criteria cited	Word order mistake
Thiết kế hệ thống thông tin liên lạc	Communication system	Omit the verb “thiết kế”, but the translation is acceptable in term of meaning	Design communication system(3)	Despite being lack of synchronization with (1) and (2) in terms of word order, the translation is acceptable
Dung lượng thuê bao của khu đô thị Hoàng Mai-Central Park	Subscriber capacity of the Hoang Mai-Central Park area	AT	The capacity of Hoang Mai-Central Park	Mistranslation

Source: Compiled by the author

Although in some contexts, several words had been omitted by the translator, but in general, it does not have any impact on the meaning, so it can be acceptable. For example, the first title of Chapter 10 – “Thiết kế hệ thống cấp điện” (1) - is translated into “Power supply system”. It is clear that the verb “thiết kế” in the Vietnamese version was omitted when rendered into English. But as a whole, this title still associated sufficiently to other titles and headings in the document creating a complete structure, so it can be considered as an adequate translation. The same can be said for heading (2) and (3).

Should be added somewhere your own definitions on “adequate” and “acceptable” translation as you mention here in the table.

However, in the Google translated version, except for some tolerable render of several short and simple headings, the remaining encountered many errors in semantic or syntactic. Particularly for complex and structured sentences, automated translation software tends to translate with word for word method, causing the sentence to be ambiguous. For example, the heading “Cơ sở tính toán phân chia mạch trung thế cấp điện” is translated into “Base calculation of the distribution of medium voltage power supply”. It can be seen that Google did not do well in this example; the output is complicated and difficult to understand. In addition, it also misinterprets specialized terms, which is an unacceptable mistake in evaluating translation quality. The study will cover this issue in the following part.

In conclusion, Google can be thought of as ideal for dealing with short and stereotypical titles and headings. However, with complex structured titles and headings, the translator's intervention is required to ensure accuracy and comprehension.

2.4.4. Terminology

According Mr. Riediger, terminology is “set of designations belonging to one particular field or subject area”. In order to evaluate the quality of the terminology translation, it is essential to understand its basic characteristics first.

- Accuracy: An appropriate term means that it only represents a single concept without any confusion;
- Systematic: Terminology systematic feature appears in both forms and content. In terms of content, each term corresponds to a certain concept that is closely related to other terms in the system, and it carries a distinct meaning. In terms of form, the systematic feature occurs in the structure of the term. One term can be classified as a part of a specific field thanks to its homogeneity and opposition, which is different to other terms structural form or composition.
- Ethnicity and internationality: Ethnicity manifests itself primarily in the form of terminology. Terminology is required to have suitable pronunciation and structural features with each language that is being used. Also, because scientific concepts are the common property of humanity, terminology must also be globally recognized. International feature is mainly appears in the meaning. The meaning of the terminology is uniform in every language because it is not influenced by each objective language's element.

In conclusion, the translation of terminology could be regarded as a vital step in the translation of electrical engineering consultant guides. This is no exception for the translation of electrical engineering terms which appear in Chapter 10 of the MCP project.

A complete list of terminology occurs in Chapter 10 of the MCPproject will be shown in the following table:

Table 2. List of terms in Vietnamese, their equivalents in English and their translated version
Be consistent in the way to use word “terms or terminology”

No.	Vietnamese terms	English equivalent	Human translation	Machine translation
1	Công suất trạm biến thế	Capacity of transformer station	Capacity of transformer station	Capacity of transformer station
2	Nối đất	Earthing/ Grounding	Earthing	Grounding
3	Nối không	Neutral grounding	Neutral grounding	Connection
4	Trạm biến áp	Transformer station	Transformer station	Transformer station/ substation

5	Trạm hạ thế	Step-down station	Step-down station	Low voltage station
6	Công suất tiêu thụ	Apparent power	Apparent power	Consumption power
7	Công suất hiệu dụng	True Power	True Power	Effective power
8	Điện trở	Resistance	Resistance	Resistance
9	Trở kháng	Impedance	Impedance	Impedance
10	Dòng ngắn mạch	Short circuit current	Short circuit current	Short circuit
11	Phụ tải điện	Load	Load	Additional load
12	Cách điện cao phân tử	Macromolecular insulation	Macromolecular insulation	Copper insulated
13	Cát mịn	Fine sand	Fine sand	Smooth sand
14	Cát mịn đầm chặt	Compacted fine sand	Compacted fine sand	Fine sand compacted
15	Gạch chỉ	Solid brick	Solid brick	Brick only
16	Độ sụt áp	Voltage drop	Voltage drop	Pressure drop
17	Dòng điện tính toán	Calculated current	Calculated current	Calculated electricity
18	Dòng điện danh định	Nominal current	Nominal current	Nominal current
19	Công suất phản kháng	Quadrature power	Quadrature power	Reactive power
20	Môi trường điện môi (cấp K)	K- class dielectric environment	K- class dielectric environment	dielectric environment (K-grade)
21	Tủ RMU	RMU	RMU	RMU cabinet
22	Độ chói	Luminance	Luminance	Glare
23	Độ rọi	Illuminance	Illuminance	Illumination
24	Độ đồng đều chiếu sáng	Light uniformity	Light uniformity	Uniformity
25	Bộ tán xạ	Diffuser	Diffuser	Scatter equipment
26	Quang thông	Light current	Light current	Brightness
27	Hệ số hao tổn	Deteriorating factor	Deteriorating factor	Loss factor
28	Aptomat	Circuit breaker	Circuit breaker	Aptomat

Source: Compiled by the author

The English translated version of electrical engineering terms which is done by human translators is completely identical to their equivalent in Vietnamese. Since this is a translation that has gone through the proofread process, there is no error in the misuse of the terminology. In contrast, for the translated version done by automated translation software, out of 27 terms,

only eight terms are translated with decent quality. Otherwise, other terms are rendered incorrectly.

To be able to explain this, the research will go into the analysis of errors that MT may have made. Firstly, the terms that MT has successfully translated into English are mostly short and simple. In addition, their equivalent in English is just a single word, “điện trở” is translated to “resistance” and “trở kháng” is translated to “impedance”. While longer and more complicated terms often make MT confusing to render. This can be explained by the fact that most Vietnamese components are Sino-Vietnamese vocabularies, which are Vietnamese words with Chinese origin. The use of such Sino Vietnamese words may reduce the amount of words requiring to convey certain concept in Vietnamese. On the contrary, when translating from Vietnamese, it may cause confusion and decrease the level of accuracy of the translation as a lot of languages are not familiar with this concept.

The second factor, which is also the most important factor influencing the quality of terminology translation by MT software, is that there is no standard referral system for terms used in the electrical engineering in Vietnam. Vietnamese is not a popular all over the world, so most of the specific terms are translated from foreign languages into Vietnamese. It is not an easy task to translate terminology into other languages appropriately. This issue can be resolved if a normative document on electrical engineering is issued and widely disseminated. However, there is no such document and most of the Vietnamese terms in electrical engineering are translated and accepted by people in the industry. Therefore, it is inevitable that automatic translation tools have difficulty in converting the term between two languages. This is most clearly demonstrated in the following example; the term “bộ tán xạ” is translated into “scatter equipment” while it should be “diffuser”. Google Translate (GT) was unable to handle the whole phrase, instead dividing it into two words, processing it separately and then pairing it together; “Bộ” is translated into “equipment” and “tán xạ” is translated into “scatter”. Clearly this method of translation is not effective, completely distorts the terminology used in English.

Also, another noteworthy mistake which MT made in terminology translation is inconsistency. Here is an example:

Table 3. Examples of inconsistency in terminology translation performed by GT

No.	Vietnamese origin	English translation by MT
1	Thiết kế này nêu giải pháp thiết kế cấp điện bên ngoài công trình của khu vực bao gồm: Xác định vị trí, công suất <u>trạm biến thế</u> , hướng tuyến điện cao thế và mạng lưới hạ thế.	This design describes the design solution for external power supply of the area including: Location, capacity of <u>transformer station</u> , high voltage line and low voltage network.
2	Đối với các toà nhà cao tầng có phụ tải lớn, các <u>trạm biến thế</u> dự kiến sẽ được đặt tại tầng hầm của toà nhà để tiện xuất tuyến các lộ hạ thế cấp điện cho các phụ tải của toà nhà.	For high rise buildings <u>the substation</u> is expected to be located right in the lower floors of the building to accommodate the low-voltage lines providing electricity to the load of the building.

Source: Compiled by the author

In the first example, Google translated the term “trạm biến thế” as “transformer station”. This is an adequate translation of the term. However, in the second example, the term “trạm biến thế” is again translated by Google, but this time as “substation”. The meanings of “substation” and “transformer station” are commonly mistaken for one another, sometimes, they are assumed to carry a same meaning. However, both terms contain a very distinctive feature. According to Collins Collins English Dictionary (CED, 2019), the transformer station (TS) is “a

station of electricity generation, transmission and distribution where voltage is transformed from high to low or by using transformers”. In addition, “TS” is the term used to refer to stations with a capacity of 110 kV or more. Meanwhile, “substation” is a form TS, but it operates at a lower capacity of 22 kV. Therefore, the confusion between the two terms can greatly affect the accuracy of the design documents as well as the latter construction.

It can be seen that for terminology translation, HT’s performance are outscoring automated translation software, which is GT in this case.

2.4.5. Mistranslation

Mistranslation is a critical error in evaluating the quality of the translation. An error is placed in the mistranslation section when it falsifies partly or entirely meaning of the sentences or paragraphs. In electrical engineering, this is something to avoid because of the text high accuracy requirements. A slight deviation in the text can cause a significant contradiction on the construction field.

The HT version of The MCP project is a rather detailed and elaborate translation. Most words and phrases used in Chapter 10 have correct or acceptable English equivalents. However, after a careful examination, there are still some mistakes that do not significantly affect the meaning but cause confusion for the reader in the text. Take a look at an example below: *Điểm lên cột cáp được luồn qua ống nhựa màu Ø200 (Vietnamese origin) → Point of connecting to electrical pole used Ø200 color pipe (English translation by HT).*

In this example, the original Vietnamese text is poorly expressed, accompanied by the transliteration of the translator causing the translated sentence to be confused and incomprehensible. According to the consultation of my instructor, the Vietnamese verse can be understood as the act of threading electric cables through colored protective pipe, so if the translator is more flexible in dealing with this sentence, the translation will be probably more uncomplicated and easier to understand. The suggested modifications to this sentence are as follows: “Electrical wire connection point is routed through Ø200 colored pipe”. Ignoring this example, in general, this HT version is a stable and acceptable translation.

As for the translation of GT, because it did not have the proofread process as well as the processing of MT is relatively skeptical, mistranslation errors tend to appear a lot in the translated text. This type of errors varies in different degrees, from the misunderstanding in meaning of words, phrases, to sentences. Because such errors occur so much in the text, the entire listing will make the study long and hard to follow, so hereafter, only a few examples will be shown. In addition, a proportional statistic of total mistranslation errors in the total number of words will also be presented.

The total number of mistranslation errors in google translated version was up to 245 out of a total of 346 errors. The explanation for this terrible number is the mistranslation of the frequently repeated word in the text. In particular, the most mentioned word in the document is “tủ công tơ”, which appears 193 times throughout the document. The English equivalent for this word is “power meter box” not as “counter”, which is mistranslated in the GT version.

Suppose the translation of chapter 10 of The MCPproject is a new project, so all of the words in the document are counted as no match. Therefore, the calculation is as follows:

$$- \text{Total weighted word count} = \text{total words} \times \text{rate} = 11,079 \times 100\% = 11,079$$

The total number of errors in the text is 346. According to error rate equation, the result is:

$$- \text{Error rate} = \text{total errors} / \text{total weighted word count} \times 100\% = 346 : 11,079 \times 100\% \approx 3.2 \%$$

According to the evaluation table that was mentioned in Chapter II of this research, the GT version is considered as an extremely poor translation. With a rate of greater than or equal to 1.3, the translation is determined as unacceptable, while the rate of GT version is up to 3.2.

In addition, using the TQI formula, we have the rating of the text translated by GT as follows:

- Total of critical errors: 245;
- Total of major errors: 81;
- Total of minor errors: 20.
- *Weighted error rate* = $[Minor + (Major * Major Multiplier) + (Critical * Critical Multiplier)] / \text{Weighted word count} = [20 + (81 * 5) + (245 * 10)] / 11,079 * 100\% \approx 26\%$

Based on that: $TQI = 100\% - \text{Weighted error rate} = 100\% - 26\% = 74\%$

This is a very low rate compared to the average standard of a good translation that is greater than or equal to 96%.

For human translated version, the total number of errors is 53. There are 22 minor and 35 major errors. Using the same calculation as above, the results of this translation quality assessment are:

- *Error rate* = $57 / 11,079 \approx 0,51 \%$
- $TQI = 100\% - \{[22 + (35 * 5) + (0 * 10)] / 11,079 * 100\% \} \approx 98 \%$

Based on the quality assessment table mentioned in earlier, the human translated version is considered to be a satisfactory translation, outscoring the MT. However, if all the mistranslation errors are eliminated from the machine translated version, the results should not be that terrible. It can be clearly noticed that having many mistranslation errors greatly influences the quality of translations. This is best illustrated by the analysis above. Although the human translated version is not really excelled in presentation and expression as it still suffering from several major and minor errors, it is the precision in the meaning which has made a great turning point in the comparison of HT and MT quality.

2.5. Discussion and implications for teaching and learning translation 2 in NEU

Chapter 10 of The MCP project is an excessively document to translate due to its technical characteristics. This explained why the human translated version is not well executed as it would be expected. The HT meets the requirement for technical document translation, which is accuracy. All specific terminologies and language used are correct, simple and understandable. However, the text is only rank at grade C, which means an acceptable translation but need to be improved, due to errors and mistakes in punctuation and language expression. Nevertheless, an improvement is required, but this translation can still be proposed for practical use as it had been approved by the translation quality assessment method.

Using automated translation software like GT to render this high-difficulty document seems to be unsuitable. When confronting a text that contains many specialized terms and rigid expressions like this one, MT has been exposed to many weaknesses. The first weakness is the accuracy and consistency in translating electrical engineering terms. This factor considerably affects the overall quality of the translation. More precisely, up to three quarter of the total errors in the document are errors in mistranslation of terminology. The second and also the inherent weakness of automated translation software is the expression of language. Mistakes such as word order or word misuse regularly occur in the text, making it extremely confusion to the readers. The last error that GT frequently made is the punctuation error. Due to differences in the use of punctuation between languages, this is one common mistake of GT in particular and automated translation software in general. However, a commendable feature of GT is the

quick and accurate rendering of simple words and phrases. Most of them are translated correctly and do not require much editing.

For evaluation, both translation approaches have their own strengths and weakness, but, fairly speaking, HT is far more superior. It cannot be replaced despite the fact that MT is making significant breakthroughs recently.

No one can deny the characteristic of time – saving and the increasingly dominant features of AI applied in GT. The contribution of the GT users and their community has made the use of the MT a convenience and necessity in the future. Therefore, to utilize the trend of applying MT in the field of professional translation, the author still proposes the introduction and encouragement to learners of translation 2 in the Faculty of Business English, the National Economics University despite the published argument that students of English have the tendency to rely on Google translate and other automatic translation tools (Thuy Hang, 2017). However, a careful process of translation including proof reading and lecturer's discussion with the whole class on the given text to ensure the quality of the target language.

3. Conclusions

In terms of MT, it has some considerable advantages over the HT. Firstly, it progresses the translation process much faster than manual translation. Therefore, the use of MT will save a lot of time when dealing with large volumes of text. In addition, automated translation software can translate almost any language. This is a great advantage, which is much more economical than HT. Assuming a text is a combination of two different languages, MT still can convert it. Meanwhile, two translators who are fluent in both languages are needed to be able to handle that text. It can be point out that the economic efficiency of MT is very sufficient.

However, MT has major weaknesses that affect the quality of the translation. Translated version of MT often lacks consistency, as well as has many expression errors due to the fact that these soft-wares are made up of rigid systematic rules. This greatly reduces the ability to render text flexibly. In addition, translation software is often unreliable due to the lack of proofreading step, so the use of its conversion in important areas such as business or construction is not feasible. Moreover, the security problem is also considered as a fatal weakness of the automatic translation software because of the risk of information leaks and the possibility of such information being exploited by software developers.

HT, as the name implies, is made by expert translators. It is performed by professional translators and proofreaders with required skills and expertise to convert the source language into the target language. With the growing demand for translation, many language translation agencies are sprouting up everywhere. These agents are capable of providing translation services in multiple languages and for different sectors.

The advantage of this translation method is the reliability and accuracy. It is more reliable than the automated translation. In addition, high level of security is the decisive factor for people using manual translations to translate their legal and personal documents over MT.

However, besides the advantages mentioned above, HT also has the inevitable disadvantages. A translator in a particular field and language can only handle text that related to that language and field, while automated translation software can almost translate any text related to any field. The quality of HT maybe better than MT, but it is not stable because it depends on the skill and expertise of each translator. Finally, HT requires an excessive price tag for accurate rendering.

Although both translation methods have their own strengths and weaknesses, however, if a more optimal method must be chosen, then surely it is HT.

Certainly, the speed of MT is extremely respectable. It provides translation for large volumes of text in just a few minutes, while HT may take several days. But no matter how fast the translation programs are, their output will always be suspected of accuracy, clarity and meaning.

But it is not correct to say that MT has no future. MT has a long way to go before it can replace HT. At least for the time being, the future of translation is a combination of human and machine. In the future, MT will probably produce more accurate, reliable translations compared to the time being. However, at the moment, in order to deal with texts that require language transfer, the presence of the translator is indisputable.

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