

Using Cat (Computer Assisted Translation) Tools In Scientific And Tourist Texts

El uso de herramientas TAO (traducción asistida por ordenador) en textos científicos y turísticos

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Resumen

El propósito de este trabajo es analizar los beneficios del empleo de herramientas TAO en traducción, mejorando la calidad de los resultados. Concretamente se ha aplicado esta tecnología en dos T. F. G. (Trabajo Fin de Grado) de dos alumnos que han acabado el grado de Traducción e Interpretación, no habiendo utilizado nunca estas herramientas. Pero, ¿cómo se evalúa la calidad de la traducción proporcionada automáticamente por los programas de traducción? De acuerdo con Papineni, Roukos, Ward & Zhu (2002: 311-318) «cuanto más se parezca la traducción automática a la de un profesional humano de la traducción, mejor es». Comparando la traducción de referencia con la automática se obtuvieron excelentes resultados. Para el estudio de la calidad de las traducciones se emplearon métricas de evaluación como la precisión, la exhaustividad, WER y BLEU. Se destaca el carácter innovador del proyecto por el hecho de introducir un programa informático escrito en lenguaje Python, que calcula las métricas de evaluación de la información volcada en un archivo.

Palabras clave: TIC's; didáctica de la traducción; traducción automática.

Abstract

The aim of this work is to analyse the benefits of introducing CAT tools to improve the quality in translation, specifically in the final year dissertation of two students who have already finished a degree in translation and interpreting but have never used this

technology before. How can we evaluate translation performance using CAT tools? According to Papineni, Roukos, Ward & Zhu (2002: 311-318) "the closer a machine translation is to a professional human translation, the better it is". This is the central idea behind our proposal. By comparing the reference translation with the machine translation, positive results were achieved in this research. To study the quality of the above translations, some evaluation metrics such as Precision, Recall, WER and BLEU were introduced. It is important to stress that the innovative aspect of the project introduced a programme written in Python language used to calculate the evaluation metrics from the information dumped in a file.

Keywords: ICT's; didactics of the translation; machine translation.

1. INTRODUCTION

Nowadays, it is a fact that translation work is rapidly increasing in such a way that the European Commission's Directorate-General for Translation (DGT) translated no less than half a million more pages over an eight-year period (European Commission, 2005). In addition, the increasing level of globalisation has led to a greater need for multilingual and localised websites, and e-commerce is a growing phenomenon as well. Europe strongly believes in the Digital Single Market (European Commission, Priorities). Another point worth mentioning is the tight deadlines within which translators have to render work so that companies can launch products in different countries.

The translation industry is trying to find a solution for the above problems by integrating modern technology into the process. This is solving the problem and also gives rise to more productivity in this particular work. Since the early nineties, translation memories have been a milestone for translators. Now, we have a similar revolution with the integration of machine translation systems in the translation process. This technology is by no means replacing human translators, but is simply offering valuable suggestions to ensure that the process is going at the requested speed.

Apart from translation memories and machine translation systems it is important to highlight different tools that are currently assisting in this process: terminology databases, terminology extraction systems, parallel corpora (thanks to the concordance software), and automatic speech recognition systems based upon voice recognition. Warren Weaver described in his Translation Memorandum (Warren, 1949) the different ways a computer could be used to translate automatically. He went further by suggesting some

cryptography methods; systems being used later by statistical machine translation systems like Google Translate. Besides this, IBM together with some researchers at Georgetown University developed a machine translation system. This system was able to automatically translate 49 sentences from Russian into English, using a lexicon of 250 words and six grammar rules (Hutchins, 2006).

In the sixties, it is important to mention the Bar-Hillel report, Bar-Hillel (1960) in which it was said that Fully Automatic High Quality Translation was a really difficult matter, mainly due to semantic ambiguity and the necessary world knowledge to be able to render quality translations. There was also an ALPAC report (1966) containing, despite the pessimistic approach, interesting suggestions for computer-assisted translation. Martin Kay was really the first one to introduce the two windows on a computer screen in the translation process: the upper window for the source text, and the lower one for the target text (Kay, 1980). Later, in the mid-1980s the first CAT companies were established, and among them we should consider Trados in Germany, and STAR in Switzerland. Besides this, the first translation memory systems were first used in 1993. In the same period, some European projects such as Eurotra (European Commission, 1990) and Rosetta (Appelo, 1986) were establishing the foundations for rule-based machine translation systems.

In the nineties, IBM turned their attention back to Warren Weaver's view that a translation could be an encoded version of the source text, which gave rise to the first statistical machine translation systems. This statistical approach has been widely used until recent times. Artificial neural networks developed in 2014 were also a major advance, leading to the creation of neural machine translation systems. Before knowing how a neural machine translation system works, it is important to recognize how an artificial neural network works. Artificial neural networks are inspired by the human brain. A neural network consists of a large number of interconnected artificial units or neurons that mimic real biological neurons in the sense that their output (or their activation) is dependent on the stimuli they receive from other neurons and the strength of the connection with which these stimuli are passed on (Forcada, 2017). Neural machine translation systems are data-based, just like statistical systems. Using a huge number of sample translations, which consist of aligned sentences in source and target language, a neural system learns how to translate.

Having dealt with the main highlights in the history of machine translation, the next section of this paper examines state of the art. In accordance with Christensen and

Schjoldager (2016) it is known that professional translators, when working, only interact with computers, although we have very little information on what is really happening between translators and machines (Muñoz Martín, 2014: 70), up to the point that “when we ask what translators really do with translation memories and machine translation, there is not an enormous amount of empirical data to speak of” (Pym, 2011: 2). In this paper, we are studying the role of CAT tools in the translation processes from a translator-computer interaction (TCI) approach, if we use a term first used by O’Brien (2012), which is connected to an area of study within the scope of computer science, which is human-computer interaction (HCI), and applied psychology (e.g. Johnson 1992; Carroll 1997, 2013). Now, we are referring to some experiments carried out within this framework of research. We should first refer to the comparison established between the quality of post-edited MT output and human translation by Fiederer and O’Brien (2009). They discovered that skilled evaluators place the same value on the quality of post-edited texts and the quality of human translations, if we refer to accuracy and coherence. Then, we should mention the experiment by Guerberof Arenas (2009), in which it is shown that higher productivity is achieved by professional translators when using MT matches than when processing fuzzy matches, making fewer errors in MT matches than in TM matches. The same study shows that there were significantly more errors when translating from scratch. It is also interesting to refer to Tatsumi’s research (2010), focused on editing speed and degree of editing. She reached the conclusion that MT matches are faster to edit than 75–79 % of fuzzy matches. It is also a fact that the usage of CAT tools is dramatically changing the procedures and content in translators’ translations (Folaron, 2010; Muñoz Martín, 2014: 70). Moreover, we should not forget the experiment by Garcia (2011), in which there was a comparison between post-editing of MT-generated text with human translation, resulting in marginal productivity gains when using MT. Furthermore, there is a shift in the role of the translator, moving from a phase based exclusively on linguistic transfer to a constant interaction with computers without forgetting linguistic matters. This could be illustrated with the process of segment-by-segment translation using CAT tools, which is more linear as translation is accomplished, as opposed to “traditional” translation, which was constantly going backward and forward (Bowker and Fisher, 2010: 4). It was also found that the process of segment-by-segment translation gives rise to the reproduction of source-text structures (Jiménez-Crespo, 2009: 233, and Dragsted, 2006). It is also worth remembering that there was a study on student-translators’ impact on TM

tools when translating by Christensen (2011), in which it was found that TM translation is more efficient, easier, more interesting, and obviously faster. It was also found that TM is more consistent, and conversely, the results were not so creative and personal, being also more mechanical. There was also an experiment by Teixeira (2011) in which the speed and quality of the translation is not greatly affected if translators are given MT or TM matches. Guerberof Arenas' 2012 research was called into question by herself at the moment she discovered no striking differences in quality or productivity between MT and TM matches (Guerberof Arenas 2014a, 2014b). Another fact to be taken into consideration is the time saved when translators are supplied with MT and TM matches, since the post-editing effort is diminished Federico *et al.* (2012). Finally, quality and translation speed was analysed by Läubli *et al.* (2013), reaching the conclusion that the translation time was reduced by 17.4 % when adding MT matches to other translation aids, and that the quality was also superior.

To sum up, the aforementioned pieces of research show the pros and cons of CAT tools concerning the translation process. The first advantage to be taken into consideration is the so-called recycling process with previous translations that translation memories accomplish. Therefore, technical or legal texts including many repetitions benefit from this system. Another advantage to be considered is efficiency. The aforementioned legal or technical texts, which have a high degree of repetition, are translated very rapidly with these translation memory systems. Translation memories also support different file formats, keep the original layout of the text and make search queries easier with the bilingual concordancer. Considering terminology, it is important to stress the consistency in translations of translation memories. Moreover, one of the most important advantages is the time gained during the translation process. Taking disadvantages into consideration, the translated texts may show inconsistencies in cohesion and coherence, since this system divides the source text into segments, and the translator may lose the importance of the text as a whole. In addition, emphasis should be placed on inaccurate translations because they could be saved and reused later.

2. METHODOLOGY

In order to check the results of applying a translation environmental tool and study the advantages and disadvantages, we are introducing Matecat, to the final year dissertations mentioned above. To select the texts and continue with the subsequent analysis at

different levels (namely lexical and semantic, syntactic, morphological, textual and stylistic level) the classification proposed by Calvi (2010) on the discursive genres has been followed. The first final year dissertation consists of a professional translation of a book entitled *Assisted Suicide* by Vaughan Roberts (2017) (from English into Spanish). For this purpose, three chapters have been chosen: the introduction, chapter one and chapter four. The Good Book Company operates in the UK, United States, Australia and New Zealand issuing books, didactic materials, videos, courses, etc. This book belongs to a collection entitled Talking Points written with the aim of helping Christians to think about the great social issues. The book could be classified within the framework of specialized texts attending the total number of scientific and theological terms. It is worth mentioning that there are 61 theological terms (38%) and 99 scientific (62%). The book is also defined by the linguistic features included in the scientific and theological texts. We can also see in the text some colloquial features such as contracted forms (*Let's not deny it, It's easier to protest*), a use of personal forms rather than impersonal ones (*If that is what you are hungry for*), active sentences instead of passive (*our aim is to give you an accessible introduction*) or the lack of conjunctions to link sentences (*The world is changing fast*). A priori, we could consider it as an informative text with a rather informal tone. Nevertheless, if we analyse its terminology, we come across a large number of specialized terms such as names of diseases (*chronic fatigue syndrome, psychic trauma*), technical equipment (*syringe pump, air syringe*), medicines (*morphine, pain reliever, heroin*), science branches (*Bioethics, Medical ethics, Biotechnology, Psychology*), theological terms (*apostle, commandment, judgment of God*), and so on. We are now focusing on five levels of the texts: lexical and semantic, syntactic, morphological, textual and stylistic levels.

a. Lexical and semantic level:

- Latin words such as *quietus*
- Use of acronyms *CFS, MND* or *ALS*
- Technical words: *Alzheimer, Chronic Fatigue Syndrome, painkiller, cancer, morphine, overdose, anaesthetise, syringe driver, etc.*
- Scientific terms; for example, *therapeutic, sedate, pills, dose, inject, etc.*
- Names of organizations: *Voluntary Euthanasia Society* or *Dignity in Dying*
- Suffixes and prefixes from science *bio-, -ose, etc.*
- Technical vocabulary: *handheld computer* or *syringes of air*
- Theological words *apostle* or *martyrdom*.

- Biblical vocabulary in words such as *compassion, love, hope, forgiveness, praise, pray, etc.*
- Biblical collocations *King of kings, bread and wine, in the image of God, etc.*
- Use of capital letters in theological terms: God, Lord, Trinity, Persons of the Godhead, Scripture, etc.

b. Syntactic level:

- Objective and clear syntax using the active voice:
The doctor was concerned that she didn't meet the required criteria for mental competence because of dementia, so he declined to write the requested prescription and instead referred her to a psychiatrist, as required by law.
- Subordinate sentences:
The main goal is to help people live as well as possible during the time they have left, rather than seeking to cure them.
- Use of neutral and impersonal forms in the passive voice:
Assistance provided by a doctor in the suicide of a patient who has chosen to end their life.
- Syntactic structures consisting of adjective + name: *loving creator, sovereign control, triune God, spiritual life, terminal cancer, mercy killing, etc.*
- Syntactic structures with an adverb + adjective + name: *highly evolved animals, highly functioning animal, etc.*

c. Morphological level:

- The use of compound words gives rise to concision and economy of the language: *physician-assisted suicide, brain-damaged, truth-revealing, pain-free, able-bodied, feel-good, etc.*
- Use of the present tense with a timeless reference:
Under the Suicide Act 1961 it is illegal in England and Wales to "aid, abet, counsel or procure the suicide of another or an attempt of another to commit suicide".
A hospital or care home that specialises in treating and caring for those who are dying from a terminal disease.
Reports suggest that Kate...

- Use of the past tenses to narrate past events:
In 2008, Frances Inglis, injected her son Tom with a massive overdose of heroin, which ended his life.
- Conditional tenses are used to introduce hypothesis:
Death occurs as a result of a decision by someone other than the person killed. This may be because the individual is unable to give consent because of their mental or physical condition.
It may be that you know that all too well from your own experience, perhaps because you, or someone you love, suffers from a terrible progressive condition, such as Alzheimer's...
- Religious sentences in the subjunctive: *may the name of the Lord be praised.*

d. Textual level:

- Connectors to achieve a logical sequence of the content:
Despite these reservations, the psychologist determined that Kate was competent to choose death.
He wrote in his report that while the assisted suicide seemed consistent with Kate's values, "she does not seem to be explicitly pushing for this". He also determined that Kate did not have the "very high capacity required to weigh options about assisted suicide", and therefore declined to authorize the lethal prescription.
- References to people, quotes by other authors or the Bible:
Our therapeutic society has already taken frightening strides towards the vision of the "Brave New World" that Aldous Huxley describes in his novel.
All flesh is grass, and all its beauty is like the flower of the field. The grass withers, the flower fades... but the word of our God will stand forever.
- Footnotes showing the source or adding some extra information:
Find a fuller version and more stories at <http://wrtl.org/assisted-suicide/personal-stories-assisted-suicide/> accessed January 2017.

e. Stylistic level:

- Use of metaphors belonging to the theological language: *the truth-revealing mirror that is God's Word, to produce the gold of strengthened faith, all flesh is grass...*
- Introduction of Biblical symbols:

...we regularly remember his suffering and death with the symbols of bread and wine

...the symbol of our faith is a cross...

- Repetitions to add emphasis:

We may lose our job, and feel worthless. We are not, because our value does not depend on what we do; it depends on who God has made us. We may fail an exam, or not find a marriage partner, or suffer from a debilitating illness—and think we are worthless. We are not, because our value does not depend on our intelligence, or ability, or marital status, or physical ability; it depends on God, who made us and loves us.

In this section, we focus our attention on another final year dissertation, based upon another professional translation of a collection of tourist texts in English collected from official web pages never translated before. To select those texts, a classification based upon Calvi's (2010) considerations on discursive genres has been used. That classification includes sub-genres comprising the following topics: Arts and History, sports, cuisine, shows and entertaining and landscape. All texts have been selected considering factors such as topics included in the sub-genres and specific conventions and terminology. In order to do so, a large number of official websites on these topics from Great Britain, Ireland, USA, Canada, Australia, etc. have been consulted.

f. Arts and History

First, regarding the text on Arts and History, some features should be mentioned. The text comes from the official website of the Royal Collection (<https://www.rct.uk>) and offers information on the history of Windsor Castle. The main aim of this text is to inform since it gives accurate information about the castle and history. In addition to that, this text aims to attract prospective customers to visit the place, so it has another purpose, which is to convince the reader. As far as the lexis is concerned, it is important to stress that positive language is used (*finest, colossal, magnificent, richly, elaborate*), but there are not many specialized terms (*carving, malachite urn, ornamental plaster*). Sentences are short and simple in order to be easily understood.

g. Sports

The next text is about sports. This one has been found on another website (<https://www.venture-xtreme.com>) and deals with adventure sports. It describes the current situation of the tourist and sports sectors. Many well-known terms on sports can

be found such as *surfing, rafting, skateboard or parachute*, as well as many unknown ones such as *coasteering, dry slope skiing, luge or free ride MTB*. The text is not a difficult one, although sentences are not so simple and grammatical structures are more complex than a simple touristic text –for example, the last part of the text is more formal than the first one that focuses on sports business.

h. Cuisine

Another text included in the work is related to the English cuisine webpage (<http://www.essentially-england.com/english-food-lunch-and-dinner.html>). The intention of this text is to trigger a potential customer to know and try the typical cuisine. It has basic information on the typical food. There are many terms dealing with English food (*shepherd's pie, Lancashire hotpot, toad in the hole o gravy*). A cultural component should be mentioned here since the text is referring to a specific type of food. The text is structured in short and simple paragraphs and the vocabulary is not difficult to understand. The author uses attractive and positive language, for example, *substantial, popular, wonderful, mouth-watering*, which demonstrate the persuasive tone of the text. The informative function should be considered to be the main one because special emphasis is given to the information about typical dishes. Finally, this text has a clear intention to recommend, which is expressed in sentences such as *and if you've never tried this, you really should* or *if you don't fancy cooking it at home, your local pub is the place to go*.

i. Shows and entertaining

The text included under the heading *shows and entertaining* is from the website (<https://www.knotts.com>). The aim of the text is to give some recommendations and persuade the reader to visit the park. Persuasion is found in the use of words such as *fun, thrilling, perfect, unique, extreme*, as well as in sentences such as *it is a must-see, plan a visit, visit often as every Seasons of Fun seasonal event brings new live entertainment to Knott's Berry Farm or check out*. Despite the fact that there is not any specialized lexis, many terms and structures are noticeable (*roller coaster, thrilling rides, defying speed, brave, extreme water slides*, etc.). Units of measurement should be considered when translating the text: *foot, mph, gallons*.

j. Landscape

With regard to the last category, namely that of landscape, it is important to mention that this is probably the most difficult to find on official websites. In this case, we

examined an English text on the National Park of Dartmoor (<http://www.dartmoor.gov.uk/wildlife-and-heritage/landscape/historic-landscapes>), where we can find terminology on Geography and Geobotany. This is mainly an informative text. Its register is more formal, displaying a rich and varied vocabulary and offering technical information, though it is not a difficult text. Sentences are longer and more complex than the other texts under consideration. As mentioned, lexis is more complex and technical in this case. This is clearly illustrated by examples such as *dams, reservoirs, leats, hedgebanks, hedgerows, ridges, tors* or *blanket bogs*. Some terms could be problematic when translating into Spanish (*tor* or *leats*).

k. Matecat

Having revised the main features of the texts under consideration, we now focus on the tool used to translate it. According to Matecat's site: "Matecat is a free and open source online CAT tool. It's free for translation companies, translators and enterprise users." (Matecat, 2014). The founders and main contributors of Matecat are the international research center FBK (Fondazione Bruno Kessler), the translation company Translated srl, the Université du Maine and the University of Edinburgh.

In Matecat translation, assignments are organized into projects in which the user specifies the source language and the target language. One project comprises one or several texts to be translated, and each project has a translations memory. Matecat provides, by default, a connection with Google Translate as a machine translation system, and a connection with MyMemory as a public translation memory. It is important to mention that MyMemory is an open, available translation memory including the translation memories of the European institutions, the United Nations and automatically extracted data from multilingual websites. The first operation to be carried out is the analysis of the project. By clicking Analyze, Matecat shows how many words need to be translated in the preliminary analysis report it produces. In this report, the total number of words of the source text is displayed under Total Word Count. Then the post-editing is started and it is possible to see some translation suggestions. The translator has to decide how to adjust the translation and click Translated when the work is done. Matecat also offers the concordance function to look up words and phrases in the active translation memories. Once the post-editing is finished in the last segment, we can download the translated text and the translation memory. The Editing Log allows the translator to view adjustments made to the MT

suggestions in the whole process. Finally, the average Post-Editing Effort (PEE) can be observed.

Before presenting the details on both of the final year dissertations, it is important to mention that Matecat counts words according to industry standards, so “words or phrases with a 100% Translation Memory match are given a weighting of 30% and words or phrases with a partial TM match are given a weighting of 60%” (Matecat, 2014).

3. RESULTS

To analyze the advantages and disadvantages of introducing Matecat in the above project, we are using an automatic method to rapidly assess the output. Before starting the actual calculations, the charts below are presented to show the information called Analysis Report in percentages given by Matecat:

Chart 1. Analysis Report. Text entitled Introduction

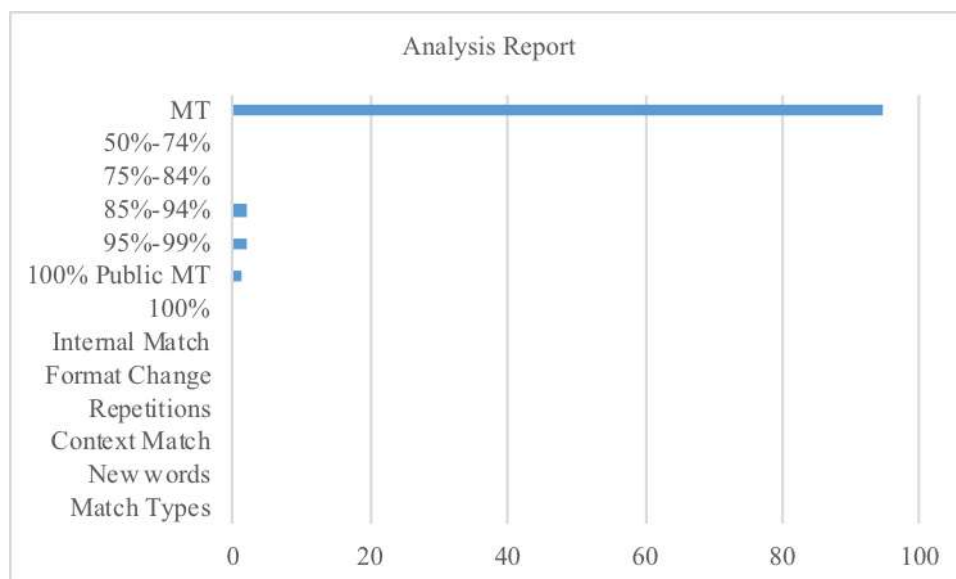


Chart 2. Analysis Report. Text entitled Chapter 1

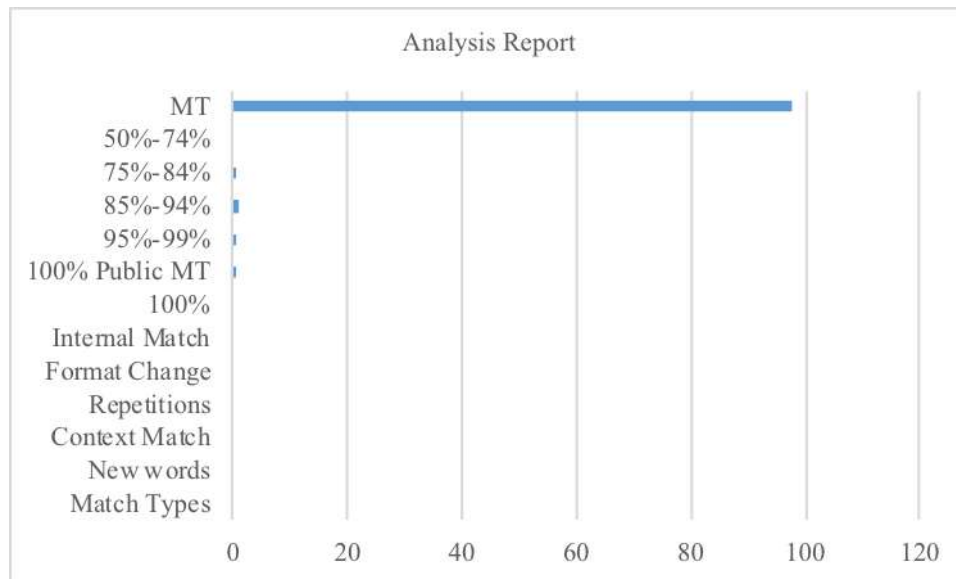
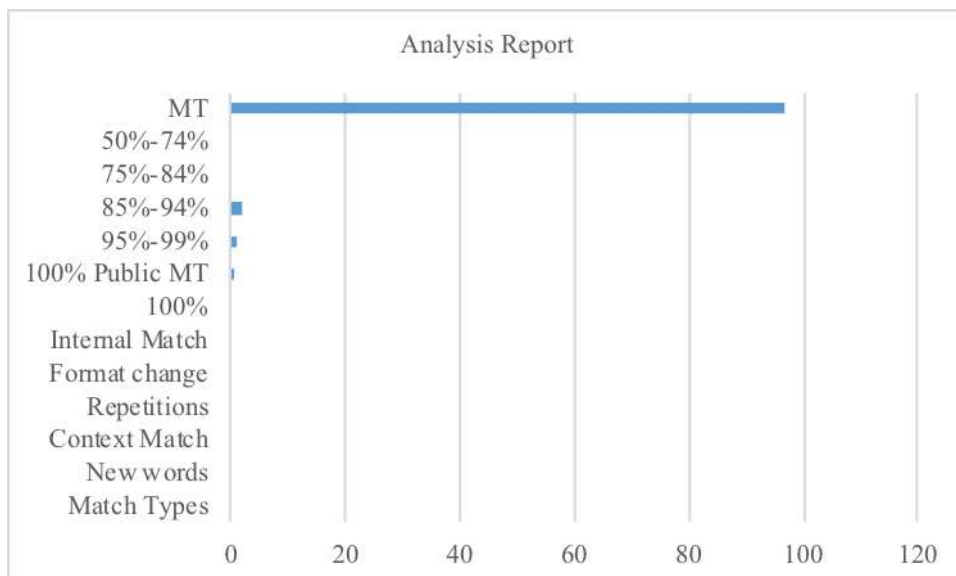


Chart 3. Analysis Report. Text entitled Chapter 4



At this point it is important to reiterate that we are comparing a reference translation with a machine translation within the context of the underlying idea that “the closer a machine translation is to a professional human translation, the better it is” (Papineni, Roukos, Ward & Zhu 2002: 311-318).

The first evaluation metrics we are introducing here are Precision and Recall. First, we must count the number of words in both the machine and the reference translation. In order to do a calculation with Precision, the number of common words is divided by the

number of words in the machine translation. The calculation of Recall is achieved by dividing the number of shared words by the number of words in the reference translation. We consider a system to be good if scores are high, so the best system is the one with the highest scores.

WER (Word Error Rate) is another metric we are implementing. In this method, differences such as substitutions, insertions and deletions are taken into account. This metric is based on Levenshtein distance calculated at word level. In this case, the lower the WER result, the better.

The most common metric used is BLEU (Bilingual Evaluation Understudy). This method discovers how many n-grams are overlapping between the machine translation and the reference translation. This metric is based upon the idea that the larger the number of n-grams overlapping between the machine translation and the reference translation, the better the machine translation is. The machine translations should be as near to 1 as possible to be considered good translations. The formula to calculate BLEU is:

$$BLEU = \min \left(1, \frac{\text{number of words in MT}}{\text{number of words in ref}} \right) \prod_{i=1}^4 precision_i$$

In order to obtain the results, a program¹, written in Python language, was used to implement the WER, BLEU, Precision and Recall functions from the information dumped in a file. The file recognized a header, followed by different text segments corresponding to the original, a reference translation and several translations to be compared. The code proceeded to calculate each function by combining the reference with each translation to generate another file in table format that could be used directly and sent to a spreadsheet. When performing translation tasks, three different machine translations were offered. The average is calculated for each suggestion offered by the machine, taking into account the above metrics.

Table 1. Evaluation metrics results for the first final year dissertation

	W1	W2	W3	B1	B2	B3	P1	P2	P3	R1	R2	R3
Introduction	0,3648	0,9696	0,9637	0,4689	0,0002	0,0065	0,9001	0,3721	0,3482	0,9172	0,8376	0,8268
Chapter 1	0,3002	0,9499	0,9797	0,5398	0,0042	0,0005	0,9548	0,3847	0,3100	0,9604	0,8522	0,8365
Chapter 4	0,3254	0,9695	0,9728	0,5089	0,0008	0,0002	0,9496	0,3994	0,3525	0,9515	0,8349	0,8566
Average	0,3301	0,9630	0,9721	0,5059	0,0017	0,0024	0,9348	0,3854	0,3369	0,9430	0,8416	0,8400

¹ This programme was developed by Juan Manuel Dato Ruiz (qualified computer technician) taking into consideration the evaluation metrics mentioned above.

Table 2. Evaluation metrics results for the second final year dissertation

	W1	W2	W3	B1	B2	B3	P1	P2	P3	R1	R2	R3
Dartmoor	0,5992	0,9836	0,9861	0,1980	0,0001	0,0139	0,8916	0,2649	0,2129	0,9206	0,8584	0,5992
English Food	0,6742	0,9445	0,9648	0,0755	0,0049	0,0000	0,8282	0,3012	0,2633	0,9212	0,9103	0,8581
Berry Farm	0,2885	0,9607	0,9667	0,5262	0,0001	0,0000	0,9503	0,2650	0,1713	0,9529	0,9092	0,9165
Royal Collection	0,6790	0,9909	0,9937	0,0899	0,0001	0,0000	0,8974	0,2019	0,1418	0,8591	0,8644	0,8752
Venture Extreme	0,6165	0,9192	0,9556	0,2648	0,0616	0,0205	0,7884	0,4426	0,3829	0,8466	0,7563	0,7038
Average	0,7470	1,2932	1,3038	0,2965	0,0017	0,0046	1,1892	0,3443	0,2631	1,2179	1,1808	1,0830

W: WER; B: BLEU; P: PRECISION; R: RECALL. Best results in bold type

We can go a step further and consider students' translations as another suggestion (and not as a reference translation) and the introduction of the professor's translation (as a real reference translation). Then, when calculating the above-mentioned evaluation metrics (WER, BLEU, Precision and Recall), the results are being refined. Following this, a mark can be calculated using this formula:

$$(3*(1-W) + 1*B + 1*P + 1*R) \cdot 10/6$$

When W=0 no mistakes, maximum mark 1-W

Following the above results, a mark can be calculated using this formula:

$$(3*(1-W) + 1*B + 1*P + 1*R) \cdot 10/6$$

When W=0 no mistakes, maximum mark 1-W

Table 3. Translation marks of five students

	W	B	P	R	MARK
S 1	0.2741	0.4776	0.9661	0.9603	7,64
S 2	0.5085	0.3024	0.8971	0.9118	5,97
S 3	0.6316	0.1314	0.8154	0.8437	4,82
S 4	0.7654	0.0310	0.8890	0.7938	4,02
S 5	0.4076	0.3931	0.7962	0.7760	6,23

S: STUDENT

A questionnaire was also posted to the students using Matecat with the following questions:

1. Was this CAT tool efficient for your work?
2. Do you think that keeping the original layout of the text is an advantage for professional translators?
3. Do you believe that the bilingual concordance made your search queries easier?
4. Considering terminology, it is said that consistency in translations of translation memories is improved. Do you think this was your case?
5. Were your texts translated faster than without using Matecat?
6. Do you think that the 3 machine translations suggestions were useful?
7. Translation is an activity that requests a deep knowledge in certain areas such as grammar, semantics and the world, and human translators are better in this matter. Despite this fact, do you think this is a practical and useful tool?
8. Matecat uses MyMemory (an open available translation memory including the translation memories of the European institutions, the United Nations and automatically extracted data from multilingual websites). Do you think this resulted in a better translation of your text?
9. Do you consider the preliminary analysis report a useful tool for your translation?
10. Another tool in Matecat is the Editing Log. It allows the translator to view adjustments made to the MT suggestions in the whole process. Do you consider it a practical tool?
11. Can you see some advantages in the average Post-Editing Effort (PEE) for your translation?
12. When using this tool, text is divided in segments. Do you think this could affect cohesion and coherence?

Chart 4. Results of the questionnaire (questions 1-11)

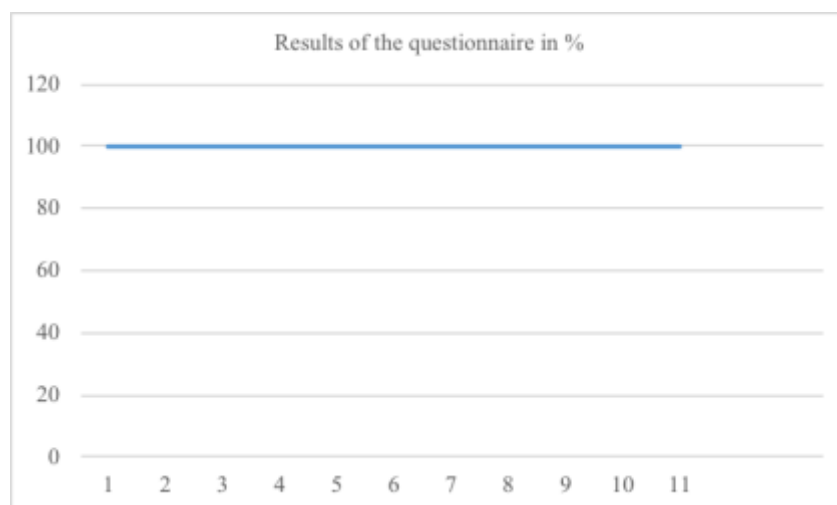
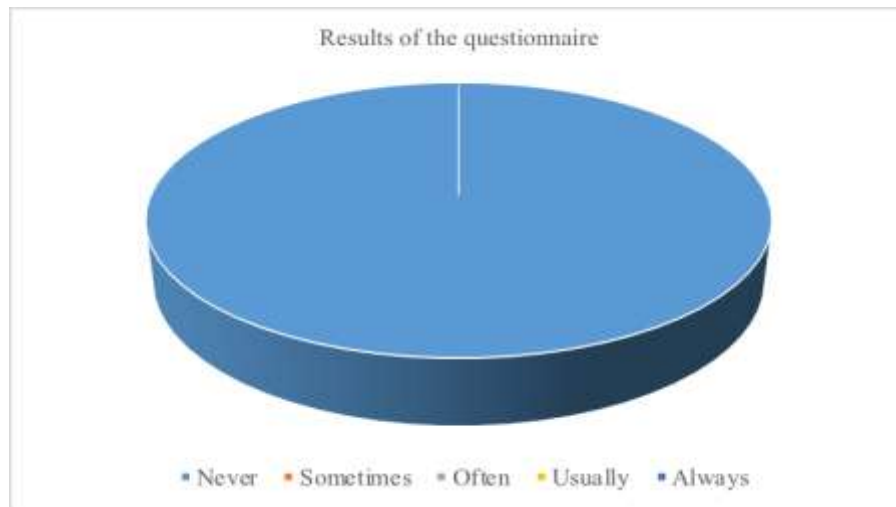


Chart 5. Results of the questionnaire (question 12)

4. DISCUSSION AND CONCLUSIONS

From the above results, the total best average results are as follows:

Table 4. Best evaluation metrics results for both final year dissertations

	W1	B1	P1	R1
Introduction	0,3648	0,4689	0,9001	0,9172
Chapter 1	0,3002	0,5398	0,9548	0,9604
Chapter 4	0,3254	0,5089	0,9496	0,9515
Average	0,3301	0,5059	0,9348	0,9430
Dartmoor	0,5992	0,1980	0,8916	0,9206
English Food	0,6742	0,0755	0,8282	0,9212
Berry Farm	0,2885	0,5262	0,9503	0,9529
Royal Collection	0,6790	0,0899	0,8974	0,8591
Venture Extreme	0,6165	0,2648	0,7884	0,8466
Average	0,7470	0,2965	1,1892	1,2179

The nearer the results are to 1, the better are BLEU, Precision and Recall (and therefore, the translation). Conversely, the nearer the results are to 0, the better the WER is. The above best results come from MT1. Hence, MT1 seems to be the most useful suggestion since it offers the best results compared to the Reference Translation. We also confirm that the recycling process with previous translations that translation memories

accomplish is a good reason for using this CAT tool. The fact that technical or legal texts include many repetitions means they can benefit from this system. The translation process is also more efficient for the same reason. With regard to terminology, we have to insist on the consistency in translations of translation memories.

Another aspect to be considered from the questionnaire posted to the students is the positive effects of using Matecat in professional translation works. At the beginning of this paper, it was mentioned that the translated texts may show inconsistencies in cohesion and coherence, since this system divides the source text into segments, and the translator may lose the importance of the text as a whole. In addition, inaccurate translations could be saved and reused later. However, from the questionnaire results (specifically the results from question 12) this matter does not affect the professional translations at all. There is some confirmation of the initial statement that machine translation is a difficult task since it requires deep knowledge in certain areas such as grammar, semantics and the world (question 7 from the questionnaire). Most importantly, this research also confirms that although the development of a technology resembling human translators is not imminent, the existing technology is currently making the translation process easier.

Some of the comments from the students are:

Student 1: this tool is very useful for professional translators, especially considering terminology. It offers accurate translations most of the time, maybe because it has an international translation memory and English is the most used language nowadays.

Student 2: translation is faster and more reliable with this tool.

An interesting proposal for further study could be the consideration of the final user's opinion regarding the translation. One way to ascertain the final users' opinions would be to send them a questionnaire to complete. This questionnaire would comprise questions relating to the different levels of translation (the lexical and semantic, syntactic, morphological, textual and stylistic levels). An analysis of the texts belonging to the first year dissertation should show us language for dissemination, which could be transmitted through written (text/scientific document) or oral (lectures, communications) discourses (Gutiérrez Rodilla, 1998: 21). However, the texts included in the second final year dissertation related to the tourist sector, include specialized and cultural terms, the subordination of the text to the images, as well as the abundance of double meanings (Durán, 2008: 355). To get the message across, the texts on tourism have to fulfil their main aim, which is to persuade the tourist, and for that there are some parameters to be

met, fixed by the sequence AIDA (attention, interest, desire and acquisition). Therefore, from a psychological point of view, the texts have to, as a final objective, produce the following sequence in the customer: “attract customers’ attention, trigger their attention, generate their desire and achieve the acquisition” (Beltrán 2002: 57). As a consequence, a detailed analysis of the results of the questionnaires could check if the main objectives of the texts have been fulfilled, and if answered by the final user, could give us relevant information regarding the translations.

To conclude, this first examination of the use of CAT tools in scientific and tourist texts has been revealing, giving us evidence on the main issues introduced at the beginning of the paper. CAT tools have many advantages such as the use of translation memories benefiting specialized texts, efficiency when accomplishing translations since texts are very rapidly translated, as well as the fact that they support different file formats. Moreover, if we consider terminology, it is important to stress the consistency in translations offered by translation memories.

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