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Title

Artificial Intelligence Contributions to Machine Translation, translation of extracts from the novel "the hearts of horses" by Molly Gloss through ChatGPT, Babylon, Reverso, Yandex and Google translate.

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Chapter II: Machine Translation of extracts from the Novel "The Heats of Horses" Analysis and Contributions.

Dedications

I dedicate this humble work to my most precious treasure in life, my beloved mother, may Allah bless her with good health and a righteous long life.

To whose tireless efforts brought us moments of happiness, to the one who cleared the thorns from my path paving the way for knowledge, my dear father may Allah protect him and keep him as a perpetual crown upon my head.

To those who have illuminated my path with their love and support, my sisters Nadia, Naima and Zohra.

To my brother Fateh and his wife Nassima, who stood by my side throughout my academic career.

Last but not least, to my dear friend Kenza, who shared the accomplishment of this work with me.

Melissa

Dedications

I dedicate this work to:

My dearest mother, the most important person in my life. You have always been here for me, through thick and thin. You have taught me so much about life, love, and compassion. I am so grateful for your unending love and support.

To my father, you taught me to work hard and never give up. This achievement is for you Dad.

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List of abbreviations:

AI : Artificial Intelligence.

MT : Machine translation.

NLP : Natural Language processing.

SMT : Statistical Machine Translation.

RBMT: Rule-Based Machine Translation.

EBMT: Example-Based Machine Translation.

NMT: Neural Machine Translation.

HAMT: Human Assisted Machine Translation.

ST: Source Text.

TT: Target Text.

TL: Target Language.

SL: Source Language.

TTS: Text-To-Speech.

ASR: Automatic Speech Recognition.

General Introduction

The technology of our time has evolved dramatically, largely due to artificial intelligence, which has impacted many facets of our lives. It enables people worldwide to communicate and interact with each other quickly and easily, reminiscent of interactions in a small village.

The idea of translation has developed to overcome the language barrier and bridge cultures; it has played a critical role in the transfer of knowledge and culture across different languages, by enabling texts, to be translated from one language to another.

In the mid-twentieth century, the world witnessed a promising attempt to develop a translation device that performs what is called machine translation. This was an attempt to reduce translation expenses and provide the factors of speed and confidentiality on one hand, and to ultimately obtain a translation that meets the highest standards on the other hand.

Thus, interest in studies and research in machine translation was born in a new from and with a different horizon to be the basis for progress in various fields, including education, commerce, medicine, entertainment, media, travel and others.

Machine translation can use translation sites to convert texts from one language to another; these sites use a combination of techniques, including statistical models and neural networks, to analyze the structure and meaning of the text and then generate a translation. They consider context and syntax, aiming for coherent translations. Machine translation systems have been developed to help bridge the language gap with the help of Artificial intelligence and machine learning technologies; in the realm of travel, machine translation significantly eases the lives of people on the move by providing instant language support, travelers can navigate the unfamiliar environment, engage with locals, and access essential information such as directions and services with greater ease. Additionally, in education, machine translation aids language learners by offering quick and accessible translations, promoting cross-cultural understanding within educational settings. Moreover, in Commerce, it facilitates international business transactions by breaking down language barriers in negotiations and collaborations, fostering global trade and economic connections.

The current study entitled: **“Artificial Intelligence Contributions to Machine Translation”** seeks to discuss the following research problem:

“How Artificial Intelligence could impact on machine translation?”

So, to achieve the purpose of the present study, this research work is carried out to find answers to the following questions:

- Can Artificial intelligence solve all the problems of machine translation?
- What are the attitudes of translators towards machine translation?

In the light of the above-questions, we hypothesize the following:

- Artificial intelligence cannot solve all machine translation problems, but it can be useful in facilitating the process.
- The attitude of human beings towards machine translation is becoming more positive as the technology improves and becomes more widely used; however, there are who ignore its accuracy and quality. Machine translation may need less intervention by human beings than earlier.

In the light of investigating the role of both artificial intelligence and machine translation in bridging cultures and facilitating the translation mission, we opted to discuss this topic by working on “Artificial Intelligence Contributions to Machine Translation” through the translation of the novel **“The Heats of Horses” by Molly Gloss**, which is considered as the corpus of our research, we will select six passages from the first part of the novel, then we will translate them from English to Arabic languages using the following translation sites: Google translate, Reverso, Babylon and Yandex translate. Later on, the focus will be on extracting the loss and gain aspects within the target text.

Throughout this research, we aim to reach the following objectives:

- Explore how artificial intelligence can be used to improve the output of machine translation.
- Find out how artificial intelligence can help and improve people’s cognitive needs.
- Identify the benefits and limitations of such websites and engines.

For this research project, we accomplish a comparative and analytical study, through discussing the translation of six (06) extracts of our corpus entitled “The Hearts of Horses”, by ”Molly Gloss”, from English to Arabic using multiple translation sites,

ChatGPT among them. After that, we will rely on the analytical study in order to assess and measure the amount of loss and gain in the target text.

If we choose to handle this subject entitled: “Artificial Intelligence Contributions to Machine Translation”, it is for a set of reasons that could be classified into two categories personal and objective:

Personal reasons:

-Passion for technology: we feel a great excitement towards the advancement of artificial intelligence and how it impacts both machine and human translation.

-Scientific curiosity: we aim to understand how artificial intelligence-driven techniques enhance and improve machine translation.

-Expanding knowledge horizons: we aim to gain in-depth knowledge about the techniques and methods used to enhance automated translation.

Objective reasons:

-Rapid technological evolution: we notice that new artificial intelligence technologies are rapidly improving the efficiency of machine translation sparking our curiosity to learn more.

-Societal impact: we recognize that the contributions of artificial intelligence to machine translation affect cross-cultural communication and bring people closer together.

-Challenges faced by the opportunities presented by artificial intelligence-enhanced machine translation techniques.

This research is structured into theoretical and practical parts:

Chapter one: this chapter entitled “Artificial intelligence and Machine Translation” is divided into two sections; the first one deals with the definition, advantages and contributions of artificial intelligence. In the second part of the same chapter, we will explore the types and the different sites of translation, machine translation errors, the need for human intervention of a translated text by machine translation, and loss and gain in translation.

Chapter Two: in this chapter, we will conduct a comparative stylistics study of a specific part of the novel “The Hearts of Horses” written by “Molly Gloss”. We will

translate it from English to Arabic languages using multiple translation sites, including Google translate, Babylon, Reverso and Yandex translate. Then we will compare the obtained translation by machine translation, after that we will measure the amount of loss and gain used in each example.

Finally, we will finish our research with a conclusion, which will summarize the two chapters mentioned above, and try to give answers to the above-mentioned questions as we will approve or reject some hypotheses.

To accomplish our research properly, we will rely on the following references:

- Thumu Muni Balaji, G. Balakrishnan, Suman and Priyanka Sharma (2023) Artificial intelligence and intelligence systems.
- Jemal H. Abawajy, Zheng Xu, Mohammed Atiquzzaman and Xiaolu Zhang (2023) Tenth international conference on Applications and Techniques in Cyber Intelligence (ICATCI 2022).
- Danin Bozovic (2021) the role of human beings in the transformation from artificial intelligence to artificial consciousness.

In addition to other references that will be organized in the list of references.

During our study, we encountered some difficulties; the main difficulty that we faced was that natural language is full of context and ambiguity, making it difficult for artificial intelligence models to understand and translate accurately.

The present chapter entitled “artificial intelligence and machine translation” is divided into two sections. In the first one we will address the definition of artificial intelligence, advantages and contributions of artificial intelligence in machine translation. In the second section, we will define machine translation, its types, then we will mention some sites of translation, and machine translation errors, Human and machine translation, at the end we will deal with the loss and gain in translation.

I.1 History of Artificial Intelligence:

The history of Artificial intelligence dates back to the 1950 s, and since then the field has developed rapidly; REYNOSO Rebecca provides us a detailed event that witnessed artificial intelligence since 380BC, here is a brief and remarkable events and periods:

13th century:

- The first humanoid robot, invented by Arab inventor Artificial intelligence - Jazari in 1206 AD, is created.

15th century:

- Johannes Gutenberg invents the printing press around 1440 AD.
- Leonardo davinci designs a “robot” in 1495.

16th century:

- The first measuring machine, the clock, is invented.

17th century:

- Machines capable of digital and arithmetical calculations are invented by Blaise pascal and Sir Samuel Morland, and perfected by Gottfried Wilhelm Leibniz.

19th century:

- The first programmable machine, the Jacquard loom, is invented b Joseph-Marie Jacquard.

20 century:

- (1912) chess machine operated by electromagnets is invented by Torres Y Quevedo.
- (1920) the term “robot” is first used in the play R.U.R (Rossum’s Universal Robots) by Czech playwright Karel capek.
- (1939) Westinghouse Electricat introduces a “mechanical man” at the 1939 world’s fair.
- (1945) the concept of “heuristic thinking” is discussed in Georg polya’s how to solve it and is said to have greatly influenced the science behind artificial intelligence.
- (1950) the three laws of robotics are published by American writer Isaac Asimov.
- (1956) the term “Artificial intelligence” is coined by John Mc Cathy.
- (1956) the first functional Artificial intelligence program is written by Allen Newell, JC Shaw and Herbert Simon.
- (1957) Arthur Samuel of IBM writes the first game playing program capable of learning checkers and challenging a world champion.
- (1962) Animation, the first industrial robot company, is founded.
- (1963-1971) it is discovered by several scientists that computers can solve the same kinds of analogies, problems, and understand language.
- (1973) the first mobile phone call is made.
- (1976) the apple 1 hits the market and sells for $666.66
- (1980) Lisp machines officially hit the market.
- (1981) Danny hill designs the connection machine.
- (1989) the World Wide Web is created.
- (1992) IBM creates the Simon personal communicator, the first “Smartphone”

21 century:

- (2007) Apple releases the iphone.
- (2010) Apple introduces personal assistant “Siri”, using voice- recognition and artificial intelligence technology.
- (2014) microsoft introduces “cortana”, a direct competitor of apple’s Siri.
- (2015) Amazon releases “Echo”, with personal assistant Alexa.

- (2015) the future society at Harvard launches the “AI” initiative, dedicated to the study, advancement, and ethical use of artificial intelligence. (Natalie.D:2017:3-4).
- (2016) a humanoid robot named Sophia is created by Hanson Robotics. She is known as the first “robot citizen”.
- (2016) Google released Google home, a smart speaker that uses Artificial intelligence to act as a “personal assistant” to help users remember tasks, create appointments, and search for information by voice.
- (2017) the facebook Artificial intelligence research lab trained two “dialog agents” (chatbots) to communicate with each other in order to Learn how to negotiate. However, as the chatbots conversed, they diverged from human language (programmed in Enghlish) and invented their own language to communicate with one another- exhibiting Artificial intelligence to a great degree.
- (2018) Alibaba (Chinese tech group) language processing Artificial intelligence outscored human intellect at a Stanford reading and comprehension test.
- (2018) Google developed BERT, the first “bidirectional, unsupervised language representation that can be used on a variety of natural language tasks using transfer learning.”
- (2018) Samsung introduced Bixby, a virtual assistant. Bixby’s functions include voice where the user can speak to and ask questions, recommendations, and suggestions: vision, where Bixby’s “seeing” ability is built into the camera app and can see what the user sees; and home, where Bixby uses app-based information to help utilize and interact with the user. (https://www.g2.com/articles/history-of-artificial-intelligence. Visited on July 8th, 2023 at: 20:53).
- (2020) Baidu releases its Linear Fold Artificial intelligence algorithm to scientific and medical teams working to develop a vaccine during the early stages of the SARS -Cov-2 pandemic. The algorithm is able to predict the RNA sequence of the virus in just 27 seconds, 120 times faster than other methods.

- (2020) Open Artificial intelligence releases natural language processing model GPT-3, which is able to produce text modeled after the way people speak and write.
- (2021) Open Artificial intelligence builds on GPT-3 to develop DALL-E, which is able to create images from text prompts.
- (2022) The National institute of standards and technology releases the first draft of its Artificial intelligence risk management framework, and voluntary U.S. guidance “to better manage risks to individuals, organizations, society associated with Artificial intelligence”.
- (2022) Deep Mind unveils Gato, an Artificial Intelligence system trained to perform hundreds of tasks, including playing Atari, captioning images and using a robotic arm to stack blocks.
- (2022) Open Artificial intelligence launches chatGPT, a chatbot just a powered by a large language model that gains more than 100 million users in just a few months.
- (2023) Microsoft launches an Artificial intelligence powered version of Bing, its search engine, built on the same technology that powers chatGPT.
- (2023) Google announces Bard, a competing conversational Artificial intelligence.
- (2023) Open Artificial intelligence launches GPT-4, its most sophisticated language model yet (https://builting.com/artificial- intelligence . Visited on July 8th, 2023 at 20:02).

The history of artificial intelligence is a testament to human ingenuity and technological progress. From the early concepts of humanoid robots in the 13th century to the modern-day sophisticated language models like GPT-3 and GPT-4, AI has come a long way.

One notable aspect is the gradual evolution of AI from mechanical inventions like the Jacquard loom and chess machines to the development of software-based intelligence in the mid-20th century. The formulation of the three laws of robotics by Isaac Asimov in 1950 reflects not just the technical advancements but also the ethical considerations surrounding artificial intelligence.

The 21st century witnessed a rapid acceleration in AI capabilities with the introduction of personal assistants like Siri, Cortana and Echo, demonstrating AI's integration into

everyday life. Moreover, the breakthroughs in natural language processing, exemplified by GPT-3's ability to mimic human speech, and innovations like DALL-E's image creation from text prompts showcase AI's versatility and creativity. However, along with these advancements, there are also discussions about the ethical implications and risks associated with AI, as seen in initiatives like the AI Risk Management Framework by NIST. The development of AI systems like Gato, which can perform a wide range of tasks, highlights the potential for AI to augment human capabilities significantly.

The history of AI reflects a journey marked by innovation, ethical considerations, and the ongoing quest to harness the full potential of artificial intelligence while ensuring its responsible and beneficial use for society.

I-2 Definition of Artificial Intelligence:

According to BOZOVIC (2020), "artificial intelligence is a sub part of computer science. It includes the study and design of intelligent agents that have the ability to analyze the environments and produce actions which maximize success. Artificial Intelligence research uses tools and insights from distinct fields, including computer science, psychology, philosophy neuroscience, cognitive science, linguistics, operations research, economics, control theory, probability, optimization and logic. Artificial Intelligence research also overlaps with tasks such as robotics, control system, scheduling, data mining, logistics, speech recognition, facial recognition and others". (Bozovic, D 2020:2)

According to the above-cited definition, artificial intelligence can be defined as a set of technologies used to learn different behaviors, and to develop the ability to make independent decision. It includes many methods and techniques, such as machine learning, neural networks, statistical learning, fuzzy logic, cooperative learning, and general learning. Artificial intelligence can be used to solve various problems in fields such as medicine, commerce, manufacturing, agriculture, education, and entertainment.
Martin SPANO (2019): defines Artificial intelligence as follows:

"It is an intelligence demonstrated by machines as opposed to the one manifested by humans. It is an area of study in computer science trying to recreate what the human brain does. That is to virtually perceive the world understand and respond to speech, learn, Plan and solve problems. As it is a computer that performs this recreation, it is the software that brings about this intelligence". (Spano, M: 2019:15).

In other words, the goal of Artificial intelligence is to create machines that can think and learn like humans, and to use these machines to solve complex problems in a wide range of domains.

I.3 Advantages of Artificial Intelligence:

Artificial intelligence presents a transformative technological frontier that brings with it a range of benefits.

In our day-to-day work, we will be performing many repetitive works like sending a thanking mail and verifying certain documents for errors.

Using Artificial intelligence we will productively automate these mundane tasks. Using artificial intelligence alongside other technologies we will make machines take decisions faster than a person's and perform actions quicker. While taking a choice human will analyze many factors both emotionally and practically but artificial intelligence powered machine works on what it's programmed and delivers the results in a faster way.(Bhbosale.S, Pujari.V,Multani Z :2020:228-229).

This means that artificial intelligence algorithms are designed to optimize efficiency, enabling machine to quickly sift through data, identify patterns, and arrive at conclusions. Moreover machines can parallel processes, which mean they can handle multiple tasks simultaneously without slowing down.

Artificial intelligence offers substantial advantages across diverse domains, including healthcare, finance, transportation, agriculture, education and others.

For education, it has been demonstrated that using AI-powered tailored learning systems improves student's learning outcomes and engagement. By tailoring the curriculum to the Individual requirements and preferences of each student and taking into account the demands of varied learners, these platforms may offer students individualized feedback and support. (Idoko.J.B, Abiyev.R: 2023: 248).

We notice that using customized learning systems supported by artificial intelligence means that educational platforms rely on artificial intelligence technology to understand the individual needs and learning styles of each student, when students participate in educational activities through these platforms, data is collected about their interactions and performance. This data is then used to create a unique learning profile

for each student; for example, if a specific student is struggling to understand a particular concept in a specific subject, the intelligent system uses information about this difficulty to provide additional explanations or tailored learning activities to help the student overcome this obstacle.

I.4 Artificial Intelligence advancements in Machine Translation:

Artificial intelligence has contributed to machine translation by improving speed, accuracy, and quality; with Artificial intelligence, we have seen significant improvement in translation software by using natural language processing (NLP) Artificial intelligence can understand context, idioms, and colloquialisms, which has allowed for more natural translation.

Text is mechanically translated from one language to another using an Artificial intelligence system with no human intervention required. Rather than just translating words into their target language, modern machine translation conveys the original text's intended meaning. It dissects the text and figures out how the various parts relate to one another (Muni Balaji,Th, G. Balakrishnan, Suman, Priyanka.Sh : 2023: 178).

In this regard, automated text translation using artificial intelligence relies on Natural language processing (NLP) technology to understand and translate text from one language to another without human intervention, the process involves training intelligent models using vast amounts of language data to ensure translation accuracy; the original text is comprehensively understood, Including sentence and word analysis, context, and intended meaning, and then carefully translated to preserve the original meaning.

The automatic translation rule of artificial intelligence is based on computer technology. As automatic translation is a new translation method, it can not only help translators understand the translation quickly and accurately, but also provide readers with high quality, high reliability and valuable information (Abawajy.J.H, Xu. Z, Zhang.X & Atiquzzaman.M.: 2023:627).

This signifies the importance of applying artificial intelligence-based automated translation techniques in the world of languages and translation. These technologies represent a significant leap in how humans interact with different languages and exchange information across language boundaries; these techniques work to enhance translator's understanding of texts and facilitate the translation process with precision

and speed, but more than that, they offer readers a distinctive and reliable experience in terms of quality, trustworthiness, and speed when accessing information in multiple languages.

Machine translation realizes the automatic process in the field of artificial intelligence automatic translation, which needs to analyze and process the robot language. Therefore, there is a very important performance index for the robot language: accuracy, fluency and accuracy (Abawajy.J.H, Xu. Z, Zhang.X & Atiquzzaman.M.: 2023:631).

This refers to three important indicators used to measure the quality of computer-based translation: “accuracy”, which measures how precisely the translation matches the original text’s meaning; “fluency”, which assesses how smoothly the translated text read; and “accuracy”, which evaluates how well the translation aligns with the original meaning.

Accordingly a deep neural network model has been developed to improve the quality of machine translation: “Neural machine translation is an artificial intelligence technique that employs a special kind of machine learning called neural networks to learn languages and then constantly improves its linguistic competence. It’s often used in tandem with statistical translation techniques” (Balaji.T.M, Balakrishnan.G, Suman, Sharma.P: 2023:184).

Hence, the deep neural network model is trained on language data that contains translated pairs between languages. The input text is analyzed, and important things in the text are identified, and then translated into the target language. The model uses artificial intelligence techniques to improve the quality of the translation.

In the realm of machine translation the convergence of linguistics and technology has given rise to innovative approaches ranging from rule-based and statistical methods to the more recent neural network-based models. The complexities of language, including nuances, idioms, and cultural context, continue to pose challenges. Yet as machine translation systems learn from vast amounts of multilingual data, they refine their abilities to capture these subtleties, making strides towards breaking down language barriers and fostering a more interconnected global society.

However, there are several negative aspects and challenges associated with AI in

machine translation:

1. Linguistic nuances

AI may struggle with abstract language, such as humor, sarcasm, or cultural-specific idioms, leading to potentially inaccurate or inappropriate translations.

2. Complexity

For highly technical or specialized content, AI may misinterpret context, resulting in translations that lack precision or accuracy. For medical documents, as anfor example, this could be particularly hazardous.

3. Privacy

Storing sensitive or confidential data in AI-powered translation tools may pose privacy and security risks, particularly if data is not properly protected.

4. Loss of emotion

AI translation lacks the human touch in understanding emotions, empathy, and the deeper meanings of text, which can affect the quality, particularly for creative or emotional content. For instance, AI may literally translate an idiom such as “over the moon” leading to a misinterpretation of the intended emotion. https://www.smartcat.com/blog/ai-vs-human-translation/ visited on 07-06-2024 at 18:03).

II.1 Definition of Machine Translation:

According to CARRILLO, machine translation is the oldest application of natural language processing (Carrillo.M: 2007:17).

This implies that it has been developed and used for a long time before other natural language processing applications such as text analysis, and speech technologies applied to facilitate communication across different language using computers.

Machine translation (MT) is an industrial process performed by machines designed and constructed by computational linguistics engineers. These machines process a very complex substance: Language, which differs from other industrial materials in that it is entirely man-made and symbolic. The machines that carry out this industrial process are computers which have to be designed in their material form, the hardware, and their mode of operation, the software instructions, so as to be capable of accepting and processing this particular substance (Sager, Jean.C: 1994: 19).

We notice that machine translation is a complex industrial process that relies on the development of sophisticated mechanisms and systems designed and manufactured by experts in computational linguistics. This technology involves the analysis and comprehension of highly intricate linguistic material (the language itself). To achieve this, the computer devices employed in machine translation must be meticulously designed, including the actual hardware design, hardware components, software, and algorithms. This comprehensive endeavor necessitates the development of machine learning systems that enable these devices to understand linguistic structures, grammatical rules, and semantic nuances, thus facilitating accurate and efficient translation between multiple languages.

II.2 Literature review:

The field of machine translation has seen a surge in study, but questions remain about its viability and capacity.

It is commonly believed that machine translation is of some help in the translation of some texts. In other words machine translation has some limitation.

ZHENG (2015) states that many of the problems that machine translation faces cannot be solved at all. High-quality translation done solely by machines is not possible and machine translated texts will continue to be plagued by errors in the future, ranging from eccentric turns of phrase to grave distortions of meaning. (Zheng.H: 2015: 92)

This implies that, machine translation has many limitations that cannot be overcome.

Machines cannot perfectly understand the nuances of human language, and as a result, machine translated text will always contain errors. These errors can range from minor grammatical mistakes to serious misunderstandings of the original text.

While concerns about machine translation’s limitations exist, some researches remain optimistic and explore its potential in demanding applications.

Poetry has always been regarded as a headache or even the impossible in machine translation. However, different opinions have been voiced. Lee introduces a bilingual poetry project by a Taiwanese poet and argues that due to a loss of human agency in translation.

Zheng(2011) mentioned that Lee states: “machine translation can produce unexpected new meanings through unpredictable route of semantic and syntactic divergences from the source text”. (ibid: 93)

In simpler words, machine translation, though aiming for accuracy, can sometimes create surprising new meanings. This happens because the translation journey takes unexpected twists and turns due to differences in word and sentence structures between languages. These unexpected turns can actually change the original meaning and create something new.

MORATTO (2021) believes that machine translation can never completely take over the job of human translators, no matter how advanced it gets.

Moratto mentioned that Xu Jun states: “ On the basis of the existing linguistic level and the research level of computer artificial intelligence, it is impossible to develop a machine translation system that completely replaces human translation”. (Moratto.R, Woesler.M 2021:203).

Hence, given the current state of linguistic understanding and artificial intelligence development, the complete replacement of human translation by machine systems remains technologically infeasible.

Among the most important results of the study are the facts that the quality of machine translation was judged to be “good” and “acceptable” by over 90 percent of the respondents, and that machine translated texts were considered to be 93 percent informative, 59 percent readable, and 81 percent complete. Also significant is the fact that the possibility of misinformativeness was rated low, since only 19 percent acknowledged its possibility, while 80 percent never experienced it. (Henisz-Doster.B, Macdonald. R.R, Zarechnak. M: 1979:206).

This indicates that the study revealed that the majority of respondents viewed machine translation as effective and satisfactory, with positive ratings for quality, informativeness, readability, and completeness. Additionally, the risk of misinformation was perceived to be low, with a small percentage acknowledging its potential and a large majority reporting no such experiences.

II.3 History of Machine Translation:

In the 1950s, the concept of utilizing computers to automatically translate human languages was initially proposed. Despite this, early estimations by computer scientists greatly underestimated the difficulty of translation.

Early machines lacked the memory and processing ability to handle the volume of data involved.

It was until the early 2000s, that computers have the data, software, and processing power to do even rudimentary machine translation. In the beginning, researches would utilize statistical language databases to teach computers how to translate text.

This took a considerable amount of time and effort. To accommodate each new language, they had to restart the development process from scratch. The speed and accuracy of machine translation have improved since then, and several distinct approaches to machine translation have evolved. (Balaji.T.M, Balakrishnan G, Suman & Sharma,P: 2023:181)

In this regard, “distinct approaches” refer to different methods or techniques that have been developed to improve the process of translating one language to another using computer, these approaches could include: rule-based machine translation, statistical machine translation, neural machine translation, hybrid machine translation, example-based machine translation, and others.

II.4 Types of Machine Translation:

Machine translation can be categorized into different types, some common types include:

II.4.1 Statistical Machine Translation (SMT):

Is a machine translation paradigm that relies on statistical models learned from parallel text corpora and decoding algorithms to automatically translate one natural language (e.g., Chinese) into another(e.g., English) .(Xiong.D, Zhang.M: 2015:1) .

Example of statistical machine translation:

Translating the French sentence “ je veux aller à la plage demain” to English using statistical machine translation involves breaking down the sentence into its components

and mapping them to their corresponding English equivalents based on a statistical model.

.Breaking down the sentence:

“Je” → “I”

“veux” → “want”

“aller” → “to go”

“à” → “to”

“la” → “ the”

“plage” →“beach”

“demain” → “tomorrow”

- Statistical patterns: in statistical machine translation, a large bilingual corpus is used for training. This corpus contains numerous sentences in both the source (French) and target (English) languages. The translation model analyzes this corpus to find statistical patterns, for instance, it observes that when “je” appears in French, it is often translated as “I” in English.

- Phrase- Based translation: statistical machine translation often works at the level of phrases or small chunks of text rather than translating word by word, it learns that “veux aller” in French is commonly translated as “want to go “in English.

Similarly, “à la Plage” is frequently translated as “to the beach”.

- Alignment and probability: the model calculates probabilities for different translations based on the frequency of these phrases and their co-occurrence in the training data.

- Decoding and selection: when you input the sentence “je veux aller à la plage demain”, the SMT system searches through its statistical knowledge to find the most likely translation by considering probabilities, alignment patterns, and language models. It might generate various possible translations and select the one that is the most statistically probable based on its training data.

- Output: the translation is: “I want to go to the beach tomorrow”.

II.4.2 Rule-based Machine Translation:

Is a relatively traditional method that depends greatly on the difficult and time-consuming work of preparing and maintaining a large number of rules and a huge amount of lexical information in the form of dictionaries, both general and specialized (Sin Wai.C : 2002:15).

Example of Rule-based machine translation:

- Input sentence(French): " je veux aller à la plage demain".

Rule-based machine translation (English):" I want to go to the beach tomorrow.

The rule-based machine translation system analyzes the sentence structure and identifies that "je" means "I", "veux" means "want", "aller" means " to go", "à" means "to", "la" means "the", "plage" means "beach" and "demain" means "tomorrow" based on predefined linguistic rules and a dictionary**.**

It applies grammatical rules to ensure correct word order and agreement in the target language. The translation is generated by directly substituting the words from the source language into their corresponding words in the target language according to these rules.

II.4.3 Example-based Machine Translation:

The example-based approach was mainly developed in Japan starting in the mid-1980s. Essentially, the systems search in bilingual corpora for to sentence that is closest to the source sentence and combine it with (an)other sentence(s) from the corpus. These fragments then generate the new sentence in the target language (Nitzke.J: 2019:8).

Example of Example-based machine translation:

Let's use the French sentence "je veux aller à la plage demain" as an example of how Example-based machine translation (EBMT) might work:

- Sentence segmentation: First, the source sentence ''je veux aller à la plage demain'' is segmented into smaller units for translation. In this case, it might segment into phrases or sub-sentences like "je veux", "aller à la plage", and "demain".

- Example retrieval: example-based machine translation relies on a bilingual corpus that contains pairs of sentences or phrases in the source and target language, the system searches this corpus for similar or matching examples.

- Finding Analogous Examples: “je veux” might find a similar example like “I want” in the corpus “aller à la plage” might find an example like “go to the beach”, “demain” might find an example like “tomorrow”.

- Alignment and combination: example-based machine translation aligns these analogous examples and combines them into a coherent translation. In this case, it combines “I want” + “to go to the beach” + “tomorrow”.

- Output: the final translation generated through example-based machine translation is: “I want to go to the beach tomorrow”.

II.4.4 Neural Machine Translation:

The latest approach to machine translation is the use of neural networks which can also be applied to parallel training corpora. NMT systems build large neural networks for translation.

NMT systems use deep-learning approaches and learn automatically from the training data.

At least three basic layers are involved in neural machine translation: the input layer, the output layer and at least one hidden layer in between. In the input layer, the source text is processed and in the output layer, the target text is created. The hidden layers are the processing steps. The model can work in a more fine-grained way and more complex tasks can be tackled when more hidden layers are included in a system (Nitzke.J, Hansen-Schirra.S: 2021:25).

Example of Neural machine translation:

Let’s translate the French sentence “je veux aller à la plage demain ‘’ into English using Neural machine translation:

- In neural machine translation, the translation is generated by a neural network that takes the entire sentence into account, considering context and linguistic structures.

- Tokenization: the input sentence is divided into smaller unites or tokens such as words.

- Embedding: each token is converted into a high-dimensional vector that represents its meaning.

- Encoder: the encoder part of the neural network processes the input sentence capturing its structure and context.

- Attention: an attention mechanism helps the model focus on relevant parts of the input sentence.

- Decoder: the decoder generates the translation word by word, taking into account the context learned by the encoder.

- Output: the model produces the English translation, such as “I want to go to the beach tomorrow” considering the context and semantics of the source sentence.

It can be said that different types of machine translation vary in their working methods, accuracy and effectiveness in converting text from one language to another. Rule-based machine translation is mainly based on dictionaries, and linguistic and grammatical rules, while statistical machine translation is based on analysis of bilingual texts and identification of the most commonly used words that are probably the most accurate in translation. Neural machine translation relies on neural networks to analyze texts and identify suitable words and phrases for translation, these networks are trained in the two languages to be translated.

While Example-based machine translation relies on comparing the text being translated to previously translated text.

II.5 Translation engines:

Translation systems are tools designed to convert text or speech from one language to another, they utilize algorithms and linguistic models to analyze and generate corresponding content in the target language. Among these systems, we mention:

II.5.1 Google Translate:

Google translate is an instant translation tool that can be accessed via a web browser or a software application. Using both TTS and ASR, it can translate words, phrases and full texts from one language to another (Van Lieshout.C, Cardoso.W: 2022:5).

Signified that Google translate is an online tool that allows users to translate text between different languages with ease. It can be accessed through a web browser or mobile application. To achieve this, it relies on two main technologies: TTS (text-to-Speech): this technology converts the input text into speech or audio in the target

language. In other words, sentences in the target language are presented in an understandable voice.ASR (Automatic Speech Recognition): this technology takes the audio or speech output from the previous step and converts it into written text. This helps in presenting the final translation in written form.

Google translate is a free online translation tool, developed by Google, which translates text from one language to another. The tool can translate over 100 languages, including commonly spoken languages such as English, Spanish, French, and Mandarin. Google translate provides users with the ability to translate text, web pages, and even spoken words and phrases. The tool uses artificial intelligence and machine learning algorithms to improve the accuracy of translations and simplify the translation process for users.

It was first launched in 2006 and initially supported just two Languages: English and Arabic. However, in the following years, Google added many more languages like French, Italian, German, Chinese, and Russian to its language support list. Since then Google translate has become increasingly popular and widely used, with over 500 million monthly users. In 2017, Google launched a significant update with the implementation of neural machine translation (NMT) algorithms, which significantly improved the accuracy of translations (James.G: 2023:01).

This implies that Google translate relies on advanced technology to improve translation accuracy, and it has seen significant improvements over the years, especially after the introduction of an update that incorporates artificial neural machine translation techniques in 2017. This has made it a useful and popular tool for translating and Interacting with content in different languages online.

II.5.2 Babylon:

Is a commercial translation software that features 75 languages and over 2,000 dictionaries including those Arabic-English- Arabic dictionaries in dentistry economics, auditing, bible names, currency codes, countries, a glossary of birds and an automotive glossary.

Babylon dictionaries have an alphabetical letter index. When a letter is clicked all the terms beginning with that letter are listed. Clicking on a term, Arabic equivalents are given together with synonyms, a definition and or an explanation and the dictionary

where each equivalent can be found. Babylon also provides the part of speech, plural from, and uses diacritics to show pronunciation. Related compound terms are also displayed on the same page as sub-entries that show the domain and context in which the term is used together with their Arabic equivalents (Calvo-Ferrer.J.R, Campos Pardillos.M.A: 2014:100-101).

Hence, Babylon is a program and website for translation services and a popular dictionary. It allows users to translate texts and words from and to various different languages. Babylon offers a variety of language tools and resources, including multiple specialized dictionaries, language correction features, and the ability to translate entire texts or individual sentences. It also provides the option to access translation services online and install its computer program for easy access to these tools.

II.5.3 Deepl Translate:

It is a new machine translation engine launched in August 2017, which uses Deep learning and neural machine translation to translate automatically from one language into another. The translations created by Deepl are more natural than those of other engines. To prove itself in a competitive environment, in August 2017, Deepl created a list of 100 sentences and translated them with Deepl translator, Google translate, and Microsoft translator. The translations were assessed in a blind study by professional translators, who didn't know which system produced which translations. Translators chose the translations from Deepl as being the best 30% of the time (Deepl 2017). In March 2018 Deepl also released its API which allows other apps and software, such as trados and Memsource, two professional translation environment tools, to integrate with the Deepl engine (Dressman.M,& Sadler.R.W: 2020:447).

In this regard, Deepl translate is a technological tool that relies on artificial intelligence and is used to convert texts from one language into another automatically. It relies on a set of algorithms and linguistic information to understand the original text and then translate it into the target language.

II.5.4 Bing Translator:

Bing translator was created by Microsoft purchasing the Yahoo! Babel fish translation service, which is based on systran's rule-based translation engine. (Tavast.A, Muischnek.K, Koit.M: 2012:56).

This translator is a cloud-based multilingual translation service. Text and speech translation are offered by Microsoft translator for business. 65 language systems and 11 speech translation systems are supported by this service as of October 2018. (Gunjan.V.K, Diaz.V.G, Cardona.M,, Solanki.V.K, & Sunitha.K.V.N: 2020:858).

Accordingly, Bing translator can translate text for words, sentences, and paragraphs, with a maximum of 5,000 words at a time. It supports translation for more than 60 languages. The website also allows listening to translated phrases in a loud voice to learn how to pronounce them.

II.5.5 Yandex Translate:

In addition to its ability to translate text, websites, and images, Yandex translate can translate documents to and from dozens of languages, as long as they are one of the following file types: .doc, .docx, .pdf, .ppt, .pptx, .xls, and .xlsx files and smaller than 5 MB in size. Yandex translate is accessible on the Yandex translate website by selecting "Documents" on the top menu, or at the URL (Miller.M.D: 2023:202).

Hence, Yandex is a website or platform that provides a feature for translating documents, specifically PDFs and similar files, into different language.

II.5.6 Reverso:

It is an online translation system marketed by Reverso softissimo, a company that works with a team of experts based in France, Russia, China, Germany, the United Kingdom, and the United States.

In 2002, PROMT[60] announced that, together with Softissimo, they had released the new version Reverso Pro 5 and Reverso Expert, which provided translation for the following directions: English-French-English, English-German-English and French-Spanish. Reverso 5 products are based on the advanced PROMT automatic translation technology and provide translation of documents, emails, and websites. It is worth noting, nonetheless, that the system has not been update since.

Reverso also provides free machine translation services of English into and from French, Spanish, Italian, German, Hebrew, Portuguese, Russian, Arabic and Chinese. Like PROMT, it offers a virtual keyboard and a spell-check function (Sin-Wai.C: 2017:230-231).

II.5.7 Amazon Translate:

Amazon translate is a natural machine translation that delivers fast, high-quality, affordable, and customizable language translation.

Amazon translate differs from traditional statistical and rule-based translation algorithms. Instead, it uses natural machine translation, which uses deep learning models to provide more accurate and natural-sounding translations (Singh.SK: 2022:451).

Amazon translate is a text translation service. We can provide documents or strings of text in various languages and get it back in a different language. It uses pre-trained deep learning techniques (Nanda.S, Moura.W: 2021:54).

This conveys that Amazon translate is a machine translation service. It uses advanced neural machine translation techniques to translate text between languages. It supports a wide range of languages and can be integrated into various applications to automate language translation tasks.

II.5.8 ChatGPT:

It is an artificial intelligence (AI) chatbot that uses natural language processing to create humanlike conversational dialogue. The language model can respond to questions and compose various written content. Including articles, social media posts, essays, code and emails. (https://www.techtarget.com/whatis/definition/ChatGPT visited on 13-04-2024 at 15:49).

This means that artificial intelligence refers to the simulation of human intelligence processes by machines, particularly computer systems. This encompasses learning, reasoning, problem-solving, perception, language understanding and decision-making capabilities. Artificial intelligence enables machines to analyze data, adapt to new information, and perform tasks that typically require human intelligence, ranging from simple to complex operations.

II.6 Machine translation Errors:

Machine translation can produce errors that impact the quality of translations in matters of style, context and idiomatic expressions; here we explore some of them:

The types of machine translation errors at the lexical level mainly focus on the translation errors of terminologies and quasi terminologies, the wrong choice of meanings of common polysemous words, improper mechanical selection of words or repeated words, translation errors of idioms, ect .; the types of machine translation errors at the sentence level mainly focus on the structural and logical confusion of short and long sentences, semantic translation errors in sentence context, and subject reduction errors of non subject sentences .(Abawajy.J, Xu.Z, Atiquzzaman.M, Zhang.X:2021: 249).

We understand from the above context that machine translation errors at the lexical level, pertain primarily to mistakes concerning individual words and phrases; such as mistranslating technical terms or idioms, while at the sentence level, these errors relate to the overall structure and meaning of sentences.

POIBEAU (2006) mentioned that VILAR et al (2006) attempted to propose a classification for the errors committed by machine translation systems, their classification included the following categories: “unknown words (words in the source language unknown to the translation system), poorly translated words (wrong meaning, incorrect word from, badly translated idiomatic expression, ect), word-order problems (problems related to the word order in the target language) and missing words in the target sentence.” (Poibeau.T: 2017:217).

This means that machine translation errors can occur due to various factors, such as the use of unfamiliar words, as the system may struggle to comprehend specific vocabulary, compromising translation precision. Additionally, poor translation choices may lead to the inaccurate rephrasing of words, resulting in a divergent understanding of the original text. Furthermore the omission of certain words in the target sentence can disrupt comprehension, diminishing the overall accuracy of the translation.

Translation errors can be categorized into main types, ranging from grammatical errors, to syntactic errors, to unnecessary additions or omissions, errors in lexical or terminological choice, and errors in collocation or style.

Here are just a few examples in English of some of these error types and their fixes:

1- Grammatical error:

a. The cat is very protective of her Kittens. She scratches anyone **which** tries to touch them.
b. The cat is very protective of her kittens. She scratches anyone **who** tries to touch them.

2- Lexical error:

a. The cat is very protective of her **pups**. She scratches anyone who tries to touch them.
b. The cat is very protective of her **kittens**. She scratches anyone who tries to touch them.

3- Syntactic error:

a. The new-born cygnets on the **lake swam**.
b. The new-born cygnets **swam** on the **lake**.

4- Collocation error:

a. The house had no **flowing** water.
b. The house had no **running** water. (Kenny.D: 2022:106-107).

We notice that, machine translation errors can manifest in various forms, presenting challenges in achieving linguistic accuracy.

Grammatical errors may arise from the failure to comprehend intricate sentence structures, leading to awkward or nonsensical translation. Lexical errors occur when the system misinterprets or misselects words, distorting the intended meaning. Syntactic errors involve issues in the arrangement of words, impacting sentence coherence. Collocation errors surface when the system struggles to grasp the natural pairing of words in a specific language, resulting in incongruent phrase choices.

II.7 Human and Machine Translation:

Machine translation aims at replacing, to some extent, the need for human translation (for some kind of texts); but a human translator is always needed to edit what is translated by machine translation system. Currently, machine translation is mainly a valuable tool to aid in human translation. (Fernandez Guerra.A: 2000:22).

In other words, machine translation strives to reduce the reliance on human translators for specific types of texts. However, it doesn't replace human involvement entirely. Instead, machine translation serves as a helpful tool to assist human translators by providing initial translation. Despite this, the output often requires human translators to

review and refine, emphasizing the continued necessity of human expertise in the translation process.

Yehoshua Bar-Hillel (1994) thinks that translation involved certain human abilities, such as real world knowledge, which no computer could ever assimilate. Recent advances in Artificial Intelligent indicate that real-world knowledge can, in fact, be incorporated into machine translation system. But it has not happened yet. So the best we can expect is human assisted machine translation (=HAMT). In other words, currently, no fully automatic system can translate to the same high standard one would expect from a human translator. There must be human assistance at some stage or some kind of restriction on the source text. (Dollerup.C, Loddegaard.A: 1994:302).

The necessity of human intervention in machine translation becomes evident in several aspects. Human understanding brings depth to translation by considering context and cultural nuances, ensuring accuracy and integration. Human adapt to linguistic changes effectively, engage with the author's personal style, and contribute a unique touch to the text. Additionally, human intervention plays a crucial role in pre-editing and post-editing processes in machine translation. In pre-editing, humans refine the source text, ensuring clarity and coherence before translation. Post-editing involves revising machine-generated translations to enhance fluency, accuracy, and overall quality. These human interventions not only improve the final output but also bridge the gap between automated processes and nuanced language nuances. They also help maintain the integrity and authenticity of the content.

II.8 Loss and Gain in Translation:

Translation involves both the loss and gain of meaning as languages differ in structure, cultural nuances, and expressions, often resulting in inevitable compromises to convey the essence of the original text.

II.8.1 Loss of Meaning:

Loss of meaning can be interpreted by incomplete meaning from source language text which is conveyed into target language text (Dizdar 2014) .It is the condition whereas the translator cannot interpret the entire meaning of source text (ST) into target text (TT) which means that the translator has less attention on CSls and linguistic features of TT.

Loss of meaning also can be defined as the incompetent of translators in conveying the expressiveness whereas some words or phrases are avoided so that loss of meaning happens. Another cause of loss of meaning is the difference in linguistic and extra-linguistic between the source language and the target language. Linguistic differences mean that every language has its own ways in expressing a similar concept with varied systems. Another factor is that extra-linguistic discrepancies involve cultural and religious discrepancies that can disturb the equivalence of translation process. ?ALWAZNA (2014) argued that this factor becomes a prominent one which shows the translator's incapability to make equivalence of target text (Darmawan.R.I, Saraswati.G.P.D & Istiani.I: 2022:300).

We notice that the loss of meaning in the context of translation represents a complex problem that reflects the linguistic and cultural differences between the source and target languages. This challenge is evident in the difficulty of accurately and faithfully converting the original text into the target language, often accompanied by changes in sentence structures and the disappearance of subtle aspects of meaning. Sometimes, it is difficult to translate concepts or terms that lack a direct equivalent in the target language.

II .8.1.1 The Aspects of Loss in Target Text:

The levels of loss of meaning in the target text refer to the degrees to which the original meaning of a text is compromised or altered during translation; these levels provide insights into the challenges faced by translators and the potential impact on the fidelity and effectiveness of the final translated text.

II.8.1.1.1 Semantic level: Semantic loss which refers to over-, under-, or mistranslation of a (ST), many result in partial or complete loss of meaning in the (TT). (Sabariah.R & Abdelaal.N 2015:1).

Complete losses are the losses that change the meaning or give an opposite one. However, partial losses are those losses in which the message of the (ST) is partially conveyed. (ibid: 6).

This implies that Semantic loss occurs when there are inaccuracies in translating a source text (ST) into a target text (TT), leading to either overtranslation, undertranslation, or mistranslation. Overtranslation can result in an exaggerated or

expanded meaning in the TT compared to the original ST, while undertranslation may lead to a reduction or omission of important details, causing a loss of meaning. Mistranslation involves conveying an incorrect meaning altogether. Complete losses significantly alter or reverse the intended meaning, while partial losses only partially convey the message of the original ST, lacking full fidelity in translation.

Here is an example of semantic loss in translation:

Source text: “As well as a bedroom filled with thoughtful extract such as a pillow menu and a classic greet myth book”.

Target text:

" فضلا عن غرفة النوم، و ستجد فيه حقيبة شاطئ و مناشف بحر و آلة نسبرسو للقهوة و كتب الأساطير اليونانية".

Omission here might be thought of in terms of the large goal of the communicative translation which seeks to deliver what is suitable to the target language.

II .8.1.1.2 Grammatical level: النحو: يختص بقواعد اللغة التركيبية

(محمود عكاشة:2005: 114)

“Grammar: deals with the rules of compositional language” (our translation).

In other words, the grammar of a language refers to the rules and structures governing how words and sentences are formed. This cognitive structure enables speakers to understand and produce meaningful utterances within the language.

Here is an example of grammatical in translation:

Source text: The book was read by the student."

Target text:"قرأ الطالب الكتاب"

In this translation, the passive voice "was read" is lost and replaced by an active construction.

II .8.1.1.3 Rhetorical level: Rhetorical is the study of the technique and rules for using language effectively (especially in public speaking). (https://www.vocabulary.com/dictionary/rhetoric visited on 29-01-2024 at 16:43).

This means that Rhetoric is the study of how language is used effectively, especially in public speaking contexts. It involves learning techniques and rules that help speakers communicate persuasively and convincingly. Rhetorical study examines strategies such

as using emotional appeals, logical reasoning, and effective delivery to influence an audience. It also emphasizes understanding audience dynamics and adapting language accordingly for maximum impact. Overall, rhetoric aims to enhance communication skills and facilitate effective expression of ideas, opinions, and arguments in various public settings.

-البلاغة اصطلاحا هي بادية المعنى الجليل واضحا بعبارة صحيحة فصيحة لها في نفس أثر خلاب مع ملائمة كل كلام المواطن الذي يقال فيه الأشخاص الذي يخطبون. (أحمد الهاشمي ،2019، 54).

“Rhetoric, in terminology, is the clarity of significant meaning expressed in a correct and eloquent phrase, possessing within it a captivating impact, along with the suitability of every speech for the orators who deliver it.”(Our translation).

This means that rhetoric refers to the clear expression of important meanings using accurate and eloquent language. It emphasizes the ability of such expression to have a captivating impact.

Here is an example of grammatical in translation:

Source text: "The pen is mightier than the sword."

Target text : " القلم أقوى من السيف."

The brevity and idiomatic expression in English convey a succinct and powerful message, which can lose some of its rhetorical elegance and persuasive force in the translated version.

II.8.1.1.4 Cultural level: Casagrande (1954) declares that “one does not translate language, one translates culture” (Casagrande. J.B: 1954:338).

Casagrande’s statement “one does not translate language, one translates culture” emphasizes the intricate connection between language and culture in translation. It implies that effective translation goes beyond literal words and involves conveying the deeper cultural meanings, values, and nuances inherent in language. This suggests that a successful translation requires not only linguistic competence but also a profound understanding of the cultural context to accurately convey the intended message across languages.

Here is an example of grammatical in translation:

Source Text: “to throw dust in the eyes”

Target Text: “يذر التراب في العيون”

the word “dust” in the phrase “to throw dust in the eyes” would be translated word for word as “التراب” in the sentence “ يذر التراب في العيون”. That is a mistake because this is an idiomatic expression that has a cultural background. The equivalent expression is “يذر الرماد في العيون”, so the word “dust” should be translated as “الرماد” which is ashes in English.

II.8.1.1.5 Morphological level:

الصرف: تعرف به الأبنية المختلفة للكلام ، وما يشتق منه (محمود عكاشة:2005: 61) .

“Morphology: defines the various structures of speech and what is derived from it”.

(Our translation).

This means that morphology deals with the different structures or forms that words can take in a language, as well as how these forms are derived or created. It involves studying how words change in terms of their endings, prefixes, suffixes, or internal modifications to convey different meanings or functions.

-الصرف هو العلم الذي يعني ببنية الكلمة في ذاتها من حيث تركيبها و هيئتها فالصرف علم من علوم اللغة العربية موضوعه بنية الكلمة المفردة خارج السياق المعنوي أي دون أن تتأثر بموصفها في الجملة وحركة الإعراب ونلاحظ أن بنية الكلمة تتعرض أحيانا للتعبير في لفظها أما لتحقيق الانسجام الصوتي أو الاستحداث معنى جديد. (عديد محمد، مستويات التحليل اللساني عند الفارابي (صوتي، نحوي، دلالي)، 2022، 20).

“Morphology is the science that deals with the structure of a word in itself, in terms of its composition and form. It is a branch of Arabic language studies that focuses on the structure of the individual word outside of its semantic context, meaning it is not affected by its modifiers in the sentence or its grammatical inflection. We notice that the structure of the word is sometimes subject to modification in its pronunciation either to achieve phonetic harmony or to create a new meaning” (Our translation).

This means that morphology is a linguistic field that studies the structure of words in a language, focusing on their form and composition independent of their context or meaning within sentences. It also acknowledges that word structure can be modified, especially in pronunciation, for reasons such as phonetic harmony or semantic innovation.

Here is an example of morphological in translation:

Source Text: “He has eaten fried rice”.

Target Text: “هو يأكل الرز”

The morphological process in English and Arabic has its own uniqueness, just from one basic word can change dozens of words that have different meanings and different positions; both have the same meaning and both change the lexical form without changing the categorical state. However, it is not the same in the process of word formation.

II.8.2 Gain of Meaning:

Darmawan.R.I, Saraswati.G.P.D &Istiani.I (2022) mentioned that Bassnett defined gain as the improvement or providing more explanation of source language text in the translation process. Besides, NOZIZWE and NCUBE (2014) defined gain meaning as the detail explanation about particular term in source text which makes target text flexible and comprehensive in the environment. As O’ NEIL (2006) argued that language is dynamic. The dynamism of language makes it able to produce new terminology in any languages. A gain in translation will enable language to adjust themselves towards speakers. So, the different languages will complement each other. (Darmawan.R.I, Saraswati.G.P.D &Istiani.I: 2022: 300).

This implies that gaining meaning is the process of accurately and clearly conveying the fundamental meaning and main idea of a text from one language to another. It relies on a deep understanding of the original text and its culture, using appropriate words and expressions in the target language to convey the meaning correctly. Language dynamics refers to the language’s ability to change, evolve and adapt to time, place, and culture. Dynamics include using language in different ways and adapting it to express new ideas, emotions, and concepts. Language can change through the addition of new words, shifts in meanings, or developments in syntax and morphology. This dynamism allows the language to remain vibrant and capable of expressing the reality and needs of society.

II.8.2.1 The aspects of gain in the Target Text:

Increasing the depth of meaning in the target text requires finesse in adjusting language, context, and cultural nuances to resonate effectively with the intended audience.

II.8.2.1.1 Addition: Addition refers to adding some words or sentences in the process of translation according to the thinking mode and expression habits of two different languages, so as to express the meaning of the source language more smoothly and clearly. Translators should pay attention to words that are implied but not explicitly stated in the dialogue to ensure that the translation has a complete grammatical structure and can accurately express the meaning of the source language dialogue. (Yue.F: 2022:146).

II.8.2.1.2 A loan word: Shuttleworth.Mark & Moira.Cowie mentioned in their dictionary that VINAY and DARBELNET (1958a, b/1995) describe the procedure as the simplest type of translation, since it merely involves the transfer of a SL word into TT without it being modified in any way. The reason for this transfer is usually that the translator needs to overcome a lacuna, or more significantly wishes to create a particular stylistic effect, or to introduce some local color into TT. (Shuttleworth.Mark & Moira.Cowie : 1997: 17).

Partial Conclusion:

We come to conclude that Artificial Intelligence is a field of computer science that aims to create technological systems capable of performing tasks requiring human like intelligence, one of these tasks is machine translation, which aims to automatically and quickly convert text from one language to another using various translation sites.

Artificial intelligence utilizes advanced techniques such as statistical machine translation and neural machine translation to enhance translation quality. However, errors may occur in automated translation as systems may struggle to grasp context and precise meanings, leading to inaccurate or unnatural translations. Difficulties may also arise in handling cultural expressions or phrases with double meaning. Hence, human intervention is considered necessary in the automated translation process.

Machine translation grapples with the delicate balance of preserving meaning while facing the inevitable loss and gain inherent in the process. It must navigate the complexities of language, often sacrificing nuances in favor of clarity or brevity. Adapting to diverse cultural contexts, it aims to bridge linguistic divides by employing varied expression techniques to convey the essence of the original text.

Chapter Two:

Machine Translation of extracts from the Novel "The Heats of Horses"

Analysis and Contributions

In this chapter, we will begin with a presentation of the corpus, followed by a summary of the novel, and a presentation of the author's biography, after that, we will translate ten passages (10) taken from different pages of Molly Gloss's novel entitled "The Hearts of Horses" using different translation websites, including Google translate, Babylon, Reverso and yandex. The chapter then ends with a conclusion to respond to the initial research problem issued in the introduction of this research besides other questions.

II.1 Reasons why choosing this corpus:

The story features a compelling and independent female protagonist, Martha Lessen, who breaks gender norms by working as a horse trainer. Her character is inspiring and offers a unique perspective on women's roles during the early 20 th century.

- Molly Gloss is known for her beautiful and evocative prose, making the novel a pleasure to read for those who appreciate literary fiction with a strong sense of place.

So through translating excerpts from this novel, we would like to:

- Showcase Western Culture: By translating selected passages, we aim to highlight the authentic portrayal of Western rural life in the early 20th century. Readers will gain insights into the daily lives, struggles, and values of the people in this region during a transformative period in American history.
- Highlight Feminist Themes: The novel's focus on Martha Lessen, an independent and skilled horse trainer, provides a powerful example of a woman breaking traditional gender roles

II.2 Presentation of Novel "The Hearts of Horses":

"The Hearts of Horses" is an English Novel written by Molly Gloss, was published by Harper Perennial on December 8th, 2008, and spans 304 pages. Extracted and revised from (https://www.sunriverbooks.com/book/9780547085753 visited on 27-01-2024 at 17:30).

The Hearts of Horses, written by Molly Gloss, is a captivating novel set in the early 20th century that beautifully captures the spirit of the American west. This sweeping tale follows the journey of a young woman named Martha Lessen, a skilled horse trainer, as she navigates through the rugged landscapes of Oregon.

Martha possesses a unique gift for understanding horses and quickly gains a reputation for her ability to calm even the unruliest of steeds. She serves as a "Horse Whisperer" to many ranchers, cowboys, and farmers in need of assistance in breaking or training their horses.

Despite living in a predominantly male-dominated profession, Martha fearlessly makes her mark in the world of horse training, defying gender norms and societal expectations along the way.

As Martha travels from one ranch to another, taming horses and helping people, she encounters various characters whose lives intertwine with hers. The readers are introduced to George Bliss, a lonely widower who desperately seeks Martha's help in learning how to ride his late wife's horse. We also meet Nate Bidwell, a young boy who dreams of being a cowboy but is haunted by personal tragedy. Martha's interactions with these individuals and others add depth and complexity to the narrative, allowing for the exploration of themes such as grief, redemption, and the power of human-animal connections.

Beyond being a tale of resilience and self-discovery, The Hearts of Horses paints a vivid portrait of the American West during a period of immense social and technological change. Gloss skillfully weaves together historical events, such as the women's suffrage movement and the impact of World War I, into the fabric of the story, capturing the shifting dynamics and challenges faced by those living in the frontier.

The prose in The Hearts of Horses is both lyrical and evocative, painting a vivid picture of the sprawling landscapes of Oregon and the bond between humans and horses. Through Gloss's exquisite storytelling, the reader becomes immersed in the sights, sounds, and smells of the untamed West, feeling the rush of wind on their face and the pounding of hooves beneath them.

Overall, The Hearts of Horses is a richly layered novel that explores themes of identity, companionship, and the limitless potential within us all. With its compelling characters, sweeping landscapes, and a palpable sense of place and time, this novel will captivate readers and leave them longing for more of Molly Gloss's exquisite storytelling. (https://www.bookey.app/quote-book/the-hearts-of-horses visited on 27-01-2024 at 17:22).

II.2.1 Summary of the Novel "The Hearts of Horses":

Molly Gloss's The Hearts of Horses begins with a shy, awkward teenaged woman who wants only to earn her living as a bronc buster. In 1917, Martha Lessen arrives at the ranch of George and Louise Bliss in Elwha County, Oregon, after the Great War "had swept all the young men from the ranches, [and] there were girls who came through the country breaking horses". She is searching for the romantic West of Buffalo Bill Cody. Her big cowboy hat and

batwing chaps, which everyone looks at amusingly, reflect her yearning for a past she feels still exists somewhere. She believes that if she earns enough money, she can ride off and discover it.

Bliss hires her to break his horses but learns that instead of a traditional ride them- or-kill them bronc buster, she is a horse gentler, a practice she acquired from an old cowboy who developed the technique due to age and injuries. Martha is soon offered the opportunity to ride a “circle tour”, a bronc buster rides from ranch to ranch, leaving one horse and taking another to the next ranch to expose horses to different environmental conditions. All members of the circle board another member’s horse until their horse completes the circuit and returns home.

In this job, she meets a wide range of people in Elwha: tow old spinsters, the Woodruff sisters, who refused to marry so they could work their father’s ranch, and their hired hand, Henry Frazer; a college-educated chicken farmer who is dying of cancer and wants Martha to break a horse as a gift to his son; a drunk who bought a horse he couldn’t break and, in the guise of not having enough time, hires her to break it to save face with his wife; an ostracized German family; a rich man from the East who was conned into buying a horse by his hired man, Logerwell, whom Martha has fired after she discovers on her circle ride that he is beating horses; and others who make up the varied landscape of ranchers and farmers. Although Martha Lessen plans on leaving come spring, she becomes intertwined in the community, attending church, going to dances and social events. The tie that finally binds her to this place is Frazer, for whom she even sheds some of her tomboy ways “to behave like the other girls”.

Gloss creates a lyrical study in contrasts of people’s attitudes, cultures, and eras. Martha straddles a time her granddaughters will consider amazing, but her story is subsumed by the stories unfolding around her. The novel is finally about Elwha. What drives the narrative are historic forces that clash within that isolated community, although some of the more interesting ones are reported rather than dramatized, like Louise dealing with patriotic bigots and the personal tragedies and triumphs of Elwha’s residents, which are presented through beautifully wrought scenes. It is a story of flux between the old and new West, about what is ugly and beautiful in each. And Gloss shows us that no matter how we try to construct a future, it will shape itself in its own way and no amount of nostalgia will create a

romanticized past in the present. Extracted and revised from (https://muse.jhu.edu/article/266869/pdf visited 27-01-2024 at 17:45).

II.2.2 Biography of the Author:

Molly Gloss, prize-winning novelist and short-story writer, was born in 1944 and has lived in and near Portland all her life. As a child, she benefited from family trips through the west, her father's collection of Westerns, and the Multnomah county library. She studied history and English at Portland state college (now Portland state University). First a teacher then a clerk, she became a full time writer in 1980.

Extracted and revised from (https://www.oregonencyclopedia.org/articles/Gloss-Molly-1944-/ Visited on 27/01/2024 at 18:39).

In 1996 she was the recipient of a prestigious whiting writers' Award. Her Novel the Jump-Off Creek is a Pacific Northwest classic, a finalist for the PEN/Faulkner Award, and winner of Oregon book Award and the Pacific Northwest Booksellers Award. The Dazzle of day, a novel of the near future, received the PEN West Fiction Prize and was a New York Times Notable Book. Wild life, set in the woods and mountains of Washington State at the turn of the Twentieth century, won the James Tiptree Award. The Hearts of Horses, recently released, takes place during the winter of 1917 among the farms and ranches of Eastern Oregon and has already garnered widespread attention and praise in the National press.

"I have had this book in mind for about Fifteen years, since first hearing about girls and young woman who were breaking horses in the early decades of the Twentieth century", Says Gloss of her newest novel "The Heats of Horses"(2008).

Researching her topic took her to an Idaho family ranch where spent a few weeks reacquainting herself with horses. "I was able to soak up a lot of information and stories about ranching and horse breaking, some of which make it into the novel", says Gloss. She also attended BLM mustang adoptions and under the guidance of Lesley Neuman, learned how to "start" a wild horse.

Gloss didn't start writing seriously until she was 35. She confesses that she always liked writing, but that she "grew up in a period when smart girls were encouraged to be teachers or nurses. Nobody ever told me I could be a writer". After graduating from Portland State University in 1966 with a degree in social science and English, Gloss married and then taught briefly at a junior high school. She sold her first short story, the result of journals kept after

the birth of her son Ben, in 1981. Since then she has authored works of fiction, more than two dozen short stories, essays and book reviews.

Extracted and revised from (https://www.deschuteslibrary.org/about/news/news?newsid=1543 Visited on 27/01/2024 at 18:47).

II.3 Methodology Analysis:

This part aims to clarify the utmost importance and impact of artificial intelligence in machine translation. In our study, we will analyze six (06) passages selected from the corpus "The Hearts of Horses" by Molly Gloss, we will classify the examples according to the levels of loss and gain of meaning.

In this analysis, we will start by giving the original text, then we will present the different translations (from the English language to the Arabic language) using various translation sites, and analyze them. After that we will rely on the analytical comparative study to assess and measure the amount of loss and gain in the translations.

We have selected various translation websites for our research, namely Google translate, Reverso, Babylon, and Yandex. This choice is motivated by a set of significant reasons that distinguish these platforms. In the following, we will present these reasons and the advantages that make each of them stand out in the context of our research.

Google translate:

- Widely used and has a large user base.
- Support a wide range of languages.
- Continuous investment in machine learning.

Reverso:

- Notable for providing context for translated words and phrases aiding researchers in understanding the correct usage of terms.
- Offers grammar and verb conjugation tests to help maintain linguistic accuracy.

Babylon:

- Known for its specialized dictionaries that can be valuable in translating terminology.
- Provides an offline mode that can be used in places with limited internet access.

Yandex:

- Allows the translation of large texts, which can be useful if you need to translate larger volumes of content.
- Allows users to input text via voice, and it can pronounce translated words and phrases, aiding in language learning and pronunciation.

II.3.1 Selected Examples and Analysis:

In this part, we are going to deal with the analysis of six (06) passages, taken from the Novel "The Hearts of Horses" by Molly Gloss, we will compare both Arabic and English versions , and after that, we will rely on the analytical comparative study to assess and measure the amount of loss and gain. We are going to suggest an alternative translation when necessary to avoid the loss of meaning.

Example 1: Addition

Source Text	Target Text(machine translation)
And Cougar had come into the pastures with the cattle. Starving horses had wandered into people's house. But this particular winter, the winter of 1917 and 1918, would be an open one. **(Page number 02 from the corpus).**	و جاء **حيوان** الكوغار إلى المراعي مع الماشية. تجولت الخيول الجائعة في منازل الناس. لكن هذا الشتاء بالذات، شتاء 1917 و 1918، سيكون شتاء مفتوحا. **Google translate**
	و دخل الكوجر إلى المراعي مع الماشية. كانت الخيول الجائعة تتجول في منازل الناس. لكن هذا الشتاء بالذات، شتاء 1917 و 1918، سيكون شتاء مفتوحا. **Reverso translate**
	و دخل كوغار المراعي مع الماشية. تجولت الخيول الجائعة في منازل الناس. لكن هذا الشتاء بالذات ، شتاء 1917 و 1918، سيكون شتاء مفتوحا. **Yandex translate**
	و جاء الكوغار إلى المراعي مع الماشية. تجولت الخيول الجائعة في منازل الناس. لكن هذا الشتاء بالذات ، شتاء 1917 و 1918، سيكون شتاء مفتوحا. **Babylon translate**

The analysis:

Addition is one of the techniques that has been suggested by Mona Baker (1992) to deal with non-equivalence; according to her, addition consists of "adding anything that is needed, such as a word, a phrase, or even a clause, in order to make the translated text appear natural, either grammatically or semantically, in the target language" (167).

By applying the addition technique as shown in the table above, the translation system avoids losing part of the meaning of the word "cougar" by adding the word "حيوان"; this gives it sufficient equivalence to the word "cougar".

Therefore, the addition of the word "حيوان" to convey the intended meaning is considered as a gain, this addition helps ensure that the message is accurately conveyed and understood by the target audience.

From the data presented in the table, we can infer that the English expression "The winter of 1917 and 1918, would be can an open one" is translated literally as " شتاء1917و1918، سيكون شتاء مفتوحا" in the target language; the expression "the winter1917and 1918, would be an open one" in this context has several possible meaning:

_Mild winter: An "open winter" means: when the temps are unseasonably mild and the snows of winter are held in abatement. (http://celticanamcara.blogspot.com/2009/11/openwinter.html?m=1#:~:text=Open%20Winter%20occurs%20when%20the,in%20fields%20and%20along%20rivers visited on 28-01-2024 at 3:10).

This contrast is highlighted by the previous sentences describing harsh conditions (the winter before, there had been a string of about a hundred days when the temperature never rose above freezing and some counties Elwa, Umatilla, Grant had piled up seven feet of snow) , (Starving horses) and (cougar in pastures), ect. An open winter would bring relief from these hardships.

_Accessible winter: an "open winter" describes a "winter without much composite snow accumulation." And Greg Haubrich, a farmer in Saskatchewan, Canada, said his great-grandfather used the phrase to mean the "horses could get around easy". (https://www.vermontpublic.org/programs/2018-11-27/adrian-open-winter visited on 28-01-2024 at 03:17).

The previous sentences mention animals driven to unusual places due to harsh conditions; an open winter would allow them (and people) to move more freely.

The extent of meaning loss depends on the target language and its ability to express the specific nuance of “open” in this context. Hence there is a partial loss of meaning for the phrase “شتاء مفتوح”.

Therefore, the meaning loss with “would be an open one” stems from a combination of factors, including the over-reliance on statistical models; many translation systems rely on statistical models that identify patterns in large datasets of text. While effective for basic translations, these models can struggle with figurative language and expressions that deviate from common patterns. The specific meaning of “open” in this case might be too unique to be captured by the statistical model, leading to a generic translation.

And in order to avoid a semantic loss in translating the above sentence, the translation can be modified as follows:

و جاء حيوان الكوغار إلى المراعي مع الماشية. تجولت الخيول الجائعة في منازل الناس. لكن هذا الشتاء بالذات، شتاء 1917 و 1918، سيكون شتاء استثنائي.

Example 02: Addition

Source Text	**Target Text (machine translation)**
I hired him mostly as a ditch walker and for moving the gates on my dams and so forth in the summer, and I'm trying to teach him cowboying but he's not the best hand I ever had in the world; and the other is a fellow with a bum arm that keeps him out of the army and also keeps him from doing any kind of roping, and which is a disadvantage, I guess you know, if you're trying to break broncs.” **(page 07 from the corpus)**	لقد وظفته في الغالب كمشاة خندق ولتحريك البوابات على السدود وما إلى ذلك في الصيف، وأنا أحاول تعليمه تربية الأبقار لكنه ليس أفضل يد حصلت عليها في العالم، والآخر هو زميل بذراع بوم يبقيه خارج الجيش ويمنعه أيضا من القيام بأي نوع من الشد، وهو عيب، اعتقد انك تعرف، إذا كنت تحاول كسر برونكس. **Yandex translate.** لقد وظفته في الغالب كمسير في الخنادق ولتحريك البوابات على سدودي وما إلى ذلك في الصيف ، وأنا أحاول تعليمه رعاة البقر لكنه ليس أفضل يد حصلت عليها في العالم، والآخر هو زميل بذراع بوم يبقيه خارج الجيش ويمنعه أيضا من القيام بأي نوع من الشد ، وهو عيب ، أعتقد أنك تعرف ، إذا كنت تحاول كسر البرونكس. **Babylon translate.** وظفته في الغالب كمراقب للخنادق ولتحريك البوابات في سدودي وما إلى ذلك في الصيف وأحاول أن أعلمه مهارات رعي الماشية، لكنه ليس أفضل عامل لدي في العالم والآخر هو رجل بذراع معطوبة تمنعه من الانضمام إلى الجيش وتمنعه أيضا من القيام بأي نوع من عمليات ربط الحبال، وهو عيب كما تعلم، إذا كنت تحاول كسر الخيول الجامحة. **ChatGPT.**

Analysis:

Dickins et al. (2017) believe that: “addition, is a common procedure in is Arabic/English translation, at least partly due to differences in structure between the English and Arabic languages”. Dickins et al. (2017:21)

As presented in the table above, we observe that the expression “I'm trying to teach him cowboying” is translated by Babylon translate as “وأحاول أن أعلمه مهارات رعي الماشية”.
Babylon Translate adds "مهارات" (skills) to the translation, which enriches the description of what the person is being taught and their job responsibilities.
By adding "مهارات" (skills), Babylon Translate clarifies that the job isn't just about physically walking along ditches but involves specific skills related to cattle herding.
The addition of "مهارات" by Babylon Translate helps to more accurately convey the intended meaning of the source text. This approach prevents potential misunderstandings and enriches the translation, making it more comprehensible and informative for the target audience.
The expression “I'm trying to teach him cowboying but he's not the best hand I ever had in the world” is translated into the target language by Yandex translate as: “ أنا أحاول تعليمه تربية الأبقار لكنه ليس أفضل يد حصلت عليها في العالم”, Babylon translate translates it as: “ أنا أحاول تعليمه رعاة البقر لكنه ليس أفضل يد حصلت عليها في العالم” while ChatGPT translates it as “ أحاول أن أعلمه مهارات رعي الماشية، لكنه ليس أفضل عامل لدي في العالم”.

The term "hand" is used idiomatically to refer to a worker or helper, particularly in the context of cowboying, which involves skills related to cattle ranching. Yandex and Babylon translations rendered "hand" literally as "يد", which means "hand" in Arabic, missing the idiomatic nuance of the term. This literal translation can lead to confusion, as it doesn't convey the intended meaning of a worker or helper. On the other hand, ChatGPT's translation interprets "hand" in its idiomatic sense, translating it as "عامل" which means "worker" in Arabic. This translation captures the essence of the original expression more accurately, making it clear that the speaker is referring to the skill level of a worker rather than the physical hand. Thus, while the literal translations might be technically correct, they fail to convey the intended meaning effectively, unlike the idiomatic translation provided by ChatGPT.

According to the Arabic Dictionary “almaany” the term “معطوب” means: : مَعْطُوبٌ فِي رِجْلِهِ مُصَابٌ بِعَطَبٍ، بِضَرَرٍ. (https://www.almaany.com/ar/dict/ar-ar/%D9%85%D8%B9%D8%B7%D9%88%D8%A8/ visited on 09-06-2024 at 22:02).

The term “bum arm” in the expression “the other is a fellow with a bum arm that keeps him out of the army” is translated by Yandex translate and Babylon as “ذراع بوم”, while ChatGPT translates it as “ذراع معطوبة”.

Yandex and Babylon's translation, "ذراع بوم," directly translates "bum arm" as "ذراع بوم," which can be interpreted as "arm of a bum" in a literal sense. This translation doesn't capture the colloquial meaning of "bum arm" in English, which refers to an arm that is injured, disabled, or not fully functional.

On the other hand, ChatGPT's translation, "ذراع معطوبة," translates "bum arm" more accurately as "معطوبة" means "damaged" or "injured." This translation conveys the intended meaning of the text, indicating that the person has a physical impairment in their arm, preventing them from certain activities like joining the army or roping.

So, while Yandex and Babylon's translation is more literal, ChatGPT's translation captures the intended meaning and context of the phrase "bum arm" better by conveying the sense of disability or injury.

The term “break broncs” in the English sentence “if you're trying to break broncs” is translated into Arabic language by Yandex and Babylon translate as “إذا كنت تحاول كسر برونكس” while ChatGPT translated it as”إذا كنت تحاول كسر الخيول الجامحة”.

According to the Arabic Dictionary “almaany” the Arabic term “ الجامحة” means: : جَمَحَ الفَرَسُ رَفَضَ السَّيْرَ بالرَّغْمِ مِنْ إلْحَاحِ صَاحِبِهِ

(https://www.almaany.com/ar/dict/ar-ar/%D8%AC%D8%A7%D9%85%D8%AD%D9%87/ visited on 09-06-2024 at 22:30).

The discrepancy in translations arises from the nuances and contextual understanding of the term "break broncs" in English. The literal translation "كسر البروكس" by Yandex and Babylon Translate might seem accurate word-for-word, but it doesn't capture the actual meaning within the cowboy context.

In cowboy terminology, "breaking broncs" refers to the process of taming or training wild horses; this process involves training them to accept a rider and respond to commands. The word "break" here doesn't imply physical breaking or harming the horses.

ChatGPT's translation, "كسر الخيول الجامحة" (breaking wild horses), is more accurate in conveying the intended meaning within the context of cowboying. It emphasizes the aspect of taming wildness rather than just breaking something physically.

The term "الجامحة" adds depth to the translation, as it specifically denotes untamed or wild horses, aligning perfectly with the cowboy jargon of breaking broncs. This translation choice

shows an understanding of the cultural and contextual nuances of the original text, making it a more fitting and accurate rendition in Arabic.

Therefore, the translation can be modified as follows:

"وظفته في الغالب كمراقب للخنادق ولتحريك البوابات في سدودي وما إلى ذلك في الصيف وأحاول أن أعلمه مهارات رعي الماشية، لكنه ليس أفضل عامل لدي في العالم والآخر هو رجل بذراع معطوبة تمنعه من الانضمام إلى الجيش وتمنعه أيضا من القيام بأي نوع من عمليات ربط الحبال، وهو عيب كما تعلم، إذا كنت تحاول ترويض الخيول الجامحة" .

Example 03:The use of loan word

Source Text	Target Text(machine translation)
When Louise Bliss encouraged her to eat up the last **biscuit.** **(Page number 15 from the corpus).**	عندما شجعتها لويز بليس على تناول آخر قطعة **بسكويت**. **Google translate**
	عندما شجعتها لويز بليس على تناول آخر **بسكويت**. **Reverso translate**
	عندما شجعتها لويز بليس على تناول **البسكويت** الأخير. **Yandex translate**
	عندما شجعتها لويز بليس على تناول آخر قطعة **بسكويت**. **Babylon translate**

The analysis:

Hervey and Higgins (1992) state that “loan words are necessary when identification is the main concern, as in the case of proper nouns, degrees, grades etc. These are also necessary when there is no equivalence between concepts in two cultures” (p.31).

Translation systems have addressed the issue of untranslatable words by borrowing from other languages. This not only fills the gap but also enriches the vocabulary of the target language, resulting in a net gain.

As portrayed in the above table, we note that the term “biscuit” is translated as “بسكويت” in the target language.

According to Collism Dictionary, the term “biscuit” means in the source language “a small flat cake that is crisp and usually sweet”

(https://www.collinisdictionary.com/dictionary/English/biscuit visited on 29-01-2024 at 07:44)

In the Arabic Dictionary "almaany", "بسكويت" means: بَسْكَوِيت : أقراص هَشَّةٌ تُتَّخَذُ من دقيق وبيض وسكر وقليل من الدهن.

(https://www.almaany.com/ar/dict/arar/%D8%A8%D8%B3%D9%83%D9%88%D9%8A%D8% AA-/ visited on 29-01-2024 at 08:03).

The word "biscuit" is seamlessly incorporated from the source text to the target text without alterations, preserving the cultural nuance for international readers.

To fill the linguistic void in the target culture, where the term" biscuit" doesn't exist, translation systems opt for applying the loan word procedure; this involves incorporating the source language term "biscuit" directly into the target language as "بسكويت" to ensure a clear and accurate transfer of the intended message to the recipients.

Therefore, the data of the above table shows a gain in the translation process.

The systems Google translate and Babylon translate ingeniously employed the addition technique by adding the word "قطعة" which translates to "piece" or "unit" they were able to bridge the gap between the two languages. This addition serves as a valuable gain, ensuring that the intended meaning of "بسكويت" is accurately conveyed and fully understood by the target audience.

Google Translator's translation includes "قطعة" (piece), offering specificity about the final piece of the biscuit. This choice enhances the clarity of the action, emphasizing the finite nature of what is being consumed. By including "قطعة" Google Translate conveys that Louise Bliss encouraged the person to eat up the last individual piece of the biscuit, making the scene more vivid and tangible.

Reverso's translation omits the word "قطعة" .While it specifies that it is the last biscuit being eaten, the lack of "قطعة"; makes the action slightly less vivid and specific compared to translations that include this term. However, it still effectively communicates the idea of consuming the final biscuit.

While Yandex's translation includes "البسكويت الأخير" (the last biscuit), providing specificity about the final biscuit being eaten. However, it still lacks "قطعة", which would further emphasize the individual nature of what is being consumed. While it specifies the last biscuit,

the absence of "قطعة"might slightly diminish the vividness of the scene compared to translations that include this term.

Babylon's translation, like Google Translate's include "قطعة", offering specificity about the final piece of the biscuit by including "قطعة", Babylon enhances the clarity and vividness of the action, emphasizing that it is the last individual piece being consumed, which adds depth to the scene.

In summary, while all translations convey the general meaning of the sentence, Google Translate and Babylon's translations stand out for their inclusion of "قطعة" (piece), providing the most specific and concrete understanding of the last piece of the biscuit being eaten. Therefore, Google Translate and Babylon offer the most vivid and detailed translations in this context.

Example 04: The use of loan word

Source Text	**Target Text (machine translation)**
She had a sleeping bag and tent with her and some **sandwiches** and cheese **(Page number 13 from the corpus).**	كان معها كيس نوم و خيمة بعض **السندويشات** و الجبن. **Google translate**
	كان لديها كيس نوم و خيمة معها و بعض **السندويشات** و الجبن. **Reverso translate**
	كان لديها كيس نوم و خيمة معها و بعض **السندويشات** و الجبن. **Yandex translate**
	كان لديها كيس نوم و خيمة معها و بعض **السندويشات** و الجبن. **Babylon translate**

The analysis:

According to Haspelmath (2023), a loanword is defined as: "a word from a language that enters the lexicon of the mother tongue because of the borrowing". (Rosa.Ariane and Budiman.Arif: 2023:513).

As depicted in the table above, we observe that the term “sandwiches” is translated into the target language by “السندويشات”.

The term “sandwiches” signifies a food typically consisting of vegetables, sliced cheese or meat, placed on or between slices of bread”.

(https://en.m.wikipedia.org/wiki/sandwich visited on 29-01-2024 at 08:45). This term lacks a direct counterpart in the target language.

In the Arabic Dictionary “almaany”, the term “السندويشات” signifies: “ شطيرة”.(https://www.almaany.com/ar/dict/ar-ar/D8%B3%D9%86%D8%AF%D9%88%D9%8A%D8%B4/ at 09:01).

Therefore, translation systems opt to retain the original word “sandwiches” from the source language and translate it as “السندويشات” in the target language; this involves using the loan word to convey the flavour of the source text.

The data above show a gain in the translation process by applying the loan word procedure.

–In the English sentence, the order of items is clear and concise, indicating possession (She had) followed by a list of items. However, in the translations, while the meaning remains largely intact, the positioning and clarity vary.

Google Translate and Babylon provide translations that maintain the order of possession followed by the list of items. Reverso and Yandex, on the other hand, place the term “معها” (with her) differently, which slightly alters the emphasis and could lead to a different interpretation in some contexts.

Overall, there is a loss in the nuanced clarity and emphasis of the original English sentence due to differences in word order and emphasis in the translations.

Example 05: Semantic loss:

Omission

Source Text	**Target Text(machine translations)**
She crossed the room and went through a doorway **into** the kitchen where the woman was pouring coffee into heavy	عبرت الغرفة و ذهبت عبر المدخل **المؤدي** إلى المطبخ حيث كانت المرأة تصب القهوة في فناجين خزفية ثقيلة. **Google translate**

china cups. **(page number 05 from the corpus)**	عبرت الغرفة و ذهبت عبر مدخل إلى المطبخ حيث كانت المرأة تصب القهوة في أكواب صينية ثقيلة. **Reverso translate**
	عبرت الغرفة و مرت عبر مدخل إلى المطبخ حيث كانت المرأة تصب القهوة في أكواب صينية ثقيلة. **Yandex Translate**
	عبرت الغرفة و دخلت عبر من مدخل إلى المطبخ حيث كانت المرأة تصب القهوة في أكواب صينية ثقيلة. **Babylon translate**

The analysis:

According to Delisle et al (2007) Omission is “a translation error”. (Kenny.D & Ryou.k:2007:59).

As portrayed in the table above, Google translate has translated the word “into” as “المؤدي”, while Reverso, Yandex translate, and Babylon have omitted this word.

Machine translation systems can often stumble if they don’t fully grasp the source text, leading to inaccurate translations; in these cases, they might opt for deleting certain parts, but this comes at a hefty cost.

Chopping away at the text not only removes content, but also damages the overall meaning and quality of the translation. It fails to capture the essence and precision of the original.

As we saw in the earlier example generally speaking, it’s neither an accurate nor an aesthetically pleasing approach to translation. Hence there is a partial loss of meaning in this example.

Therefore, the best translation of the sentence is as follows:

”عبرت الغرفة ودخلت عبر المدخل المؤدي إلى المطبخ، حيث كانت المرأة تصب القهوة في أكواب صينية ثقيلة“

The English sentence “the woman was pouring coffee into heavy China cups” is a simple declarative sentence that describes the cups as being heavy and made of china.

Since the original sentence described the cups as heavy, Google Translate described them using the word: “فناجين”, which means in the Arabic Dictionary “arabdict”: فنجال، قَدَح صغير من

الخزف ونحوه تُشرب فيه القهوة ونحوها.
(https://www.arabdict.com/m/results?lang=ar&dict=ar&q=%D8%A7%D9%84%D9%81%D9%86%D8%AC%D8%A7%D9%86 visited on 29-01-2023at 09:13); this choice reflects a more traditional Arabic terms for cups.

And "خزفية", which means in the Arabic Dictionary "almaany":

المصنوعات الخزفية: ما صنع من الطين و احرق في النار"
(https://www.almaany.com/ar/dict/arar/%D8%A7%D9%84%D9%85%D8%B5%D9%86%D9%88%D8%B9%D8%A7%D8%AA%D8%A7%D9%84%D8%AE%D8%B2%D9%8A%D8%A9/ visited on 29-01-2023 at 09:22).

Google Translate uses the transposition strategy to preserve the meaning of the original sentence in the target language without altering its intended meaning, as stated by Vinay and Darbelnet (1958/1995).

The adjective "خزفية ثقيلة" is used to describe the material of the cups, emphasizing their weight and material composition. The adjective "ثقيلة"comes after the noun "خزفية" which is common in Arabic syntax.

Reverso, Yandex, and Babylon use "أكواب" for "cups", which means in the Arabic Dictionary "almaany":الكُوب: قَدَحٌ من الزُّجاج ونحوهِ، مستديرُ الرأس لا عُروةَ له، وهو من آنية الشراب

(https://www.almaany.com/ar/dict/arar/%D8%A3%D9%83%D9%88%D8%A7%D8%A8/ visited on 29-01-2023 at 09:31).

In the Arabic sentence" عبرت الغرفة وذهبت عبر المدخل المؤدي إلى المطبخ حيث كانت المرأة تصب القهوة في فناجين خزفية ثقيلة

The adjective "ثقيلة" again comes after the noun "صينية", following Arabic syntax.

Both translations effectively convey the intended meaning of "heavy China cups"; While Google Translate specifically mentions "فناجين خزفية" Reverso, Yandex, and Babylon use the broader term "China cups"; which also captures the material and style of the cups.

Google Translate's choice of "فناجين" may appeal to a more traditional Arabic-speaking audience familiar with this term for cups. On the other hand, Reverso, Yandex, and Babylon's use of "أكواب" is more general and may be suitable for a broader audience.

Despite differences in term choice and adjective placement, both translations adhere to Arabic syntactic structures, with adjectives typically following the nouns they modify.

Hence, there are variations in term choice and adjective placement, both translations effectively convey the meaning of “heavy China cups” in Arabic while considering cultural nuances and syntactic conventions.

Example 06: Semantic loss

Literal translation:

Source Text	Target Text (machine translations)
He set back and fished out his **Bull Durham** and made a cigarette and smocked it. **(page number 21 from the corpus).**	جلس و اخرج **ثوره دورهام** و اعد سيجارة و دخنها. **Google translate**
	جلس مرة أخرى و **صيد بول دورهام** و صنع سيجارة و دخنها. **Reverso translate**
	جلس مرة أخرى و**صيد ثوره دورهام** و صنع سيجارة و دخنها. **Yandex translate**
	جلس و **اصطاد بول دورهام** وصنع سيجارة و دخنها. **Babylon translate**

The analysis:

According to Vinay and Darbelnet (1958/1995): “ the literal translation is a word-for word translation with no lexical word or structure alterations. To put it another way, when using this method, the translator neglects the context of the source language words and phrases while adhering to the target language’s syntactic structure”.(Vinay & Darbelnet :2023:84).

As depicted in the table above, we observe that the two expressions “fished out” and “Bull Durham” are translated literally in the target language.

According to the Oxford English Dictionary, the term “fished out” in this context signifies: “to take or pull something out of a place”.

(https://www.oxfordlearnersdictionaries.com/definition/American-English/fishout visited on 16-01-2024 at 21:58).

From this table, it can be seen that translation systems tend to use vocabulary that does not convey the intended meaning; the term “fished out” in this example, is translated by Reverso,Yandex translate and Babylon, as “اصطاد، صيد”.

The change of meaning resulting from the use of an inappropriate word in the semantic field is one of the common types of loss in the translation of this example.

Therefore, the term “Bull Durham” in this context signifies: “the oldest surviving brand of smokeless tobacco. (https://www.spellchecker.net/meaning/bull%20durham#google-vignette visited on 16-01-2024 at 22:20).

According to the Cambridge Dictionary, the word “bull” referred to “a male cow, or the male of particular animals such as the elephant or whale” (https://dictionary.cambridge.org/dictionary/English/bull visited on 16-01-2024 at

23:54).

Translation systems (Google translate and yandex) have translated the term “Bull Durham” as “ثور دورهام”and this is not proper because the two word are not equivalent. Hence, there is a complete loss of meaning for the word “ثور دورهام”.

The machine’s output does not meet the requirements; the correct translation of this example is to use the equivalence technique for both the terms “fished out” and “Bull Durham”.

Therefore, the translation can be modified as follows:

”جلس مرة أخرى و اخرج سيجارة من نوع بول دورهام ليدخنها. “

Example 07: Semantic loss:

Omission:

Source Text	**Target Text (machine translation)**

His two white mules were standing there tied to the porch rails; George Bliss had saddled them before he had come inside the house. He climbed onto one of them and when she realized what was expected of her Martha got up on the other and they rode out to find the horses. The yellow dog ran to get ahead because it was his habit to take the lead, a habit that had resulted in his acquiring the name Pilot. **(Page 09 from the corpus).**	كان بغلاه الأبيضان يقفان هناك مربوطين بقضبان الشرفة. كان جورج بليس قد أسرجهم قبل أن يدخل المنزل. صعد إلى أحدهما وعندما أدركت ما كان متوقعا منها نهضت مارثا على الآخر وركبوا للعثور على الأكواخ. ركض الأصفر للمضي قدما لأنه كان من عادته أن يأخذ زمام المبادرة ، وهي عادة أدت إلى حصوله على اسم الطيار. **Babylon translation.** كان بغاله الأبيض يقفان هناك مربوطين بقضبان الشرفة؛ كان جورج بليس قد سرجهم قبل أن يدخل المنزل. صعد إلى أحدهم وعندما أدركت ما كان متوقعا منها، نهضت مارثا على الآخرى وركبوا للعثور على الخيول. ركض الكلب الأصفر للمضي قدما لأنه كان من عادته أن يأخذ زمام المبادرة ، وهي عادة أدت إلى اكتسابه اسم Pilot. **Reverso translate.** كانت بغلتيه البيضاوين واقفتين مربوطتين بسياج الشرفة وكان جورج بليس قد سرجهما قبل أن يدخل إلى البيت صعد على واحدة منهما وعندما أدركت مارثا ما هو متوقع منها ركبت الأخرى وانطلقا للبحث عن الحصان. ركض الكلب الأصفر ليتقدمهم لأن من عادته أن يأخذ زمام المبادرة وهي عادة جعلته يكتسب اسم "بايلوت". **ChatGPT.**

Analysis:

Dickins et al. (2017) explain that omission is one form of translation loss where parts of the ST are simply omitted in the TT. (Dickins, J., Hervey, S.G.J. and Higgins, I: 2017: 20).
As shown in the table above, ChatGPT has translated the word “dog” as “ الكلب” while Babylon translate has omitted this word.
The omission of the word "dog" in the Babylon translation results in a significant semantic loss, as it removes a crucial detail about the character and dynamics within the scene. In the original text, the yellow dog is described as having a habit of taking the lead, which not only provides insight into the dog's personality but also establishes a visual image of the dog running ahead of the mules. This detail adds to the richness of the scene, highlighting the interaction between the animals and the human characters. By omitting "dog" and merely referring to "the yellow" without specifying it is a dog, the Babylon translation loses this layer of meaning and leaves the reader with an incomplete understanding of the scene.
Therefore, accurately translating "dog" as "الكلب" is essential to preserve the full meaning and vividness of the original text.

In the provided table, the English sentence "a habit that had resulted in his acquiring the name Pilot" has translated by Babylon as “وهي عادة أدت إلى حصوله على اسم الطيار” ;this sentence

uses the term "Pilot" as the name given to the dog due to its habit of taking the lead. This name is significant because "pilot" refers to someone who leads or guides, which directly correlates with the dog's behavior.

According to the Arabic Dictionary almaany the term “pilot” means:

الطَّيَّارُ: قائد الطائرة

(https://www.almaany.com/ar/dict/ar-ar/%D8%B7%D9%8A%D8%A7%D8%B1/ visited on 27- 05- 2024 at 13:03)

In Arabic, "الطيار" strictly means a person who flies an aircraft, which doesn't capture the figurative aspect of the dog's leadership quality.

The literal translation of "Pilot" to "الطيار" by Babylon retains the meaning of a guide or leader, akin to the role of a pilot in navigation. This approach provides an immediate and direct understanding to Arabic speakers, linking the dog's habit of leading to the familiar concept of a pilot.

Reverso's translation as "pilot" stays close to the original meaning but lacks the cultural and contextual nuances offered by transliteration or a direct translation. Each approach has its merits and drawbacks, highlighting the complexity and artistry involved in translation, especially when dealing with names and cultural references.

While ChatGPT translates it as"هي عادة جعلته يكتسب اسم بايلوت";

“بايلوت” is a transliteration of the English word "Pilot.”

ChatGPT's transliteration to "بايلوت" preserves the specific name given to the dog, reflecting its uniqueness and cultural context from the original text. This approach ensures that the specific name "Pilot" is retained, which might carry additional nuances or associations for readers familiar with English. Transliteration can also highlight the character's background, potentially indicating a setting where English names are used.

However, this choice can result in a loss of immediate clarity for Arabic readers who may not recognize "بايلوت" as readily as they would "الطيار." While transliteration maintains the original name's integrity, it sacrifices some of the straightforwardness and relatability that a direct translation provides.

ChatGPT's decision to transliterate "Pilot" to "بايلوت" aims to preserve the original name's uniqueness and cultural context. This approach respects the specific character naming in the source text but may introduce a slight barrier to immediate comprehension for Arabic readers unfamiliar with the term. In contrast, Babylon's translation to "الطيار" offers a clear, direct meaning that aligns with the dog's behavior, making it more immediately understandable but losing the specific name's original cultural flavor.

In the translation of the phrase "got up on" from the original text, there is a notable difference between the Babylon translation and the ChatGPT translation, leading to a loss of meaning. The Babylon's and reverso's translation use "نهضت" (which means "she stood up" or "she got up"), which is inaccurate in this context because it implies that Martha was previously sitting or lying down and then merely stood up. This translation misses the crucial aspect that Martha is mounting or riding the mule, which is the intended action in the original text.

On the other hand, the ChatGPT translation uses "ركبت" (which means "she rode" or "she mounted"), accurately conveying the intended meaning that Martha got onto the mule to ride it. This translation preserves the original narrative's clarity, indicating that Martha not only stood up but also got on the mule to join George in riding out to find the horses. Thus, the use of "نهضت" in Babylon's and Reverso's translation introduces ambiguity and loses the specific action of mounting the mule, which is crucial to understanding the scene's dynamics and Martha's actions.

In the Babylon translation, a significant error occurs where "horses" is mistranslated as "الأكواخ".

The passage in question describes a scene where two white mules are saddled and ready for a journey. In the original English text, the characters George Bliss and Martha ride the mules to find their horses, accompanied by a yellow dog named Pilot.

This mistake alters the context and meaning of the passage. Instead of searching for their horses, the characters appear to be looking for huts, which don't align with the narrative. This mistranslation disrupts the coherence of the story and confuses the reader about the characters' intentions.

Therefore, the translation can be modified as follows:

كان بغلاه الأبيضان يقفان هناك مربوطين بقضبان الشرفة. كان جورج بليس قد أسرجهم قبل أن يدخل المنزل، صعد إلى أحدهما وعندما أدركت ما كان متوقعا منها نهضت مارنا على الآخر وركبوا للعثور على الأحصنة. ركض الكلب الأصفر للمضي قدما لأنه كان من عادته أن يأخذ زمام المبادرة ، وهي عادة أدت إلى حصوله على اسم الطيار.

Example 08: Cultural loss

Literal translation:

Source Text	**Target Text (machine translations)**
	يمكن لهؤلاء الفتيات كسر الخيول مثل أي رجل، لكن لديهن

Those girls could break horses as well as any man but they had their own ways of doing it, not such a bucking **Wild West** show. **(Page number 01 from the corpus).**	طرقهن الخاصة للقيام بذلك، و ليس مثل عرض الغرب المتوحش المخالف. **Google translate**
	يمكن لهؤلاء الفتيات كسر الخيول مثل أي رجل، و لكن كان لديهم طرقهم الخاصة للقيام بذلك، و ليس مثل عرض المخالف **Wild West** **Reverso translate**
	يمكن لهؤلاء الفتيات كسر الخيول و كذلك أي رجل، و لكن كان لديهم طرقهن الخاصة للقيام بذلك، ليس مثل هذا العرض الغربي المتوحش . **Yandex translate**
	يمكن لهؤلاء الفتيات كسر الخيول مثل أي رجل، و لكن لديهن طرقهن الخاصة للقيام بذلك، و ليس مثل هذا العرض الغربي المتوحش. **Bbylon translate**

Analysis:

The sentence “not such a backing Wild West show “is” translated by translation systems

(Google translate, Yandex and Babylon) as “ليس مثل عرض الغرب المتوحش المخالف” this translation is grammatically correct, but it does not convey the same meaning as the original English text.

While Reverso translated it as “Wild West”, Reverso opts for a literal translation of the term, assuming a shared understanding of the “Wild West” concept, this discrepancy highlights the challenge in translating cultural references where a balance between literal accuracy and cultural interpretation is sought.

The loss of meaning in the translation of Reverso lies in Reverso’s decision to keep “Wild West” untranslated.

Machine translation often relies on data and algorithms, which can sometimes result in an inaccurate interpretation of the cultural nuances present in the original text. Newmark (1988) maintains that translation problems caused by culture-specific words arise due to the fact that they are intrinsically and uniquely bound to the culture concerned and, therefore, are related to the “context of a cultural tradition”. (Newmark: 1988: 78).

According to the Oxford English Dictionary the term “Wild West show” signifies :“(in the US) a show in which performers creates the atmosphere and characters of the Wild West, with cowboys and Native Americans. They ride horses, shoot at objects and demonstrate other western skills.

Such shows were especially popular at the end of the 19th century, when they were often performed in large tents. The most famous was Buffalo Bill’s Wild West Show, which he took to many US cities and also to Europe” (https://www.oxfordlearnersdictionaries.com/definition/english/wild-west-show visited on 29-01- 2024 at 14:10); this term “ Wild West show” is associated with the cultural heritage of the United States of America, lacking equivalence in the cultural framework of the Arabic audience, thus resulting in cultural loss when translated into the target language.

In the table above, it is observed that in all three translations (Google translate, Yandex and Babylon) the Arabic word “المخالف” is omitted, which means in the Arabic Dictionary “inoor”:مخالف: مُتباين و معاكس، غير مطابق و غير متشابه (https://qamus.inoor.ir/ar/8KK6G/%D8%A7%D9%84%D9%85%D8%AE%D8%A7%D9%84%D9%81 visited on 29-01-2024 at 14:30); in this context, the word “المخالف” means that the show being described differs from the typical or expected portrayal of Wild West shows.

In the context of the sentence, it is used to describe the way that the girls break horses as being different from the way that men do it. The girls’ method is not as aggressive or violent as the traditional Western method .Babylon and Yandex have omitted this word in their translations, while Google Translate has included it. This is a significant omission, as it changes the meaning of the sentence. Without the word “المخالف”, the sentence simply states that the girls have their own way of breaking horses. It does not convey the idea that their method is different from the traditional method.

In this case, the target audience is Arabic speakers who may not be familiar with the traditional Western method of breaking horses. Therefore, it is important to include the word “المخالف” in the translation in order to convey the full meaning of the sentence.

The change of meaning resulting from the use of Omission strategy is one of the common types of loss in the translation of this example.

Therefore, the translation can be modified as follows:

يمكن لهؤلاء الفتيات ترويض الخيول مثل أي رجل، لكن كان لديهن طرقهن الخاصة للقيام بذلك، وليس مثل عرض الغرب المتوحش المخالف.

Example 09 : Cultural loss

Literal translation:

Source Text	Target Text (machine translation)
“I might switch to those Lucky Strike ready mades,” he said, just to provoke her. “What would you think of that ? ” She believed there was nothing uglier than an ashtray full of stubbed out cigarettes and liked to complain that his smoking stank up her curtains and burnt holes in her carpets. **(Page number 40 from the corpus).**	قال "قد أنتقل إلى تلك الملابس الجاهزة ل Lucky Strike، فقط لاستفزازها. " ما رأيك في ذلك ؟" كانت تعتقد أنه لا يوجد شيء أبشع من منفضة سجائر مليئة بالسجائر العنيدة، و تحب أن تشكو من أن تدخينه يفسد ستائرها و يحرق ثقوبا في سجادها. **Babylon translate.** قال فقط لاستفزازها :" قد أتحول الى منتجات Lucky Strike الجاهزة". ما رأيك في ذلك ؟" كانت تعتقد أنه لا يوجد شيء أقبح من منفضة سجائر مملوءة بالسجائر المطفأة، و كانت تحب الشكوى من أن تدخينه أدى الى ارتفاع ستائرها و احداث ثقوب في سجادها. **Google translate.** ربما أبدأ في استخدام تلك السجائر الجاهزة من لوكي سترايك"، قال، بهدف إثارتها. " ما رأيك في ذلك؟" كانت تعتقد أنه لا يوجد شيء أبشع من صينية سجائر مطفأة و تحب أن تشتكي من أن دخان تدخينه يفسد ستائرها و يحرق ثقوبا في سجادتها. **ChatGPT.**

The analysis :

According to Nida and Taber (1982) cultural translation is “A translation in which the content of the message is changed to conform to the receptor culture in some way, and/or in which information is introduced which is not linguistically implicit in the original” (Nida, E. & Taber, C. R: 1982: 199).

As depicted in the table above, we observe that the sentence “I might switch to those Lucky Strike ready mades”is translated by Babylon translate as: “قد أنتقل إلى تلك الملابس الجاهزة ل Lucky strike”.

Google translate translated it as: " قد أتحول الى منتجات Lucky Strike الجاهزة".

while ChatGPT translated it as “ ربما أبدأ في استخدام تلك السجائر الجاهزة من لوكي سترايك”, Babylon and Google translate opt for a literal translation of the term “ Lucky Strike” .

Lucky Strike is an American brand of cigarettes owned by the British American Tobacco group. (https://en.m.wikipedia.org/wiki/Lucky_Strike visited on 01-05-2024 at 16:51).

In English, "Lucky Strike" refers to a specific brand of cigarettes, but Babylon Translate doesn't provide context or cultural understanding. Therefore, it translates "Lucky Strike" literally into Arabic, which doesn't convey the brand association or the idea that the speaker is referring to a specific type of cigarette.

Translating "Lucky Strike" into Arabic directly might result in a loss of the brand's association with cigarettes or the recognition of the term as a specific brand name.

Babylon and Google translate have opted for a literal translation of "Lucky Strike" in the sentence "I might switch to those Lucky Strike ready mades" due to the inherent complexity of idiomatic expressions and brand names in translation. The phrase "Lucky Strike" is a specific brand of cigarettes with a well-known name and connotation in English-speaking cultures. When encountering such terms, especially in a specific context like this sentence, Babylon and Google translate might default to a literal translation because it lacks the contextual understanding to recognize the brand association or the cultural significance attached to it.

This results in a loss of meaning and clarity in the translation.

The sentence "I might switch to those Lucky Strike ready mades" was translated by Babylon as "قد أنتقل إلى تلك الملابس الجاهزة ل Lucky strike, this translation introduces a significant change in meaning, interpreting "ready mades" as "ready-made clothes" and misunderstanding "Lucky Strike" as something associated with clothing. On the other hand, ChatGPT's translation, "ربما أبدأ في استخدام تلك السجائر الجاهزة من لوكي سترايك," correctly identifies "ready mades" as referring to pre-rolled cigarettes, aligning with the context of "Lucky Strike" as a well-known cigarette brand. This highlights the importance of context in translation, where Babylon's translation missed the cultural reference to the cigarette brand, leading to a complete loss of meaning, whereas ChatGPT preserved the original intent by recognizing the specific usage of "Lucky Strike" and "ready mades" within the context of smoking.

When comparing the translations provided by Babylon with Google and ChatGPT's translation for the phrase "an ashtray full of stubbed-out cigarettes," we can see a significant difference in how each system approaches the translation.

Babylon's translation, "منفضة سجائر مليئة بالسجائر العنيدة," uses the term "العنيدة", which can be translated as "stubborn" or "persistent." This translation suggests that the cigarettes in the ashtray are somehow stubborn or resistant, which is not the intended meaning of "stubbed-out" in English. This is likely due to a literal interpretation of the word without considering its context within the phrase.

On the other hand, Google's and ChatGPT's translation, "صينية سجائر مطفئة," focuse on conveying the action of stubbing out or extinguishing the cigarettes. The word "مطفئة" means "extinguished" or "put out," which accurately describes the state of the cigarettes in the ashtray. This translation captures the intended meaning of the original phrase more effectively by emphasizing the action that has been taken with the cigarettes.

According to the Oxford English Dictionary, the term " stank up" means: to fill a place with a strong unpleasant smell.

(https://www.oxfordlearnersdictionaries.com/definition/american_english/stink-up#:~:text=stink%20somethingup&text=to%20fill%20a%20place%20with,with%20her%20incense%20and%20candles. Visited on 08-06-2024 at 16:38).

In the given sentence "his smoking stank up her curtains," the intended meaning is that the act of smoking caused the curtains to absorb unpleasant odors, making them smell bad. The translation by Babylon translate and ChatGPT, "تدخينه يفسد ستائرها," correctly captures this idea, implying that his smoking ruins or spoils her curtains, which aligns with the notion of them becoming smelly or dirty. On the other hand, Google Translate's version, " تدخينه أدى إلى ارتفاع ستائرها," translates to "his smoking caused her curtains to rise," which is a literal and nonsensical interpretation in this context. This translation completely loses the original meaning by misinterpreting "stank up" (meaning to make something smell bad) as causing the curtains to physically rise, which is not relevant to the impact of smoking on curtains.

Therefore, the translation can be modified as follows:

قال :"ربما أبدأ في استخدام تلك السجائر الجاهزة من لوكي سترايك" بهدف إثارتها. ما رأيك في ذلك؟ كانت تعتقد أنه لا يوجد شيء أبشع من صينية سجائر مليئة بالسجائر المطفأة، و تحب أن تشكو من أن تدخينه يفسد ستائرها و يحرق ثقوبا في سجادتها.

Example 10: Grammatical loss:

Repetition

Source Text	Target Text (machine translations)
The long pine table and **chairs** and two kitchen cupboards were painted white, and the windows were tall and narrow and **curtainless.** **(page number 05 from the corpus)**	كانت الطاولة و الكراسي الطويلة المصنوعة من خشب الصنوبر و خزانتي المطبخ مطلية باللون الأبيض، و كانت النوافذ طويلة و ضيقة و بدون ستائر. **Google translate**
	تم طلاء طاولة الصنوبر الطويلة و **الكراسي** و خزانتين للمطبخ باللون الأبيض، و كانت النوافذ طويلة و خالية من **الكراسي.** **Reverso translate**

كانت الطاولة و الكراسي الطويلة المصنوعة من خشب الصنوبر و خزانتي المطبخ مطلية باللون الأبيض، و كانت النوافذ طويلة و ضيقة و بدون ستائر. **Yandex translate**	
تم طلاء طاولة و كراسي الصنوبر الطويلة و خزائن المطبخ باللون الأبيض، و كانت النوافذ طويلة و ضيقة وخالية من الستائر. **Babylon translate**	

The analysis:

According to He Qingshun, Syntactic repetition can be exemplified into parallelism and antithesis. Parallelism means the arrangement in a series (often three or more) of phrases or sentences similar in structure, closely relevant in meaning and consistent in mood." (He Qingshun: 2014:82).

As indicated in the table above, it is apparent that the term "curtainless" is translated as "الكراسي" in the target language by Reverso.

According to the Collins English Dictionary, the term "curtainless" means "without a curtain or curtains" (https://www.collinsdictionary.com/dictionary/English/curtainless visited on 21-01-2024 at 06:33).

The table above, illustrates that the word "curtianless" is translated by translation systems (Google translate, Yandex and Babylon) as "بدون ستائر" while Reverso opts to translate it as "الكراسي" instead of "بدون ستائر" ;we note that the program Reverso considers the term "chairs" and "curtainless" as a single term.

The repetition here caused the intended meaning to be completely lost; this made it difficult for the reader or listener to understand, because of the inappropriate word choice (الكراسي) .Additionally, the repetition made the sentence sound boring and clumsy, reducing its aesthetic value.

Hence, this repetition implies a grammatical loss and prevents the full conveyance of the intended meaning.

The repetition error in Reverso's translation significantly disrupts the sentence structure and overall readability of the passage. By incorrectly repeating the word "الكراسي" (chairs) instead of accurately translating "curtainless" as "بدون ستائر" (without curtains), the flow of the sentence is interrupted. This interruption creates confusion and incoherence in the structure of

the sentence. Readers may struggle to understand the intended meaning and may question the accuracy of the translation. The misplaced repetition detracts from the smooth reading experience and diminishes the reader's comprehension of the passage as a whole. Ultimately, the repetition error hurts the effectiveness of the translation, leading to a loss of clarity and coherence in the sentence structure.

Therefore, the translation can be modified as follows:

كانت الطاولة و الكراسي الطويلة المصنوعة من خشب الصنوبر و خزانتي المطبخ مطلية باللون الأبيض، وكانت النوافذ طويلة وضيقة وبدون ستائر

Example 11 : Grammatical loss

The Plural and Feminine forms:

Source Text	Target Text (machine translations)
She'd left her things and carried her saddles **in one at a time** and slung them up onto the **half** walls of the stalls. **(Page number 08 from the corpus).**	عادت إلى حيث تركت أغراضها و حملت سروجها **واحدا تلو الآخر** و علقتها على **نصف** جدران الأكشاك. **Google translate**
	عادت إلى حيث تركت أغراضها و حملت سروجها **واحدة تلو الأخرى** و علقتها على جدران **نصف** الأكشاك. **Reverso translate**
	عادت إلى حيث تركت أغراضها و حملت سروجها في **واحدة تلو الأخرى** و ألقتها على **نصف** جدران الأكشاك. **Yandex translate**
	عادت إلى حيث تركت أغراضها و حملت سروجها **واحدة تلو الأخرى** و علقتها على **أنصاف** جدران الأكشاك. **Babylon translate**

The analysis:

Jabak Omar emphasizes that "languages have different syntactic rules and that translation into a foreign language presents translators and students with various syntactic challenges because their knowledge of the syntax of the foreign language is not as good or profound as that of their mother tongue. Languages across the world have strikingly different syntactic rules when it comes to number, gender, person, tense, aspect, voice and word order.

Some of these grammatical devices or systems may be present in one language but absent in another language" (Jabak Omar Osman: 2019:18).

Several key grammatical points are lost in the translations of the English sentence "She went back to where she'd left her things and slung them up onto the half walls of the stalls." While all translations convey the overall meaning, discrepancies emerge in specific details.

According to the Britannica Dictionary, the word "half" means: "one of two equal or nearly equal parts into which something can be divided". (https://www.britannica.com/dictionary/half#:~:text=Britannica%20Dictionary%20definition%20of%20HALF,which%20something%20can%20be%20divided visited on 30-01-2024 at 15:40).

In the original English text, the phrase "half walls" is used to describe the structure onto which the saddles are slung. It implies that there are only half-height walls, likely separating different sections of the stalls. However, in the Babylon translation, "half walls" is translated as "أنصاف جدران" which is the plural form, suggesting that each stall has multiple half walls, which is grammatically inaccurate and changes the meaning. This loss of grammatical accuracy could lead to confusion for the reader regarding the physical layout of the stalls.

According to the English Dictionary "Britannica" the term "saddle" means: a leather-covered seat that is put on the back of a horse" (https://www.britannica.com/dictionary/saddle visited on 30-01-2024 at 16:57).

In the original English text, Google Translate correctly translates the phrase "in one at a time" as "واحدًا تلو الآخر", using the masculine form "واحدًا" to match the gender-neutrality of the original text. However, Reverso, Yandex, and Babylon all incorrectly translate it with the feminine form "واحدة تلو الأخرى", which assumes a feminine subject. This introduces a grammatical inconsistency in the translation, as it should match the gender neutrality of the original phrase.

Ultimately, the grammatical error in the translations hurts the effectiveness of the translation. This error leads to a loss of accuracy and detracts from the overall quality of the translation, as it deviates from the grammatical structure of the original text. As a result, the intended meaning may be obscured or misrepresented, diminishing the reader's comprehension and potentially causing confusion. Therefore, ensuring grammatical accuracy is essential in maintaining the fidelity and effectiveness of translations.

Hence, the translation can be modified as follows:

"عادت إلى حيث تركت أغراضها و حملت سروجها واحدا تلو الآخر و علقتها على نصف جدران الأكشاك."

Example 12: Morphological loss:

Equivalence at the word level

Source Text	Target Text (machine translations)
Roy **had come up crippled** with arthritis after breaking his hip and **had figured out** how to outsmart his horses Instead of bucking them to a standstill. **(page number 28 from the corpus).**	**أصيب** روي **بالشلل** بسبب التهاب المفاصل بعد كسر في وركه و **اكتشف** كيفية التغلب على خيوله بدلا من إيقافها. **Google translate**
	كان روي قد **أصيبت بالشلل** بسبب التهاب المفاصل بعد كسر وركه و **اكتشف** كيفية التفوق على خيوله بدلا من وضعها على طريق مسدود. **Reverso translation**
	كان روي قد **أصيب بالشلل** بسبب التهاب المفاصل بعد كسر وركه و **توصل إلى** كيفية التغلب على خيوله بدلا من إيقافها إلى طريق مسدود. **Yandex translate**
	أصيب روي **بالشلل** بعد كسر وركه و **اكتشف** كيفية التغلب على خيوله بدلا من إيقافها. **Babylon translate**

Analysis:

The morphological loss in translation refers to differences in word forms and structures between the source and target language.

Reima Al-Jurf(1990) states that “comparison of Arabic and English morphological systems will not be made, since Arabic and English are not cognate languages, i.e. genetically related. They are considerably different in the classes that are characterized by inflectional affixes. There is no way to compare the forms within the classes. The inflectional morphemes and derivational and compounding processes do not match in any of the word classe”. (Reima Al-Jurf: 1990: 8).

According to the Oxford English Dictionary the word “crippled” means: unable to walk or move in the usual way because of injury or a medical condition. (https://dictionary.cambridge.org/dictionary/english/crippled visited on 29-01-2024 at 15:02).

The Arabic term “الشلل” means in the Arabic Dictionary “almaany”:

الشَّلَلُ : تَعَطُّلٌ في حركة العضو أو وطيته.

(https://www.almaany.com/ar/dict/ar-ar/%D8%B4%D9%84%D9%84/ visited on 29-01-2024 at:1523) while the term "التهاب المفاصل" means in the same Dictionary:

مرض عضويّ يصيب أجزاء في جسم الإنسان أهمها المفاصل والعضلات، وعادة ما يصيب كبار السِّنّ وينتج عن خلل بالغدد الصَّمّاء وتقدُّم السنّ

(https://www.almaany.com/ar/dict/arar/%D8%A7%D9%84%D8%AA%D9%87%D8%A7%D8%A8-%D8%A7%D9%84%D9%85%D9%81%D8%A7%D8%B5%D9%84/ visited on 29-01-2024 at 15:28).

As we can see in the table above, this sentence "had come up crippled" also is translated by translation systems as "أصيب بشلل" (became paralyzed), which doesn't capture the full nuance of "had come up crippled" or "أصبح مشلولا " (became crippled), losing the connection to the hip injury and the participial form.

The phrase "had figured out" consists of several morphemes:

"had" (past auxiliary), "figure" (root) "ed" (past participle suffix), and "out" (adverb).

"Figured out" becomes a verb like "اكتشف" (discovered) and Yandex translate, translates it as: "توصل إلى" (reached), losing the specific meaning of the participial construction.

The translations convey the general meaning of the sentence accurately. However they sacrifice some morphological details and nuances at the word level, especially regarding tens /aspect, verb choice and connection between events.

Therefore, the best translation of the sentence is as follows:

أصيب روي بالتهاب المفاصل بعد كسر وركه، لكنه اكتشف كيفية التغلب على خيوله بدلا من إيقافها.

Example 13 : Morphological loss

Equivalence at the word level

Source Text	Target Text (machine translation)

In another twenty years people would wake up to realize that the timber was gone and the native grasses plowed up or eaten right down to the roots, that cheat grass and rabbit brush and water-hogging scrub juniper had taken over all the disturbed ground. **(Page number 65 from the corpus).**	وفي غضون عشرين عاما أخرى، سيستيقظ الناس ليدركوا أن الأخشاب قد اختفت وأن الأعشاب المحلية قد حرثت أو أكلت حتى الجذور، وأن العشب الغش وفرشاة الأرانب والعرعر الذي يمتص الماء قد استولى على كل الأرض المضطربة. **Google translate.** في عشرين عاما أخرى، كان الناس سيستيقظون ليدركوا أن الأخشاب قد اختفت وأن الأعشاب المحلية حرثت أو أكلت حتى الجذور، وأن العشب الغش وفرشاة الأرانب والعرعر قد استولى على كل الأرض المضطربة. **Yandex translate.** في غضون عشرين سنة أخرى، سيستيقظ الناس ليكتشفوا أن الأخشاب قد اختفت وأن الأعشاب الأصلية قد تم حرثها أو أكلها حتى الجذور، وأن عشب الشيت والشجيرات الأرنبية والعرعر الذي يستهلك الماء بكثرة قد استولت على جميع الأراضي المضطربة . **ChatGPT.**

Analysis:

Translation can sometimes lead to morphological loss, where the detailed word forms of the original language are simplified or altered in the target language.

Aronoff and Fodaman (2011) emphasize that “morphology refers to the mental system involved in word formation or to the branch of linguistics that deals with words, their internal structure, and how they are formed”. (Aronoff and Fodaman: 2011:1).

As depicted in the table above, we observe that the term “would wake up” is translated in the target language by Google translate and ChatGPT as “سيستيقظ”.

The English form includes a modal verb "would" that implies a future conditional or hypothetical situation, adding nuance to the action. However, the Arabic translation "سيستيقظ" directly translates to "will wake up", which indicates a simple future tense without the conditional nuance. This simplification results in a loss of the original sentence's subtlety, as the conditional aspect conveyed by "would" in English is not fully captured in the Arabic translation. Consequently, while the basic meaning is preserved, the morphological richness and the hypothetical nature implied by "would" are lost.

According to the Oxford English Dictionary the term “plowed up” signifies: to turn over a field or other area of land with a plow to change it from grass. (https://www.oxfordlearnersdictionaries.com/definition/american_english/plow-up visited on 29-04-2024 at 22:37).

The table above illustrates that the term “plowed up” is translated by translation system (Google translate) as “حرثت”, while ChatGPT opts to translate it as “تم حرثها”.
Both of these translations are grammatically correct, but they do not preserve the morphological information of the original English word.
The English word "plowed up" is a past participle, which is a verb form that is used to describe an action that has already been completed. The Arabic word "حرثت" is also a past participle, but it is not exactly equivalent to the English word "plowed up". The Arabic word can be used to describe any type of plowing, while the English word is specifically used to describe plowing that has turned over the soil.
The ChatGPT translation, "تم حرثها", is more accurate than the Google Translate translation because it preserves the passive voice of the original English sentence. However, the ChatGPT translation still does not capture the full morphological information of the original word "plowed up".
Morphological loss can be a problem for machine translation because it can make it difficult for users to understand the full meaning of the translated text.

The term “had taken over” also is translated as “استولت” by Google translate, while ChatGPT translates it as “استولى”.
In English, the past participle of the verb "to take over" is "taken over". This participle does not have any grammatical gender or number, so it can be used with nouns of any gender or number.
In Arabic, however, verbs and adjectives must agree in gender and number with the nouns they modify. The Arabic verb "استولى" is in the masculine singular past tense. This means that it can only be used with masculine singular nouns.
However, to translate the English phrase "had taken over" into Arabic, Google Translate and ChatGP did not change the gender or number of the verb to agree with the noun "الأراضي", which is feminine plural. This is a morphological loss, because the original English phrase contains information about the gender and number of the noun that is not preserved in the Arabic translation.
As a result of this morphological loss, the Arabic translation is slightly less accurate than the original English phrase. This is because the Arabic translation does not explicitly state that the noun "الأراضي" is feminine plural.

From this table, it can be seen that the two expressions “cheat grass” and “rabbit brush” are translated literally in the target language.

The terms "cheat grass" and "rabbit brush" are specific to certain plants found in North America,

The term “cheat grass” means: an annual weedy Eurasian bromegrass (Bromus tectorum) naturalized in North America.(https://www.merriam-webster.com/dictionary/cheatgrass#:~:text=cheat%C2%B7%E2%80%8Bgrass%20%CB%88ch%C4%93t%2D%CB%8Cgras,tectorum visited on 02-05-2024 at 19:40).

According to the Cambridge Dictionary, the term “rabbit brush”means: one of several bushes with long stems and yellow flowers that grow especially in dry areas of North America.(https://dictionary.cambridge.org/dictionary/english/rabbitbrush visited on 02-05-2024 at 22:58).

Google translate and ChatGPT tend to use vocabulary that does not convey the intended meaning in the target language; the term “cheat grass” is translated by Google translate as “العشب الغش”, while ChatGPT translated it as“عشب الشيت”, neither translation captures the specific botanical and ecological characteristics of "cheat grass”. Similarly, "rabbit brush," is translated by ChatGPT as "الشجيرات الأرنبية" and by Google Translate as "فرشاة الأرانب”, these translations fail to convey the specific plant species referred to by "rabbit brush." Consequently, the translations result in a significant loss of meaning, as they do not accurately represent the ecological implications or the specific plant types mentioned in the original text.

Referring to the table above, the sentence: “water-hogging scrub juniper had taken over all the disturbed ground” is translated by Yandex translate as: “ العرعر قد استولى على كل الأرض المضطربة”.

According to the Collins English Dictionary, the term “ juniper” means: a juniper is an evergreen bush with purple berries which can be used in cooking and medicine.(https://www.collinsdictionary.com/dictionary/english/juniper visited on 08-06-2024 at 17:18).

The translation provided by Yandex Translate omits the phrase "water-hogging" from the original sentence. The original sentence describes "scrub juniper" as "water-hogging," indicating that this type of juniper consumes a significant amount of water, which is a critical detail in understanding the impact of the plant on the environment. Google Translate retains this descriptive detail, translating it to "الذي يمتص الماء," meaning "which absorbs water," thereby preserving the nuance of the juniper's effect on the land.

Yandex Translate's omission of "water-hogging" simplifies the sentence to " العرعر قد استولى على كل الأرض المضطربة," meaning "juniper has taken over all the disturbed ground." While this conveys the basic idea of the plant's proliferation, it lacks the specific characteristic of the

juniper's excessive water consumption. This characteristic is important for a comprehensive understanding of the environmental context, particularly how the juniper affects soil moisture and competes with other vegetation. Thus, the omission in Yandex Translate's version results in a less detailed and potentially less accurate depiction of the ecological dynamics described in the original sentence.

Example 14: Rhetorical loss

Source Text	**Target Text (machine translations)**
Martha Lessen was big and strong enough she might have turned out **a bronco twister** like any man. **(page number 27 from the corpus)**	كانت مارثا ليسن كبيرة و قوية بما يكفي لتتحول إلى **إعصار برونكو** مثل أي رجل. **Google translate**
	كانت مارثا ليسن كبيرة و قوية بما يكفي لربما تكون قد تحولت إلى **إعصار برونكو** مثل أي رجل. **Reverso**
	كانت مارثا ليسن كبيرة و قوية بما يكفي لانها ربما تحولت إلى **إعصار برونكو** مثل أي رجل. **Yandex translate**
	كانت مارثا ليسن كبيرة و قوية بما يكفي لربما تكون قد تحولت إلى **إعصار برونكو** مثل أي رجل. **Babylon translate**

Analysis:

For Nietzsche (2017) and subsequently others, the formation of a rhetorical expression is a question of power; as a violation of the linguistic norm, it can be rejected as an error and the speaker thus perceived as incompetent or can be welcomed as an innovation and embraced, thereby becoming a new species of “rhetorical device”.(Davila.Montes, Jose.M 2017:5).

Referring to the table above, it is clear that translation systems loses some specificity and nuances in conveying the term “bronco twister” accurately.

he term “bronco twister” is used in the source text to vividly describe someone skilled in taming wild bronco horses; this term conveys a sense of physical strength, expertise in horse training, and certain ruggedness associated with handling untamed animals.

According to the Cambridge English Dictionary, the term “bronco”, means: “a wild horse of the western US” (https://dictionary.cambridge.org/dictionary/english/bronco visited on 29-01-2024 at 17:03).

And according to the Oxford English Dictionary, the term “twister”, signifies “a violent storm with very strong winds that move in circles”. (https://www.oxfordlearnersdictioaries.com/definition/enghlish/twister visited on 29-01-2024 at 17:10).

The word “إعصار” means in the Arabic Dictionary “maajim”: تتحرك منطقة ضغط جوي منخفض ، فيها الرياح بشدة حلزونيا نحو مركزها. (https:www.maajim.com/dictionary/%D8%A3%D8%B9%D8%B5%D8%A7%D8%B1 visited on 29-01-2024 at 17:30) Translation systems have translated the English term “bronco” into Arabic as “إعصار” and “bronco twister” as “إعصار برونكو”; which may not capture the original meaning of someone skilled in taming wild bronco horses, which loses the specific connotation of horse training expertise.

The translated phrase “كانت مارثا ليسن كبيرة وقوية بما يكفي لتتحول إلى إعصار برونكو مثل أي رجل” may evoke a more destructive image associated with a natural disaster (hurricane), rather than the controlled, skilled, and purposeful action implied by “bronco twister”.

Hence, this rhetorical loss impact the readers understanding of Martha Lessen’s abilities, as the translated term lacks the original’s connection to the art of taming wild horses.

This loss impacts the rhetorical effectiveness of the translation by not preserving the specific connotations of the original term “twister”.

Therefore, the translation can be modified as follows:

” كانت مارثا ليسن كبيرة وقوية بما يكفي لتصبح متمكنة في ترويض خيول البرونكو تماما كأي رجل .

Example 15: Rhetorical loss:

Source Text	Target Text (machine translation)

She had opinions and might have stated them; it was just from natural shyness and a failure to realize what he was fishing for that she didn't say much. But as he kept on with it, she finally figured out what George was after and began to speak up, and once she got going she had plenty to say. **(Page 11 from the corpus)**	كانت لديها آراء وربما عبرت عنها؛ كان ذلك بسبب الخجل الطبيعي والفشل في إدراك ما كان يصطاد من أجله ولم تقل الكثير. ولكن مع استمراره في ذلك اكتشفت أخيرا ما كان يسعى إليه جورج وبدأت في التحدث، وبمجرد أن بدأت الحديث كان لديها الكثير لتقوله . **Google translate.** كانت لديها آراء وربما ذكرتها؛ كان فقط من الخجل الطبيعي والفشل في إدراك ما كان يصطاده من أجله أنها لم تقل الكثير. ولكن مع استمراره في ذلك، اكتشفت أخيرا ما كان جورج يسعى إليه وبدأت في التحدث، وبمجرد أن بدأت كان لديها الكثير لتقوله . **Babylon translate.**
	لديها آراء وربما كانت قد عبرت عنها؛ لكنها كانت فقط بسبب الخجل الطبيعي وعدم إدراكها لما كان يحاول الحصول عليه أنها لم تقول الكثير. لكن كما استمر في ذلك، بدأت أخيرًا في فهم ما كان جورج يسعى إليه وبدأت في التحدث، ومرة واحدة بدأت، كان لديها الكثير لتقوله. **ChatGPT.**

Analysis:

Rhetorical loss in translation often occurs when idiomatic expressions or culturally specific terms are not properly adapted to fit the target language's nuances.

From the data presented in the table above, we can infer that the English expression “was fishing for” is translated literally by Google translate as “ما كان يصطاد من أجله” in the target language.

According to the Oxford English Dictionary the term “fishing for” means: to try to get something or to find out.

(https://www.oxfordlearnersdictionaries.com/definition/english/fishfor#:~:text=fish%20for,phrasal%20verb,for%20compliments%20about%20her%20looks visited on 05- 05-2024 at 17:02).

According to the Collins English Dictionary, the term “Fishing” is the sport, hobby, or business of catching. (https://www.collinsdictionary.com/dictionary/english/fishing visited on 05-05-2024 at 17:15).

The word “يصطاد” means in the Arabic Dictionary “ almaany” :

الصيد: ما يصاد من السمك و الطير و الوحش.

(https://www.almaany.com/ar/dict/arar/%D9%8A%D8%B5%D8%B7%D8%A7%D8%AF/ visited on 08-05-2024 at 16:00).

The phrase "was fishing for" is an idiom in English that implies someone is subtly trying to obtain information or a response without directly asking for it; this phrase carries connotations of subtlety and indirectness, likening the act of seeking information to the patience and skill required in fishing. However, when Google Translate and Babylon rendered this phrase into Arabic as "ما كان يصطاد من أجله," they translated it literally to mean "what he was fishing for," focusing on the literal act of fishing rather than the idiomatic meaning. This literal translation fails to convey the implied indirectness and subtle probing of the original phrase.

ChatGPT's translation, "لما كان يحاول الحصول عليه," while closer in meaning, still missing some of the idiomatic nuance by rendering it more straightforwardly as "what he was trying to get." This translation, though more accurate than Google's and Bbylon's translation, still does not fully capture the subtlety of the original idiom.

The rhetorical loss here lies in the inability to translate the idiom with an equivalent expression that conveys the same connotations in Arabic. The original English phrase's metaphorical imagery is lost, and with it, the nuanced understanding of the character's behavior.

Therefore, the translation can be modified as follows:

كان لديها آراء وربما عبرت عنها؛ كان ذلك بسبب الخجل الطبيعي والفشل في إدراك ما كان يحاول الحصول عليه أنها لم تقل الكثير. ولكن مع استمراره في ذلك اكتشفت أخيرا ما كان يسعى إليه جورج وبدأت في التحدث، وبمجرد أن بدأت الحديث كان لديها الكثير لتقوله.

Conclusion:

This chapter showcases our endeavor to translate various randomly chosen excerpts from Molly Gloss's novel "The Hearts of Horses". We accompany these translations with an analytical examination of their accuracy, utilizing translations systems such as Google translate, Reverso, yandex and Babylon.

The chapter lays bare the potential for meaning to gain or loss in machine translation, a consequence of navigating the linguistic minefield of cultural differences, due to the fundamental asymmetry between English and Arabic, their distant lineages and distinct grammatical frameworks; while machine translation strives for faithful word-for-word transfer, it often encounters unavoidable obstacles. Cultural references and idioms rooted in

one language might lose their intended meaning when translated literally, leaving the target audience puzzled. Similarly, stylistic elements like tone and formality can get blurred or lost, altering the emotional impact of the original text. Grammatical complexities can also pose challenges, leading to awkward phrasing or even inaccuracies in the translated version. Yet, amidst these potential losses, surprising gains can also emerge. Machine translation can sometimes bring clarity and conciseness to complex sentences or idioms, making them more accessible to the target audience. Exposure to alternative interpretations in another language can offer new perspectives and understanding of the original text. At the end, here is a chart that encompasses the main results obtained from the translation of the extracts of "The Hearts of Horses" using different machine translation sites and systems:

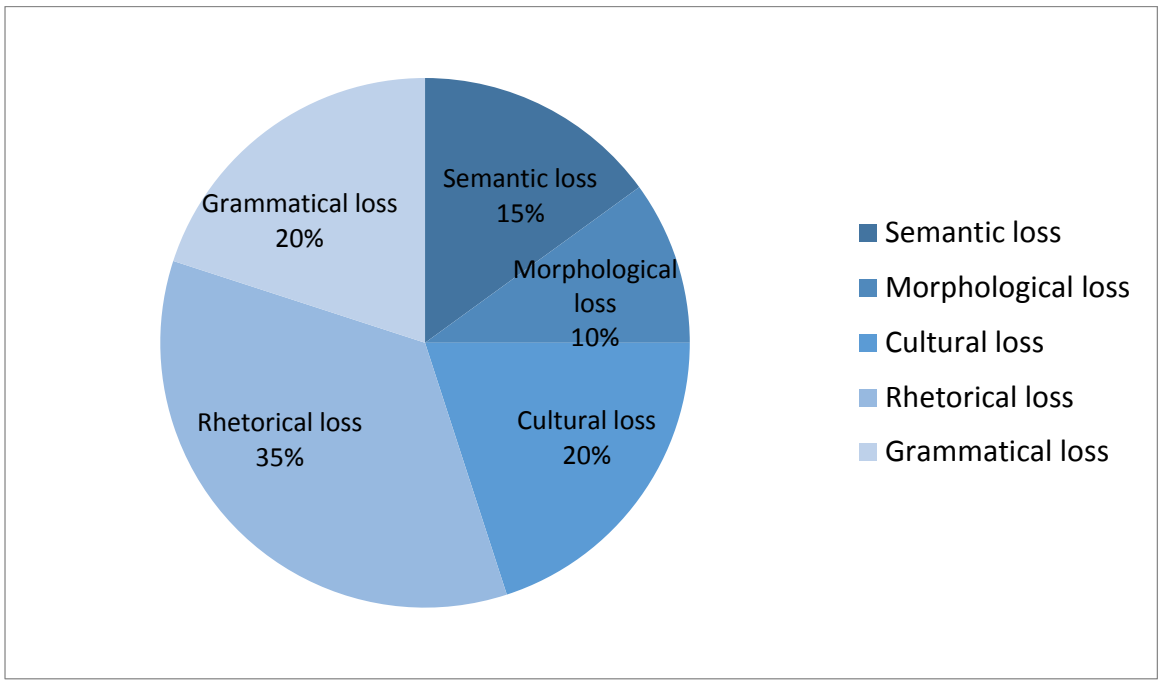

Figure: Main aspects of loss of meaning of machine translation.

Machine translation has come a long way, but there are still notable areas where it struggles, leading to loss of meaning.

This pie chart displays the main aspects of loss of meaning in machine translation:

1. **Semantic loss (15%):** Occurs when the translated text deviates from the original intended meaning due to difficulties in capturing nuances, context, idiomatic expressions, and cultural references.

2. **Morphological loss (10%):** Involves inaccuracies in word forms, tenses, and grammatical structures as machine translation systems may struggle with the morphological aspects unique to different languages.
3. **Cultural loss (20%):** Reflects the challenges in accurately translating cultural references, customs, idioms, and sensitive topics, leading to a loss of cultural context and potential misinterpretations.
4. **Rhetorical loss (35%):** The most significant portion, highlighting the difficulties in maintaining the original rhetorical style, persuasive elements, emotional tone, and stylistic nuances, which are crucial for effective communication and impact.
5. **Grammatical loss (20%):** Involves grammatical errors, awkward phrasing, and challenges in handling complex grammatical structures, particularly in languages with different syntactic rules, impacting the clarity and coherence of the translated text

General Conclusion

Conclusion:

Artificial intelligence is a vast and constantly evolving field encompassing the development of intelligent machines capable of performing tasks typically requiring human intelligence.

Artificial intelligence has revolutionized the world of communication, particularly through machine translation. These systems, powered by complex algorithms and vast datasets of translated text, have shattered the once-impenetrable walls between languages. Artificial intelligence is a relatively new area of study that raises many interesting questions.

Thanks to artificial intelligence's ability to analyze grammar, syntax, and bridge the gap between languages. This automated translation conveying meaning eliminates geographical and cultural barriers, and opens doors to previously inaccessible knowledge and experiences. Whether it is a tourist deciphering a menu, a researcher accessing a foreign academic paper, or a doctor communicating with patients across continents.

This research seeks to study and examine how the meanings of certain parts of the Novel "The Hearts of Horses" by Molly Gloss are changed or preserved when translated by machine translation systems, the central aim of this research is to address the following inquiry:"What are the contributions of artificial intelligence to machine translation?"

We are aware that translation may necessarily involve changes or modifications in meaning.

Therefore, we seek to identify the level of gain and loss of meaning in specific elements of the translated text. This assessment provides us with a deeper understanding of the mechanisms of translation and how successful it is in conveying the core idea.

Through our investigation of the initial research question, we arrived at several key findings, Summarized below:

-Artificial intelligence still faces significant challenges in translating texts, particularly those with colloquial language or subtle cultural references.

-Grasping the meaning of words is not always enough for accurate translation; artificial intelligence needs to understand the intent and purpose behind the text to preserve its true meaning.

- Artificial intelligence significantly enhances translation efficiency by reducing both time and cost.

-While artificial intelligence is a powerful tool for translators, especially in handling repetitive tasks or large volumes of text, it’s important to remember that it’s not a silver bullet.

-Human critical thinking and linguistic expertise are still essential for optimal results, particularly in nuanced creative writing, handling cultural references, and ensuring accuracy in complex domains like legal or medical documents.

This research has confirmed the hypotheses cited above.

- Artificial intelligence cannot solve all machine translation problems, but it can be useful in facilitating the process.
- The attitude of human beings towards machine translation is becoming more positive as the technology improves and becomes more widely used, however, there are still who are skeptical about its accuracy and quality. Machine translation may need less intervention by human beings than earlier.

To conclude our study, we hope that our investigation will be a guide for further researchers. We also suppose that the theme of “Artificial intelligence contributions to machine translation” can be a very interesting and very workable topic to study.

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Glossaries

English/Arabic Glossary

	English	Arabic
A	Accuracy	دقة
	Addition	إضافة
	Algorithms	خوارزميات
	Artificial Intelligence	ذكاء اصطناعي
C	Colloqualism	عامية
	Complete loss	خسارة كلية
	Computer-based translation	ترجمة معتمدة على الكمبيوتر
	Contribution	مساهمة
	Convert	تحول
	Corpus	مدونة
	Cultural loss	خسارة ثقافية
D	Deep Neural Network	نموذج الشبكة العصبية العميقة
	Dynamism	ديناميكية
E	Efficiency	كفاءة
	Equivalence	تكافؤ
	Evolution	تطور
	Example-based machine Translation	ترجمة آلية قائمة على الأمثلة
F	Fluency	طلاقة
G	Gain	ربح
	Gaining meaning	اكتساب المعنى

	Grammatical loss	الخسارة النحوية
H	High-quality	جودة عالية
	Human Assisted Machine Translation	ترجمة آلية بمساعدة الإنسان
	Human intervention	تدخل بشري
	Human translation	ترجمة بشرية
	Hybrid Machine translation	ترجمة آلية هجينة
K	Knowledge	معرفة
L	Leiteral translation	ترجمة حرفية
	Loss	خسارة
	Loss of meaning	خسارة المعنى
M	Machine translation	ترجمة آلية
	Machine learning	تعلم آلي
	Machine translation systems	أنظمة الترجمة الآلية
	Morphologicial loss	خسارة صرفية
N	Natural language processing	معالجة اللغة الطبيعية
	Neural Machine translation	ترجمة آلية عصبية
	Neural Net works	شبكات عصبية
O	Omission	حذف
	Original text	نص أصلي
P	Phonologicial loss	خسارة صوتية
Q	Quality	جودة
R	Rule-based machine translation	ترجمة آلية قائمة على القواعد
	Rule-based modal	نموذج قائم على القواعد
	Semantic loss	خسارة دلالية

S	Software application	تطبيقات برمجية
	Solve	يحل
	Source text	نص مصدر
	Speed	سرعة
	Statistical machine translation	ترجمة آلية إحصائية
	Statistical model	نموذج إحصائي
	Syntax	نحو
	Syntactical loss	خسارة نحوية
T	Target audience	جمهور مستهدف
	Target text	نص الهدف
	Translation sites	مواقع الترجمة
	Trustworthiness	جدارة بالثقة

Arabic/English Glossary

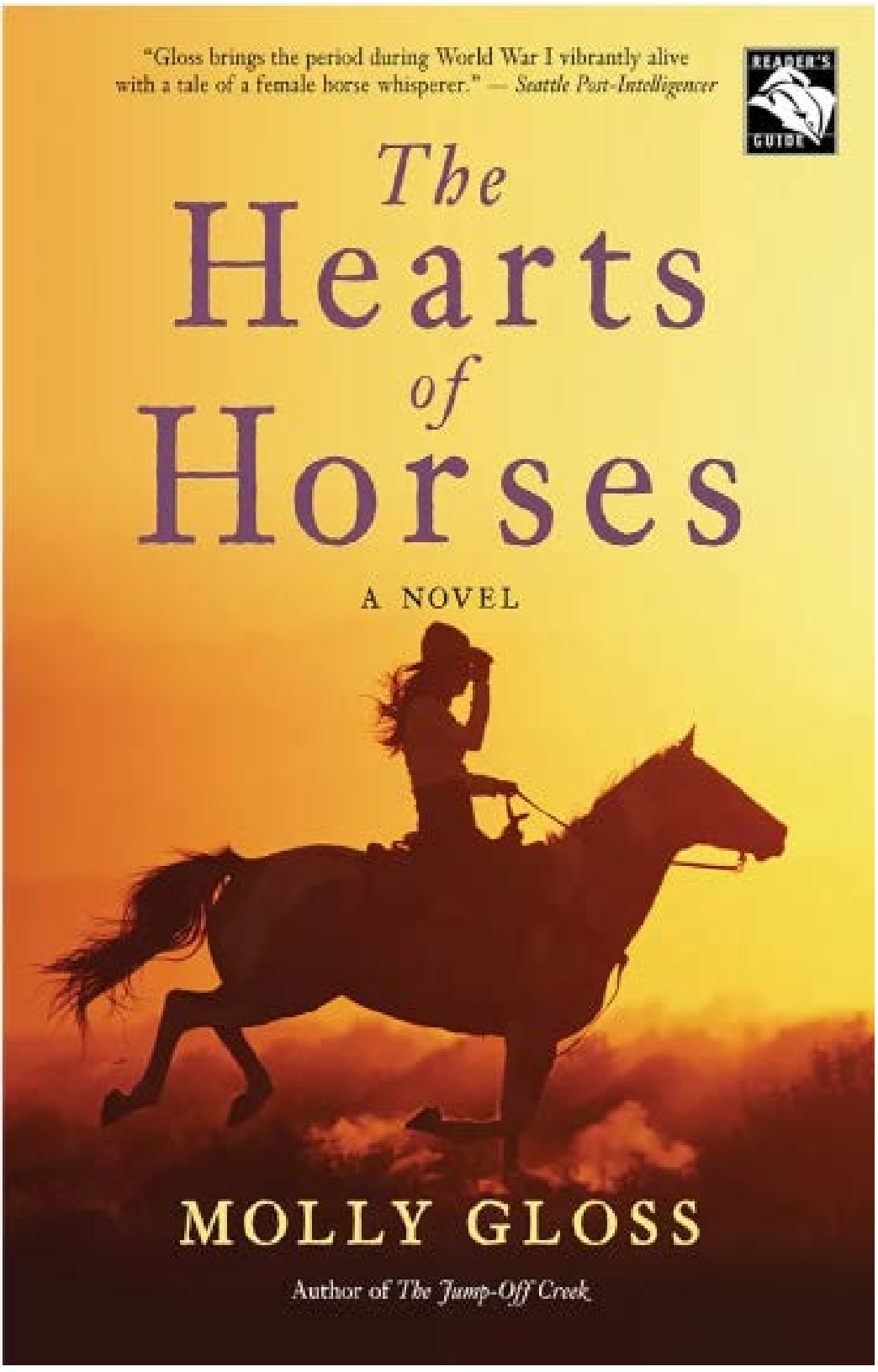
انجليزي	عربي	
Addition	إضافة	ا
Gaining Meaning	اكتساب المعنى	
Machine Translation Systems	أنظمة الترجمة الآلية	
Statistical Machine Translation	الترجمة الآلية الإحصائية	
Neural Machine Translation	الترجمة الآلية العصبية	
Example-based Machine Translation	الترجمة الآلية القائمة على الأمثلة	
Rule-based Machine Translation	الترجمة الآلية القائمة على القواعد	
Hybrid Machine Translation	الترجمة الآلية الهجينة	
Computer-based Machine Translation	الترجمة المعتمدة على الكمبيوتر	
Trustworthiness	الجدارة بالثقة	
Target Audience	الجمهور المستهدف	
Quality	الجودة	
Dynamism	الديناميكية	
Speed	السرعة	
Machine Learning	التعلم الآلي	
Colloquialism	العامية	
Original Text	النص الأصلي	
Source Text	النص المصدر	
Target Text	النص الهدف	
Convert	تحول	
Human intervention	تدخل بشري	
Machine Translation	ترجمة آلية	

Human Assisted Machine Translation	ترجمة آلية بمساعدة الإنسان	ت
Human Translation	ترجمة بشرية	
Literal Translation	ترجمة حرفية	
Software Application	تطبيقات برمجية	
Evolution	تطور	
Equivalence	تكافؤ	
High-quality	جودة عالية	ج
Omission	حذف	ح
Loss	خسارة	خ
Loss of Meaning	خسارة المعنى	
Rhetorical Loss	خسارة بلاغية	
Semantic Loss	خسارة دلالية	
Morphological Loss	خسارة صرفية	
Phonological Loss	خسارة صوتية	
Grammatical Loss	خسارة نحوية	
Algorithms	خوارزميات	
Accuracy	دقة	د
Artificial Intelligence	ذكاء اصطناعي	ذ
Neural Networks	شبكات عصبية	ش
Fluency	طلاقة	ط
Gain	كسب	ك
Efficiency	كفاءة	
Corpus	مدونة	
Contribution	مساهمة	
Natural Language Processing	معالجة اللغة الطبيعية	

Knowledge	معرفة	م
Translation systems	مواقع الترجمة	
Syntax	نحو	ن
Statistical Model	النموذج الإحصائي	
Deep Learning Network	نموذج الشبكة العصبية العميقة	
Rule-based Machine Translation	نموذج قائم على القواعد	
Solve	يحل	ي

Appendix

Extracts from the corpus: The Heats of Horses by Molly Gloss


"Gloss brings the period during World War I vibrantly alive with a tale of a female horse whisperer." — Seattle Post-Intelligencer
READER'S GUIDE
The Hearts of Horses
A NOVEL
MOLLY GLOSS
Author of The Jump-Off Creek

IN THOSE DAYS, even before the war had swept up all the young men from the ranches, there were girls who came through the country breaking horses. They traveled from ranch to ranch with two or three horses they were taking home to break or with horses they had picked up in trade for work they'd done. Of course most outfits had fifty or sixty horses back then so there was plenty of work, and when the war came on, no men to get it done. Those girls could break horses as well as any man but they had their own ways of doing it, not such a bucking Wild West show. They went about it so quiet and deliberate, children would get tired of watching and go off to do something else. They were usually alone, those girls, but it wasn't like in the moving pictures or the gunslinger novels, the female always in peril. If they were in peril it wasn't from outlaws or crooked sheriffs, it was from the usual things that can happen with ranch work — breaking bones, freezing your fingers off — the kinds of things that can happen whether you're a man or a woman.

In November in that first winter of the war a girl named Martha Lessen rode down through the Ipsoot Pass into Elwha

The daylight was thin, a cold and wintry light, and it pulled all the color out of the man's face. He stood up straight. The winter before, there had been a string of about a hundred days when the temperature never rose above freezing and some counties — Elwha, Umatilla, Grant — had piled up seven feet of snow. Deer had been driven down into the towns, and cougar had come into the pastures with the cattle. Starving horses had wandered into people's houses. But this particular winter, the winter of 1917 and 1918, would be an open one, and the day Martha Lessen rode down out of the Ipsoot Pass there wasn't any snow on the ground at all, although the stubble field the man was working in had been grazed off and the skimpy leavings were dark from frost-kill. He was feeding from a wagon drawn by a pair of black Percherons.

"Maybe I do," he said. "There's a couple could use working." He looked her over. "I guess you ain't no Land Girl." This past summer a lot of men from the ranches had gone into the army and quite a few town and city girls had come out to the countryside to fill in where they were needed — "Land Girls" the newspapers had begun to call them. Some of them had come to Elwha County with the idea of being cowboys, though mostly the work that needed doing was getting in the hay crop and the

wheat. Martha Lessen was the first girl he had seen advertising herself as a broncobuster.

"No I'm not," she said. "I've been riding and doing ranch work since I could walk. I can break horses."

He smiled and said, "I just bet you can," which was a remark about the way she was built, big and solid as a man and five-eleven in her boots. Or he meant something about her old-fashioned cowboy trappings, the fringed batwing chaps well scratched up and her showy big platter of a hat much stained along the high crown and the rolled edge of the brim. Then he said, not with serious misgiving but as if he had discovered something slightly amusing, "Breaking to saddle, so I guess that means you're not interested in breaking horses to harness."

She could have found plenty of work around Pendleton, where she had come from, if she had wanted to break horses to drive, so she said stubbornly, "I'd just rather train a stock horse than a wagon horse if I'm able to choose."

He considered this. "Well, go on up to the house and I'll be up shortly and we'll see about it." He went back to feeding hay.

She followed a line of telephone poles from the road back to the ranch house, which was a paintless tall box with skinny windows set among a scattering of barns and sheds and bunk-houses built variously of lumber and pine logs. A yellow dog scrambled out from under the porch of the house and barked once and then walked up and smelled of the girl's boot. "Hey there," she said, which satisfied him, and he walked off and flopped down in the hard dirt at the edge of the porch steps.

Elwha County was more than two-thirds taken up by the Clarks Range and the Whitehorn Mountains, with the towns and most of the ranches lying in the swale between. This house stood on the first moderately flat ground at the foot of the Clarks, its front windows facing south across the valley toward the Whitehorns. The girl wondered what sort of view could be

there was any chance of seeing the mountains she'd have left the windows open to the view.

She crossed the room and went through a doorway into the kitchen where the woman was pouring coffee into heavy china cups. This room was bare of the fussy furnishings at the front of the house. The long pine table and chairs and two kitchen cupboards were painted white, and the windows were tall and narrow and curtainless. The day's gray brightness flooding through those panes of glass made the room seem clean and cold. From this side of the house you could see some trees, but the house was too close to the Clarks to get a view of their snowy peaks. The girl took off her hat and held it in her hands.

"What's your name, dear?" the woman said.

"It's Martha Lessen."

"Well my goodness, I have a sister and a cousin both named Martha, so that's a name that will come easy to my lips."

She put the coffee cups and a pitcher of cream on the kitchen table and sat down in a chair.

"If I was to pay you for it," the girl said to her, "I wonder if I could later on give my horses a little bit of your hay."

The woman made a dismissive gesture with one hand. "Oh heavens," she said, as if that was just the most outrageous idea. "You help yourself. A horse has got to have something to eat. Sit down now and drink your coffee." Martha sat in a kitchen chair and put her big hat in her lap and poured as much cream into her coffee as the cup would hold.

"You talked to George, did you?"

"I didn't get his name. He had on overalls and a brown coat."

This amused her. "Well of course every man in this part of the world is wearing overalls and an old brown coat," she said, "but I guess it was George Bliss who is my husband and I am Louise Bliss."

two longs and a short, this was three long jangles — but Mrs. Bliss went to the telephone anyway. In those days there were seven ranches on the party line at that end of the valley and they listened in on each other's calls without a bit of apology.

George took his opening to say to Martha, "I've got a couple of likely-looking three-year-olds, or I guess they're four-year-olds now, that haven't never been broke. They're halter-broke more or less, and I suppose I could get a saddle on them if I was determined about it, and I suppose if I was truly determined I could stick on and ride them out. But they ain't been finished and I haven't got the time to do it now that my son has gone off to fight. I've got just two hands I've been able to keep this winter. Henry Frazer, who was my foreman, has left me and gone over to help out the Woodruff sisters since all their hands joined up, and one of the two I got left is a kid who I expect will be joined up as soon as he turns eighteen and anyway ain't had much experience bucking out horses. I hired him mostly as a ditch walker and for moving the gates on my dams and so forth in the summer, and I'm trying to teach him cowboying but he's not the best hand I ever had in the world; and the other is a fellow with a bum arm that keeps him out of the army and also keeps him from doing any kind of roping, and which is a disadvantage, I guess you know, if you're trying to break broncs."

The usual method of broncobusters in those days was to forefoot a horse with a catch rope, which brought him right to his knees, and then wrestle a saddle onto him while he was on the ground, climb on and buck him near to death. Martha Lessen was a terrible hand with a lariat and horses hardly ever bucked when she rode them the first time but she didn't say any of this to George Bliss. "I'd like to break them out for you," she said. "I can gentle most anything that has four feet and a tail."

"What would you want for the two of them?"

nodded at his coffee. Then Louise said suddenly, "Do you know? This girl sitting here is named Martha?" as if she expected the news to amaze him.

George said, "Is that so," with no more than mild interest. "Well Miss Martha, let's go out and take a look at them broncs and you tell me do you think you can make them into cow ponies." He winked at her without smiling and set his coffee down and went out through the back porch into the yard.

"Thanks for the coffee," she told Louise Bliss and followed the man outside.

His two white mules were standing there tied to the porch rails; George Bliss had saddled them before he had come inside the house. He climbed onto one of them and when she realized what was expected of her Martha got up on the other and they rode out to find the horses. The yellow dog ran to get ahead because it was his habit to take the lead, a habit that had resulted in his acquiring the name Pilot.

The war had encouraged George Bliss to plow up a big stretch of his deeded pastureland to plant wheat, so his wheat fields, fenced and cross-fenced and edged with irrigation ditches and diversion dams, took up most of the flattish ground to the east and the south near the homeplace. George led Martha the back way, north through a gate into the grass and bitterbrush foothills. After forty minutes or so they went up through another gate into the scattered timber of the Clarks Range. Those mountains had been part of Teddy Roosevelt's freshly minted Blue Mountain Forest Reserve back in '06, then were split off into their own reserve about 1912. The Taylor Grazing Act and all the rules and rigamarole of leasing from the government were a good fifteen years off at that point and George was still using the mountains as pasture for his livestock, was still wintering his horses and some of his cattle in the grassy

hides spotted rarely with white. "Those is Louise's cows," George said. "I hate those pure breeds, all that extra work trying to keep them separate, and all the paper filing and so forth. Her daddy give her two registered ones when we was married and she was just dumb enough to like it." Martha would have taken this at face value if it had been her own dad saying it. She didn't know how to take George Bliss, who sounded only cheerfully long-suffering.

"Well, let's go eat," he said to her, and slapped his palms on the top rail of the fence. She had expected George Bliss to say yes or no while they were standing there looking over his animals, and he hadn't given her the word either way. She had a sleeping bag and tent with her and some sandwiches and cheese, and had more or less imagined that if she had trouble finding work she'd sleep in fields or sheds and make do with her own groceries. She didn't know if George Bliss's invitation to supper constituted an unspoken offer of employment. If she thought she was hired, she'd have wanted to put up her horses before going in to eat; but there was no way to know if Mr. Bliss had just forgotten about her animals standing saddled in his barn or if he hadn't yet made up his mind whether to hire her on.

She followed him across the shadowy yard and around to the back door, onto the closed-in porch where they kept the wash basin and a towel. He let Martha have first turn at the water, which may have been a concession to her femaleness. She was used to elbowing a turn with her brothers and her dad, used to dirty towels and brown water, but sometimes when she'd worked on other ranches the men would put her at the head of the line. She didn't mind being singled out for such things but liked it better when the men seemed to forget she was a girl. Once some women relatives of the boss, women dressed in linen suits and delicate shoes, had come out to watch a branding crew where Martha was helping out, and some of the men had grum-

along those lines; but all the time they were riding he went on talking in the same indirect way about matters to do with horses, especially anything to do with their breaking. He was mildly trying to provoke an opinion out of Martha Lessen without ever directly asking her anything. "I guess you know a mule is just about nothing to break," he told her. "You can climb up on a mule and he'll raise his back once or twice and then settle down to work, that easy." And later on he said, "I don't know what the difference is, or why horses have got to be so hard about it."

She had opinions and might have stated them; it was just from natural shyness and a failure to realize what he was fishing for that she didn't say much. But as he kept on with it, she finally figured out what George was after and began to speak up, and once she got going she had plenty to say. She told him, for instance, about her preference for a McClelland saddle when she was breaking a horse, because those old cavalry saddles were light in the stirrup leathers and she liked how they let her feel the horse, and the horse feel her. She told him she liked to use her own homemade basal hackamore as long as possible on a green colt and after that a snaffle bit; and that she didn't have much use for a spade bit. She told him when a horse misbehaved she figured it was for one of two reasons: either he didn't understand what you wanted or the bad behavior hadn't ever been corrected in the past. She said that in her experience horses weren't mean unless some man made them that way; but some horses, once they'd been made mean, just weren't worth the time it took to break them. "Like people," she said, glancing at George. "Some people just belong in prison and some horses just belong in the rodeo."

They made a full swing along the timbered breaks of the foothills, passing through several small bunches of cows and steers, and three different bands of horses. In one bunch of fif-

El Bayard said, "Is that right?" matter-of-factly without seeming to be amused by the spectacle of a girl bronc rider; and this, together with his family name, immediately put him in a good light with Martha: Bayard was the name of a legendary horse she had read of who had outraced the army of Charlemagne while carrying four men on his back. El's right arm was fixed or nearly fixed in a half-bent position as if it had been broken once and poorly set. He made deft use of it lifting and passing plates and bowls but it was a puzzle to Martha how he would ever manage to get a saddle onto a horse or shovel out a hole or tighten a fence wire. Martha was left-handed and had been made to feel self-conscious about it, especially when she was with new people, but El Bayard's frozen arm seemed in some way to mitigate her shyness as she spooned her soup with the wrong hand.

They had eaten their dinner earlier in the day and supper was therefore pretty light. There was turnip and carrot in the soup and a chicken may have run through the pot on its way to somewhere else, or more likely this was one of the meatless days that had become patriotic in the last few months. Given that there wasn't much to eat, Martha minded her appetite, though the only food she had had all day was a breakfast of toast and buttermilk, and a sandwich eaten while in the saddle riding down from the Ipsoot Pass. When Louise Bliss encouraged her to eat up the last biscuit, she allowed herself to be persuaded.

Talk at the supper table was devoted to the war. In the afternoon newspaper had come more news of the fighting around Passchendaele, finally taken by the Canadians after months of bloody battle. In the midst of something the men were saying about soldiers who had drowned in the deep mud of the trenches, Louise Bliss stood up from the table and said in a tired voice, "I just can't bear to think about it." As she clattered

comfortable in the tack room and if you need another blanket you come over to the house and get one. My other hand has a girl he's spooning and that's why he wasn't at the table tonight but he'll be at breakfast, and you come on over to the house tomorrow too and have breakfast, come around to the back door and walk right in but don't come before daylight. We're getting old enough we don't like to roll out until the sun is up." He winked at her solemnly and walked off across the dark yard. The dog considered the question of who he ought to stay with and finally trotted off to get out in front of George. It occurred to Martha that the rancher still hadn't, strictly speaking, said she was hired.

On one side of the barn runway six stalls were laid out on either side of a tack room. The other half of the barn had been left open to shelter machinery, and she made out a set of harrows, a cultivator, a stoneboat, pipe for irrigation, parts for a homemade buck rake. There was a haymow above, but she wouldn't have wanted to sleep up there on account of the dust, and anyway George had said to make herself comfortable in the tack room. It was small and crowded, half a dozen saddles on wall trees and twenty or more bridles and halters and hackamores, as well as collars and rope and harness pieces hanging on pegs or slung over the half-walls that divided the room from the stalls. There was barely space to turn around between the wooden boxes spilling over with tools and blacksmithing equipage. She lit a candle she found standing inside a sooty glass chimney on a shelf crowded with veterinary gear and turned out the kerosene lamp. She went back to where she'd left her things and carried her saddles in one at a time and slung them up onto the half-walls of the stalls, then carried the rest of her gear into the tack room and shifted some things around a bit so she could make her bed in the cramped space on the floor. After shucking her chaps and walking out in the darkness to use

ting. Once she made an exasperated sound and went out through the back porch and came back a bit later with a wet jar of butter retrieved from the cellar under the house. Her face, thrown into relief by the slant of the early light, seemed to Martha somewhat aged and mournful, which would have surprised Louise had she known of it. There were plenty of women back then who thought they were old at fifty and women who made a practice of unhappiness, but Louise Bliss wasn't one of them.

When George had finished mopping the last bit of gravy from his plate, he sat back and fished out his Bull Durham and made a cigarette and smoked it and squinted out the window into the pink sky. "You figure you can find those horses again, do you?" This was evidently directed at Martha, although he never looked toward her. "I expect you'll want to bring them down here to use some of these pens. You need help getting that done?"

She divined from this question that she was hired. "No sir, I don't need any help, but when I go up there I wonder if it would be all right if I left the gate open, the one along the section line between your place and the reserve?" When she brought the horses down, they would naturally be looking for a way to stay ahead of her, and when they found the hole in the fence she hoped they'd go through to the ranch.

George seemed to know this was what she meant. He nodded and said, "Just close it, after them broncs go through."

"And if it doesn't matter to you," she said after a moment, "I think I'd want to use those old pens you've got, the ones over back of the bunkhouse."

He winked at her, which wasn't the first time, and which she had already begun to realize had no meaning beyond a mild sort of amusement. "I thought you might. My daddy built

In those days a lot of cowboys figured a horse wasn't broken until he'd had the spirit entirely beaten out of him. It wouldn't have been out of the ordinary for six or seven men to throw ropes at a horse from all directions with a view to lassoing him, which the horse would understand as men trying to kill him. He might pull three or four men over on the ground before they could bring him down and wrestle a saddle onto him, after which one of them would climb on and spur him until he quit bucking or until he was crippled or dead from ramming into a fence or throwing himself over backward.

Some girls must have done it that way too, just to show off they had the same gumption as the men; and Martha Lessen was big and strong enough she might have turned out a bronco twister like any man except she didn't have the nature for it. She'd learned what not to do by watching her dad, who liked to break a horse by trussing him up in a Scotch hobble, pulling the hind leg clear up to the brisket and tying off the end of the rope to a post so the horse couldn't lie down or ease off the pain in the hip joint. He'd leave him standing that way, trembling on three legs, and come back hours later when the horse was half

in shock, dripping under a blanket of sweat, foaming around the gums. Once, when Martha freed a horse from the hobble — she was nine or ten years old and the horse had been left to stand under a blistering sun for half a day — her dad beat her with a belt and then tied the horse up again and walked off and left him standing overnight. In the morning the horse was dead on the ground, strangled in his hobble. "I guess he won't never try that again," was all her dad said, and which was meant for Martha.

When she was fourteen she began working summers for the L Bar L, and the boss put her with Roy Barrow, who was their old wrangler and horseshoer. Of course this was in the days before all the whispering got started, but Roy had come up crippled with arthritis after breaking his hip and had figured out how to outsmart his horses instead of bucking them to a standstill. It was Roy who showed Martha that a Scotch hobble wouldn't harm a horse if it was used right, the hind leg never drawn clear up to the belly but raised just barely off the ground and the horse given his foot as soon as he quit raising a lot of dust. Another thing Roy liked to do was send Martha out on a good quiet strong horse, with a raw horse tied to the saddle horn: after traveling ten miles like that without enough halter rope to get his head down to buck, that unbroke horse would usually be halfway to tame.

Martha had an inborn horse sense, which Roy had seen right away, and he let her work out her own methods of making a horse less scared of the whole thing and more agreeable to be ridden. One of the things she tried was to walk out in the middle of a corral and just stand there with her head down and her hands in her pockets, blowing air out through her nose, making kind of a low snort as if she was a horse, which was the way horses investigated each other when they were first getting acquainted. Sometimes she wouldn't have to stand there very

"Did you put out that cigarette?"

He grunted. "I might switch to those Lucky Strike ready-mades," he said, just to provoke her. "What would you think of that?" She believed there was nothing uglier than an ashtray full of stubbed-out cigarettes and liked to complain that his smoking stank up her curtains and burnt holes in her carpets. She had been trying to get him to quit smoking for thirty years without getting anywhere.

"At this moment I'm just interested in knowing if you've put out the one you were smoking."

"Don't get on me now."

"I'm not on you, I just don't care to die in a burned-up house." Louise in fact was not a woman with a deep dread of fires, but fire was more common in those days than it is now, and people who had been burned out had a healthy wish to keep it from happening again.

George grunted, and in a minute he rocked the bed slightly and she heard the gritty sound of his cigarette rubbing across the bottom of the ashtray. He was asleep almost immediately and snoring like a train. He worked himself so hard he usually would drop right off as soon as he thought Louise was finished talking, or sometimes right in the middle of something she was saying. She was often the one who put out his cigarette. But she always liked to lie awake a little while in the darkness and go over things, anything hanging on from the day's business, before letting sleep claim her.

Tonight what she had been thinking about before bringing up Martha Lessen's dress was something the new young preacher at the Federated Protestant church had said the Sunday before. The Lord, he said, has a way of evening things out in the long run — giving luck and hardship in fairly equal measure over the whole of a person's life — or a nation's life — though you might have to look hard to see it. And he told the congre-

dians or crooked sheriffs. In another twenty years people would wake up to realize that the timber was gone and the native grasses plowed up or eaten right down to the roots, that cheatgrass and rabbit brush and water-hogging scrub juniper had taken over all the disturbed ground. But it was still possible for Martha Lessen to look around and imagine the country as it must have been — the way Nez Perce and Shoshone Indians must have seen it, riding across with their big herds of ponies before white men overran the land, the kind of country where every gully and gorge in the foothills holds a clear, pebble-bottom creek, where the mountain slopes are clothed in timber and the valley floor is a golden grassland with stands of trees in patches, good big timber in the creek bottoms and along the river, the kind of country that leads people to name towns Eden or Paradise or Opportunity.

Martha had read a little book about famous men and their horses: Alexander and Bucephalus, El Cid and Babieca, General Lee and Traveller, the knight Reynard and his charger Bayard, the horse that had outraced Charlemagne's army. She sometimes imagined herself one of them, or a famous woman, famous as Annie Oakley or Joan of Arc, on a famous horse. Riding over the low hills between the McWilliamses' and the Romers' she fell easily into thinking again that she was Mattie (this was how she'd be called, once she was famous), a horsewoman renowned all over the West, on her horse Meriwether Lewis, a tall black with a metal sheen to his coat and a fiery eye behind a long wavy forelock, a horse she had trained, like the Virginian's horse, to come straight to her at a certain four-note whistle and to carry no other rider but her. Always in these imaginings it was forty or fifty or sixty years ago, when she'd have been able to ride all over the valley of the Little Bird Woman River without seeing a fence and without getting down from her horse, not even once, to open and close a gate.

Outstanding Praise for *The* HEARTS *of* HORSES

"With *The Jump-Off Creek* Molly Gloss has made herself a permanent place on the shelf of American literature that features tough, smart, independent women. Now with *The Hearts of Horses* she's given us another woman in that same vein — as well as a great deal of lore about the gentling of horses — a gentling that suggests both a practical fact and an enduring metaphor."

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"In all of Molly Gloss's work, lyric descriptions and unforgettable characters are supported by an open, wide-ranging intelligence and not at all undone by dry wit and an open heart. *The Hearts of Horses* is a shining example of Gloss's gifts."

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Abstract

Abstract:

The present research entitled “ The contributions of artificial intelligence to machine translation through the translation and analysis of extracts from “ The Hearts of Horses” written by Molly Gloss; aims at investigating the challenges, limits, and contributions of ChatGPT and other translation engines in translating a literal and cultural text.

Our study is considered a comparative and analytical approaches, first we compare the translation of a same passage through different engines system, secondly we analyse the loss and gain by Bassnett and dizdar in the translation of these websites this will achieve through the analyses of different levels; morphological, lexical, and cultural.

Throughout of our research, we conclude the following: Regarding accuracy and quality, we believe that the effectiveness of machine translation varies depending on the specific level being considered morphological, lexical, grammatical, or cultural. While machine translation systems, such as ChatGPT and others, can produce accurate translations at the morphological and grammatical levels, they often struggle with cultural nuances and idiomatic expressions.

Key words: artificial intelligence, machine translation, contributions, loss and gain.

الملخص :

تهدف دراستنا المعنونة ب "إسهامات الذكاء الاصطناعي في الترجمة الآلية من خلال ترجمة وتحليل مقتطفات من "قلوب الخيول" لمولي غلوس" إلى البحث في التحديات والحدود والمساهمات التي يقدمها شات جي بي تي ومحركات الترجمة الأخرى في ترجمة النصوص الأدبية والثقافية.

تعتمد دراستنا على نهج مقارن وتحليلي؛ حيث نقوم أولاً بمقارنة ترجمة نفس المقطع عبر أنظمة ترجمة مختلفة، ثم نحلل مواطن الربح والخسارة وفقا لباسنت و ديزدار لهذه الترجمات من حيث المستويات الصرفية، المعجمية، والثقافية.

توصلنا في بحثنا إلى أن دقة وجودة الترجمة الآلية تختلف حسب المستوى الذي يتم تحليله، سواء كان صرفياً أو معجمياً أو نحوياً أو ثقافياً. في حين أن أنظمة الترجمة الآلية مثل جي بي تي وغيرها يمكنها إنتاج ترجمات دقيقة على المستويات الصرفية والنحوية، إلا أنها غالباً ما تواجه صعوبات مع الفروق الثقافية والتعابير الاصطلاحية.

الكلمات المفتاحية: الذكاء الاصطناعي، الترجمة الآلية، الإسهامات، الكسب و الخسارة