

Translating Culture Specific Items: A Comparative Analysis of Human and Artificial Intelligence Translations

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Abstract

The advent of Artificial Intelligence (AI) has significantly impacted fields like healthcare, finance, and translation, revolutionizing them with humanlike capabilities to perform complex tasks rapidly and efficiently. This study explores AI's effectiveness in translating culture-specific items, specifically through a comparative analysis of translations generated by OpenAI's ChatGPT and Google's Gemini, as well as a human translation of culture-specific terms in Naguib Mahfouz's Sugar Street, the third novel in the Cairo Trilogy. Using a case study research design, translations were evaluated qualitatively based on accuracy, cultural context preservation, and overall coherence. Results indicated that Gemini demonstrated a notable effectiveness in conveying cultural items compared to ChatGPT. This effectiveness is attributed to Gemini's advanced language processing abilities, contextual sensitivity, and likely training on diverse, culturally rich datasets. However, post-editing remains essential to address any translation flaws and inaccuracies. These findings apply to the specific data collected and should not be generalized across all AI translation models.

Keywords: Translation, Artificial Intelligence, Cultural Specific Items, AI-powered Translation, translation Technology.

1. Introduction

There is no doubt that the advent of Artificial Intelligence (AI) witnessed by the world today has come out to be life-changing in various fields such as engineering, business, healthcare and education [1], and translation sector was not spared of AI technological intrusion. While social media and smart applications fuel global information exchange, translation remains essential. It acts as a key that unlocks the door to understanding different languages and enables people to share their unique perspectives.

Traditionally, human translators reigned supreme for reliable and detailed translations. In fact, translation appears like a straightforward process of meaning transfer, but professional translators make it an art form. They start by meticulously extracting the meaning of the source text (decoding) before meticulously rebuilding it (encoding) in the target language. This requires a deep well of knowledge – grammar, meaning, sentence structure, and specialized terms – in both languages. Finally, they carefully navigate the text's specificities, ensuring cultural and regional nuances are preserved.

Today, Machine Translation (MT) has made huge progress in breaking down language barriers, fostering communication worldwide and competing with human translation in terms of efficiency and quality after being in its early stages a simple word-swapping exercise that consists in replacing words in one language with their supposed equivalents in another, which limited its understanding of context and terminology and consequently made it far less effective than human translators even with recent significant improvements that were introduced. Indeed, MT exhibits faces many challenges to accurately convey cultural nuances, metaphors and humour [2].

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The translation of Culture specific items is challenging even for human translators as these items are culturally-bound and differ from a culture to another. Human translators should have good knowledge of the source and target cultures in order to accurately translate these cultural items. Similarly, AI models should be equipped with huge data related to culture specificities into order to boost their effectiveness in translating cultural items.

Hence, in the midst of this stiff competition between human and AI translation, the following questions are raised in this research paper:

- What are the differences between human and AI-powered translation in terms of translating culture-specific items? To what extent are culture-specific items accurately rendered by AI-powered translation models?

2. Literature Review

Several studies have addressed the performance of machine translation in rendering culture specific items, Sekhri [3] studied the problems of translating cultural terms in the Arab world using machine translation and concluded that many translators do not use machine translation to translate cultural terms because of fear of falling into cultural gaps and getting dependent on it. Pudjiati et al. [4] have conducted a semantic analysis in the translation of cultural-specific items by machine translation from Indonesian into English. Their study has concluded that the results of machine translations must still be reviewed by human translators to ensure key quality requirements are satisfied, including fidelity or correctness, intelligibility or clarity, and style. Omar & Gomaa's [5] study about the use of machine translation programs mainly Google Translate and Q Translate to translate literature concluded that these two programs have committed different lexical, structural, and pragmatic errors which negatively impact the reliability of their translations. Latief et al. studied the effectiveness of machine translation to improve the system of translating language on cultural context, and concluded that language is a nuanced, dynamic, and complex phenomenon. We cannot expect machines to comprehend every facet of human communication, particularly when it comes to cultural contexts. To ensure the highest level of translation accuracy, it's crucial to employ a professional human translator rather than utilizing machine translation [6]. The research focused on an analysis of the MT output, yet little research has been done to conduct a comparison between human translators and AI models regarding the translation of Culture Specific Items. The present study is an endeavour to fill in this gap by comparing the translation of culture specific items between two artificial intelligence models and human translation; it aims at finding out to what extent these AI-powered models are capable of rendering the exact meaning of cultural items from Arabic into English compared to the human translation.

3. The status of Translation in The Era of Artificial Intelligence

The AI has lately been a subject of hot debate owing to its impact on various fields. Maurya et al. [7] define AI as a branch of computer science aiming to create intelligent machines that can act and think like humans by developing programs and algorithms that are able to reason, behave and learn with some autonomy. On the other hand, McPherson refers to AI as “robots, computers, and other machines with a humanlike ability to reason and solve problems [8]”. AI can perform human-like tasks and functions in a plethora of domains ranging from healthcare, finance, education, language processing etc. The advent of AI and its huge capacity of performing tasks in a short lapse of time have been described by many researchers as an existential threat to mankind as AI-powered machines and systems could replace humans in performing of wide range of tasks.

Translation industry has always been at the core of technological development; MT which refers to automatically translating texts from a language to another is not a recent idea as it dates back to the early 1970s. Several approaches have emerged ranging from Rule-based Machine translation (RBMT) to Statistical Machine Translation (SMT) and Neural Machine Translation (NMT). Rule-based Machine Translation relied on linguistic rules and grammars between the language pairs, Statistical Machine Translation, was widely employed between 1980s and 1990s, and was based on creating translations with the help of statistical models using bilingual text corpora, Neural Machine Translation “learns from the patterns in the texts, identifies connections between words and works by predicting the likelihood of

certain word sequences, based on the data used for training [9]". The name of NMT stems from the fact that the layers and nodes used to process knowledge and transmit information work comparably to human neurons [10]. NMT, being a sub-field of AI, has manifested its effectiveness in translating a text from a language to another as it uses deep learning techniques; it learns from large amounts of bilingual text data and analyses complex linguistic patterns and context to produce natural translations.

The capability of AI-powered translation to translate large amounts of texts with a rapid delivery is jeopardizing the jobs of human translators. MT has proved effective in translating simple informative texts pertaining to media, politics, economics...etc. as up-to-date MT is dotted with huge parallel corpora pertaining to various fields. Gong & Cheng [11] outline that the use of Parallel translation corpora enhances machine translation by providing high-quality training data generated by human translators, which will enable data-driven learning, improve translation quality and speed while addressing challenges in lexical-semantic, grammatical, and cultural aspects of translation.

The progress in translation technology has given rise to new approaches to translation such as Machine-assisted Translation (MAT), and Machine Translation Post Editing (MTPE) which relies on the human intervention to post-edit the output produced by machines to correct any mistakes and make the translation sound original, this involves different translation techniques such as addition, deletion, rewriting, explanation ...etc. Eszenyi et al. think that in the aftermath of the wide use of machine and artificial intelligence, human translators fear that their skills and creativity will no longer be coveted, yet this has led to the emergence of new roles related to translation industry; post-editors and the translation technologists, while post editors' main task is to revise and edit the machine output, translation technologists should be capable of preparing texts for translation CAT tools or MT engines, doing desktop publishing, compiling terminologies and feeding them to MT engines. They can also give advice and solve problems related to technological aspects of translation [9]. On the other hand, Pym & Torres-Simón [12] think that expanding skill sets, fusing translation with other kinds of communication, and using interactive talents to improve and humanize automated outputs are possible future roles for translators.

Similarly, Translators' duties will probably change to include more cultural complexity, context, and quality control. This will enhance AI's efficiency by directing it toward tasks that call for human creativity and comprehension [13]. Therefore, translators should have good command of Computer-assisted Translation (CAT) tools and the technological aspect of translation in order to remain in the game.

4. Translation of Culture Specific Items

Language and culture are two faces of the same coin; language is embedded with items related to the culture to which it belongs. The cultural competence in both the source language and the target one is a prerequisite for the translation process since the translator is a bilingual and bicultural mediator. Aixela refers to culture-specific items as "those textually actualized items whose function and connotations in a source text involve a translation problem in their transference to a target text, whenever this problem is a product of the non-existence of the referred item or of its different intertextual status in the cultural system of the readers of the target text [14]". Therefore, culture specific items are "peculiarities which distinguish a culture from another and cannot be understood out of their cultural and historical contexts [15]". Sapir claims that no two languages are ever sufficiently similar to represent the same social reality and "the worlds in which different societies live are distinct worlds, not merely the same world with different labels attached [16]". Hence, the socio-cultural context plays a pivotal role to grasp the meaning of the text, as Ripoll puts it "every text [...] makes no sense and has no *raison d'être* if it is not included in a specific context, attached to the heart of a particular society and a particular culture [17]"

The difficulty in translating CSI stems from the fact that they are immersed in their culture, Aixela states that the difficulty of translating these cultural references "lies, of course, in the fact that in a language everything is culturally produced beginning with language itself [14]". A cultural concept which exists in a culture may not exist in another culture or may have different meanings and connotations. Therefore, finding the equivalent cultural item may be tricky and challenging both for human translators and machine translation as languages reflect the socio-cultural reality which is not unique in all cultures.

For the sake of overcoming the difficulty of rendering CSI, translation scholars suggested a wide range of translation techniques. For instance, Aixela [14] suggested preservation techniques; which include repetition, orthographic adaptation, linguistic translation, extratextual gloss and intratextual gloss, and

substitution techniques; which include synonymy, limited universalization, absolute universalization, naturalization, deletion and autonomous creation. On the other hand, Davies suggested seven techniques to translate CSI; preservation, addition, omission, globalization, localization, transformation and creation [18]. All in all, translation techniques suggested to translate CSI tend either to preserve the peculiarities of the source language or cater them according to the target culture. Choosing the right translation technique differs from a translator to another and depends on whether the translation is source-oriented or target-oriented.

Notwithstanding the increasing progress and prevalence of MT, the latter has demonstrated limitations and shortcomings mainly in translating creative texts such as literary texts that are loaded with culture specific items, idiomatic expressions, complex structures...etc. Amini et al. contended that despite the advancements made in AI-based translation, there are still challenges and limitations that need to be tackled and range from translating figurative language such as idioms, metaphors, and cultural nuances to having limited resources available for low-resource languages [19]. In the same vein, Han outlines that AI algorithms are currently unable to process the polysystemic relations that make up an artwork, despite the fact that they can process some literary devices. As a result, it is stressed that obstacles to machine translation in the future will persist even over time due to meaning transferal, meaning production, and the revolt against meaning [20].

Therefore, creativity is mainly human and “machines that rely on existing corpus databases with predetermined translation aims cannot recreate [21]”. In the same vein, Thai et al. asserted that MT outputs contain not only mistranslations, but also discourse disrupting errors and stylistic inconsistencies [22]. Hence, machine translation is not always effective and cannot always be relied upon to deliver accurate and flawless output, and the human intervention, which takes the form of post-editing, is of paramount importance to address potential flaws in the machine output.

5. Research Methodology

This study is based on a case study research design to scrutinize the effectiveness of AI models mainly OpenAI's ChatGPT and Google's Gemini in translating some culture specific items contained in Naguib Mahfouz's novel *Al-sukariya* (Sugar Street) from Arabic into English. “Sugar Street” was penned by the Egyptian novelist Naguib Mahfouz and its events take place in the 1940's and 1950's with the main theme of fighting for the independence from British colonial rule. Besides, this novel is rife with culture specific items related to the Egyptian society. The free versions of ChatGPT and Gemini AI models were selected for the sake of conducting this study; these two models were chosen for their performance and effectiveness in providing context-aware translations as well as their availability and accessibility.

The data consists of nine excerpts of cultural items contained in the aforementioned novel. The examples were purposively selected and submitted for translation from Arabic into English by the two AI models ChatGPT and Gemini and the obtained translations were compared to William Maynard Hutchins & Angele Botros Samaan's translation of the same novel into English. William Maynard Hutchins & Angele Botros Samaan's translation is the only translation of Naguib Mahfouz's novel *Al-sukariya* and will be referred to in the analysis as “Human translation”. The study endeavors to conduct a semantic analysis in order to probe the translation accuracy and appropriateness of the selected CSI by studying the word choice and the cultural context which plays an important role in the translation process. The comparison between Human and AI translations of CSI is significant as rendering these cultural items requires good knowledge of the cultural context which might be missed by AI models. Besides, comparing the translation output of Human and AI in terms of CSI can evaluate the capability of AI models in understanding deeper meaning and identify gaps in current AI translation skills.

6. Findings and discussion

6.1 Excerpt one

وعادت أم حنفي تقول: أجمل ما فيها يا ستي دكان عم بيومي الجديدة، ثريات و بندرمة و حلوى “

Human translation: “Umm Hanafi continued: “The most beautiful part of it, my lady, is Uncle Bayumi's new place for soft drinks, ice cream, and sweets”.

ChatGPT: Um Hanafi would say again, “The most beautiful thing in it, my dear, is the new grocery store, with chandeliers, **utensils**, and sweets.”

Gemini: “And Umm Hanafi returned, saying, 'The most beautiful thing about it, my lady, is the new shop of Am Bayumi. Chandeliers, **dandarma**, and sweets.'”

Explanation of specific terms:

****Umm Hanafi (أم حنفي):**** This is a name, literally meaning "Mother of Hanafi". It's common in Arabic to refer to women as 'the mother of' their eldest son.

Sty (ستي): This translates to "my lady" or "madam", a term of respect for an older or more distinguished woman.

Am Bayumi (عم بيومي): Similar to the name above, this likely means "Uncle Bayumi". 'Am' is a term for an older man, often used as a sign of respect.

Dandarma (دندرمة): This refers to a type of ice cream or creamy dessert popular in the Middle East.” In the human translation, the word "Dondurma" was translated based on its meaning which is “ice cream” as “Dandurma” refers to dessert akin to ice cream, by choosing to convey the cultural essence rather than retaining the original term. Although, this technique communicated the meaning of the word, the original name of the dessert and the cultural context were lost, as Dondurma is a dessert distinct from western ice creams. ChatGPT failed to convey the meaning of the word by translating it as a kitchen utensil. This translation does not serve the meaning or the context of the author’s description of uncle Bayumi’s store and reduces its cultural authenticity, and which reflects a lack of sensitivity to culinary terminology specific to Middle Eastern Culture while Gemini used transliteration and added an explanatory translation below, defining it as "a type of ice cream or creamy dessert popular in the Middle East." This strategy largely preserved the dish’s original cultural name, allowing target readers to engage with a term unfamiliar to them while understanding it through context.

On the other hand, the word “Siti ستي” which is an Arabic title that implies respect and familiarity, often marking respectful relationships, was translated by the human translation and Gemini as “my lady”. The use of “my lady” in this context maintains formal respect and enables the reader to be aware of the respectful tone in Umm Hanafi’s words. However, ChatGPT translated “my lady” into “my dear”, which failed to capture the formality and depict the social hierarchy in this context.

6.2 Excerpt two

"و لم تكن تجد فرجة إلا في زيارة الحسين وغيره من الأولياء"

Human translation: “Visits to **al-Husayn and to the other saints in their shrines** were the only relief she found.”

ChatGPT: “And she would find solace only in visiting **Al-Hussein and other saints.**”

Gemini: “She found no relief except in visiting **Al-Hussein and other saints.**”

Explanation:

فرجة (farjah): This can mean "relief," "comfort," or "outlet." In this context, it suggests a sense of solace or release from hardship or distress.

الحسين (al-Hussein): it is a proper noun which refers to Imam Hussein, a revered figure in Islam and grandson of the Prophet Muhammad. His shrine is often visited by pilgrims seeking spiritual guidance and blessings.

الأولياء (al-awliya'): This translates to “saints” or “holy men and women”. Some people think that these individuals are particularly close to God and capable of interceding on behalf of believers.”

In this example, human translation used the preservation technique to render the word "al-Hussein" as it, preserving its significance without altering the original name, a common technique for translating religious and historical names. However, human translation used addition in the word “shrines” which does not exist in the original text, in order to make clear that the visit is to the shrines of these righteous saints who are believed by some Muslims to have blessings. This addition broadens the cultural understanding of the target readers, by relating the term with Islamic religious practices.

ChatGPT simply translated it into al-Hussein without making any additional context; hence the meaning is incomplete and the translation does not accurately convey the cultural load of the name. Therefore, ChatGPT’s translation reflects an act of visiting an ambiguous place, and without the word “shrines”, target readers may perceive these visits as merely ordinary interactions instead of sacred

acts of devotion. Gemini, on the other hand, goes beyond simply preserving the original name, adding an explanation that portrays the religious status of al-Hussein and his esteemed position among Muslims in general and some sects in particular. This strategy ensures the transmission of religious features, which are part of culture specific items, and provides valuable insight into religious practices that may be foreign to the target reader.

6.3 Excerpt three

"ظَلَّتْ أناقته كما كانت في الماضي، فالجبة الجوخ و القفطان الشاهي و الكوفية الحرير كالعهد القديم"

Human Translation: "Dressed as elegantly as ever. His broadcloth cloak, striped silk caftan, and silk scarf were of the same type as before".

ChatGPT: His elegance remained as it was in the past, with the velvet cloak, the tea-colored robe, and the silk keffiyeh, reminiscent of ancient traditions.

Gemini: "His elegance remained as it was in the past, for the woolen cloak, the royal caftan, and the silk keffiyeh are as in the old days."

Explanation:

ظَلَّتْ (zallat): This is the feminine past tense of the verb "to remain" or "to stay."

أناقته (anāqatuhu): This is the masculine singular noun for "elegance" or "refinement."

الجبة الجوخ (al-jubbatu al-jūkh): This refers to a type of cloak or mantle made of wool.

القفطان الشاهي (al-qafṭān al-shāhī): This translates to "royal caftan" and refers to a long, loose-fitting garment worn by men in the Middle East.

الكوفية الحرير (al-kūfiyyah al-ḥarīr): This translates to "silk keffiyeh" and refers to a traditional Arab headdress made of silk.

كالعهد القديم (ka-al-‘ahd al-qadīm): This translates to "as in the old days" or "as in the past."

In this excerpt, the human translation used transliteration to translate the word "القفطان", this technique helped preserve the word's specific meaning and cultural load as transliteration provides the readers with a clear significance of the caftan's roots and connection to the Middle East. However, translating "كوفية الحرير" into "silk scarf" instead of "silk Keffiyeh" failed to convey the cultural implications of the word Keffiyeh as a symbol of identity and belonging in the Arab world, and reduced it into a mere scarf.

ChatGPT, on the other hand, used the word "robe" to translate "caftan" using the neutralization strategy which resulted in the translated word losing its specific significance and one of its main pillars, which is the cultural aspect it contains. This cultural aspect refers to the regions where the caftan is popular, the occasions on which it is worn, its types, the cultures that created it, and so on. Besides, the word "robe" does not capture the symbolism behind the word "caftan. However, ChatGPT used transliteration to translate "Keffiyeh", preserving its cultural meaning and providing readers with a deeper understanding of its significance.

Gemini used transliteration to translate "caftan" and "keffiyeh", preserving their specific cultural and social implications, and allowing readers access to the original items and their symbolism and delve deep into the cultural context of the novel.

6.4 Excerpt four

"كانت أمينة تحدّثه من مجلسها فوق الشلّطة عن برد اليوم والمطر"

Human translation: "Seated on the pallet, Amina was talking about the cold and the rain".

ChatGPT: "Amina used to discuss with him, from her seat above the rug, about the cold weather and the rain".

Gemini: "Amina spoke to him from her seat on the rug about the cold weather and the rain today."

Explanation:

أمينة (Amina): This is a common Arabic female name.

تحدّثه (tuḥaddithuhu): This is the feminine past tense of the verb "to speak to" or "to talk to."

من مجلسها (min majlisihā): This translates to "from her seat" or "from her place."

فوق الشلّطة (fawq al-shilte): This translates to "on the rug" or "on the carpet."

عن برد اليوم (an bard al-yawm): This translates to "about the cold weather today."

والمطر (wa-al-maṭr): This translates to "and the rain."

The human translation used the word "pallet", as an equivalent for the word "شلّطة", while both ChatGPT and Gemini suggested "rug". However, all of the three suggestions lack accuracy because

they translated the literal meaning of the word without capturing the full context. The first suggestion, "pallet," is a support on which objects are placed and it is usually made of wood, and the second suggestion, "rug," which refers to a flat piece of woven fabric often laid on floors. However, "شلتة" is a type of cushion often made of feathers and is often decorated with embroidery or other embellishments. It is usually used in living rooms for seating and socializing in traditional Arab houses, and it is considered as a symbol of hospitality. Besides, using "rug" may target readers to perceive something similar to a carpet, which does not reflect the intended meaning. Therefore, we suggest translating it as "embroidered cushion" as it is closer to the original cultural context, and better communicates the purpose and cultural symbolism of this item. A brief explanation of this item and its usage would be helpful for English readers unfamiliar to Arab seating customs.

6.5 Excerpt five

"الزمن غير الزمن يا سلطانة"

Human translation: "Times have changed, Sultana".

ChatGPT: Time has changed, O Sultanah

Gemini: "Times have changed, O Sultana."

Explanation:

الزمن (az-zaman): This translates to "time" or "era."

غير (ghayr): This means "not" or "other."

الزمن (az-zaman): This is repeated for emphasis.

يا سلطانة (yā sultānah): This is a vocative phrase, used to address someone. It translates to "O Sultanness" or "O Queen."

The three translations adopted a transliteration of the word "sultana." This technique succeeded in preserving the dialect used in the novel by the author. It is an expressive style that depicts the way of expressing a certain position in a specific geographical area, which reflects a distinctive cultural characteristic. More than just a name, the term "Sultana" reflects the cultural context of the original text by implying authority, respect, or affection. Such titles are frequently used to address women of position or influence in traditional Arab dialects, and this distinction is effectively conveyed by the transliteration technique utilized here. Besides, Translating "Sultana" as "Queen" could be more accessible to non-Arabic speakers, yet it omits the cultural specificity of the word "sultana" as an honorific title in some Arabic dialects. It is worth noting that the word "sultana" can be used as a substitute for "sty" or "sit el-kol which literally means "the lady of all".

6.6 Excerpt six

"فزارت السكرية ثم زارت بين القصرين عند اشتداد المرض على السيد"

Human translation: "Those calls had emboldened her to visit first Sugar Street and then--at a time when al-Sayyid Ahmad was quite ill--Palace Walk."

ChatGPT: She visited the sugar refinery, then went between the two palaces when the illness of the gentleman intensified.

Gemini: "So she visited Al-Sukkarayah and then visited Between the Two Palaces when the master's illness worsened."

Explanation:

فزارت (fazārat): This is the feminine past tense of the verb "to visit."

السكرية (as-Sukkarayah): This is a historical neighborhood in Cairo, Egypt.

ثم (thumma): This translates to "then" or "afterwards."

زارت (zārat): This is the feminine past tense of the verb "to visit" again.

بين القصرين (bayna al-qasrayn): This translates to "Between the Two Palaces" and refers to an area in Cairo located between the Abdeen Palace and the Koubbeh Palace.

عند اشتداد المرض (inda ishtidād al-marḍ): This translates to "when the illness worsened."

على السيد (alā as-sayyid): This translates to "on the master" or "on the gentleman."

The human translation was more successful in translating the toponyms than the ChatGPT and Gemini translations. The human translation translated "Al-Sukariya" as "sugar street," which effectively captures the literal meaning of "Al-Sukariya" and aligns with the historical context of the area as the name refers to sugar but does not imply a sugar factory. "Bayn al-Qasrayn" was translated as "palace walk," which is an effective choice, as it refers to the adopted name of this area in Cairo's

administrative division, and corresponds with the English title of the first novel in Mahfouz's Cairo Trilogy, providing an established literary and cultural resonance. This choice respects both the original meaning and the location's role within the story's setting.

On the other hand, ChatGPT translated "Al-Sukariya" as "sugar refinery," which bears no relation to the sugar refinery because the area "Al-Sukariya" was named so after "the preparation of sugar dissolved in water during the opening of the Al-Mu'ayyad Sheikh Mosque in the Mamluk Circassian era to be distributed to the general public attending the opening ceremony of the mosque at the time of its construction in the Mamluk Circassian era [23]. Therefore, ChatGPT misinterpreted the nature of the place, suggesting a term that refers to a production facility rather than a neighbourhood. This choice changes the meaning entirely and misleads readers by suggesting a functional rather than geographical or cultural landmark. Both ChatGPT and Gemini have literally translated "Bayn al-Qasrayn" into "between the two palaces", which did not convey the meaning properly. Gemini transliterated "Al-Sukariya", preserving its nature as a proper noun which makes its translation appropriate from this perspective.

Similarly, "Al-Sayyid" is as well considered as a culture-specific item and was translated in different ways; Human and Gemini Translations used the English equivalent "the master" which reflects the formal and respectful connotations of the Arabic title and maintains cultural authenticity, however, ChatGPT used the term "gentleman" which softens the tone and fails to convey the respect implied in the original passage.

6.7 Excerpt seven

"بيد أنها لم تكف يوما عن التَشَكِّي اتقاء العين"

Human translation: "But to ward off the evil eye of jealousy never let a day go by without some complaint".

ChatGPT: "However, she never ceased complaining, fearing the evil eye."

Gemini: "However, she never stopped complaining to ward off the evil eye."

Explanation:

بيد أنها (bayda ʾān hā): This translates to "however" or "nevertheless."

لم تكف (lam takuff): This is the feminine past tense of the verb "to stop" or "to cease."

يوما (yawman): This translates to "day" or "ever."

عن التَشَكِّي (ʿan at-taṣakkī): This translates to "from complaining."

اتقاء (ittiḳā): This translates to "to ward off" or "to protect oneself from."

العين (al-ʿayn): This translates to "the eye" and can refer to the evil eye, a belief in which a person's gaze can cause harm or misfortune."

The excerpt contains the phrase "اتقاء العين to ward off the evil eye" which implies cultural beliefs and superstition. The human translation unnecessarily added "of jealousy" as an explanation, yet "evil eye" already implies jealousy. On the other hand, both ChatGPT and Gemini used more neutral and general translations which implied general sense of fear and anxiety associated with the evil eye without referring specifically to jealousy.

5.8 Excerpt eight

"إذا فكر الملك أن يلعب بذيله"

Human translation: "If the king wants to make trouble behind the scenes".

ChatGPT: "If the king considers playing with his tail."

Gemini: "If the king thinks to play with his tail."

Explanation:

إذا (idhā): This translates to "if."

فكر (fakkara): This is the masculine past tense of the verb "to think."

الملك (al-malik): This translates to "the king."

أن (ʿan): This is a conjunction that can be translated as "that" or "to."

يلعب (yalʿab): This is the masculine present tense of the verb "to play."

بذيله (bi-daylihi): This translates to "with his tail."

This example contains a colloquial expression that is so much used in the Egyptian society which is "يلعب بذيله".

This excerpt contains the idiomatic expression “يلعب بذيله” which implies engaging in secretive activities. The human translation used the expression “make trouble behind the scenes” which successfully captured the cultural context and conveyed the meaning of the original phrase that implies inappropriate or secretive actions. Hence, the human translator showcased a high level of cultural awareness and ensured that the output aligns with cultural understanding of target readers. On the other hand, ChatGPT and Gemini focused solely on the literal meaning of this expression and translated it into “playing with his tale”, therefore, they failed to convey the appropriate meaning, and capture the cultural sensitivity of the Egyptian society. Besides, readers might find the translation ambiguous and confusing as it lacks to communicate the intended cultural significance.

6.9 Excerpt nine

"نينة مشغولة باستعدادات شمّ النسيم"

"Human translation: Mother has been busy getting ready for **the Shamm al-Nasim holiday.**"

ChatGPT: Nina is busy with the preparations for **the Sham El-Nessim celebration.**

Gemini: Nina is busy with the preparations for **Sham El Nessim**

Explanation:

نينة (Nina): This is a feminine given name, which means "little girl" in Arabic.

مشغولة (mašgūlah): This is the feminine passive participle of the verb "to be busy."

باستعدادات (bi-'ist'idādāt): This is the plural form of the noun "استعداد" ('ist'idād), which means "preparation."

شمّ النسيم (šamm an-nasīm): This is a traditional Egyptian holiday that celebrates the arrival of spring. It is also known as "Sham Ennessim" or "Sham El Nessim."

Context:

Sham El Nessim is a national holiday in Egypt that is celebrated on the Monday following Easter. It is a day for families and friends to get together and enjoy the outdoors. People traditionally eat feseekh, a type of fermented fish, and paint eggs. They also go on picnics and outings."

The three translations have used transliteration to render the term "Sham el-Nessim" with the addition of some indicators, such as "celebration" and "holiday" by the human translators and ChatGPT. This method guarantees that readers who are not familiar with the term will comprehend that it denotes a noteworthy event without providing extra information about the time of its celebration and the traditions related to it.

Gemini, on the other hand, exclusively preserved the name of the event “Sham El Nessim”, but attached a full explanation of its context at the end, including the time of the celebration, the dishes that are cooked, and others, which provides the target reader with a full idea about this Egyptian cultural trait, which enhances cultural understanding.

The analytical and comparative study of a set of excerpts containing cultural specificities from the translations of Naguib Mahfouz's novel "Al-Sukariya," by both human and IA translators demonstrates that human translation has entirely preserved cultural specificities through transliteration. However, it lacked additional explanations that refer to the cultural context, except in rare cases. On the other hand, ChatGPT relied on literal translations that did not convey the intended meaning in many cases, whereas Gemini suggested, in addition to preserving cultural items, a deconstruction of sentences' parts and an explanation of the suggested translations and the reasons for translating them that way. Furthermore, it provided their overall cultural context, as was the case with the Sham El-Nessim celebration.

7. Conclusion

In a nutshell, the emergence of artificial intelligence has indeed revolutionized the translation industry as the latter has always been affected by the development in translation technology. Translation industry is going to witness a boom in the use of AI-powered translation owing to the great demand for translation in a more and more globalized world and AI huge capacity of translating loads of data in a short period of time along with the incapacity of human translators to meet the growing needs for translation. The analysis of the research sample concluded that Gemini outperformed ChatGPT in translating culture specific items in Naguib Mahfouz's “Sugar Street” from Arabic into English; by preserving the cultural sensitivity and

providing explanatory translations that enable English-speaking readers to understand the cultural differences and contexts. Gemini's performance likely derives from its capacity to interpret cultural nuances, drawing from a vast and varied database to improve contextual sensitivity and reduce cultural misunderstanding.

Besides the performance of AI models in translating these cultural items varies, whether compared to each other or to human translation with which they are becoming increasingly competitive in terms of quality in some cases potentially due to the ability of these models to access a vast amount of data that provide them with the appropriate contexts to suggest appropriate translations, albeit relatively. On the other hand, despite the promising progress of AI models in terms of accuracy and fluency, they still have limitations in dealing accurately with sensitive and complex cultural contexts. Therefore, resorting to post-editing is of the essence; AI translation models should be used as a tool to assist human translators who should post-edit the machine output so as to address potential inaccuracies, capture cultural contexts and reduce errors.

The results presented here pave the way for further research into improving AI models for enhanced context sensitivity, particularly with regard to translations that are culture-related. In order to strike a balance between machine's accuracy and cultural sensitivity, future research should examine how particular translation theories, such as functional theories, can direct AI training in enhance its cultural sensitivity. On the other hand, translators and translation agencies should consider AI models as a complementary tool rather than a substitute, as the future of translation workflows and industry standards may be shaped by the combined efforts of AI and human expertise, which could result in translations that are timely and contextually accurate for end users.

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