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RESEARCH ARTICLE

A Linguistic Investigation for the Image Translation Powered by AI Tool: A Case Study of Google Lens

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ABSTRACT

This study aims to evaluate the quality of "Google Lens Translation" provided for Arabic and English images extracted from various domains, including medical signs and prescriptions, signage, handwritten text on images, food products displayed on images, and descriptions. The study adopted quantitative and qualitative research approaches to analyze the data. In the quantitative part, an online survey was created to elicit the views of translation specialists regarding the degrees of fluency and adequacy achieved by "Google Lens" using "TAUS" scales. The study found statistically significant evidence that "Google Lens" committed both adequacy and fluency errors. However, "Google Lens" made an equal number of fluency errors and adequacy errors. Such recurrence of errors affected the intelligibility and accuracy of the output. The study concluded that "Google Lens Translation" is considered an effective tool to help end users render images; however, it will never replace human professional translators.

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INTRODUCTION

Translation is a growing field of research, with new insights being made all the time. Translation has played an essential role in human history, facilitating communication, and understanding between different cultures. (Catford, 1965, p. 20) defined translation as "the replacement of textual material in one language (SL) by equivalent textual material in another language (TL)." Before the advent of translation technology, the translation process relied on manual methods, wherein translators would refer to printed dictionaries and employ their subjective discretion. Nowadays, the integration of translation and technology has led to translation platforms that produce instant translations across human languages with mouse clicks. These systems are called Machine Translation systems, where the systems translate languages instantly without the intervention of humans using computer algorithms to convert text, speech, or images from one language to another (Almahasees, 2021).

The incorporation of technology and translation was deliberate. It was a forward-thinking reaction to the swift progress in computer technology throughout the latter half of the 20th century. Scientists recognized the potential synergy between technology and translation, leading to the emergence of a new era filled with possibilities.

Translation and technology

The advancement of artificial intelligence in recent years has ushered in a new age for machine translation and artificial intelligence translation. While the future of machine translation seems promising, traditional methods must yield to the dominance of technology, and individuals must adapt to embrace new technical breakthroughs. Furthermore, it is intriguing to contemplate the complex interaction between humans and machines in the field of translation. (Lin, 2023). In 2010, Hutchins listed around 250 systems that provide translation services for various human languages. The study primarily focuses on the Image translation service powered by Google Translate, which is the most widely used machine translation system with a daily user base of 500 million worldwide.

Google translate

Google Translate is an advanced neural machine translation tool created by Google, designed to facilitate the translation of many forms of text, documents, and websites from one language to another. With a daily user base exceeding 500 million, this translation service is one of the most widely utilized platforms globally. Google Translate employs a range of methodologies for text translation, encompassing statistical machine translation, neural machine translation, and rule-based machine translation. It has a website interface and a mobile app for Android and iOS. Google Translate covers 133 languages at various levels until August 2023. However, Google's innovations in language services did not stop at Google Translate. The company extended its capabilities by introducing Google Lens, a visual recognition tool that combines image analysis and machine learning to provide users with an enhanced interactive experience. This seamless integration of technologies demonstrates Google's commitment to breaking down linguistic barriers and visual obstacles, improving user interactions, and exceeding traditional language boundaries (Google Translate, 2024). The current study is concerned with the adequacy and fluency of Google Lens in rendering Arabic and English images

Image recognition and google lens

Image processing is the process of manipulating and analyzing images to improve their quality, extract useful information, or make them easier to store and transmit. This field has expanded rapidly in response to advances in digital technology, powered by the explosion of visual data from devices such as smartphones, computers, and specialized imaging equipment. Image processing is critical in a variety of applications, including medical diagnostics, satellite imagery, security, and general photography. As digital image quality improves with greater dimensions and color depth, advanced methods and algorithms are required to effectively manage the increased data volume. Scientists and engineers are constantly creating mathematical models, computational techniques, and specialized hardware to improve the efficiency of Digital Image Processing (DIP) systems, with parallel computing being a popular method. (Nagornov, Lyakhov, Bergerman, & Kalita, 2024).

The primary objective of image processing is to efficiently register, process, store, and transmit large amounts of visual data. This entails performing a variety of operations on image pixels, including addition, subtraction, scaling, and edge detection, all of which require different computational resources. Techniques such as approximate computing can make data processing faster and less resource intensive. Digital filtering, particularly convolution, is critical for detecting image features, and Convolutional Neural Networks (CNNs) extensively employ this technique for tasks such as image translation. (Nagornov, Lyakhov, Bergerman, & Kalita, 2024) Efficient image processing is critical in applications such as image translation, where tools like CNNs manage resources to complete tasks quickly and accurately, ensuring their reliability and functionality. Image processing is available via Google Lens, Google company product to translate images across languages.

Google Lens is an advanced visual search tool employing artificial intelligence algorithms to accurately recognize and classify objects and textual content inside the physical environment. It was first released in 2017 and offers translation for 29 languages including Arabic. This technology can facilitate language translation, discern the classification of plants and animals, conduct geographical exploration, and locate images with a visual resemblance. Google Lens is accessible both as an independent application and as an integrated functionality within the Google app (Google Lens, 2023).

LITERATURE REVIEW

(Abdullah Naeem, 2023) examined the stylistic problems that arise in the translations of collocations in scientific texts from English to Arabic using Google Translate. Additionally, it revealed the translation's stylistic problems related to collocations. Furthermore, it aims to revise machine translation output in compliance with the criteria for acceptable translation quality. The work employs a comparative analytical strategy to compare the data collected from the Google Translate (2021) output with human translation. Subsequently, post-editing approaches are applied to alter the outputs. The research revealed that Google Translate does not possess the requisite comprehensive comprehension of the linguistic and cultural heritages of both the source and target languages, hence impeding its ability to employ the appropriate method(s) for accurately translating collocations from English to Arabic.

(Ubhayawardhana & Hansani, 2023) assessed the effectiveness of the Google Translate method in translating technical terminology found in legal papers. This study utilized birth, marriage, and death registration forms and certificates, together with two legal documents and one law obtained from the Registrar General's Department, as primary data sources. Secondary data sources included past research papers, e-books, and online sources. This study employed a qualitative approach where the collected data was inputted into Google Translation categories including voice, keyboard, and camera. The resulting translations were then compared to human translations. The analysis revealed that Google Translation is more effective in translating terms from English to Sinhala than in the opposite direction. Both typing and camera options demonstrated more efficacy in translating legal terminology from English to Sinhala. Due to the lack of support for the Sinhala-English language mix, the typing and voice alternatives are believed to be more efficient. Moreover, it has been found that the output of Google Translation is entirely inadequate in numerous instances.

In their study, (Deng & Yu, 2022) carried out a thorough evaluation of the existing literature on the use of machine translation (MT) in language learning. They examined several aspects such as the primary users, theoretical frameworks, user attitudes, and the integration of MT tools in language teaching and learning. In order to achieve this, a total of 26 pertinent peer-reviewed papers (n = 26) were chosen for additional examination utilizing the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocol (PRISMA-P). The results indicated that the main consumers of machine translation (MT) were graduate and undergraduate students. Teachers and students have contrasting perspectives for many reasons. Moreover, it was determined that the process of integrating machine translation (MT) consisted of four distinct stages: introduction, demonstration, and work assignment.

(Almahasees & Mahmoud, 2022) examined the precision of Google Image Translate in converting Arabic language found on various signs, such as banners, traffic signs, and store signs, into English. Moreover, it aims to assess the proficiency of Google Translate in accurately translating Arabic signs into English without the need for human translators. This research utilizes the Linguistic Error Analysis Framework developed by (Costa et al., 2015) to examine the output of the Google photo service in terms of orthography, grammar, lexis, and semantics. The study identified many language errors in Google Translate, including mistranslation, omission, additions, improper choice of words, misordering of words, lack of subject-verb agreement, and semantic difficulties. The study discovered that the Google Image Translate tool aids users in comprehending the essence of the image. Nevertheless, the expertise of a human translator is still necessary as machine translation may not provide a precise and efficient translation comparable to that of humans.

The study conducted by (Pires & Espindola, 2021) presented recent findings regarding the utilization of Google Translate outputs in multimodal contexts. The creation and evaluation of machine translation often prioritizes the verbal aspect, while there is limited research in the field on the automatic translation of multimodal publications that involve text-image interactions. This work aims to provide a description of relationships and their characterization. It is divided into two parts: firstly, by examining the issue through an interdisciplinary approach that involves analyzing examples from the Wikihow website using Machine Translation and Multimodality; secondly, by presenting recent research on appropriate tools and methods for accurately annotating these issues, with the long-term objective of creating a corpus. Additionally, it reports on recent research on suitable tools and methods for annotating these issues accurately.

(Amilia & Yuwono, 2020) examined the inaccuracies produced by Google Translate in rendering Eliza Riley's short tale "Return to Paradise". The methodology employed is qualitative and descriptive in nature. The data is collected through a comparison between the translation provided by Google Translate and the translation done by a professional translator. Mossop's revision guidelines are utilized to scrutinize the errors. The findings indicate that Google Translate had significant shortcomings in differentiating idiomatic expressions, leading to severe errors in the translated text. Additionally, there were issues with word selection, resulting in translations that were out of context. Furthermore, cultural differences led to the presence of illogical sentences in the translated text. In summary, Google Translate can be advantageous for translating individual words, phrases, or specific sentences, and it also offers a comprehensive understanding of translating content. However, it may not offer a translation product that meets your specific requirements. This paper presents the results of a research study conducted by (Putri & Havid, 2015) that focused on identifying faults in the English translation of Indonesian folklore using Google translation. The examination of Google translation errors not only reveals the specific types of errors generated by Google Translate, but also demonstrates the consequences of these errors on the conveyed message in the translation. This can serve as educational material to enhance language learners' critical thinking regarding language usage. The study identified four distinct issues in Google Translate's English translation of Indonesian folklore: "inaccurate word choices," "omitted words," "incorrect word order," and "unrecognized words." These findings are thought to enhance the linguistic consciousness of language learners, specifically regarding word selection and grammatical structure.

(Napitupulu, 2017) conducted a frequency analysis of translation errors in abstracts translated by Google Translate, utilizing Keshavarz's (1999) error analysis approach. The data was collected from faculty members at the Methodist University of Indonesia in Medan. A random selection was made of ten abstracts from papers written by undergraduate students across different faculties. Subsequently, the data is compared for each sentence segment, and any words or phrases that include faults are scrutinized. The study found that there were 21 instances of lexicosemantic errors, 9 instances of tense errors, 13 instances of preposition errors, 27 instances of word order errors, 15 instances of errors in the distribution and use of verb groups, and 8 instances of errors in active and passive voice.

In a study undertaken by (Al-Jarf, 2016), the objective was to examine the precision achieved by Google in translating English technical words into Arabic. The study revealed that Google Translate exhibits uneven translation of words that have different prefixes and roots combined with the same suffix, as well as compounds and blends. Illustrations of these concepts are "mobilization" and "technical." A team of linguists or subject matter experts is needed to update, incorporate, and oversee the inclusion of scientific terms into the Google English-Arabic translation dictionary. Students planning to use the Google English-Arabic translation tools should be cautious and are advised to verify any interpretations they have obtained from GT with a professional or their instructor.

(Alqudsi, Omar, & Shaker, 2014), discussed many machine translation approaches found in literature, with the aim of encouraging scholars to explore them. This text explores some of the distinctive linguistic features of the Arabic language. The article extensively discusses the Arabic features relevant to machine translation, as well as the potential issues they may pose. The paper outlines the primary techniques used for machine translation from Arabic to English, and provides an assessment of their respective benefits and drawbacks.

(Li, Graesser, & Cai, 2014) examined the precision of Google's Chinese-to-English translation by considering formality and cohesiveness. They conducted two comparisons: Google translation versus human expert translation, and Google translation versus the original Chinese source language. The text sample consisted of 289 extracts from the Selected Works of Mao Zedong, encompassing both spoken and written texts in both Chinese and English translations. The Chinese texts were translated into English using Google Translate. The automatic text analysis tools used to analyze these texts include the Chinese and English LIWC, as well as the Chinese and English Coh-Metrix. The Pearson correlations conducted on formality and cohesiveness revealed a strong positive association between Google English translation and both human English translation and the original Chinese texts.

In summary, the literature mentioned above emphasizes the scarcity of research on image translation services, with only one study suggesting the need for comprehensive analysis of the output produced by image translation in terms of both qualitative and quantitative measures. This work aims to address this gap by undertaking such an analysis.

METHODOLOGY

The study is qualitative in nature. The qualitative approach has employed the error analysis framework developed by (Costa et al., 2015) to identify the errors made by Google Lens when translating between Arabic and English languages. The faults were categorized into orthography, lexis, grammar, semantics, and discourse, based on the established framework of error analysis. The inaccuracies are depicted in visual representations, accompanied by clarifications.

Qualitative part

In this section, the researcher qualitatively evaluated the output of Google Lens translations for the English and Arabic languages. The researcher spotted signs that may be necessary for the general public and tourists and captured 30 images. Subsequently, the researcher utilized Google Lens to evaluate the images and identified the ones that exhibited significant flaws. The chosen errors were subjected to qualitative analysis using the error analysis taxonomy proposed by (Costa et al., 2015), as shown in Figure 1.

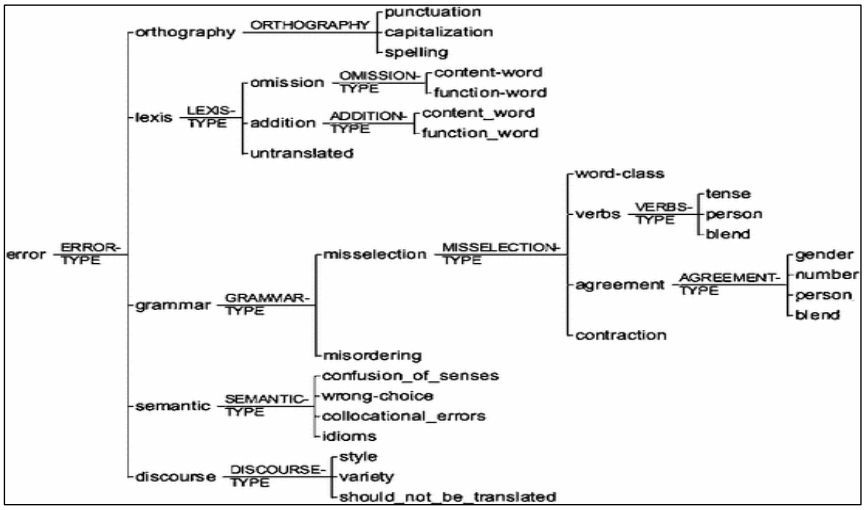


Figure 1: Error analysis taxonomy (Costa, Ling, Luís, Correia, & Coheur, 2015).

Procedures of the study

The researcher took the following steps:

- Reviewed various theoretical and empirical studies on machine translation and error analysis.
- Taking photos of commonly used public and tourist signs.
- Using Google Lens to translate photos.
- Selecting images with critical errors.
- Error extraction.
- Aligned the original and target text on an Excel sheet.
- Data was ready for contextual analysis and feedback integration.

ANALYSIS AND DISCUSSION

This section conducts a qualitative analysis of the translation output of Google Lens between the English and Arabic languages by (Costa et al., 2015).

Evaluation of google lens translation

The growing need for translation, driven by economic globalization, surpassed the ability of humans to manage all translation jobs, leading to the development of automated translation systems and

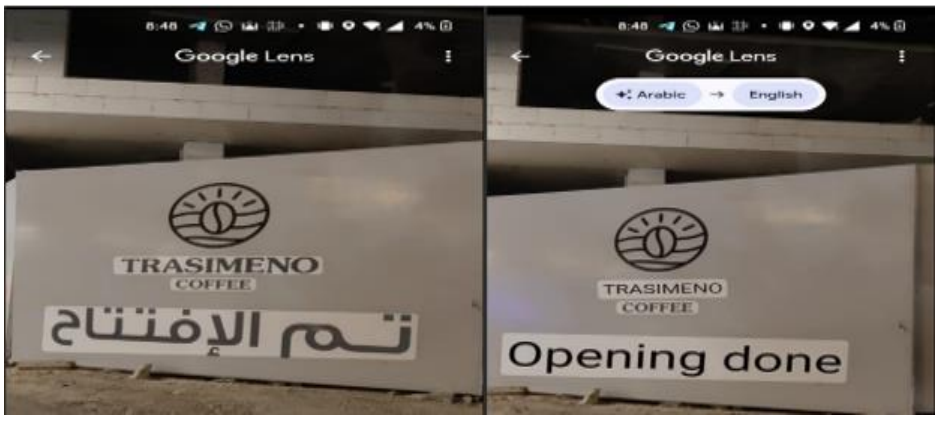
substantial transformations in associated domains (Chéragui, 2012). Hence, the assessment of machine translation is imperative in order to gauge the system's advancement over a period of time. The objective of this study is to evaluate the translation accuracy of Google Lens in terms of Orthography, Grammar, Semantics, and Discourse. The following sections provide further information on each category and outline the specific faults identified in photos translated by "Google Lens" in different areas, including medical signs, signage, handwritten text on photographs, food products displayed on images, and descriptions.

Error categorization

Error analysis (EA) is a field of linguistics that has mostly focused on language acquisition but has more recently been applied to assess the accuracy of automated language production, including speech and visual recognition, particularly in machine translation (MT) (Costa et al., 2015). The existing literature on error analysis has presented many frameworks that try to offer detailed analysis of errors, which reveal the strengths and shortcomings of machine translation systems. Upon careful examination of these frameworks, the researcher is compelled to provide new categorizations of faults as minor and significant. Minor errors do not impede the comprehensibility of the text; they impede the smoothness of the text, but major errors impede both the comprehensibility and conveyance of the text. The minor errors pertain to orthographic aspects like capitalization, spelling, and diacritical marks. On the other hand, the major errors encompass issues related to vocabulary, grammar, semantics, and discourse. This classification is based on MQM metrics.

Signages:

Opening sign



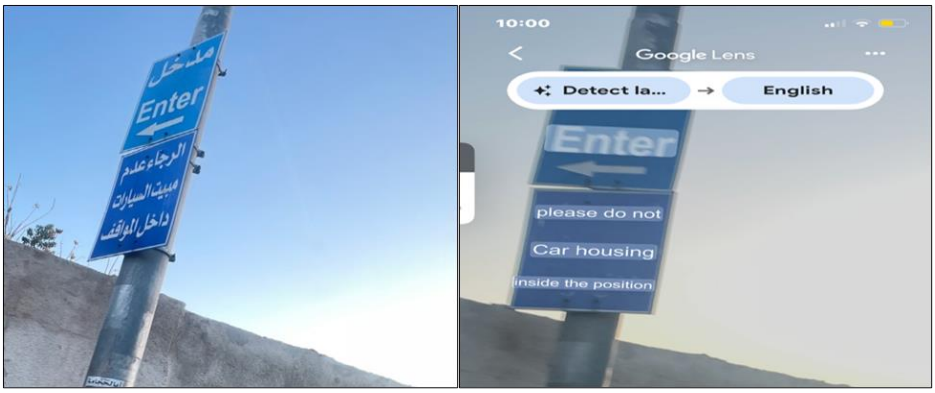
Example 1: An "Open" sign is a sign displayed on a window or wall to indicate that the business is now operating, without explicitly stating the specific hours of operation. Signs that display open information and operational hours are categorized as information signs. The example is sourced from TRASIMENO café located in Amman. A sign has been displayed by the coffee shop to signify that the café is currently operational. The sign displays the Arabic phrase (تم الافتتاح, (tm ālāfttāḥ)), indicating that the shop has recently commenced its operations. "Google Lens" translated the Arabic word into (Opening done). The translation indicates that the system made an incorrect selection error by using the phrase "Opening done," which is not standard English. This suggests that the translated phrase lacks context and may result in a semantic error due to the inappropriate choice of words. The disparity is presumably a result of the algorithm's constraints in comprehending the subtle connotations of Arabic expressions and formations, notably those in passive voice composition. The proposed translation is "Currently open." The second type of error for the untranslated brand name "TRASIMENO" can be classified as a lexical error (untranslated). In this particular situation, (TRASIMENO) is used as a brand name or proper noun that should remain unchanged without being translated, but it must be written using Arabic letters. The recommended translation should be "تراسيمينو". The third form of error for untranslated coffee can be classified as a lexical error (untranslated). In this particular situation, the term "coffee" denotes the specific product that the company is marketing and should be rendered into another language. The recommended translation should be "قهوة".

Flag mounted sign

Example 1: The flag-mounted sign above, taken from Amman's streets, indicates parking spaces for the three main entities: The Legal Department, Sharia Court, and Estimation and Building Department. However, certain translation gaps come to light when examined via "Google Lens.". For example, the term (guessing) used in the translation of (تخمين, (takẖmīnuⁿ)), fails to capture its actual nature, which primarily denotes estimation or assessment in the realm of construction projects. This misinterpretation is classified as a semantic error (collocational error) because it fails to accurately convey the complex meaning found in the original phrase. The suggested translation is (Estimation). Furthermore, the translation (legal court) for (المحكمة الشرعية, (ạlmaḥkamaẗu ạlsẖãfʿīãẗu)) is not precise enough to capture the distinct legal and cultural context associated with Sharia courts, categorizing it as a semantic error (wrong of choice). While the term "legal court" refers to a wide range of judicial systems that follow civil or criminal laws, it does not adequately describe the specialized jurisdiction of Sharia courts, which work under Islamic law. A more appropriate rendering would be (Sharia Court) or (Islamic Court), which better reflects the inherent nature of these judicial bodies and the legal framework that they follow. On the other hand, the translation (land department) for (دائرة الأراضي, (dāyîraẗu ạlạ̊rāḍī)) exemplifies accuracy and relevance in context. This rendition accurately captures the essence of (دائرة الأراضي) as the governmental entity responsible for land-related matters. While some translations are accurate to the original text, others fail to capture the nuanced complexities inherent in Arabic phrases, requiring a more careful translation process to ensure semantic accuracy and cultural sensitivity.

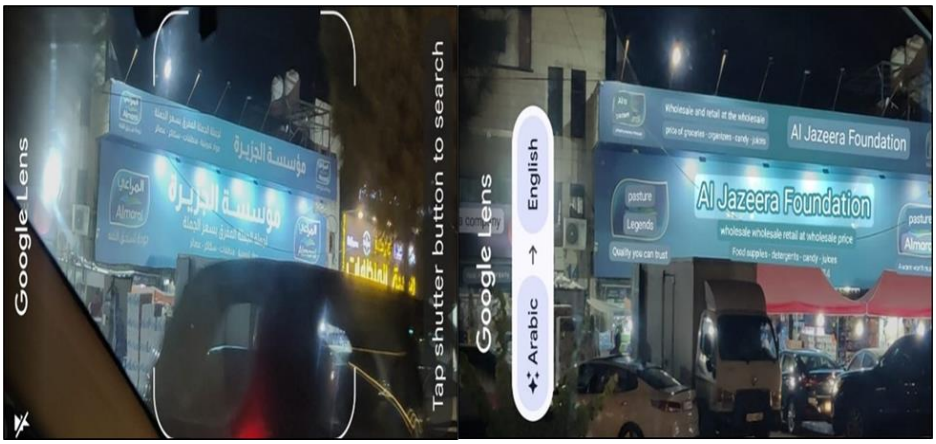
Example 2: The image depicted above, taken on a roadway in Amman, showcases a sign affixed to a flagpole that directs vehicles to remain within their designated lane. Regrettably, the sign was inaccurately translated by "Google Lens". The translation "Stick to the laek" for the Arabic phrase "التزم بالمسرب" (ạilٰtazama biạlmaŝrabi) seems to include a semantic error. The term (laek) is an incorrect rendering of "lean," perhaps resulting from a translation error due to confusion. The accurate interpretation of (التزم بالمسرب) is (Adhere to the designated lane) or (Remain within the lane), with (lane) denoting a specifically allocated place for vehicles on a road or highway. Consequently, the error lies in the inaccurate interpretation of the term "lane" as "leak," which changes the intended meaning of the instruction and could potentially confuse the reader or listener. The occurrence of this semantic error, which involves the misinterpretation of different meanings, highlights the significance of precise translation and meticulousness in properly transmitting

messages, especially in situations such as traffic signs where clarity is crucial for safety and comprehension. The recommended translation should be "Adhere to the designated lane."



Example 3: The sign above, obtained from a street in Amman, indicates that overnight parking is not allowed in this designated parking area. However, the translation provided by Google Lens for the Arabic phrase الرجاء عدم مبيت السيارات داخل الموقف (ạlrājā’u ʿadama mabīti ạlsāyāạrāti dākẖila ạl̊mawq̊ifi) contains several errors that hinder its clarity and effectiveness in conveying the intended message as follows: Firstly, the term "car housing" inaccurately replaces the concept of parking, leading to a semantic error (confusion of sense). "مبيت السيارات is not commonly translated as "car housing" in English. The suggested translation: no overnight parking. Furthermore, the expressionداخل الموقف translated to "inside the position" lacks a clear indication of the intended location, rendering it contextually inappropriate which refers to a semantic error (wrong choice). The suggested translation: inside the parking area.

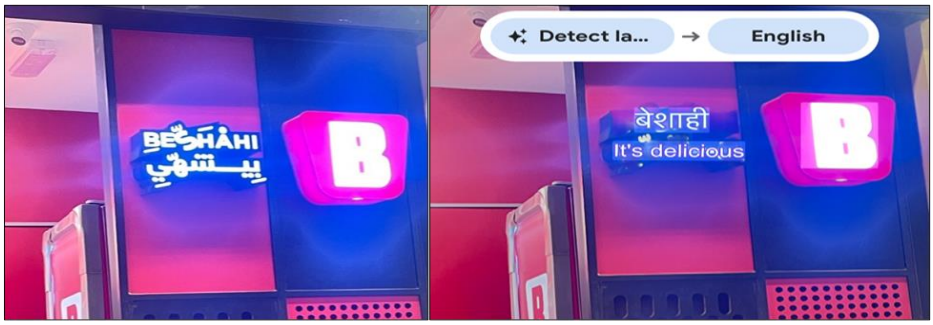
Wall mounted sign



Example 1: "Wall-mounted" signs display a wide range of products, sales methodologies, brand names, and the market's identity. The "wall-mounted" sign was taken from the Aljazeera market in Amman. However, among the translations, errors arise that call for attention, which refers to more than one error. The first mistranslation refers to the Arabic term (مؤسسة, (mūå̈sāsaẗu^{n})) which means wholesale store. The rendered term (foundation) does not accurately convey the essence of the original word. This discrepancy indicates a semantic error (confusion of sense), most likely caused by the translation algorithm's difficulty in determining the precise context of the word (مؤسسة) as it has multiple meanings in Arabic as in this context, it clearly indicates a grocery store. Polysemous words like (مؤسسة) can be difficult for translation algorithms to understand, hindering their ability to provide accurate translations. The suggested translation (Wholesale store). When considering translations generated by "Google Lens" it is critical to recognize the potential errors caused by the interaction of "Optical Character Recognition" (OCR) technology and machine translation algorithms. These errors can appear in a variety of categories. OCR Errors typically occur when "Google Lens" misinterprets characters or words in an image, resulting in inaccuracies in the recognized text. Image quality, text distortion, and complicated fonts are all factors that can influence this phenomenon. For example, translating (منظفات, (munaẓ̣īfātu^{n})) to (organizers) is a significant semantic error (confusion

of sense) caused by OCR problems. The suggested translation is (cleaning products) (supplies) or (detergents.). The third error type for translating (المراعي, (ʾalmarāʿī)) to (pasture) could be categorized under discourse error (should not be translated). In this context (المراعي) refers to a brand name or proper noun that should be kept as is without translation. The error occurred when the machine translation algorithm attempted a literal translation based on the word's dictionary meaning, resulting in a loss of the brand's identity and recognition. The suggested translation should be (Almarai). The translation of (المفرق بسعر الجملة, (ʾalmufarraqu bisiʿri ʾaljumlaẗi)) in Arabic, which accurately translates to (retail at wholesale price). The translated term (retail at wholesale price) correctly conveys the intended meaning. As a result, this translation does not appear to contain any errors. The translated phrase effectively conveys the concept of selling items at retail prices equivalent to wholesale prices. This accurate translation ensures the message is clearly conveyed to the intended audience.

Restaurant wall mounted sign

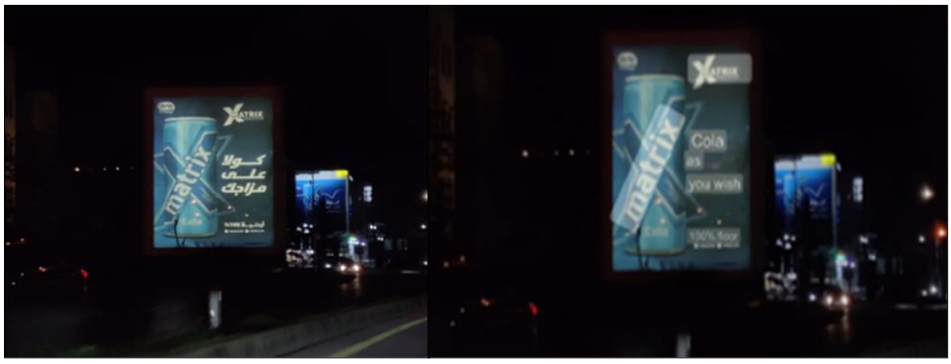


Example 1: The image above, placed at Mecca Mall in Amman, illustrates a restaurant advertisement with expressions commonly used by Jordanians. This expression indicates that a meal is delicious. The translation of "بيشهي, (bisẖahīiʾ) " to be "delicious" appears to be a colloquial or informal interpretation of the Jordanian Arabic expression. "Delicious" captures the sense of enjoyment or satisfaction associated with the word "بيشهي". However, Google Lens failed to recognize the transliteration of the same word in English characters, so it was converted to Hindi language wrongly which cause a semantic (confusion of sense) translation.

Street signs: taxi stand signs: loading and unloading

Example 1: The above signage is placed in front of Mecca Mall that outlines the designated area where cars and taxis can pick up and drop off passengers without staying for too long. However, the translation provided contained a critical error. The translation الوقوف للتحميل والتنزيل فقط (ʾalwuqūfu liltaḥmīla wāltanzīla faqaṭ) to "stand for uploading and downloading just" seems to have a semantic error (wrong choice). The Arabic phrase typically refers to designated areas where vehicles, such as taxis or private cars, can temporarily stop so that passengers can be picked up and dropped off. However, the translated phrase implies a different context for digital uploading and downloading activities, which is not appropriate in this context. This discrepancy could be due to the machine translation algorithm's inability to determine the phrase's specific context and intended meaning, resulting in a mistranslation that could confuse users, particularly those looking for transportation information. To ensure clarity and understanding for the target audience, translation must consider

the context and domain-specific terminology. The suggested translation: for pick- up and drop- off only.



Example 2: The image above, taken from a street in Amman, shows a local cola product next to a colloquial statement commonly used among Jordanians. (كولا على مزاجك, (kwlạ ʿalay mizājika)) a Jordanian colloquial with its translation (cola as you wish) appears to capture the colloquial nature of the phrase. In Jordanian Arabic (على مزاجك) translates to (as you wish). This translation effectively maintains the informal and flexible tone of the original colloquial commonly used in Jordanian culture. As a result, the translation is consistent with the cultural context and effectively conveys the intended meaning.

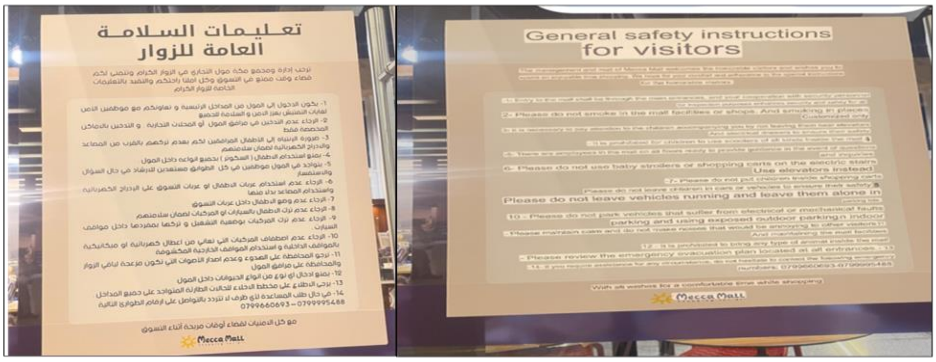
Services sign

Example 1: The image above is taken from the Jo Petrol Station in Amman and shows a range of services available, including bunchier service, car washing, and gas filling, among others. However, when subjected it to Google Lens, the results revealed critical errors: The translation of خدمة البناشر (kẖi̊dmaẗa ạlbnạshr) to 'publisher services' reflects a semantic error (wrong choice). The machine translation algorithm fails to understand the context of "بناشر" as a puncher, resulting in the discrepancy. Unlike the intended meaning of providing puncher services or hole puncher services, "publisher services" implies a completely different domain related to publishing. This error highlights machine translation algorithms' linguistic and cultural challenges, particularly when translating technical terms or specialized vocabulary. The translation fails to capture the nuanced meaning of "خدمة البناشر" highlighting the limitations of machine translation tools in dealing with context-specific language and technical terms. The suggested translation: puncher services. Google Lens' OCR failed to recognize "Jo Petrol" as "Jordan Petrol," instead rendering it as "Lo Petrol." This discrepancy is an orthography error, specifically a spelling error, because it misrepresents the intended name of the business. The suggested translation: JoPetrol.

Tourist brown sign

Example 1: The tourist Brown Sign is placed at the historic Roman Theater in downtown Amman. This tourist brown sign explains the site's historical significance, shedding light on its purpose between 138 and 161 A.D. However, when checked for translation via Google Lens, one error was detected as follows: The translation of "عام ʿ (āmu^n) as "general" in the context of "year" is a semantic error (confusion of sense). This mistranslation is most likely the result of the machine translation algorithm interpreting the term without considering its specific context. "عام" is commonly used in Arabic to refer to a time or period, such as a calendar year. However, the translation "general" fails to capture this temporal aspect correctly. Machine translation algorithms may fail to capture the nuanced meanings of words like "عام," especially in context-dependent situations. The suggested translation: year.

General safety instructions for visitors of a shopping mall



The image is taken from Mecca Mall in Amman's General Safety Instructions for Visitors. These instructions typically include guidelines and regulations designed to ensure the safety and well-being of the public on the premises. However, when translated from Arabic to English via Google Lens, the following results were obtained: The translation of "التدخين بالأماكن المخصصة فقط" (*ạltãd̊kẖīnu fī ạlạmạkn ạl̊mukẖạṣãṣạẗa faqaṭ̊*) to "customized only" appears to contain a semantic error (wrong choice). The Arabic phrase usually means that smoking is only permitted in specific areas, such as designated smoking zones or areas. However, the translated phrase "customized only" fails to convey the intended meaning in this context. The term "customized" implies that something has been tailored or personalized, which is not the intended message regarding smoking regulations. The suggested translation: smoking allowed in the designated areas only. The lack of contextual awareness and understanding of the specific terminology most likely caused this error. Machine translation algorithms may translate words or phrases literally without regard for the larger context in which they are used. In this case, "الأدراج الكهربائية (*ạl̊ạ̊d̊rāju ạl̊kah̊rabāẙiyãtu*), was interpreted as "electrical drawers" based solely on the individual meanings of the words, without realizing that it refers to escalators or moving staircases commonly found in public spaces. Furthermore, the algorithm may lack domain-specific knowledge or have not been trained in specialized terminology. As a result, it provided a literal translation that did not accurately capture the intended meaning in the given context. This error falls into the category of semantic errors (confusion of sense). The suggested translation: escalators.

Car alert board

Example 1: The image above, taken from a Ford Fusion car, alerts the driver to put the gear in park when the transmission is not in park. However, when translated from English to Arabic, the following

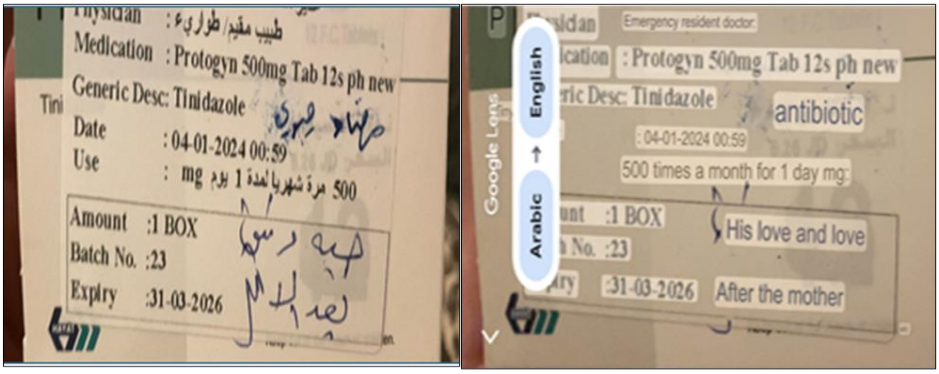
results were obtained: The translation ")" ناقل الحركة ليس في الحديقة (nāqilu ạlḥarakaẗi laỷsa fī ạlḥadyqaẗi(‹transmission not in park ‹Google Lens makes a significant error in conveying its intended meaning. In automotive terminology, "park" refers to a specific gear position, not a physical garden or "حديقة." This translation error demonstrates a semantic error (confusion of sense), as the machine translation algorithm fails to recognize the technical meaning of "park" in the context of vehicle transmissions. Such errors are frequently caused by the algorithm's incomplete understanding of specialized vocabulary and context-specific terminology. In this case, the machine translation algorithm may not have the necessary domain knowledge to interpret automotive terms accurately.

Medical handwritten text and informational sign

Medical prescription

Example 1: The prescription obtained from the Royal Hospital in Amman includes medical terminology and doctors' unique handwriting, which is known for its complicated style. Google Lens provided the following interpretation: Several insights emerge from analyzing the translation "medical classification" to وصفة طبية (waṣafaẗa ṭubỷaẗi^{n}), which must be translated to (medical prescription). The error type is associated with semantic error (collocational error), which occurs when the translation fails to convey the intended meaning accurately within the medical context. The algorithm's difficulty with medical terminology and cultural nuances complicates accurate translations, emphasizing the complicated handwriting that already exists in the image. Google lens has successfully translated وجع بطن (wajaʿu baṭni^{n}) accurately to "abdominal pain" in Arabic and successfully translate "القيء (ạlqaỷ'u) to "vomiting" in Arabic. This translation appears to be error-free and accurately conveys the intended meaning.

Medicine pack



Example 1: The medicine pack shown above is a direct result of the previous prescription, outlining the instructions for how to use the medication besides its type, which works as a reference for the patient. Google Lens provided the following interpretation: "حبة مرتين (ḥubãẗu^{n} marãtaỷni) translated to "his love and love" seems to be a mistranslation or misinterpretation. The translation does not accurately convey the intended meaning of the source text. It appears to be an OCR error, possibly due to the ambiguity of the handwritten calligraphy that resulted in a semantic error (confusion of

sense). The suggested translation: twice a day. "بعد الاكل (baʿda ạlạkl) translated to "after the mother" is also a mistranslation. The intended meaning, likely "after eating" or "post-meal," is not accurately captured in the translation. It appears to be an OCR error, possibly due to the ambiguity of the handwritten calligraphy that resulted in a semantic error (confusion of sense). The suggested translation: post-meal. "مضاد حيوي (muḍādũ ḥayawī) translates to "antibiotic," which is accurate and appropriate and aligns well with the intended meaning in a medical context. The study found that machine translation algorithms may misinterpret handwritten medical calligraphy due to readability issues and stylistic variations. As a result, accurate verification and interpretation of handwritten medical documents are critical for maintaining proper communication within medical settings.

Informational signs for departments and services

Example 1: The informational signage is positioned in King Abdullah University Hospital, Irbid, Jordan. The sign guides people to departments on a specific floor, all of which are focused on newborn care. When Google Lens has used to test the way, it would be translated, the following results appeared: Translating the word "delivery" into "توصيل (taẘṣīlu^{n}) in the context of delivering babies appears to be a semantic error (confusion of sense). This discrepancy is most likely caused by the machine translation algorithm's difficulty determining the term's specialized medical context. While "توصيل" is often translated as "delivery" in general, it does not accurately convey the precise meaning of childbirth or delivering babies in the medical field. This error highlights machine translation's difficulties when dealing with medical terminology and specialized contexts. The suggested translation: الولادة.

Food product information

The images below, collected from Miles Market in Mecca Mall, demonstrate information on food products. They illustrate the difficulties encountered by Google Lens due to cultural nuances, which result in semantic errors.

Tahini halva

Example 1: The image above displays a local brand that produces ""حلاوة بطحينية (ḥalāawaẗa^{n} biṭaḥīnīāẗi^{n} (. It is a traditional Middle Eastern sweet made primarily with sesame paste (tahini) and sweeteners like sugar or honey. The translation fails to capture the essence of this food, which may confuse those unfamiliar with Arabic cuisine. Translation of "حلاوة بطحينية" as "flour sweetness" makes a significant semantic error (wrong choice) in communicating the intended meaning. This error demonstrates the limitations of machine translation algorithms, particularly in accurately translating culturally specific terms and food expressions. As a result, users who rely on Google Lens translations may not fully grasp the product being described. To ensure accurate communication across

languages and cultures, translations of food-related terms must consider cultural context and culinary nuances. The suggested translation: Tahini.

Evaporated milk natural cardamom

Example 1: The image above displays a local brand introduced an Evaporated Milk Natural Cardamomelaborated milk with cardamom flavor, "elaborated milk," is similar to "condensed milk." Condensed milk is a type of milk that has had the water removed and sugar added, resulting in a thick, sweetened product. When translating the image via Google Lens, the errors below were obtained: The translations for " (haỷlu^{n}) هيل" as "hill" and ", (murakãzu^{n}) مركز" as "center" have significant errors in conveying their intended meanings. The term "هيل" refers to the spice "cardamom," which is popular in Middle Eastern. When describing milk, "مركز" usually means "condensed," indicating a thicker and sweeter consistency. However, the translation "center" lacks the specificity needed to accurately convey the intended meaning in the context provided. Both translations reflect semantic errors specifically confusion of senses. The suggested translation is cardamom/ condensed. These errors demonstrate the difficulties inherent in machine translation, especially when dealing with specialized vocabulary and cultural nuances. In the world of food, such errors can lead to misunderstandings and misinterpretations of recipes or food products. Therefore, it is critical to exercise warning and rely on human judgment and expertise when translating terms related to specific cuisines or cultural practices, especially when intricate details like ingredients and flavors are involved.

Artichoke

Example 1: The image above depicts a frozen artichoke product, presenting a challenge for accurate interpretation by Google Lens. The translation issue could be due to the limitations of Google Lens' OCR system. The similarity in spelling between "مجمد,) mujamãdu^{n} (it means "frozen" and "Muhammad" (muḥamãdu^{n}) may confuse the OCR algorithm, especially when processing text from images. Because both words have similar visual patterns, the OCR system may struggle to correctly identify and translate the intended term. In this case, the issue most likely lies with the recognition process rather than the translation algorithm itself. Google Lens uses OCR technology to extract text from images, and inaccuracies in this process can result in semantic translation errors (confusion of sense). Improvements to the OCR algorithm, such as better pattern recognition and context

understanding, could help to address these concerns. By improving the OCR capabilities, the system can better differentiate visually. The suggested translation: Frozen.

Maftoul (couscous)

The image above shows a product from the Al Gazal brand that contains "مفتول, (maf̊tūlu^{n}) a traditional Levantine couscous meal known for its cultural significance in the Levant region. However, when translated with Google Lens, the results were not accurate. The error in translating "مفتول" to "wire" is classified as semantic error (wrong choice). This type of error occurs when the source and target texts' meanings do not match. In this case, "مفتول" refers to a couscous- meal, whereas "wire" refers to a completely different object. The error was most likely caused by a lack of understanding of the context that indicate a food type rather than wire which could be correct as a word translation but in another context. This emphasizes the importance of considering the specific domain when translating specialized terms in order to ensure accuracy and relevance in the target language. The suggested translation: couscous (Moroccan food).

Orzo

Example 1: The image above, collected from Miles Supermarket in Mecca Mall, shows a relatively unknown type of food. Unexpectedly, unlike in Example A: Example 17, the translation appears to be accurate and error-free. The translation "لسان عصفور, (lisānu ʿaṣfūri^{n}) to "orzo" appears appropriate and accurate. "Orzo" is a type of pasta that looks like rice grains and is widely used in Mediterranean and Middle Eastern cuisines. The Arabic term "لسان عصفور" means "bird's tongue" and refers to the small size and shape of this pasta, which appears like a bird's tongue. The translation accurately conveys the essence of the pasta type and its characteristics. In this context, the translation appears to be error-free.

Tea products

Example 1: The image above shows a description for a type of tea from the brand (Ahmad Tea), when the image was translated by google lens, the error below was found: The translation “Ahmed green tea analyzed” suggests a semantic error (confusion of sense). It fails to convey the intended meaning correctly. Furthermore, the translation differs from the original message as (ḥal) حلل" often refers to loose or unpacked tea rather than analysis or examination. The suggested translation: unpacked tea.

Medals

Example 1: The image above demonstrates the Miles market label, which specifies the tea brand (Ahmad Tea) and the number of tea bags in the package. However, when translating via Google Lens, an error occurred. When analyzing the translation "100 medals" for the Arabic phrase "١٠٠ ميدالية", (mīdāl̊yaẗu^{n}), the error could be classified as a semantic error (wrong choice). The translation does not accurately convey the intended meaning of the original text. Instead of representing the number of tea bags, as the Arabic phrase intends, the translation conveys a completely different concept related to awards or honors. This variation demonstrates a semantic error in the translation process, in which the machine fails to correctly recognize the context and the meaning of the source text. Such errors could cause confusion and miscommunication The suggested translation:100 teabag.

Sachets

Example 1: The image above, is taken from Miles Supermarket in Mecca Mall, shows an alternative Arabic description for tea bags. Notably, Google Lens appears to handle this translation more accurately than Example A: Example 18. The translation of "كيس, (kīsu^{n}) " as "sachets" appear appropriate in certain contexts. The Arabic term "كيس" literally means "bag" or "sack." In product packaging or descriptions, the term "sachets" usually refers to small packets rather than larger bags or sacks. This translation choice is appropriate for small packets or bags containing a specific product, such as tea, sugar, or spices.

Dairy products

Almarai yogurt

Example 1: The image above illustrates one of Almarai's products, specifically a drinkable yogurt. However, when translating from Arabic to English, critical errors occur. According to Costa et al. (2015), translating the Arabic phrase "لبن شرب" (labanu sẖuřb) as "milk wine" is a semantic error (confusion of sense). The translation does not accurately convey the original text's meaning. The term "لبن شرب" usually refers to "drinking yogurt" or "yogurt for drinking," which is a type of yogurt meant to be consumed as a beverage rather than wine. This error may be caused by the machine translation algorithm's inability to understand the context and cultural nuances associated with the term " لبن شرب." It emphasizes the value of considering contextual factors and cultural references when translating to ensure accurate and meaningful communication. The suggested translation: Drinking yogurt.

Fresh eggs

Example 1: The image above illustrates an Ajyad egg product, highlighting its local and fresh qualities. However, when translated with Google Lens, an error arises as follows: The incorrect translation "my eggs are normal" for "بيض بلدي طبيعي " (buỷḍuⁿbaladīuᴺ ṭabīʿīuᴺ) could be classified as a semantic error) confusion of sense). This error occurs when the translation algorithm fails to accurately capture the intended meaning of "بيض بلدي" as "local eggs" or "farm-fresh eggs" in its proper cultural and regional context. The translation misinterprets the phrase, providing an overall interpretation that contradicts the original meaning. As a result, the error is a consequence of a semantic error in the source text rather than grammatical or structural. The suggested translation: local fresh egg.

Soft ewes, dairy

Example 1: The image above displays a product from the Maha brand, featuring ewe's yogurt and its weight. However, when translated, some errors occurred. The provided translations contain two errors that demonstrate the complexities of translation, particularly when dealing with specific terms or cultural contexts. Semantic errors are evident in the translations of "soft ewes" and "sorrows" for "لبن نعاج" (labanu niʿājiⁿ) and "غم"(gẖarāmuⁿ) respectively, as they fail to accurately convey the intended meanings. "Soft ewes" incorrectly represents "ewe's yogurt," and "sorrows" misinterprets "grams." Semantic errors compound these lexical inaccuracies, as neither translation matches the context of the original Arabic terms. Such errors highlight the importance of taking context, linguistic nuances, and cultural factors into account during the translation process in order to ensure correct and meaningful communication. The suggested translation: ewe's yogurt/ grams

Natural camel milk

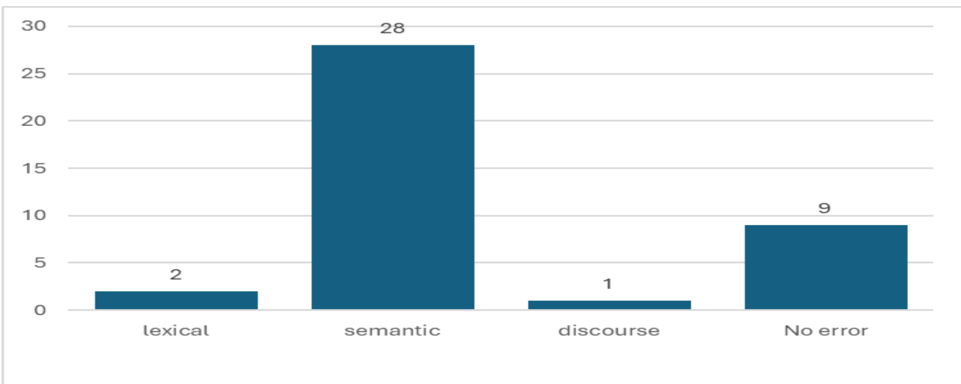
Example 1: The image above, taken from a supermarket, sells camel milk. Unlike the previous example (A: Example 16), which shares some common words, the translation here appears to be accurate and error-free. The Arabic phrase "حليب ابل طبيعي (ḥalību ạub̊lu ṭabīʿīã). " Appears to be correctly translated as "natural camel milk." It clearly states that the product is natural camel milk.

Antique stationary products

Example 1: The image above was taken from the museum of the Roman Theater in Amman. Visitors can view ancient tools used by people in ancient times. Among these historical objects is an ink pot, which Google Lens was unable to identify accurately. The translation "محابر to laboratories" (maḥābiru) is likely due to limitations in Google Lens' OCR system. The term "محابر" means "ink pots" rather than "laboratories," which appears to be a mistranslation. This error could be attributed to the difficulties encountered by OCR algorithms when processing Arabic text, particularly when dealing with complex scripts and fonts that cause a semantic error (confusion of sense). In this case, the problem appears to be with both recognition and translation. The suggested translation: ink pots.

Discourse error

Discourse errors extend beyond grammatical and semantic errors to include a variety of aspects of text coherence and organization. Discourse errors can affect the translation's overall fluency and naturalness and can include issues with style, variety, as well elements that should not be translated. In example number 24 (Dairy product) an error of (should not be translated) was detected there. This part indicates that Google Lens translation succeeds in rendering to some extent English and Arabic expressions. However, various linguistic problems hinder the intelligibility of the translation. The chart below shows the errors revealed by the researcher in the selected data.



The frequency of errors

CONCLUSION

This chapter provides a concise overview of the findings. The chapter emphasizes the constraints of this study and the need for further investigation. The ongoing research has assessed the caliber of Google Lens translation. This thesis examines the merits and drawbacks of Google Lens translation services, as well as the impact of image quality on the overall translation accuracy. The researcher conducted a qualitative analysis of the errors made by Google Lens during imagine translation. The errors were classified according to the categorization system proposed by Costa et al. in (2015). The researcher found that the extracted sentences analyzed by Google Lens were most commonly challenged by semantic errors, lexical errors, and discourse problems. Such errors affect the intelligibility of the output.

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