

ARABIC LINGUISTIC DISCREPANCIES IN TRANSLATION: THE ROLE OF AI PLATFORMS

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Abstract:

There can be no doubt that Arabic, like many other languages spoken in the world, is a language of regional variations with each having its own charm and significance and each displaying a kaleidoscope of linguistic diversity. This paper attempts to highlight the challenges this diversity may present to translators due to the nuanced differences inherent in the Arabic variations, be they syntactic, lexical, phonological or cultural. It also emphasizes the role of AI technology in handling those differences by focusing on some AI models such as Natural language processing (NLP) and Neural Machine Translation (NMT) that help attain more accurate and precise translations. Ultimately, through the analysis of some Arabic variations and the presentation of some AI-driven translation platforms, this study aims to highlight the effectiveness of AI use in improving the quality and reliability of translation from and to Arabic and across various linguistic contexts, with the aim of contributing to the ongoing discourse on the overlap between AI and Arabic translation.

Keywords: Arabic translation, variations, AI models, Natural language processing, Neural Machine Translation.

المخلص:

لا يمكن أن يكون هناك شك في أن اللغة العربية، مثل العديد من اللغات الأخرى المستخدمة في العالم، هي لغة ذات اختلافات إقليمية لكل منها سحرها وأهميتها الخاصة وكل منها يعرض مشهداً من التنوع اللغوي. تحاول هذه الورقة تسليط الضوء على التحديات التي قد يمثلها هذا التنوع للمترجمين بسبب الاختلافات الدقيقة المتأصلة في الاختلافات العربية، سواء كانت نحوية أو معجمية أو صوتية أو ثقافية. كما يؤكد على دور تكنولوجيا الذكاء الاصطناعي في التعامل مع هذه الاختلافات من خلال التركيز على بعض نماذج الذكاء الاصطناعي مثل معالجة اللغة الطبيعية والترجمة الآلية العصبية التي تساعد في تحقيق ترجمات أكثر دقة. أخيراً ومن خلال تحليل بعض الاختلافات العربية وتقديم بعض منصات الترجمة القائمة على الذكاء الاصطناعي، تهدف هذه الدراسة إلى تسليط الضوء على فعالية استخدام الذكاء الاصطناعي في تحسين جودة وموثوقية الترجمة من وإلى اللغة العربية وعبر السياقات اللغوية المختلفة، بهدف المساهمة في الخطاب المستمر حول التداخل بين الذكاء الاصطناعي والترجمة العربية. **الكلمات المفتاحية:** الترجمة العربية، الاختلافات، منصات الترجمة القائمة على الذكاء الاصطناعي، معالجة اللغة الطبيعية، الترجمة الآلية.

Introduction

Arabic, the mother tongue of Arabs, is a Semitic language that is spoken as a native language in more than 25 countries across different geographical regions in the world. It is a language that stands out for its rich cultural legacy and notable linguistic contrasts. From the formal standard Arabic to the different regional dialects that are spoken throughout the Arab world, the variations pay tribute to the prosperous and multidimensional development of the Arabs' history and culture. However, the beauty and the complexity of the language with all its discrepancies present daunting challenges to human translators attempting to translate to and from Arabic.

Background

Arabic covers a wide range of geographical areas, and so does its linguistic landscape. Classical Arabic, the literary and religious script which has its roots in the Qur'anic alphabet, is usually associated with tradition and esteem, especially in the Arab Muslim world, and is the standard official language of education, religious speeches, news and governmental documents. In today's day and age and because of the influence of globalization and technology, it has developed to become Modern Standard Arabic (MSA). MSA is "the written language of contemporary literature, journalism, and "spoken prose". It exists side by side with a great number of regional vernaculars, usually referred to globally as colloquial Arabic" (El-Hassan cited in Ibrahim 2009, p.17)

Beyond its standard form, however, there is a tapestry of Arabic variations that are shaped by historical, geographical and cultural factors. Whether in North Africa, in the Middle East, in the Arabian Peninsula, in Sudan or in any other part of the world, Arab speakers swing between different variations of their mother tongue, formal and colloquial and on different occasions. The colloquial variations, known in Arabic as 'aamiya' (العامية), have their own distinct linguistic features that mirror the rich history and distinctiveness of their speakers, and are spoken lexically and grammatically different from the formal language. Yet it is worth mentioning that "all the dialects derive ultimately from the same ancient Arabic source, but have undergone changes in grammatical structure, vocabulary and so on". Abuata and Al-Omari (2015, p.3)

Therefore, when it comes to translating to and from Arabic, translators will find themselves on the horns of a dilemma, translating either to the standard form of the language or to the colloquial informal dialects. The significant discrepancies between the different variations of the language will most likely intervene in the translation process, leading to serious problems of meaning transmission especially if the translator's first tongue is not Arabic.

In this line of thought, Abdelaziz (2022) states that "the richness and complexity of the Arabic language never fail to leave inexperienced translators confused". Translation, therefore, is a complex task that requires translators to have a full proficiency and mastery of the different dialects of the language as well a sensitivity to their corresponding cultures.

This paper attempts to explore the linguistic discrepancies that Arabic translators may navigate when translating to and from Arabic along with shedding light on the AI-driven platforms and their role in boosting the reliability of translation and in managing Arabic formal and dialectal differences.

1. Embracing Dialectal Variations in Translation for Clear Communication

In order to ensure effective communication across linguistic borders and enhance the authenticity of the translation; translators need to address the dialectal variations of the languages they intend to translate because neglecting them while translating may result in misinterpretation, misunderstanding and even offence. This is mainly because the meaning of a word in a standard language does not necessarily correspond to the meaning of the same word when used in its variations. Definitely, translators do not convey meaning through words only but through the cultural contexts embedded within the words. These cultural contexts may differ from a region to another and hence from a language variation to another, by reason of that considering variations in translation has become crucial to attain accuracy and precision. It is important to remember in this

context that the cultural factor is significant in translation studies and that anyone who aspires to translate from a language to another need to consider it.

1.1. Analysis of Arabic Dialectal Variations

As already pointed out, an array of Arabic dialects exist with linguistic differences on different levels phonological, syntactic, morphological, semantic and even cultural. A translator, then, needs to consider those differences while embarking on the translation journey. The following is an attempt to illustrate some of the disparities existing between some chosen dialects and explain how they may pose challenges to translators.

1.1 .1. Word Order Alternations

Syntactically speaking, Arabic speakers alternate between different word order patterns in Arabic and so do their variations, i.e. within one variation you may find two patterns : the SVO pattern (Subject-verb-Object) or the VSO Pattern (Verb –subject –Object), depending on the context, the purpose and the emphasis the speaker wants to bestow. Still, the dominant word order in many Arabic dialects is overwhelmingly (VSO) while some instances from Classical Arabic may reveal some SVO patterns. This is what Fakih (2016, p.1) confirmed when he stated “what is interesting in SA is that there are two dominant word orders which are commonly used in formal settings and daily life conversations: VSO and SVO”.

Quran, for example, is a reflection of the classical Arabic that exhibits a flexible word order as can be explained in the following verses. The verse (268) in Surah Al-Baqara where Allah says:“al-shaytan ya3idokom alfa9ra” (الشيطان يعدكم الفقر), is a nominal sentence that follows an SVO pattern and is composed of the two parts: al-shaytan refers to the subject “Mubtada?” and the second part “ya3idokom alfaqra” is the predicate “ *khabar* in Arabic”. Therefore,

- al-shaytan (to mean satan) is the subject of the clause
- ya3idokom (to mean promises) is a verb attached to
- a direct object (kom: meaning you), and
- alfaqra (to mean poverty) is an indirect object.

In the verse (14) of Surah al hujurat, Allah says “9alati ala3rabou aamana” (قالت الاعراب آمنا), the VSO pattern is present in which we have:

- qalati(to mean said) is the verb of the sentence
- ala3rabou (to mean the Bedouins) is the subject
- aamana (to mean we believed) is a verb phrase functioning as the object of the clause.

As previously mentioned, these two examples illustrate the alternation in word order in Quran as in any other variation of Arabic. The following table, moreover, demonstrates how the word order of the sentence ‘سافر الولد’: ‘the boy traveled’ varies across the chosen Arabic variations.

Arabic Dialectal Variations	Word order of “The boy traveled”
MSA	سافر الولد “Safara al-waladou” (VS)
Algerian dialect	الولد سافر “Lwled safer” (SV)
Tunisian dialect	الوليد سافر “lewleyed safar) (SV)
Moroccan Dialect	الولد طاف “Lewled taf” (SV)
Levantine Dialect	سافر الولد “Saafar elwalad (VS)
	or

	الولد سافر “elwalad Saafar” (SV)
Gulf Dialect	سافر الولد “elwalad Saafar” (SV)

What can be noticed from the table is that the same English clause ‘the boy traveled’ when translated to Arabic can have two word-order alternations. It takes the VS order in modern standard Arabic and an SV pattern in the dialects listed in the table. An important notice moreover, is that the word *boy* is pronounced differently in Arabic, it is ‘alwalad’ in MSA, ‘lwled’ in Algerian and Moroccan dialects, ‘lewleyed’ in the Tunisian dialect and ‘elwalad’ in Levantine and Gulf dialects. Besides, the verb *traveled* translated as “safara” in Arabic has even become “taf” in the Moroccan dialect which is a different word with a different meaning in the formal language. A two-word structure in English, then, may engender alternations when translated to Arabic and may even have different words with different pronunciation, as was the case with the word boy, which is translated to “*alwalad*” with different pronunciations across the different variations. Mastering the different variations of Arabic then is a prerequisite to overcome translation issues that may pop up from examples as such.

Questions in the Arabic language do not also have a standard pattern, both the type and place of the question words differ from one variation to another. What follows is an example provided by Abdelaziz (2022) in which he compares the different realizations of the question “*what is your name?*” in the dialects he chose.

MSA	Egyptian	Levantine	Yemeni
مَا اسْمُكَ؟	اسْمُكَ إِيَّه؟	شُوْ اسْمُكَ؟	مِسْمُكَ؟
<i>maa ismuk?</i>	<i>ismak eeh?</i>	<i>shuu ismak?</i>	<i>msmak?</i>

What is your name? What is your name? What is your name? What is your name?

words are used at the beginning of the sentence in MSA, in Levantine, and Yemeni dialects. However, in Egyptian, it is used at the beginning of the sentence. He adds that it is also noticeable that both question words and the structure of the question sentences differ depending on the dialects.

In addition to the word order variations, translators may navigate different syntactic challenges while attempting to translate to Arabic such as verb conjugation and agreement, pronoun usage, the use of articles, negation and propositions, which all differ from one variation to another.

1.1.2. Lexical and Meaning Variations

Reflecting the Arabic richness and depth of meaning across different linguistic boundaries, Arabic dialects exhibit several lexical and semantic variations. The English phrase “my car”, as an example, can be interpreted to:

- “Tonobilty” طونوبيلتي in the Algerian dialect (a loan from the French word: automobile)
- “Karhebty” (كرهبتي) in the Tunisian dialect.

- “Lotto dyali” (اللوطو ديالي) in the Moroccan dialect.
- “3arabity” (عربييتي) in the Egyptian dialect
- “Sayarti” (سيارتي) in the Levantine and Gulf dialects and
- “Sayarati (سيارتي) in MSA (with a different pronunciation from the Levantine and Gulf dialects)

Considering the grammatical aspect of possession, the possessive adjective “my” is translated to the bound morpheme “ty” in the Algerian, Tunisian, Egyptian, Gulf and Levantine dialects, which align with the MSA pronoun of possession “ty”. Another way of expressing the same function is by adding the free morpheme “dyali” in the Moroccan dialect, a morpheme that can also be used in some regions of Algeria.

What is more important to add, however, about the lexical variations is that the word sayara سيارة in MSA may denote several meanings. The Egyptian “araba”(عربية), for instance, does not only refer to the four wheeled car used for transportation , but also refers to the baby stroller. Besides, the standard word سيارة “sayara” may also refer to people who walk on their feet , not necessarily using a car, and comes from the verb يسير, سار (to walk).

A good example about the use of the word “سيارة” is in surah Yousef (verse 10) where Allah says " قال قائل منهم لا تقتلوا يوسف وألقوه في غيابة الجب يلتقطه بعض السيارة إن كنتم فاعلين " , which is interpreted as: “one of them said do not kill Joseph and throw him in the pit while he is gone and the group of people who are travelling by road will collect him”. Therefore, the word ‘السيارة: sayara’ in this context is interpreted to a group of people traveling by road while it may also mean “car” in another context.

Thus, what adds to the richness and complexity of the Arabic variations is the notion of polysemy and homonymy, many words in Arabic as in many other languages carry multiple meanings and these meanings do not relate across the variations especially that words are carriers of multiple cultural meanings.

Like in any other language, misinterpretation may arise when translating to and from Arabic and translators need to be cautious about the different factors that may affect meaning, especially those related to pronunciation and culture.

1.1.3. Phonological Variations

Speaking of different regions implies speaking of different accents and Arabic is renowned for its rich phonological variations. The regional, historical and cultural factors shaped the phonological diversity across the Arabic linguistic landscape. In fact, the Arabic variations encompass various pronunciations of vowels and consonants, in addition to the different stress patterns and the assimilation of sounds, which all contribute to the diversity and complexity of the Arabic language. Examples of the phonological variations in Arabic include:

- The pronunciation of some consonants such as the quaf “ق” varies across regions. It is pronounced as a voiceless soft ‘k’ in both the Maghrebi and the Levantine dialect and as a voiced uvular hard /g/ in the Gulf Arabic and in the North African Arabic in certain contexts. The same consonant is expressed as a glottalized voiced velar plosive in the Egyptian dialect, it is expressed as “hamzah”, for example in the word “قهوة” read /ahwa/ ‘coffee’. Mufrodi in Zawawi(2023, p.17)
- The length of vowels can also vary throughout the regional variations. Length which is a “perceptual attribute that leads to the perception of a speech sound” (Almisreb et al., 2015,

p.2) affects word pronunciation and meaning likewise. If the Arabic speaker, for instance, pronounces the vowel /a/ as /aa/ in some words, he may want to emphasize something. In the example of “the boy traveled”, explained previously, it has been shown how the verb traveled is pronounced with a long /aa/ in “Saafar” in the gulf and Levantine dialects, and with a short /a/ “safar”, in the North African dialects.

- Assimilation is another phonological aspect that characterizes the Arabic spoken variations and that may lead to misapprehension of the speech sounds and confusion for the listener who wants to transcribe the sounds into words. It is defined as “the influence exercised by one sound segment upon the articulation of another, so that the sounds become more alike or identical in terms of one or more of its phonetic characteristics (Crystal cited in Abumathkour (2009,1). These sounds are usually neighbors. In fact, assimilation is one of the commonest phonological aspects of Arabic variations. A foreign listener who hears the Arabic sounds “assabir” for “the patient” may transcribe them to “اصابر” (assabir), which is not accurate as the target word is “الصابر” (alsabir). A similar example would be in the word “a جـ-جـ اري” الشارع in Arabic (street in English) when the definite article “ال” assimilates with the ج sound to become “aj” and not “al”, therefore adding to the complexity of meaning and interpretation. Many more nasal assimilations exist in Arabic and may cause misinterpretation especially to foreign tongues.

1.1.4. Cultural Variations

In addition to the previously stated variations that the Arabic dialects exhibit, translators need to deal with some more cultural variations and challenges. Despite the fact that the Arab speakers speak the same tongue with some linguistic variations, the geographical and historical aspects have implanted diverse cultures in them. The cultural variations encompass some aspects like religion, family structure, social etiquette, cuisine, music, clothing, etc. On this account, translators must not only focus on the literal meaning of the language they translate but also on the cultural implications of the variations in order to ensure an accurate and appropriate transmission of meaning. Islamic holiday’s celebrations, to give an example, are associated with various religious and social practices throughout the different Islamic regions and are not shared with the foreign cultures. A foreign translator may not find the appropriate expressions that correlate with the target occasions.

In this context, we considered sharing the researchers’ anecdotal experience, being an Algerian who, for the first time in 2012, traveled to Jordan. The Jordanians speak the Levantine dialect which is known for its linguistic and cultural traits that significantly differ from those of the Algerian dialect. What happened was that a waiter in a restaurant uttered the phrase /khaliha 3alina/ خليها علينا, when it was time to pay the bill. For an Algerian, who is unfamiliar with the Jordanian culture, the only possible interpretation of that phrase would be “the bill is on us”. The surprise felt at that instant was magnified when the waiter disclosed the order’s cost as it turned out to be merely a way of expression and not a proposal to settle anyone’s bill.

2. Towards an AI-based Translation

The linguistic and cultural differences, which have been discussed in the previous sections, pose significant challenges to translators who usually struggle to provide exact and culturally appropriate translations. Technology continues to offer booming materials that help them meet those challenges by proposing advanced platforms and models for managing Arabic variations effectively.

Using AI-driven sources and platforms may enable translators to come up with eminent translations that convince a large Arabic speaking audience, irrespective of their linguistic or even cultural backgrounds. AI technology enables the access to an abundant amount of Arabic dialectal variations with the different disparities that they exhibit and that have been discussed earlier, due to the special and sophisticated algorithms and language models that are trained on comprehensive corpora to target the different linguistic, cultural and regional subtleties.

3.1. AI –Driven translation Models

The introduction of Artificial intelligence (AI) to the field of information science has brought forth a revolutionary shift in the way people live, think, study and work. The realm of language and translation has also witnessed a qualitative leap because of the advent in AI as it has become an indispensable tool, which broke down the traditional translation barriers and oiled the path towards a seamless global communication.

With regard to Arabic, Artificial Intelligence provides several platforms and models that are powered by machine learning and deep learning and that are capable to account for the richness and the complexities of the Arabic variations and consequently deliver high quality translations. Among these models, one can mention Neural Machine Translation (NMT) and Natural Language Processing (NLP).

3.1.1. Neural Machine Translation (NMT)

A pioneering model that extends the potentialities of artificial intelligence in processing and generating language is the Neural Machine Translation (NMT). Baniata et al. (2018, p.5) believe that “NMT has lately been introduced as a promising methodology with the potential of handling the shortcoming of traditional statistical machine translation systems”. If well trained, the model is capable of dealing “with the morphological, semantic, syntactic and different types of linguistic complexities that often pose difficulty” Baniata et al. (2018, p.2).

The NMT model, in some instances, can be “a data hungry technology (that) suffers from the lack of bilingual data in low-resource scenarios.” Zaremoodi & Haffari,(2019). That is why it sometimes depends on deep learning techniques such as the neural networks to provide instant and improved translation quality. Concerning the different Arabic variations, the model can be trained to handle different linguistic and cultural nuances existing between the dialects by integrating different corpora from MSA and the target dialects. Therefore, in order to ensure accurate translation, language trainers need to expose the model to sufficient training data that covers a wide range of Arabic variations.

3.1.2. Natural Language Processing (NLP)

A widely recognized method in the field of language analysis and interpretation is the Natural Language Processing. It is the realm where artificial intelligence and human language interact to process, analyze and produce language. It is defined as “the machine’s ability to identify process, understand and/or generate information in written and spoken human communications” (Samoili et al, p.25 2020).

It is worth noting that Arabic NLP applications need to consider the specific features and intricacies of the Arabic language because if an NLP system does not consider them, then it would be inadequate and likely to yield inaccurate results. Therefore, in order to accomplish human-like language processing, generation, production and even translation, the NLP machine must be trained

upon a variety of tasks ranging from text generation, natural language comprehension, sentiment analysis, question answering, machine translation, etc. These tasks are more likely to empower the machine's capacity to handle a wide range of languages and varieties across different contexts in an accurate and fluent way. The section entitled Multi-Task Learning will explain how the machines can be trained to deal with different languages and their varieties.

3.1.2.1. Multi-Task Learning

Multi-Task Learning refers to “a single shared machine learning model that can perform multiple different (albeit related) tasks” Kandu (2022). The majority of AI platforms are designed to perform single tasks. However, Multi-Task Learning (MTL) aims to learn tasks together to improve the learning of a model for each task by using the knowledge contained in all or some of other tasks” Zhang & Yang (2022, p.2).

For a robust and adaptable translation across different dialects and languages, and because of the previously mentioned reasons, the NMT model can be injected with the MTL technique. This technique enhances the model's strength to capture the nuances existing between the varieties of a language as it provides it with a large linguistic diversity.

As the name implies, the MTL enables the translation model to perform multiple tasks at the same time. Therefore, instead of dealing with individual tasks of translation for instance, the MTL integrates several tasks that are interrelated in order to avoid the pitfalls of the isolated training techniques. The purpose of training the model with this technique is to ensure a high quality translation between many language variations while considering their linguistic, regional and cultural variations, in a way that plausibly emulates the human brain functioning, as the brain is able to perform multiple tasks at a time.

An important feature that is worth mentioning about MTL is that it facilitates information transfer between tasks and thus allows the model to use the knowledge learnt from one task and use it for the decoding of another. Like in real life, the human tries to involve all the knowledge and life experiences to handle a difficult new problem that is related in a way or another to a déjà vu one.

A task that best illustrates the multi-task learning technique is the identification of the language type present in the given input, be it the standard language (MSA or any other variation viz Levantine, Egyptian, Maghrebi. The task also trains the model how to recognize instances of code switching or borrowing in the languages. Once trained, the model will generalize the results to other tasks and to further input, besides language identification can be joined to another language-processing task, which is sentiment analysis. Sentiment analysis refers to the analysis of the emotions associated to the language, either positive, negative or even neutral. The model can function by identifying the sentiment of the language and recognizing the type of the language at the same time, as it can start by recognizing the type and the accompanying sentiment simultaneously.

By combining different tasks, the model will be able to share the information it learnt about the languages across similar or even different related tasks. More importantly, the neural translation machine will acquire a thorough knowledge and understanding of the features of the various dialects and languages, the fact that will ultimately generate better translation results.

3. Recommendations

While NLP and NTM continue to prove their effectiveness in accounting for the difficulties of translating the different variations of the Arabic language; it is justifiable to say that these models may have troubles capturing the infinite nuances existing between the dialectal variations of the language spoken across the different Arabic-speaking regions, especially in cases where the AI models may have limited ability to properly understand contextual variations.

For that reason, it is advisable to involve the human expertise in the translation process. By inviting Arab native speakers, who are aware of the different applications of the Arabic variations, to edit and refine the translated output while considering the dialects' cultural features; an accurate and robust translation is more likely to originate. Besides, linguists, Arab native speakers and NLP experts may collaborate to attain a notable level of translation's robustness and accuracy. The union of the human creativity with the AI models can then create infinite opportunities of communication and help establish a global society where linguistic barriers no more exist.

Conclusion

In order to shed light on the complexities of Arabic dialectal variations, this paper addressed some syntactic, lexical, phonological and cultural intricacies among the Arabic dialects and how they may pose challenges to human translators. By exploring AI-driven translation, mainly NMT and NLP, this research reveals the role of machine translation in boosting the quality of interpretation and in enhancing cultural comprehension and communication across different linguistic boundaries.

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