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## Translation Challenges of the Qur'an and Opportunities of integrating AI Automation

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### Abstract

Despite the growing number of English translations of the Qur'an, persistent linguistic, semantic, rhetorical, and theological challenges continue to limit accurate comprehension for non-Arabic readers. Existing studies largely address these challenges descriptively or through comparative translation analysis, yet they seldom explore how recent advances in Artificial Intelligence (AI), particularly reasoning-based Large Language Models (LLMs), can systematically respond to the multidimensional complexity of Qur'anic language. This **gap** becomes critical in light of semantic shifts, polysemy, phonological symbolism, rhetorical devices, and doctrinal diversity that conventional translation methods struggle to accommodate. This study employs a **qualitative-analytical approach** grounded in Qur'anic linguistics, translation studies, and computational linguistics. It critically examines representative examples from English Qur'an translations to identify recurrent translation challenges, including lexical asymmetry, rhetorical loss, semantic ambiguity, and theological bias. Building on these findings, the paper proposes a conceptual AI framework that integrates multimodal embeddings, knowledge graphs, Qur'anic phonology, classical exegesis, theological schools, and historical context (Asbāb al-Nuzūl), supported by explainable and anti-hallucination AI mechanisms. The **results** demonstrate that AI-assisted frameworks, when guided by authoritative Islamic knowledge sources and transparent reasoning models, have the potential to significantly enhance translation accuracy, semantic depth, and rhetorical sensitivity. Rather than replacing human scholarship, AI is positioned as an augmentative tool that bridges linguistic gaps while preserving interpretive plurality. The international **impact** of this research lies in its contribution to global Qur'anic studies, interfaith understanding, and ethical AI development. By proposing a multidisciplinary, culturally sensitive AI model, this study offers a scalable pathway for improving Qur'an translation, interpretation, and accessibility for diverse global audiences.

**Keywords:** Digital Humanities; Religious Text Translation; AI Ethics; Cross-Linguistic Semantics; Qur'anic Studies

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## Introduction

Translation between languages is known to be a complex task due to cross-languages differences and intra-language variation over time, cultural diversity, etc. This is truer for the Qur'an as a holy book with unique rhetoric where words have meanings of unique and positive effect on both physical and mental state [1]. Additionally the Qur'an is not a normal text [2]. A foundational knowledge from multiple sources is needed to be able to have a comprehensive understanding of the meanings of its verses. Among these sources are:

- The Arabic language fields including the morphology (Sarf - صَرْف), the grammar (Nahw - نَحْو), the rhetoric (Balaagha - بَلَاغَة) as well as the field of the historical and contemporary usage of the Arabic, including the variations in dialects used by the Arab tribes at the time of the revelation.
- The historical and contextual background of the verses called "The Reasons for Revelation" or Asbab al-Nuzul in Arabic (أسباب النزول) which is a branch of the Qur'an sciences.

A lot of different translations exist from different authors and originated in different countries. Some are old. Yusuf Ali translation was published in 1938. Others are more recent like the Clear Qur'an by Dr Mustafa Khattab, the one made by Dr. Muhammad Taqi-ud-Din Al-Hilali and Dr. Muhammad Muhsin Khan, the majestic Qur'an by Musharraf Hussain, Saheeh international authored by three American women, Umm Muhammad (Emily Assami), Mary Kennedy, and Amatullah Bantley. Many other translations to English exist and it is not the objective of this note to enumerate all of them [3]. These efforts should continue to improve the quality of the translation in order to allow the non-Arabic speaking reader to have a pleasurable flow and enjoyable feeling closer to the ones that spark from the original text.

Note that Qur'an translation can be biased and manipulated to serve the Islam refutation agenda. An example is the first Latin translation that was completed in 1143 by the English theologian Robert of Ketton, known as Robertus Ketenensis [4]. The hateful title of this translation is: "Lex Mahumet pseudoprophete" meaning "the law of the false prophet Mahomet" [5]. This partial translation mistrustfully influenced the orientalism and vastly contributed to the negative perception of Islam in western countries.

Note that the examples provided in this paper are only for illustration purpose. The main contribution of this paper is to argue that the recent development in AI technologies can potentially contribute to improve the quality of the Qur'an translation and interpretation if it is done properly [6]. The

comparison of different translations is not in the scope of this paper. The examples are provided to illustrate what are the challenges that arise in Qur'an translation.

## Method

This study employs a qualitative conceptual-analytical methodology that integrates Qur'anic studies, translation studies, and computational linguistics [7]. The research is not designed as an experimental AI implementation but as a theoretical and analytical inquiry aimed at identifying core translation challenges of the Qur'an and proposing an AI-based framework capable of addressing those challenges in a systematic and academically grounded manner.

The primary data consist of selected Qur'anic verses that represent recurrent linguistic and interpretive difficulties, including polysemy, semantic shift, rhetorical devices, phonological symbolism, and theological ambiguity. These verses are examined alongside authoritative English Qur'an translations produced across different historical periods and theological orientations, enabling a comparative understanding of how meaning variation and loss occur in translation.

The analytical process is guided by established disciplines within Qur'anic linguistics, particularly morphology (*ṣarf*), syntax (*naḥw*), rhetoric (*balāghah*), semantics, and phonology, as well as supporting sciences such as *Asbāb al-Nuzūl*, *Qirā'āt*, and classical *tafsīr* traditions [8]. This multi-layered linguistic analysis allows the study to contextualize translation challenges within their original textual, historical, and theological frameworks.

Building on the linguistic findings, the study adopts a theoretical modeling approach to examine the potential of recent advances in Artificial Intelligence, especially reasoning-based Large Language Models (LLMs) and multimodal embeddings [9]. Relevant AI literature is reviewed to map current model capabilities and limitations against the identified Qur'anic translation challenges, forming the basis for the proposed AI-assisted framework.

Finally, the proposed framework is evaluated conceptually using qualitative criteria such as semantic fidelity, rhetorical sensitivity, theological neutrality, and explainability, complemented by reference to established AI evaluation metrics (e.g., BLEU, ROUGE-L, METEOR, and BERTScore). Ethical considerations, including bias mitigation and hallucination control, are incorporated to ensure that the framework aligns with both scholarly rigor and the sanctity of the Qur'anic text.

## Result and Discussion

### Annex: English Translations of the Qur'an

This Annex is provided to present a selected list of English translations of the Qur'an that are widely referenced in academic research, particularly in the fields of Qur'anic studies, tafsir, linguistics, and contemporary Islamic studies. These translations reflect sustained scholarly efforts to convey the meanings of the Qur'anic text to a global readership beyond the Arabic-speaking world [10]. The translations listed here represent both classical and contemporary works, produced within diverse theological, linguistic, and methodological frameworks. Such diversity inevitably influences lexical choices, interpretive nuances, and translation strategies, making it essential for researchers to be aware of the specific translation sources employed in their analyses.

It should be emphasized that this list is not exhaustive, nor does it claim to represent all available English translations of the Qur'an. Rather, it is intended as a representative and accessible reference for commonly cited translations, particularly those available through reliable online platforms [11]. Readers and researchers are encouraged to consult additional translations where relevant to their research objectives and analytical frameworks [12]. By including this Annex, the study aims to enhance transparency regarding the Qur'anic translation sources referenced, while supporting methodological clarity, scholarly rigor, and reproducibility in research involving English renderings of the Qur'an. This list is not exhaustive.

**Table 1.** Primary English Qur'anic Translation References

	Qur'an Translation	Reference
1	A. Yusuf Ali Qur'an Translation 1937	<a href="https://Quranyusufali.com/">https://Quranyusufali.com/</a>
2	The Meaning of the Glorious Koran Muhammad Marmaduke Pickthall	<a href="https://sacred-texts.com/isl/pick/index.htm">https://sacred-texts.com/isl/pick/index.htm</a>
3	The Noble Qur'an Muhammad Muhsin Khan and Muhammad Taqi-ud-Din al-Hilali	<a href="https://thenobleQuran.com">https://thenobleQuran.com</a>
4	Saheeh International Translation Umm Muhammad (Emily Assami), Mary Kennedy, and Amatullah Bantley, 1997	<a href="https://Quran.islamonline.net">https://Quran.islamonline.net</a>
5	The Clear Qur'an	<a href="https://theclearQuran.org/">https://theclearQuran.org/</a>

6	Translation of the Meanings of the Noble Qur'an - English Translation - Noor International Center	<a href="https://Quranenc.com/en/browse/english_saheeh">https://Quranenc.com/en/browse/english_saheeh</a>
7	The Majestic Qur'an Dr Musharraf Hussain, 2021	<a href="https://www.majesticQuran.co.uk/">https://www.majesticQuran.co.uk/</a>

## Arabic vocabulary

The Arabic language is one of the richest languages in the world in terms of vocabulary with more than 12 million words. This number is compared to 600,000 words in the English language.



Figure 1. Comparative Vocabulary Richness between Arabic and English

This means it is not possible to have a one-to-one mapping between Arabic vocabulary and English vocabulary. This leads to a potential loss of meaning of the translated text from Arabic to English. This issue is very frequent in Qur'an translation from Arabic to English [13]. For example, the "Basmala" "بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ" is a common sentence in Qur'an, meaning supplication for God's mercy. It's recited at the beginning of each verse, with the exception of the 9<sup>th</sup> chapter At-Tawbah because it deals with the topic of war and punishment, which may not be suitable to begin with the invocation of mercy [14]. It is also part of the Qur'an in the 27<sup>th</sup> chapter An-Naml (النمل), Ayah 30 "إِنَّهُ مِنْ سُلَيْمَانَ وَإِنَّهُ بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ", translated to "Indeed, it is from Solomon, and indeed, it is [i.e., reads]: 'In the name of Allāh, the Entirely Merciful, the Especially Merciful'" [6]. It is also frequently used at the beginning of multiple ordinary activities such as starting a speech. Below some of its translation to English:

- In the name of Allāh, the Entirely Merciful, the Especially Merciful [from 4 & 6]
- In the name of Allah, the Kind, the Caring (The Majestic Qur'an) [from 7]
- In the name of Allāh, the Most Beneficent, the Most Merciful [from 3]

Another example is that both Arabic words of “القبور” and “الاجداث” translate to English as tombs or grave. In the Qur'an the word “القبور” is associated with a state of stillness and tranquility while “الاجداث” is associated with a dynamic state of resurrection that comprises all who die including those not buried in a traditional grave [15]. Similar situation occurs between the words “المودة” and “البر” that are both used in the Qur'an [16]. They look to be synonyms when they are translated to English, but there is an underlying semantic difference [17]. Affection (المودة) has a wholeheartedly component, and righteousness “البر” is only doing good to others regardless of love or hatred.

Further instance is the spelling and its relation to the symbolic and nuanced meaning within the Qur'an text. For example “Ta” in Arabic can be open or closed. Rahma can ends with a closed Ta (رحمة) and represents potential mercy that is not yet fully revealed while (رحمت) with open Ta connotes a fulfilled mercy [18]. The difference in meaning is not shown in the word by word translation where both formats are translated to “Mercy” as shown in the example below.

From the 7<sup>th</sup> chapter Al-Arāf, Ayah 56: “وَلَا تُفْسِدُوا فِي الْأَرْضِ بَعْدَ إِصْلَاحِهَا وَادْعُوهُ “خَوْفًا وَطَمَعًا إِنَّ رَحْمَتَ اللَّهِ قَرِيبٌ مِّنَ الْمُحْسِنِينَ”, this verse is translated in Saheeh International by: “And cause not corruption upon the earth after its reformation. And invoke Him in fear and aspiration. Indeed, the mercy of Allāh is near to the doers of good”. From the fourth chapter An-Nisā', Ayah 96: “دَرَجَاتٍ مِّنْهُ وَمَغْفِرَةً وَرَحْمَةً وَكَانَ اللَّهُ “غَفُورًا رَّحِيمًا”, this verse is translated in Saheeh International by: “Degrees [of high position] from Him and forgiveness and mercy. And Allāh is ever Forgiving and Merciful [19].” Another example is “نعمت” vs “نعمة”. The one with open “Ta” indicates specific blessings while the closed one symbolizes general blessings.

## Arabic Language Evolution

Natural languages have lifecycles. They lose and add features over time. In particular, they experience the semantic shift phenomena due to the evolution of words usage through space and time. The translation of an old text should take into account the semantic change over time [20]. This task is even more complex in the context of the Qur'an since the Qur'an was revealed 14 centuries ago [21]. Qur'an was revealed in the Arabic language and some meanings and words have become strange and rarely used by contemporary generations. This makes its

understanding sometimes challenging even for native Arabic speakers. The semantic shift of the Qur'an words is well documented, especially with a focus on the difference in the meanings of some words in the Qur'an between pre-Islamic and Islamic times [22]. The most important initiative in this regards is the project of the historical semantic encyclopedia of the words of the Holy Qur'an in Turkey [23]. This project, funded by the Turkish government, is led by Dr. Şehmus Demir, along with nearly four hundred researchers [24]. They list more than 1,700 word roots mentioned in the Holy Qur'an, and list their full meanings in all Semitic languages, if they exist in them. Examples of the semantic shift cases extracted from talks in social media by Dr Şehmus Demir are:

- In the chapter Masad (Arabic text: *المَسَد*), the 111<sup>th</sup> chapter of the Qur'an, "حمالة الحطب" in Ayah 4 is an Arabic phrase that directly translates to "the one who carries wood". The figurative meaning is being gossip, hate monger and stirring up trouble among people. This meaning is the most appropriate since the expression "حمل الحطب" was used in the pre-Islamic Arabia to symbolize the spreading of misinformation, negativity and discord, much like carrying firewood to ignite a fire. The carrier of spreading misinformation out might be more appropriate to today's readers [25]. Unfortunately some translations carry the word by word translation like in Yusuf Ali translation where Ayah 4 "وَأَمْرَأَتُهُ حَمَّالَةَ الْحَطَبِ" is translated to "His wife shall carry The (crackling) wood As fuel!"
- Zakat is a mandatory act of charity and one of the five pillars of Islam. The word Zakat, not only it connotes a form of obligatory charity in Islam but it means also increase and growth as this word was understood in the pre-Islamic Arabia [26]. The Islam adds to this meaning the notion of "تزكية" that can be translated to purification. Unfortunately this word is now perceived as a 2.5% Islamic tax rate by most Muslims.
- The Arabic word taqwa "التقوى" can be translated to piety or righteousness. Its meaning in the pre-Islamic Arabia is "Stay away from destruction". In the Qur'an it means "Staying away from worldly and otherworldly destruction". So its meaning became much broader
- In the 56<sup>th</sup> chapter Al-Muddaththir (المُدَّثِّر) that means "The cloaked one", the Ayah 6 "وَلَا تَمُنُّنْ نَسْتَكْتَرُ" is translated to "And do not confer favor to acquire more" [6] meaning: Don't give to get more reward than you gave. This translation is accurate in the Qur'an context. In pre-Islamic times, "تَمُنُّنْ" means reminding people of favors and used as an act of boasting and bragging.

Another recent reference worth to mention is the book "[هويات قرآنية](#)" that stands for "Qur'an identities" by Dr Abdul Rahman Chamseddine. This work,

published in 2023, provides a thorough historical analysis of key terms in the Qur'an.

It is a fact that the Arabic language has an extraordinary capability to evolve thanks to its vocabulary and extension capabilities. This is a good thing to be able to cope with new objects (e.g. car) or new concepts (e.g. globalization). The issue is that this capability can also restrict the meaning of certain words that may impact negatively the Qur'an understanding even for native Arabic speakers [27]. This is mainly true when the words or the expressions experienced semantic shift. Also the Arabic is practically only spoken through various dialects, very often mixed with western languages [28]. This is to say that an effort should be made for people with Arabic as mother tongue to cope with the linguistic issues they face when dealing with the Qur'an understanding.

### Arabic Rhetoric

Translation as rhetorical act is a sophisticated task since it aims at using strategies to make the translation not just correct but also effective, meaningful and impactful. The challenges are multiple due to linguistic and cultural differences [29]. They may result in a loss of meaning and rhetorical effect. For example, in the Qur'an, the past tense form is used to indicate that the associated future event is certain to occur [30]. This rhetorical device of talking about a future event like resurrection using the past tense is more impactful [31]. This is called the assurance of realization or "تحقق الوقوع" in Arabic rhetoric. This can be seen in the 39<sup>th</sup> chapter Az-Zumar or the Groups, Ayah 68 " وَنُفِخَ فِي الصُّورِ فَصَعِقَ مَنْ فِي السَّمَاوَاتِ وَمَنْ فِي الْأَرْضِ إِلَّا مَنْ شَاءَ اللَّهُ ثُمَّ نُفِخَ فِيهِ أُخْرَىٰ فَإِذَا هُمْ قِيَامٌ يَنْظُرُونَ ". The past sentence is used for the action of blowing the horn "نُفِخَ". This doesn't mean that the action occurred in the past but it connotes its certainty of happening in the future. In this case translations to English use the future tense.

Another example is the swearing format used in the Qur'an. The swearing comes always with the negation "لا" or "No" as a way to emphasize the object of the swearing [32]. This way of swearing is an act of praise and honoring. This is illustrated in the 90<sup>th</sup> chapter Al-Balad, The City, Ayah 1 "لَا أَقْسِمُ بِهَذَا الْبَلَدِ", translated in Saheeh International to "I swear by this city, Makkah". The translation doesn't reflect this rhetorical fact.

Another aspect is that the translation should use respectful words when these words are linked to Allah SWT. For example, the phrase "غَيْرِ الْمَغْضُوبِ عَلَيْهِمْ" in the last verse of the opening of the Qur'an, is translated in Saheeh International [4] as "Not of those who have earned Your anger or of those who are astray [33]." The use of the word "anger" is not appropriate in this translation as it is a human and physical emotion manifested by abrupt reaction and sometimes with a desire to retaliate [34]. Condemnation or Indignation is more

appropriate as its scope involves violation of moral principles. This is conveyed by the translation in the Majestic Qur'an [7] "not those who are condemned nor the misguided ones".

### Polysemous words

Polysemous words are words that can carry multiple meanings. The spatio-temporal context needs to be taken into account to choose the right interpretation. The issue here is even an average native Arabic speaker will not contextualize the word meaning and choose the right interpretation. As an example, the word "الْخَيْرِ" in Ayah 8 of the 100<sup>th</sup> chapter Al-Adiyat "وَأِنَّهُ", "الْعَدِيَّتِ", "لِخَيْرٍ لَشَدِيدٍ", is translated to "And indeed he is, in love of wealth, intense". An average Arabic speaker (at least from North Africa) would interpret the word "الْخَيْرِ" by good deeds instead of its other meaning of a lot of wealth. Another similar case is in the second chapter AL Baqara Ayah 180:

"كُتِبَ عَلَيْكُمْ إِذَا حَضَرَ أَحَدَكُمُ الْمَوْتُ إِنْ تَرَكَ خَيْرًا الْوَصِيَّةَ لِلْوَالِدَيْنِ وَالْأَقْرَبِينَ بِالْمَعْرُوفِ حَقًّا عَلَى الْمُتَّقِينَ", which is translated to "Prescribed for you when death approaches [any] one of you if he leaves wealth [is that he should make] a bequest for the parents and near relatives according to what is acceptable - a duty upon the righteous". Another example is in the 101<sup>st</sup> chapter Al-Qariah (القارعة) or "Calamity". The Ayah 10 "فَأُمُّهُ هَاوِيَةٌ" is properly translated to "His refuge will be an abyss. The word "أم" means most of the time "mother" and it has other meanings [35]. In the context of this Ayah it means refuge. This meaning is obvious given the context since the Ayah 12 "نَارٌ حَامِيَةٌ" that is translated to "It is a Fire, intensely hot". Unfortunately in this case most average native Arabic speakers will misinterpret the Ayah 10 with the common use of "أم" as mother.

Chapter A-Tariq (الطارق) is the 86<sup>th</sup> chapter of the Qur'an. The chapter title in English in most of the translations are "The Night-comer", "The Night Star", "The Bright Star", "The Morning Star" reflecting its several meanings in the Arabic language. However, the literal translation is "Knocker" or "Striker". This meaning stems from the Arabic root "taraqa" (طَرَقَ), which means "to knock" or "to strike". This translation seems to be more reasonable in this case since it is described in Ayah 3 as "النَّجْمِ الثَّاقِبِ" which means "The Piercing Star" or "The Bright Star". It indicates that this star emits a penetrating light through the sky. Note that this might refer to the pulsar stars that emit electromagnetic waves which when being frequency modulated as sound to be listenable to human ears, they demonstrate the knocking effect. In this case the context of modern science seems more appropriate to select the right interpretation and translation from Arabic [36]. Note that there is a knowledge field related to the scientific miracles in the Qur'an.

Regarding the particle kalla “كلا” in the Qur’an, it has several meanings depending on the context and can be recognized through punctuation marks. The most common usage is reprimand and repulsion. Other meanings are:

- Strong denial/repudiation ("never," "by no means," "definitely not", "no way", or "absolutely not"),
- Affirmation/assertion (usually when followed by an oath: "yes, truly", "absolutely", or "certainly")
- Warning/persuasion (used to highlight and intensify a statement for alert purpose)

Another example is the word light “نور” that is frequently used in the Qur’an. It has multiple meanings beyond the physical one of “light”. The physical meaning of light is in 10<sup>th</sup> chapter Yunus Ayah 5 “هُوَ الَّذِي جَعَلَ الشَّمْسَ ضِيَاءً وَالْقَمَرَ نُورًا ” وَقَدَرَهُ مَنَازِلَ لِتَعْلَمُوا عَدَدَ السِّنِينَ وَالْحِسَابَ مَا خَلَقَ اللَّهُ ذَلِكَ إِلَّا بِالْحَقِّ يُفَصِّلُ الْآيَاتِ لِقَوْمٍ يَعْلَمُونَ”. This ayah is translated in Saheeh International [4] to “It is He who made the sun a shining light and the moon a derived light and determined for it phases – that you may know the number of years and account [of time]. Allah has not created this except in truth. He details the signs for a people who know”. In The Noble Qur’an [3], it is translated to “It is He Who made the sun a shining thing and the moon as a light and measured out its (their) stages, that you might know the number of years and the reckoning. Allah did not create this but in truth. He explains the Ayah (proofs, evidences, verses, lessons, signs, revelations, etc.) in detail for people who have knowledge.” In the Majestic Qur’an [7], it is translated to “He gave the sun (its) radiant glow and the moon its light, He determined their phases precisely, so you might calculate the (passing) years and keep time. Allah created (this) for a purpose; so people of knowledge can understand the signs (of creation)”. The reason of discrepancies in these translations is that there is no one-to-one equivalence from Arabic to English of “ضياء” and “نور”. “ضياء” is light emitted directly from its source in the sense that the body is self luminous. “نور” is the light reflected from a source. The other meanings are:

- Islam and Iman or faith described in the Qur’an as a light that brings believer out of the darkness of disbelief into the light of guidance.
- Qur’an and divine guidance (Hidaya - الهداية) as in the 4<sup>th</sup> Chapter An-Nisa Ayah 174 “يَأْتِيهَا النَّاسُ قَدْ جَاءَكُمْ بُرْهَانٌ مِّن رَّبِّكُمْ وَأَنْزَلْنَا إِلَيْكُمْ نُورًا مُّبِينًا”. This verse is translated in Saheeh International [4] to “O mankind, there has come to you a conclusive proof from your Lord, and We have sent down to you a clear light”. In The Majestic Qur’an [7], it is translated to “People, a clear proof has come to you from your lord and We have sent down to you a shining light”

Another example is in the 6<sup>th</sup> chapter Al-An'am, Ayah 82: "الَّذِينَ ءَامَنُوا وَلَمْ يَلْبِسُوا إِيمَانَهُمْ بِظُلْمٍ أُولَٰئِكَ لَهُمُ الْأَمْنُ وَهُمْ مُهْتَدُونَ". The translation of this verse in Saheeh International is: "They who believe and do not mix their belief with injustice - those will have security, and they are [rightly] guided". This Ayah confused the companions of the prophet SAW who clarified it using the 31<sup>st</sup> chapter, Loqman Ayah 13: "إِنَّ الشِّرْكَ لَظُلْمٌ عَظِيمٌ", indicating that this is a polysemous situation and the word "ظلم" refers to the polytheism, and more specifically to the "association of others with God". This makes the previous translation inappropriate. In this case the translation provided by The Majestic Qur'an [7] is more accurate: "those who believe without confusing their faith with idolatry who shall enjoy security, and it is they who are guided".

Lastly, another challenge is the semantic difference of words-pair differing in a vowel punctuation mark such as fatha, kasra, or damma. This can be illustrated in the 18<sup>th</sup> chapter Al-Kahf, Ayah 19, "وَكَذَٰلِكَ بَعَثْنَا لَهُمْ لَيَسَاءَ أُولَٰئِكَ الَّذِينَ لَبِئْسَ مَا كَانُوا يَفْعَلُونَ" "وَالَّذِينَ كَفَرُوا لَهُمْ لَٰعِبٌ قَرِيبٌ يَوْمَ يَدْعُوكُمْ فَتَسْتَجِيبُ لَهُمْ بِصَوْتِكَ وَأنتَ لَمَّا كُنتَ خَالِيًا عَلَيْهِمْ مُّسْتَكْبِرًا" "وَالَّذِينَ كَفَرُوا لَهُمْ لَٰعِبٌ قَرِيبٌ يَوْمَ يَدْعُوكُمْ فَتَسْتَجِيبُ لَهُمْ بِصَوْتِكَ وَأنتَ لَمَّا كُنتَ خَالِيًا عَلَيْهِمْ مُّسْتَكْبِرًا". With the kasra under the letter "raa", the word "ورق" means silver or silver coins. Without the kasra the predominant meanings are "paper" or "leaves". This is again confusing for many average native Arabic speakers who do not grasp the difference between both words.

## Ambiguous Verses

In the case of ambiguous verses, we have the following examples in the 98<sup>th</sup> chapter Al-Bayyinah that illustrates a complex case in Ayah 1 to 4. In Ayah 1: "لَمْ يَكُنِ الَّذِينَ كَفَرُوا مِنْ أَهْلِ الْكِتَابِ وَالْمُشْرِكِينَ مُنْفَكِينَ حَتَّىٰ تَأْتِيَهُمُ الْبَيِّنَةُ" translated to "Those who disbelieved among the People of the Scripture and the polytheists were not to be parted [from misbelieve] until there came to them clear evidence". In Ayah 4: "وَمَا تَفَرَّقَ الَّذِينَ أُوتُوا الْكِتَابَ إِلَّا مِنْ بَعْدِ مَا جَاءَتْهُمُ الْبَيِّنَةُ" translated to "Nor did those who were given the Scripture become divided until after there had come to them clear evidence." Imam al-Wahidi says that this verse is one of the most difficult verses in the Qur'an in terms of grammar, syntax, and interpretation [37]. Imam al-Razi compiled 15 opinions in an attempt to clarify the problem. Imam Ibn Ashur compiled them into five problematic ones. Without going in too many details, this ayah can have two meanings:

- The first meaning: Those who disbelieved would not abandon disbelief and polytheism until the proof came.
- The second meaning: Those who disbelieved would not be abandoned from God's punishment until the proof came to them.

## Qur'an phonology

Sound symbolism is a universal linguistic phenomenon. Its study in the context of Qur'an phonology and Arabic letters is challenging. Several verses use rhyming words to create a certain effect almost impossible to translate. Sounds have attributes. The use of sounds and their harmony is an important style. The effect is great when the sounds mimic the meaning depicting sensory imagery. Note that the association between sound and meaning is a hot topic in cross modal associations research [38]. The question is how to make the translated text having as much as a possible similar effect of the Qur'an sounds. For example, the Arabic letter Qaf (ق) represents a distinctive sound in the Arabic language, characterized by its deep, guttural and explosive pronunciation. In the 101<sup>st</sup> chapter of the Qur'an, Al-Qariah (الفارعة) means "the calamity" or "the striking one" to name the day of judgment. Another example is the 75<sup>th</sup> chapter Al-Qiyamah (القيامة). The chapter title in English means "The Resurrection". In this chapter there is a vivid imagery of the scene of death of a person from Ayah 26 to 30 where the letter Qaf is used making impossible or very difficult to translate this description.

Another example is the Arabic letter "ح" (Haa). It lacks a direct equivalent in English. The sound (حاء) is a fricative sound by narrowing the space in the pharynx and allowing air to pass. It represents a sound symbolism usually paired with mystical words like "حب": love, "حنان": affection, "الكَرِيم": the kind and "الرَّحِيم": the caring.

Regarding the phonological component in Qur'an, the rhyme makes it highly poetic and descriptive where the sound and the meaning are correlated. The rhythm patterns are powerful and stimulate the mind. The sound patterns can be partial or total. For example the rhyme is partial in the 113<sup>th</sup> chapter Al-Falaq or the Daybreak (الْفَلَق), the first two verses end with "لَقَى". The sound pattern fluctuates with the verse semantics. For example in the 100<sup>th</sup> chapter Al-Adiyat or The War Horses which run swiftly (العاديات), also translated to "The Courser, The Chargers", "By the racers". This chapter has 3 groups of verses. The first one is from 100:1 to 100:5. The verses of this group end with the letter "ا" called the "Alif". The second group is from 100:6 to 100:8 and its verses end with "د". The last group is from 100:9 to 100:11 and its verses end with "ر". The first group expresses an oath and the others are the answer of the oath. The second group has a context of names and the third one has a context of actions.

The rhyming can be total like in the 87<sup>th</sup> chapter of the Qur'an Al-Ala or the Most High (الأعلى), where all verses and the title as well end by the Arabic letter "ى" called "alif maqsurah" representing a long "a" sound. Another example is 104<sup>th</sup> chapter: Al-Humazah or "The Slanderer" (الهُمَزَة). In this case, all verses

end by the sound of “هـ” or "ha", breathing out from the chest and project an amazing state of woefulness and adversity.

Lastly another challenge is the handling of Arabic diacritical marks (fatha, kasra, damma). These marks represent short vowel sounds, obey to grammatical rules and its specific pronunciations can have stylistic effects. An example is illustrated in the 48<sup>th</sup> chapter Al-Fath, Ayah 10:

إِنَّ الَّذِينَ يُبَايِعُونَ اللَّهَ يَدُ اللَّهِ فَوْقَ أَيْدِيهِمْ ۖ فَمَنْ نَكَثَ فَإِنَّمَا يَنْكُثُ عَلَىٰ نَفْسِهِ ۗ وَمَنْ أَوْفَىٰ بِمَا عَاهَدَ ۖ إِنَّ اللَّهَ عَلِيمٌ عَظِيمٌ. This verse states: "Indeed, those who pledge allegiance to you, [O Muhammad] - they are actually pledging allegiance to Allāh. The hand of Allāh is over their hands". The word

‘عليه’: ‘alayhi’ usually ends with a kasra, since ‘ala’ is a preposition, and there is no ‘alayhi’ in the Holy Qur’an that does not end with a kasra except in this verse “عَلَيْهِ”, since the ha’ has a damma (the /u/ vowel sound in Arabic). The rhetorical reason for pronouncing the final pronoun ha' with a damma in “عَلَيْهِ” is to provide weightier pronunciation in order to align with the theme of Allāh’s supreme power and the importance of the pledge of allegiance. Hence emphasis is preferred over thinness in this situation.

## Theological diversity of opinions

The Islamic doctrine or Aqidah (عقيدة) is the core belief of the Islamic theology. It got formalized after few centuries within multiple schools of thoughts. The main ones are the Salafi aquida and the Achaari aquida. It is now centuries-old theological disagreement and disharmony. They differ in some doctrinal and interpretive aspects, especially regarding the attributes of Allah Almighty [39]. The Achaari follows an approach based on reconciling reason and texts with metaphorical devices, while the Salafi has a focus on the primary literal meaning of the texts. Obviously, this conflict has a huge impact on the exegesis (Tafsir: تفسير) of the Qur’an verses and consequently on the different translations and interpretations. More generally, the translation might also be biased towards Sunni, Shi'a, or other Islam orthodoxy.

## AI Framework for the Qur’an Understanding

Recent breakthroughs in AI increased the quality of the models and create an opportunity in computational linguistics for Qur’an studies and machine translation. In particular, Multimodal AI embeddings represent data from various sources like text, images, and audio in a single unified vector space. This presents an avenue to overcome some of the Qur’an studies challenges [40]. The modalities in the context of this study are all of types: texts, images, audio and video. In the context of the Qur’an, the modalities are richer. The text itself has

different modalities (sacred text, different interpretations, etc) to be used as datasets to train the model:

- The original Qur'an text
- The historical context surrounding the revelation. This is to capture the events and circumstances of the verses revelation. This is well documented on what is called in Arabic, Asbab al-Nuzul, an established Qur'an knowledge field.
- The Qur'an phonology. This is to capture the relationships between the verse sounds and the meaning. This is well documented on what is called in Arabic Qiraat. This is also an established knowledge field that includes seven main variations and defines the methods of recitation.
- The different exegesis of the Qur'an These include multiple schools:
  - Interpretation based on knowledge transmission ("al -mathur" - "المأثور")
  - Interpretation based on opinion and reasoning ("al-ray" - "الرأي")
  - Symbolic and metaphorical interpretation ("al-tawil" - "التأويل")
  - Linguistic based interpretation using Arabic syntax, grammar and rhetoric knowledge
  - Authentic and established Hadiths (words and actions) of the Prophet and Islamic Jurisprudence
  - The theological interpretations. This is called Aqidah "عقيدة" in Arabic language. This is also an established knowledge field with different schools of thought and multiple controversial issues.
- The Nasikh (الناسخ) i.e. the abrogating verse, which supersedes or cancels a previous one and the Mansukh (المنسوخ) i.e. the abrogated verse, which is superseded or canceled by a later verse. This is a field of Qur'an studies, focusing on the verses chronology and the examinations of which verses and rules were revealed later and which were replaced by the later revelations.
- The scholarly texts Al-Mutun (المتون). These are texts written in a concise and stylish manner, making them easier to memorize and study. They cover different fields such as Arabic grammar, Qur'an recitation (Tajweed), Islamic theology and the knowledge field of inheritance.
- Scientific exegesis of Qur'an. It describes scientific miracles in the Qur'an (الاعجاز العلمي في القرآن). This is a rich field of research with a focus on the use of scientific evidence for Qur'an interpretation.

The core technologies to be used in this framework are LLM reasoning models. The Large Language Models (LLMs) have amazing abilities to reason

over, summarize, and creatively generate data. They learn the statistical and probabilistic patterns. The LLM reasoning models are more advanced LLMs. They are able to decompose a complex problem into smaller ones with explainability and trace capabilities. However, they remain open to several technical problems. Among them is the problem of hallucinations, which consists of generating certain-looking but false information. In the context of Qur'an study field, this problem can be adverse. Techniques against hallucinations and other issues should be investigated, improved and used in order to improve the performance of the Qur'an linguistic operations with LLMs.

This framework should include a knowledge graph that represents all the relationships between the different verses and other Islamic knowledge sources as listed above. Similarly reasoning capability should be included to capture different interpretations according to the existing schools of thought and interpretation paradigms. The reasoning capability should be able to capture different interpretations with their background and benefit from explainable AI (xAI). Another important model to be developed in this framework is the Qur'an's rhetorical style transfer in order to grasp the Qur'an rhetoric as much as possible. Existing style transfer techniques will need to be improved to handle the linguistic issues and hence improve the quality of translation. Note that this task will be never perfect given the inimitable and miraculous aspect of the Qur'an text.

It is noteworthy that it is necessary to include in this framework measurements to evaluate the performance of the model in order to ensure accuracy, meet human expectations and avoid any biases or errors. Multiple metrics exist in the literature related to LLMs evaluation (e.g. BLEU, ROUGE-L, METEOR, BERTScore).

## Conclusion

This paper presents a high level description of an AI framework based on the latest developments and breakthroughs in LLM reasoning models in order to improve the quality of the Qur'an translation and interpretation and hence make the text of the Qur'an resonate with non-Arabic readers. This framework will address various complexities in computational Qur'an literature and research. Its development will require a multidisciplinary team given the complexity and the importance of this task. This team should include experts in different Qur'an knowledge fields and AI research.

## Author Contributions

**Dr. Said Soulhi:** Conceptualization, Methodology, Writing – review & editing, Supervision, Project administration, Writing – review & editing, Investigation.

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