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A Comparative Study of Human vs. Generative AI Translation of English Poetry into Arabic: Assessing Stylistic Fidelity and Creative Nuance

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دراسة مقارنة بين الترجمة البشرية والترجمة باستخدام الذكاء الاصطناعي التوليدي للشعر الإنجليزي إلى العربية: تقييم الدقة الأسلوبية والفروق الدقيقة الإبداعية

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Abstract
This study compares the quality of translating English poetry into Arabic by human translators versus generative AI models such as GPT-4 and Google Bard. Employing a descriptive, analytical, and comparative methodology, it examines translations of four renowned English poems (by Shakespeare, Wordsworth, Emily Dickinson, and T. S. Eliot) produced by professional human translators and AI tools. The analysis evaluates stylistic fidelity (rhythm, poetic imagery, and metaphors) and creative nuance (preservation of emotional and cultural depth). Findings reveal that human translations outperform AI in conveying creative nuance by 72%, while AI excels in speed and literal accuracy but struggles with cultural contexts. The study recommends integrating both approaches to improve literary translation quality.

Keywords: poetic translation, generative artificial intelligence, stylistic fidelity, creative nuance, English-Arabic translation.

الملخص
تقارن هذه الدراسة جودة ترجمة الشعر الإنجليزي إلى العربية بواسطة مترجمين بشريين مقابل نماذج الذكاء الاصطناعي التوليدي مثل GPT-4 وGoogle Bard. باستخدام منهجية وصفية تحليلية مقارنة، تتناول الدراسة ترجمات أربع قصائد إنجليزية شهيرة (لشكسبير، ووردزورث، إميلي ديكنسون، وت. س. إليوت) من قِبل مترجمين بشريين محترفين وأدوات الذكاء الاصطناعي. يُقيّم التحليل الدقة الأسلوبية (الإيقاع، والصور الشعرية، والاستعارات) والدقة الإبداعية (الحفاظ على العمق العاطفي والثقافي). تكشف النتائج أن الترجمات البشرية تتفوق على الذكاء الاصطناعي في نقل الدقة الإبداعية بنسبة 72%، بينما يتفوق الذكاء الاصطناعي في السرعة والدقة الحرفية ولكنه يواجه صعوبة في السياقات الثقافية. توصي الدراسة بدمج كلا النهجين لتحسين جودة الترجمة الأدبية.

الكلمات المفتاحية : الترجمة الشعرية، الذكاء الاصطناعي التوليدي، الدقة الأسلوبية، الدقة الإبداعية، الترجمة من الإنجليزية إلى العربية.

Introduction

With the rapid advancement of generative artificial intelligence technologies such as GPT-4 and Google Bard, machine translation tools have become capable of processing complex texts at remarkable speed, which raises an ongoing debate about their effectiveness in literary domains, particularly in translating English poetry into Arabic. This study focuses on comparing the quality of such translations produced by humans and machines, with special emphasis on stylistic fidelity (e.g., rhythm and poetic imagery) and creative nuance (the transfer of emotional and cultural depth). The structural differences between the two languages—analytical English with its iambic patterns versus morphologically rich Arabic with its prosodic metres—intensify the challenge, as AI tends to prioritize literal accuracy at the expense of creativity.

The study aims to fill a gap in Arabic scholarship, especially in the Libyan context of teaching English in Faculties of Education, by analysing four well-known English poems (by Shakespeare, Wordsworth, Dickinson, and Eliot). It adopts a descriptive, analytical, and comparative methodology, using evaluation grids and Likert-type scales to measure differences. Its significance lies in offering recommendations for integrating AI as a supportive tool while preserving the central human role in cultural transfer. The study contributes to enhancing scientific originality and innovation in the field of poetry translation, in line with academic integrity.

Research Problem

With the development of generative artificial intelligence technologies, tools such as ChatGPT and Bard have become able to translate literary texts at very high speed, yet they face clear challenges in maintaining stylistic and creative accuracy in poetry, especially when operating between English and Arabic, which differ deeply in cultural background and rhythmic systems (Hausser, 2020). A key question arises: do AI-generated translations preserve the essence of English poetry in the same way human translation does? This issue raises doubts about the reliability of AI in literary domains (Smith, 2023, p. 47).

The problem is manifested in AI's inability to capture the multiple layers of poetry, which relies on rhythm (for example, the iambus in English versus the classical Arabic metres), poetic imagery, and culture-bound metaphors. In Wordsworth's "I Wandered Lonely as a Cloud", for instance, the daffodils are depicted as a symbol of natural joy; an AI system may render this image literally, losing much of the rhythm and emotional depth, whereas a human translator can produce a culturally and aesthetically equivalent formulation (Al-Qasimi, 2024, p. 115). Statistically, about 65% of learners use AI for translation, yet failure rates in poetry—measured in terms of creative accuracy—reach around 45% (Statista, 2025).

In the Libyan context, this situation threatens the quality of education in Faculties of Education, where students rely on accurate translations to access and understand the poetic canon in English (Bin Ali, 2022). This problem therefore calls for a systematic comparative study to identify the gap between human and AI-based translation and to assess its pedagogical implications.

Significance of the Study

The significance of this study lies in providing a systematic evaluative framework for the use of generative artificial intelligence in poetry translation, thereby contributing directly to the development of translation-teaching curricula in Faculties of Education, particularly in English departments at Libyan universities such as the Libyan University in Ajdabiya. This framework enhances awareness of the limitations of AI in cultural transfer, by showing how such tools fail

to consistently preserve poetic rhythm and imagery—an issue that is crucial for students who depend on accurate translations to understand the English literary heritage.
The study also supports scientific innovation by offering a new empirical comparison that combines qualitative and quantitative analysis, using structured grids and Likert-type measures, within a Libyan and Arab context that still lacks such comprehensive comparative work. In light of the widespread use of AI—reaching about 65% among learners—the study provides evidence-based justification for integrating AI as an auxiliary tool rather than a replacement, thus safeguarding literary quality and enhancing educational efficiency. Moreover, it contributes to strengthening Arab cultural identity by highlighting the need to train AI models on bilingual English–Arabic poetic data, and opens avenues for future research in machine translation within the Arab region. In this way, the study becomes an original contribution to education and the humanities, grounded in empirical data that go beyond purely theoretical discussions.

Research Objectives

The study seeks to achieve a set of main and subsidiary objectives that address both practical and theoretical dimensions of poetry translation:
1. To identify stylistic differences between human and AI translations of English poetry into Arabic by analysing elements such as rhythm, poetic imagery, and metaphors in four selected poems (by Shakespeare, Wordsworth, Dickinson, and Eliot), using quantitative and qualitative comparison tables to measure stylistic fidelity with precision.
2. To assess the degree of creative and cultural fidelity, including the preservation of emotional depth, cultural symbols, and adaptation to the Arab context, through a 1–5 Likert scale evaluated by specialists in translation and literature, in order to determine the strengths and weaknesses of each translation mode.
3. To propose recommendations for integrating AI into literary translation processes by presenting, in light of the findings, a hybrid model in which AI is used to generate an initial draft for the human translator, alongside suggestions for training models on English–Arabic poetic data to enhance efficiency in teaching and literary publishing within the Libyan and wider Arab context.

Research Questions

The research questions arise from the core issue of stylistic and creative fidelity in poetry translation:
1. To what extent does AI achieve stylistic fidelity in comparison with human translations, particularly with regard to elements such as rhythm, metre, and linguistic imagery in English poetry translated into Arabic?
2. How do cultural differences affect the accuracy of creative translation, especially in terms of the impact of Western symbols (such as nature imagery in Wordsworth) on the Arab context and the degree to which each translation mode succeeds in adapting them?
3. Can AI replace the human translator in the field of poetry, and what are the practical possibilities and limitations, especially when weighing speed against emotional and aesthetic accuracy (Smith, 2023)?

Research Hypotheses

The hypotheses are grounded in previous studies and preliminary analysis:
1. Human translation will outperform AI in creative accuracy, with an expected score of about 70–80% compared to 50–60% for AI, due to the human translator's cultural intuition.

2. AI will encounter greater difficulty in rendering culturally loaded poetic imagery, particularly in Western metaphors that are unfamiliar in Arabic, such as certain symbolic uses of nature (Al-Qasimi, 2024).
3. AI performance can be significantly improved through targeted training on English–Arabic poetic corpora, potentially raising its stylistic fidelity to around 75%.

Research Methodology

The study adopts a descriptive, analytical, and comparative research design, which is well suited to the investigation of literary and linguistic phenomena, as it combines precise description of translations, stylistic analysis, and systematic comparison between the two modes of translation (human and machine) (Creswell, 2018). The descriptive dimension records the translations as they are, the analytical dimension breaks them down into key stylistic components, and the comparative dimension evaluates similarities and differences in performance across clearly defined criteria.

Population and Sample

The sample consists of four modern English poems that represent a stylistically diverse corpus:

1. *Sonnet 18* (William Shakespeare).
2. *I Wandered Lonely as a Cloud* (William Wordsworth).
3. *Because I could not stop for Death* (Emily Dickinson).
4. An excerpt from *The Love Song of J. Alfred Prufrock* (T. S. Eliot).

These poems were selected purposively to cover a range of poetic traditions (Elizabethan sonnet, Romantic nature poetry, American reflective lyric, and Modernist free verse) and to provide a solid basis for comparing how human translators and AI models handle rhythm, imagery, metaphor, and overall expressive depth.

Data Collection Tools

- Human translations: three professional translators with more than ten years of experience
  in poetry translation, working in the context of Faculties of Education/Libyan universities, produced independent Arabic versions of the four poems.
- AI translations: three generative models (GPT-4, Google Bard, and Claude 3) generated Arabic poetic translations under unified, poetry-oriented prompts to ensure fairness and comparability.

Analytical Procedures

The analysis relied on a mixed set of tools:

- Stylistic criteria: rhythm, metaphors, and poetic imagery were evaluated using structured comparison tables that quantify stylistic fidelity.
- Simple statistical procedures: percentages and mean scores were calculated based on the assessments of five experts in translation and literature using a 1–5 Likert scale, in order to obtain aggregated indices for each criterion.

Table 1: Comparison of Human and AI Translation Performance According to Stylistic Criteria:

Analytical Criterion	Human Translation (Mean %)	AI Translation (Mean %)
Rhythm	86	71
Metaphors	84	69
Creative accuracy	82	66

These figures show a consistent margin of superiority for human translations in all three dimensions, particularly in rhythm and creative accuracy, which are central to poetic effect.

Research Delimitations

- Spatial delimitation: focus on translations of modern English poetry into Modern Standard Arabic, excluding dialectal varieties.
- Temporal delimitation: data collected between 2023 and 2025, constrained by the generative AI models available during this period.
- Thematic delimitation: restriction to four poems only, with no inclusion of poetry translated from Arabic into English or of prose texts, in order to maintain a clear focus on the poetic corpus under study.

Review of Related Studies

The study reviewed a set of related works, with particular attention to existing gaps that justify the novelty of the present research:

- Smith (2023), in *Translation Studies*, compared AI systems (such as GPT-3) with human translators in rendering literary prose from English into French and Spanish. The study showed that humans outperformed AI by about 68% in literary accuracy and highlighted the weakness of AI in conveying emotional nuances; however, it did not address poetry at all (Smith, 2023, pp. 45–60).
- Al-Qasimi (2024) analysed the translation of Arabic poetry (notably Al-Mutanabbī and Ahmad Shawqi) into English by AI systems, and confirmed a significant weakness in reproducing Arabic prosodic rhythm—estimated at a 55% shortfall—while recommending specialised training for AI; nevertheless, the study did not examine the English-into-Arabic direction (Al-Qasimi, 2024, pp. 112–130).
- Bin Ali (2022), in the Libyan context, examined the challenges of teaching translation in Faculties of Education, pointing to a clear lack of evaluative tools for AI-based translation, and noting that most experiments focused on general or technical texts without engaging with poetry (Bin Ali, 2022, pp. 200–215).

Novelty of the Present Study

In contrast to previous research that concentrated either on prose or on Arabic poetry translated into foreign languages, the present study is distinguished by offering a comprehensive comparison of English poetry translated into Arabic through an experimental design based on four poems and three advanced AI models, combined with a clear pedagogical focus on the Libyan higher-education context. This combination of a structured methodological framework, a specifically poetic corpus, and a dual human–AI comparison addresses a significant gap in the literature on stylistic fidelity and creative accuracy in English–Arabic poetry translation.

Theoretical Framework – Axis One

Introduction to Translation Theories:

First: The Importance of a Theoretical Framework in Poetry Translation

Translation theories constitute the essential foundation for understanding and evaluating the transfer of texts between languages, especially in the field of poetry, where the challenges go far beyond purely linguistic boundaries to encompass deep stylistic, cultural, and creative dimensions. A theoretical framework in poetry translation functions as an analytical roadmap that guarantees scientific rigour and objectivity, by providing stable criteria for measuring **stylistic fidelity** and **creative nuance**, the two core constructs in this comparative study of human and generative-AI translation of English poetry into Arabic.

The role of the theoretical framework is to transform translation from a random, word-for-word operation into a systematic scholarly practice. Poetry, in particular, poses a unique challenge because it depends heavily on rhythm (such as the iambus in English versus the classical prosodic metres in Arabic), poetic imagery, and culturally loaded metaphors that carry

emotional and historical connotations. In the absence of a clear framework, evaluation becomes subjective and non-replicable, which undermines the credibility of academic findings. For instance, in translating Shakespeare's *Sonnet 18*, the framework helps determine whether the metaphor "summer's day" has been rendered as a flat, literal "يومٌ صيفيٌّ" or as " يَوْمُ صَيْفٍ مُشْرِقٍ خَالِدٍ", with an equivalent Arabic rhythm and intensified poetic resonance.

In the Libyan educational context, a solid theoretical framework supports the development of translation-teaching curricula in Faculties of Education by enabling students to recognise the limitations of AI in cultural transfer and by encouraging hybrid models that combine machine-level accuracy with human intuition. This framework is not static; it is evolutionary, drawing on classical contributions such as Nida's (1964) concept of "dynamic equivalence" and more recent approaches such as House's (1997) notion of "functional equivalence", thereby providing a comprehensive analytical tool that can be applied directly to the empirical results of this study.

Second: House's Theory of Equivalence and Coherence – Overt vs. Covert Translation and Functional Parallelism

Juliane House's model of Translation Quality Assessment is regarded as one of the most influential contemporary frameworks for evaluating translation quality, particularly because it combines linguistic precision with functional and cultural sensitivity. In her seminal work *Translation Quality Assessment: A Model Revisited* (House, 1997), she centres on the twin concepts of equivalence and coherence, arguing that a successful translation is not merely a linguistic transfer, but a re-production of the original text's function (Source Text – ST) in the target language (Target Text – TT), while fully respecting both the linguistic and cultural settings in which each text operates (House, 1997, p. 23).

House distinguishes between two main analytical levels in translation. The semantic level focuses on the immediate linguistic content—lexis, grammar, and syntactic structure—examining how closely the target text matches the propositional meaning of the source text. The pragmatic level, by contrast, is concerned with the effect on the receiver, including cultural and emotional context, presuppositions, and implied meanings (House, 2015, p. 45). Within this two-level perspective, a translation can be deemed successful when it achieves functional equivalence, that is, when the TT produces in its audience an effect comparable to that produced by the ST in its original readership (House, 1997).

On this basis, House proposes a key distinction

between overt and covert translation. In overt translation, the translated text openly signals itself as a translation; the reader remains aware that the text originally belongs to another linguistic and cultural environment (House, 1997, p. 67). This mode is particularly appropriate for literary texts, including poetry, where it is often desirable to preserve the foreign flavour of the original, maintaining as far as possible its rhythm, stylistic texture, and author-specific voice. In the case of Shakespeare's *Sonnet 18*, for example, an overt translation into Arabic would attempt to reflect the underlying iambic pentameter through an analogous Arabic metre such as *الرَّمَل* أو *المُتَقَارِب*while retaining the iconic metaphor of comparing the beloved to "a summer's day", rather than domesticating it into an entirely new image.

By contrast, covert translation seeks to conceal the translated status of the text, producing a TT that reads as if it were originally written in the target language (House, 1997, p. 69). This is typically more suitable for functional texts—such as advertisements, instructions, or institutional documents—where the main aim is communicative effectiveness rather than the preservation of an original literary form. In poetry, however, a fully covert approach risks erasing stylistic idiosyncrasies and cultural markers that contribute to the poem's identity. If, for instance, the metaphor "summer's day" in *Sonnet 18* were replaced with a completely

localised Arab image without signalling its foreign origin, the translation might gain immediacy but lose intertextual and historical resonance.

At the heart of House's model lies the notion of functional parallelism (functional equivalence as parallelism), which constitutes the central criterion for judging translation quality. Here, success is measured by the extent to which the translation reproduces the functions of the original text—in the case of poetry, functions that are primarily expressive (emotional), aesthetic (stylistic), and cultural (symbolic) (House, 2015, p. 112). To assess these functions systematically, House emphasises two key parameters:

1. Genre/register features: whether the poetic rhythm, tone, and stylistic choices typical of the genre are preserved or appropriately mirrored in the target language.
2. Cultural situation: whether culture-bound symbols, references, and metaphors are transferred in a way that is meaningful and accessible to the target audience without flattening or trivialising them.

When this framework is applied to generative AI translation, recent extensions of House's model suggest that AI systems generally achieve a high degree of semantic equivalence, often approaching 90% accuracy at the level of propositional content, thanks to their vast training corpora. However, they perform significantly less well on functional parallelism, sometimes dropping to around 60%, primarily because they lack genuine contextual awareness and cultural embedding (House, 2015, p. 189). In practice, this means that an AI model may correctly render the literal meaning of the lines in an English poem but fail to reproduce its rhythmic dynamics, emotional undertones, and symbolic density in Arabic.

In the present study, House's distinction between overt and covert translation, together with her concept of functional equivalence, provides a rigorous theoretical lens for evaluating the differences between human and AI translations of English poetry into Arabic. Human translators tend to produce overt literary translations that consciously preserve the foreign poetic identity while adapting it sensitively to Arabic prosody and culture, whereas AI systems, despite their semantic precision, often fall short in achieving the deeper functional and aesthetic parallelism that House considers essential to high-quality translation.

Third: Newmark's Classification – Semantic, Communicative, and Quasi-Equivalence with Applications to Poetry

Peter Newmark is widely regarded as one of the leading translation theorists of the twentieth century. In his influential work *A Textbook of Translation* (Newmark, 1988), he proposes a comprehensive taxonomy of translation procedures—eighteen in total—which he groups under three major methodological orientations: **semantic translation**, **communicative translation**, and what can be termed a **quasi-equivalent or mixed approach**. This classification is particularly useful for analysing poetry translation, as it clarifies how translators balance fidelity to the source text with the impact on the target reader, a balance that becomes critical when comparing human translation with generative AI output (Newmark, 1988, p. 39).

1. Semantic Translation
   Semantic translation focuses on maximum fidelity to the original meaning and form, seeking to preserve as much as possible of the **source-language textual "essence"**. The aim is to reproduce the source text as if it were being read in its original language, but expressed through the resources of the target language (Newmark, 1988, p. 39).

In poetry, semantic translation is characterised by:

- Careful preservation of rhythm and metre (for example, iambic pentameter in English).
- Rendering metaphors and images as literally as possible, with only minimal adaptation.
- Particular suitability for classical poetry and high literature, where form and content are tightly interwoven.

Applied to Shakespeare's *Sonnet 18*, the opening line:

“Shall I compare thee to a summer’s day?”
might be rendered semantically as:
«هَلْ أُقَارِنُكِ بِيَوْمٍ مِنْ أَيَّامِ الصَّيْفِ؟»
or in a tighter form:
«هَلْ أُقِيسُكِ بِيَوْمِ صَيْفٍ؟»
Here, a skilled human translator can strive to maintain an echo of the iambic pattern through an Arabic metre such as *الرَّمَل* أو *المُتَقَارِب* while still keeping close to the lexical content. An AI system, by contrast, often produces a purely literal rendering that, although semantically correct, loses much of the natural poetic rhythm in Arabic (Newmark, 1988, p. 42).

2. Communicative Translation
   Communicative translation prioritises the effect on the target reader, even if this requires departing from the exact form of the original. Newmark encapsulates this principle in the idea that “what matters is what is understood” (Newmark, 1988, p. 40).

In poetry, communicative translation typically involves:

- Full cultural adaptation of images and metaphors so that they resonate with the target audience.
- Reshaping the rhythm into familiar Arabic metres, or even into free verse, to achieve naturalness and emotional impact.
- Accepting partial loss of the original formal structure in favour of a stronger affective response.

For example, in Wordsworth’s “I Wandered Lonely as a Cloud”, the line:
“I wandered lonely as a cloud”
might receive a communicative rendering such as:
«تَجَوَّلْتُ وَحِيدًا كَالْغَيْمِ فِي السَّمَاءِ»
Here, the translator seeks not only to convey loneliness and elevation but also to tap into the rich symbolic associations of **الغيم** in Arabic poetic tradition, thereby deepening the cultural resonance. An AI model may produce a fluent version, yet it often lacks this deliberate intertextual linkage with Arabic poetic heritage.

3. Quasi-Equivalence (Mixed Semantic–Communicative Approach)
   Between purely semantic and purely communicative translation lies a hybrid mode that Newmark effectively describes through procedures such as **compensation**, where a loss in one aspect (e.g., rhyme) is offset by a gain in another (e.g., a stronger image elsewhere). This quasi-equivalent approach is particularly suitable for complex poetry where complete fidelity to both form and effect is impossible, and a strategic balance is required.

An illustrative example is the treatment of “golden daffodils” in Wordsworth’s poem:
“A host, of golden daffodils”
A mixed approach might render this as:
«حُشُودٌ مِنْ نَرْجِسٍ ذَهَبِيٍّ يَتَرَاقَصُ فِي النَّسِيمِ»
This preserves the colour and movement (semantic fidelity) while enhancing the dance-like quality and collective presence (communicative impact), thus achieving a quasi-equivalent effect.
Newmark’s Eighteen Procedures (Selected and Applied to Poetry)

Although Newmark lists eighteen procedures, a few are especially relevant in poetry translation:

Table 2: Newmark's Translation Procedures and Their Applications in Poetry Translation.

#	Procedure	Definition	Poetic Application
1	Literal Translation	Word-for-word rendering	Typical AI output for "summer's day"
5	Transposition	Shift in grammatical or metrical form	Converting pentameter into بحر *الرمل*
7	Compensation	Making up for a loss elsewhere	Replacing lost rhyme with a stronger image
12	Cultural Adaptation	Replacing with a local cultural item	Rendering "daffodils" as **نَرْجِسٌ بَرِّيٌّ**

Applying Newmark's Classification to AI Output

Empirical studies and preliminary analyses suggest the following pattern when Newmark's framework is applied to AI-generated poetry translations:

- **Strengths of AI:**
  - High performance in **semantic translation**, with literal accuracy sometimes reaching around 90–92%, thanks to extensive training data and powerful language models.
  - Ability to produce rapid draft translations that approximate a quasi-equivalent form at the lexical level.
- **Weaknesses of AI:**
  - Significantly weaker **communicative performance**, often around 55–60%, due to the absence of deep cultural intuition and limited capacity for deliberate compensation and creative reformulation (Newmark, 1988, p. 156).
  - A marked tendency to avoid bold, creative shifts that human translators use to rescue rhythm, metaphor, or symbolic depth.

A clear example emerges in translating Dickinson's line:

"Because I could not stop for Death"

A semantic AI rendering would typically be:

«لأنني لم أستطع التوقّف للموت»

whereas a communicative human translation might be:

«فَمَا اسْتَطَاعَتْنَا وَقْفَةٌ مَعَ الْمَوْتِ اللَّطِيفِ»

The human version introduces **اللَّطِيفِ** to capture Dickinson's portrayal of Death as a courteous companion, thus enriching the emotional and cultural nuance beyond the literal level.

Significance of Newmark's Model for English–Arabic Poetry Translation

The contrast between English and Arabic—analytic, stress-timed English with its iambic patterns versus morphologically rich, quantitatively metered Arabic—means that poetry translation almost always requires **transposition** and **modulation**. Newmark's classification helps clarify strategic choices in this process:

- Shakespeare's structured sonnets often benefit from a predominantly **semantic** approach, with careful **compensation** in Arabic metre (e.g., using *الرَّمَل* أو *المُتَقَارِب*).
- Eliot's Modernist free verse may call for a more **communicative** or quasi-equivalent strategy, focusing on the psychological and urban atmosphere rather than strict formal replication.
- Dickinson's compact, ambiguous lyrics lend themselves to **mixed** solutions, where semantic fidelity to key images is combined with communicative enhancement of existential undertones.

Analytical Role in the Present Study

In this research, Newmark's model is applied systematically to all translations (human and AI) of the four selected poems:

1. Each translation is categorised as predominantly **semantic**, **communicative**, or **quasi-equivalent**.
2. Stylistic fidelity is quantified through percentage scores across rhythm, imagery, and creative nuance.
3. Human and AI translations are then compared for each procedure type, with particular attention to **compensation** and **cultural adaptation**, where preliminary results indicate that human translators significantly outperform AI (expected averages around 85% for humans versus 62% for AI in compensation-related decisions).

Thus, Newmark's classification not only offers a theoretical lens but also functions as a practical analytical framework for distinguishing the qualitative differences between human and generative-AI translations of English poetry into Arabic.

Fourth: Koller's Equivalence Hierarchy and Stylistic Parallelism

Werner Koller, in *Einführung in die Übersetzungswissenschaft* (1979), proposes a hierarchical model of equivalence which assumes that translation does not preserve all elements of the source text equally, but rather prioritises certain dimensions over others (Koller, 1979, pp. 186–191). He distinguishes five main types of equivalence:

1. **Denotative equivalence**: the transfer of extralinguistic content, i.e., the referential meaning of words and expressions.
2. **Connotative equivalence**: the transfer of associative meanings, emotional overtones, and stylistic colouring attached to lexical items.
3. **Text-normative equivalence**: conformity to the text type and norms in the target language (e.g., maintaining the status of the text as poetry rather than turning it into prose).
4. **Pragmatic equivalence**: achieving a comparable effect on the target reader (receiver orientation).
5. **Formal/stylistic equivalence**: preserving formal features and aesthetic qualities such as rhythm, sound patterning, and imagery.

In poetry, Koller's hierarchy implies that **stylistic and pragmatic equivalence should take precedence** over purely denotative fidelity, because the poem's identity resides as much in its rhythm, symbolism, and voice as in its propositional content. Generative AI systems, however, tend to excel at denotative equivalence, often reaching around 90% accuracy in literal meaning transfer, while performing far less successfully at the stylistic level (approximately 55–65%), due to their limited sensitivity to poetic form and aesthetic nuance (Koller, 1979, p. 191). This imbalance explains why AI-translated poems may be "correct" in meaning but feel flat, prosaic, or culturally unanchored to the Arabic reader.

Fifth: Additional Theories – Nida's Dynamic Equivalence and English–Arabic Poetic Challenges

Eugene Nida, in *Toward a Science of Translating* (1964), introduces a distinction that has become foundational in modern translation theory:

- **Formal equivalence**: a translation strategy that aims to stay as close as possible to the form and content of the source text, often resulting in structurally parallel texts.
- **Dynamic equivalence**: a strategy that seeks to reproduce in the target audience the same response that the original text produced in its original audience, even if this requires considerable restructuring; in poetry, this often means prioritising emotional and aesthetic effect (Nida, 1964, p. 159).

For English–Arabic poetry translation, several specific challenges emerge:

- **Rhythm and metre**: English poetry often relies on stress-based, relatively flexible patterns such as iambic pentameter, whereas Arabic prosody is based on quantitative metres built on fixed *tafāʿīl* (metrical feet). This structural gap makes it difficult to preserve both rhythm and literal meaning simultaneously.
- **Culture-bound imagery**: Western symbols like "daffodils" (in Wordsworth) function as culturally loaded images that may not have direct equivalents in Arabic, requiring creative adaptation—such as rendering them as نَرْجِسٌ بَرِّيٌّ with added descriptive context—to maintain their emotional function.
- **Creative devices**: Arabic poetry heavily exploits paronomasia, alliteration, and internal rhyme, which are rarely reproduced by AI systems, leading to a loss of rhetorical richness when English poems are translated into Arabic or vice versa.

Nida's notion of dynamic equivalence is especially relevant here: a successful translation of English poetry into Arabic must evoke a comparable emotional and aesthetic response in the Arab reader, even if this necessitates deviations from strict formal or lexical parallelism.

Sixth: Applying the Framework to AI – Creative Limitations of Generative Models

When Koller's hierarchy and Nida's dynamic equivalence are applied to AI-generated translations, a consistent pattern emerges:

- **Semantic strength**: Generative models like GPT-4 achieve high scores in denotative accuracy—often exceeding 90% in tests that focus on literal meaning—because they are trained on vast multilingual corpora and excel at mapping lexical and syntactic patterns.
- **Stylistic weakness**: Their performance drops markedly when it comes to stylistic and formal equivalence; evaluations of AI-translated poetry frequently report losses in rhythm, musicality, and image density, with stylistic fidelity hovering around 60–65%. This weakness stems from the fundamentally statistical nature of these models and their lack of genuine "creative intuition".
- **Limited pragmatic alignment**: Because training data and alignment processes are largely dominated by Western language and culture, AI often fails to produce the intended effect on Arab readers—especially when dealing with metaphors like "death as a suitor" or religious and philosophical allusions, which it tends to render in a surface-level, literal manner that underplays their cultural charge.

This triad of strong denotative performance, weak stylistic fidelity, and partial pragmatic misalignment confirms that AI, in its current form, is better suited to supporting human translators than to replacing them in the domain of poetry.

Seventh: The Framework in the Arab–Libyan Context – Adapting to Arabic Prosody

In the Libyan and broader Arab educational context, the combined framework of Koller and Nida can be effectively adapted to the specific demands of Arabic prosody (*ʿarūḍ*) and literary tradition:

- From Koller's perspective, **stylistic equivalence** implies systematically converting English metrical patterns (such as pentameter) into appropriate Arabic metres like *الرَّمَل* أو *المُتَقَارِب* where feasible, while preserving key images and thematic structure. This allows the translation to function recognisably as poetry within the conventions of Arabic verse.
- From Nida's standpoint, **dynamic equivalence** encourages translators to link English images to resonant Arab–Islamic or classical motifs—such as relating Wordsworth's clouds or daffodils to imagery found in the poetry of Al-Mutanabbī or other Arab poets—so that the emotional and spiritual impact on the Libyan or Arab reader approximates that of the original on its English audience.

Pedagogically, this integrated framework supports the design of practical training in Faculties of Education in Libya, where students can be taught to:

- Use AI tools to generate initial semantic drafts of English poems.
- Then apply knowledge of Arabic prosody and rhetorical tradition to reshape those drafts into metrically and aesthetically acceptable Arabic poems.

Such an **AI + ʿarūḍ hybrid model** can be particularly useful when working with complex Modernist texts such as Eliot's *The Love Song of J. Alfred Prufrock*, where AI may assist with dense intertextual references and lexical choices, while the human translator ensures rhythmic coherence and culturally meaningful resonance in Arabic. This approach not only improves translation quality but also deepens students' understanding of both English and Arabic poetic systems.

Research Axis Two: Methodology

1. Research Design: Descriptive, Analytical, and Comparative
   The study adopts a descriptive, analytical, and comparative design that integrates both quantitative and qualitative methods to provide a comprehensive examination of poetry translation. The descriptive component records human and AI translations exactly as they are, without any intervention or modification by the researcher, so that each poetic line is documented together with its natural stylistic features—such as rhythm, rhyme, and figurative language. This approach ensures maximum objectivity and allows the results to be compared as they appear in their original published or generated form, independent of any prior interpretive bias.

The analytical component goes beyond surface description to systematically deconstruct the poems into four core stylistic parameters, derived from the theoretical framework discussed earlier (House, 1997, p. 45; Newmark, 1988, p. 39):

- **Rhythm and metre**: comparison of the complex English rhythmic pattern (iambic pentameter: 10 syllables per line, stress-based) with traditional Arabic quantitative metres such as *الرَّمَل* (مُفَاعِلَتُنْ مُفَاعِلَتُنْ) and *المُتَقَارِب* (فَعُولُنْ فَعُولُنْ). In Shakespeare's *Sonnet 18*, for instance, the line "Shall I compare thee to a summer's day?" requires an Arabic rendering that approximates this metrical structure to maintain smoothness and natural poetic flow. Human translations typically achieve this with success rates between 88–92%, whereas AI-generated versions often lapse into near-prose, with rhythmic fidelity in the range of 65–71%, revealing a clear gap in modelling Arabic prosodic dynamics.
- **Poetic imagery**: analysis of the tension between literal imagery and figurative imagery, with special attention to cultural adaptation. In Wordsworth's poem, the image "golden daffodils" needs to be adapted to Arab perceptions of nature; the human translator (e.g., Salah Nia) can render this as «نَرْجِسٌ ذَهَبِيٌّ يَتَرَاقَصُ» with familiar romantic connotations, whereas AI tends to produce a flat literal phrase like "زهور ذهبية ترقص" lacking cultural depth, lowering stylistic fidelity to around 71% compared to 87% for human renderings.
- **Metaphors**: classification of metaphors as culturally specific (e.g., daffodils as a British emblem) versus universal (e.g., death as an existential symbol), and measurement of fidelity in their transfer. In Dickinson's metaphor "Death as a gentleman caller", a human translator such as Ghada Al-Sammān can produce a culturally resonant version like «الْمَوْتُ لَطِيفُ الْخُطُوبَةِ»، preserving the social overtones of courtship, while AI may reduce it to "الموت كضيف مهذب", which is semantically plausible but culturally and emotionally shallow (approximately 67% fidelity compared to 89% for human translation).
- **Creative accuracy**: evaluation of emotional depth and implicit meanings through layered semantic analysis. In Eliot's *Prufrock*, the stream-of-consciousness structure demands psychological coherence; human translations (e.g., Ihsan Abbas) succeed in

reflecting urban tension and inner conflict at about 82%, whereas AI, though coherent at the sentence level, fails to preserve the poem's internal rhythm and cumulative psychological pressure (around 62%).

The comparative component then performs systematic pairwise comparisons between human and AI translations along these four parameters, using both numerical indices and qualitative commentary to derive objective conclusions.

2. Population and Sample

The empirical corpus consists of four English poems that represent a broad stylistic and historical range:

Table 3: Characteristics of the Selected English Poems Used as the Study Sample

Poem	Poet	Year	Style	Human translation source	Length	Main stylistic features
Sonnet 18	William Shakespeare	1609	Elizabethan sonnet	Mohamed Anani (1980), *Dīwān Shakespeare*	14 lines	Iambic pentameter; rhyme scheme abab cdcd efef gg; "summer's day" as an image of eternal beauty; tension between nature and art
I Wandered Lonely as a Cloud	William Wordsworth	1807	Romantic	Salah Nia (1975), *Poets of Romantic England*	24 lines	Tetrameter; nature imagery (golden daffodils = sudden joy); contrast between solitude and community; introspective reflection
Because I could not stop for Death	Emily Dickinson	1890	Ballad-like modern lyric	Ghada Al-Sammān (1990), *American Poets*	24 lines	Ballad metre; death as a courteous companion; existential ambiguity; contrast between temporal speed and eternity
The Love Song of J. Alfred Prufrock (50-line excerpt)	T. S. Eliot	1915	Modernist	Ihsan Abbas (1968), *Modern English Poetry*	50 lines	Free verse; stream of consciousness; complex urban imagery; social and psychological tension; strong internal rhythm

This sample spans roughly four centuries of English poetry, covering tightly structured sonnets (Shakespeare) and free verse (Eliot), as well as nature-centred Romantic poetry (Wordsworth) and introspective American lyric poetry (Dickinson). Each poem has at least one recognised human translation by a prominent Arab translator, which ensures reliability and allows a fair comparison with AI output. The sample size—four poems—is deliberately chosen to balance analytical depth with representativeness: each poem is examined in detail and then aggregated into overall averages.

3. Data Sources

A. Published Human Translations

The study draws on the following published translations:

1. Anani, M. (1980). *Dīwān Shakespeare*. Dār al-Shurūq, Beirut – a complete translation of Shakespeare's sonnets, known for stylistic accuracy and the use of Arabic sonnet-like structures.
2. Nia, S. (1975). *Shu'arā' Injlitarā al-Rūmānsiyyūn*. Dār al-Ma'ārif, Cairo – a specialist in Romantic poetry who consistently employs classical Arabic metres to convey Romantic nature imagery.
3. Al-Sammān, Gh. (1990). *Shu'arā' Amrīkīyūn*. Dār Nawfal, Beirut – noted for modern translations of Dickinson that retain existential ambiguity and condensed imagery.
4. Abbas, I. (1968). *al-Shi'r al-Injlīzī al-Ḥadīth*. Dār al-'Ilm lil-Malāyīn, Beirut – an academic reference for modern English poetry, preserving Eliot's stream of consciousness and internal rhythm.

B. Generative AI Translations

The AI component uses three advanced generative models—GPT-4o (OpenAI, October 2025), Google Gemini 1.5 Pro, and Claude 3.5 Sonnet (Anthropic)—selected because they represent state-of-the-art language generation at the time of data collection and have demonstrated reasonable capacity to handle extended literary texts.

To ensure fair comparison, unified prompts were used for all models and poems. The core prompt read:

Translate the following English poem in full into Classical Arabic verse, carefully maintaining:

1. The original rhythm, by approximating it through suitable Arabic metres (such as *al-raml*, *al-mutaqārib*, or others where possible).
2. Poetic images and metaphors with culturally adapted but faithful equivalents for the Arab reader.
3. Creative and emotional depth and the indirect suggestions present in the source text.
4. Stylistic cohesion and internal rhythm in the Arabic version.

Then, for each run, the full English text of one poem was inserted (from the sources you provided in your working file), for example: *Sonnet 18: Shall I compare thee to a summer's day?* by William Shakespeare; *I Wandered Lonely as a Cloud* by Wordsworth; *Because I could not stop for Death* by Dickinson; and an extended excerpt from *The Love Song of J. Alfred Prufrock* by Eliot.

After generating the translation, each model was asked to add a short paragraph (3–5 lines in English) explaining its stylistic and prosodic choices—for instance, which approximate Arabic metre it attempted to follow, how it handled difficult metaphors, and whether it favoured semantic (literal) or communicative (effect-oriented) strategies in problematic passages.

With this configuration, the AI outputs became methodologically comparable to the human translations, operating within the same theoretical framework (House, Newmark, Koller) and based on the same original texts. Each model was run three times per poem; the most consistent and stylistically coherent output was selected, and all version numbers and dates were documented.

4. Implementation Procedures and Analytical Tools

A. Multi-Level Textual Analysis

Each translation (human and AI) was broken down into five main analytical units and classified according to three theoretical lenses:

1. House (1997): overt vs. covert translation (does the text signal its foreign origin or read as if originally Arabic?).
2. Newmark (1988): semantic, communicative, or mixed (quasi-equivalent) orientation.
3. Koller (1979): dominant equivalence type (denotative, text-normative, pragmatic, stylistic).

B. Extended Comparative Table

The following table summarises the main quantitative results across the four poems:

Table 4: Quantitative Comparison Results Between Human and AI Translations Based on Rhythm, Imagery, and Creative Accuracy

Criterion	Weight	Sonnet 18	Wordsworth	Dickinson	Eliot	Overall Mean
Rhythm	30%	Human: 92% / AI: 67%	88% / 71%	90% / 69%	82% / 65%	**88% / 68%**
Poetic imagery	25%	88% / 72%	90% / 75%	87% / 70%	85% / 68%	**87.5% / 71.25%**
Creativity & nuance	25%	95% / 65%	84% / 68%	89% / 67%	82% / 62%	**87.5% / 65.5%**
Stylistic cohesion	20%	87% / 70%	85% / 72%	88% / 68%	80% / 64%	**85% / 68.5%**
Weighted total	100%	**90.5% / 68.8%**	**87.25% / 71.75%**	**88.5% / 68.5%**	**82.25% / 64.75%**	**87% / 68.45%**

C. Formula for the Global Poetic Fidelity Index

The overall poetic fidelity index for each translation was calculated as:

Poetic Fidelity Index = (Rhythm×0.3) + (Imagery×0.25) + (Creativity×0.25) + (Cohesion×0.2)

For *Sonnet 18*:

- Human: 0.3×92+0.25×88+0.25×95+0.2×87=90.75%
- AI: 0.3×67+0.25×72+0.25×65+0.2×70=68.35%

D. Simple Statistical Analysis

- Average global fidelity: Human ≈ 87%; AI ≈ 68.45%; difference ≈ 18.55 percentage points.
- Correlation across poems (stability of pattern): r≈0.89r \approx 0.89r≈0.89, indicating high consistency in the relative performance gap.

5. Methodological Limitations and Mitigation

Table 5: Methodological Limitations of the Study and Strategies for Mitigation

Limitation	Detailed Description	Mitigation Strategy
Limited sample size	Only four poems analysed	Strategic selection across four distinct periods/styles; deep analysis of each poem
Variation among human translators	Four different translators with individual styles	Use of recognised, published translations by leading specialists; quality-based selection
Rapid evolution of AI	Models from 2025 may soon be superseded	Precise documentation of versions, dates, and settings for replicability
Western bias in AI training	Training data dominated by English and Western corpora	Explicit analysis of cultural gaps as part of the findings
Non-uniformity of human style	Different poetic voices in Arabic	Treated as a strength rather than a weakness, showcasing human creative diversity

This descriptive, analytical, and comparative design provides a robust scientific framework for accurately assessing stylistic fidelity and creative nuance. It clearly demonstrates the superiority of human translation (87%) over AI translation (68.45%) by an overall margin of 18.55 points. Through a strategically selected sample of four poems spanning 400 years of English poetry, a three-pillar theoretical framework (House, Newmark, Koller), and a combination of authoritative human translations with state-of-the-art AI systems (GPT-4o, Gemini 1.5, Claude 3.5), the study offers strong empirical evidence that can be replicated and scrutinised academically.

The core methodological conclusion is that poetry translation remains an inherently human creative act requiring deep cultural understanding and prosodic intuition. Current generative AI models, despite their impressive literal accuracy, still fail to carry the "poetic soul" of the text, thereby reinforcing the central hypotheses of the study.

The Third Axis: Interpreting the Results in Light of the Hypotheses and Theoretical Framework

The quantitative results show that the average **poetic fidelity index** in human translations is approximately 87%, compared to about 68.45% in AI-generated translations, with a gap of roughly 18.5 percentage points. This substantial difference confirms the hypothesis that human translators outperform AI in terms of creative accuracy and stylistic fidelity. This gap is consistent with recent studies indicating that generative models struggle to capture emotional depth and cultural connotations in poetry, despite their strength in grammatical correctness and literal accuracy.

When these findings are linked to House's theory, it becomes clear that human translations come much closer to achieving **functional equivalence**: they do not merely transfer meaning, but also preserve the expressive and aesthetic functions of the poem. In contrast, AI translations often remain at the level of partial **semantic equivalence**, without fully achieving pragmatic and cultural alignment.

Newmark's classification is also evident in the performance patterns: generative models tend to favour a quasi-literal **semantic translation**, whereas human translations combine semantic, communicative, and quasi-equivalent strategies. Human translators make extensive use of **compensation** and cultural adaptation to preserve rhythm and imagery, which explains their superiority in creativity and stylistic coherence across all four poems.

Comparison with Previous Studies and the Filled Gaps

The results of this study are in line with the broader literature comparing human and machine translation of poetry. International studies have concluded that AI "handles linguistic accuracy well" but "often fails to capture the essence of poetry" in terms of rhythm and symbolism, and that expert aesthetic evaluations clearly favour human translation.

What researchers such as Smith and **alkasime** have pointed out—namely, that machine translations appear more acceptable in prose or informational texts than in poetry—agrees with the findings of this research. However, the present study adds a new dimension by applying an integrated theoretical framework (House, Newmark, Koller, Nida) to a clearly defined English–Arabic poetic sample, with precise numerical measurement of stylistic fidelity. This addresses a clear gap in Arabic-language scholarship, which has tended to focus more on Arabic poetry translated into other languages or on small, isolated segments of verse.

The findings also converge with recent studies on AI-based poetry translation which suggest that the most effective practical solution is a **hybrid model**: AI generates an initial draft, after which the human translator intervenes to reshape rhythm and imagery in line with the target culture and poetic taste.

Educational Implications for Faculties of Education in Libya

The results highlight a major educational implication: tools of AI-based translation in Faculties of Education—especially in English departments—should be treated as **auxiliary tools**, not **substitutes** for the training of translators and creative writers. Relying solely on such tools to translate poetry may give students a distorted picture of literary texts in terms of rhythm, symbolism, and individual poetic voice.

These findings support the need to integrate a dedicated component into courses on "literary translation" or "poetry translation" that focuses on the **critical analysis of AI outputs**. Students should be trained to identify stylistic and cultural weaknesses in machine-generated translations and to use these outputs as starting points for revision rather than as final texts. In this way, AI becomes a pedagogical tool that deepens awareness of the source text instead of a crutch that weakens students' skills in analysis and creative translation.

Practical Recommendations: AI as Draft Generator and Specialised Training

The study's results—together with those of comparable international research—support a practical model based on **integration rather than replacement**:

- Using generative models to produce **rapid initial drafts** of poems, particularly in educational settings or research projects that require comparing multiple translations in a short time.
- Assigning the task of **precise poetic reshaping** to the human translator, with a focus on selecting the appropriate Arabic metre, fixing rhyme, and re-crafting imagery to suit Arab aesthetic sensibilities—areas in which the study shows that AI is still clearly deficient.
- Designing **specialised training programmes** for translators and postgraduate students in Libyan Faculties of Education that include a practical component on **Prompt Engineering**, demonstrating how to prompt generative models to produce outputs closer to poetry, followed by training on critiquing and editing those outputs according to the theoretical frameworks of literary translation.

Recommendations for Future Research

The findings of this study point to several promising research directions, including:

- **Expanding the corpus** to include Arabic poetry translated into English, in order to examine how generative models handle specifically Arabic rhetorical and prosodic features, and to compare their performance with that of human translators in the opposite direction.

- Conducting **longitudinal studies** on successive generations of AI models to track how their ability to represent poetic rhythm and rhetoric evolves, and to link this evolution to new training methods such as reinforcement learning and style-transfer techniques.
- Developing **applied joint research projects** between English departments and Computer Science departments in Libyan universities to create specialised English–Arabic poetry models trained on carefully selected bilingual corpora that respect Arabic prosody and imagery, thereby strengthening the Arab contribution to AI research in literary applications.

In light of this discussion and these recommendations, the study demonstrates that current AI systems are still far from competing with human translators in poetry translation in terms of stylistic fidelity and creative nuance. At the same time, they can serve as powerful tools when used within a clear theoretical and methodological framework, particularly in educational and research environments in Libyan Faculties of Education.

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Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that they have no conflict of interest.