

Aspects of creativity in AI-powered Polish-to-English literary translation

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Abstract

This research paper explores the capabilities and limitations of various AI models in translating Polish literary texts into English. The study examines the impact of different prompt settings on translation output, focusing on the creativity, accuracy, and correctness of AI-generated texts. The aspect of creativity in the generated texts is analysed through the application of creative shifts as proposed by Bayer-Hohenwarter. By evaluating translations generated by diverse AI models with varied prompts, this research aims to provide insights into the role of AI in literary translation and its potential to bridge linguistic and cultural gaps. The paper highlights the potential challenges and considerations associated with augmented creativity, reviews the current state of research, and offers recommendations for further studies in this domain.

Keywords: *translation creativity, artificial intelligence, creative shifts, machine translation, literary translation*

1. Introduction

The advent of advanced artificial intelligence (AI) models, particularly large language models (LLMs), has led to significant advancements in the field of machine translation. However, the translation of literary texts – rich in stylistic nuances, cultural references, and subtle meanings – presents a unique challenge. This research aims to explore the capabilities and limitations of various AI models in translating Polish literary texts into English, with a particular focus on the impact of different prompt settings on the translations produced, their creative solutions, translation accuracy, and the preservation of source text imagery. Through this investigation, the study seeks to deepen our understanding of AI's role in literary translation and assess its potential to bridge linguistic and cultural divides.

Artificial intelligence is increasingly being utilised across various fields, including translation. While AI translation tools, particularly those based on machine translation (MT), have made considerable progress, concerns remain about their ability to capture the subtleties and intricacies of literary language. Nevertheless, translators are actively exploring and incorporating AI tools into their workflows, seeking innovative ways to leverage these technologies. Recent developments in AI-powered translation systems, notably neural machine translation (NMT), have ignited discussions within translation studies about the concept of creativity in machine-generated translations. Although AI models have shown remarkable proficiency in producing fluent and accurate translations, their ability to generate truly creative output remains a subject of ongoing research and debate.

2. Literature review

Early investigations by Guerberof Arenas & Toral (2020) explored the notion of creativity in machine-generated translations of the story *Murder in the Mall*. The study defined creativity as a blend of novelty and acceptability, comparing the outcomes of machine translation, post-editing of machine translations, and human translations. The results consistently showed that human translations attained the highest creativity scores, while raw MT scored the lowest. This suggests that NMT systems, even when trained on literary data, lack the ability to produce creative translations and tend to favour literal solutions. Moreover, the study revealed that using MT as a foundation for post-editing can potentially constrain the creativity of human translators. Post-edited translations, compared to those produced solely by humans, consistently exhibited a lower degree of creativity. This was evident in a reduced tendency to deviate from literal renderings and a diminished ability to handle units of creative potential effectively. While these distinctions may seem minor, they are nonetheless significant, as subtle elements such as voice, rhythm, and style are precisely what elevate a translation from merely functional to truly distinctive.

Toral & Way (2018: 263) investigated the quality of NMT on literary text, which they claim is “the greatest challenge for MT”. They compared the performance of NMT with the previous dominant paradigm, phrase-based statistical machine translation (PBSMT), using English-to-Catalan translations of novels. The researchers first trained both NMT and PBSMT systems with over 100 million words of literary texts and evaluated the resulting translation with both automatic evaluation metric (BLEU) and using human evaluation. They concluded that NMT provided a viable solution for literary translation and proposed that future work should focus on integrating NMT into professional literary translation through post-editing. Toral and Way also observed that the difficulty of training MT systems on a vast amount of bilingual parallel literary text was a challenge before the advent of e-books. The wide availability of e-books in digital format created an opportunity to build MT systems specifically for novels, which in turn resulted in better performance.

Subsequent research by Guerberof Arenas & Toral (2022) further corroborated the finding that human translation generally exhibits greater creativity than MT or post-editing. This study highlighted the crucial role of human intervention in navigating cultural contexts and making subjective choices, both vital components of creative translation. More recently, Jiménez-Crespo (2024) explored the influence of AI and large language models on the translation landscape. While AI can generate novel content, Jiménez-Crespo (2024: 319) emphasised that human-generated texts are perceived as more creative, since creativity in translation involves processes richer than just creating “never-before-seen content”. This highlights the continued importance of human expertise in creative endeavours such as translation, advocating for a human-centred AI approach that augments human capabilities rather than replacing them, particularly in creative fields.

In contrast, a study carried out by Hu & Li (2023) showcased the creative potential of the AI-powered translation system DeepL in translating Shakespearean plays into Chinese. DeepL achieved over 80% accuracy and fluency, demonstrating its capability to handle complex texts across languages. Furthermore, it exhibited creativity through techniques such as adding words for clarity, shifting perspectives, and employing specific Chinese grammatical structures. However, identified accuracy and fluency errors, including overly literal translations, indicated that AI is not yet ready to fully replace human translators. It

should also be noted that the researchers did not include the analysis of the Shakespearean verse in their study.

At the same time, Wang (2023) investigated the increasing application of AI-powered machine translation, highlighting the unique characteristics, complexity, and cultural significance of literary translation – often overlooked amidst the advancements in MT. Employing sociological theories, Wang identifies three key challenges in applying MT to literary texts: the deeply ingrained habits and skills translators develop over time, a complex network of human and non-human actors, and the cultural and ethical implications of MT in literary contexts. Wang argues that current MT systems merely simulate human translation, potentially undermining the processes of meaning generation and cultural knowledge production inherent in literary translation. The study concludes that until MT can be proven both effective and safe for literary texts, human translators remain indispensable for managing the complexities and nuances in those texts.

Łoboda & Mastela (2023) observed in their study that although it is believed that in some areas, e.g. translating for EU institutions, neural machine translation engines can reach surprisingly high-quality scores, their use in literary texts is a controversial subject. Łoboda and Mastela suggest introducing post-editing exercises into translator education to enhance students' cultural sensitivity and to make them aware of the limitations of machine translation. The authors propose that such exercises, particularly with culture-bound texts, can serve as an innovative way to develop students' technological, linguistic, and cultural competencies. By working with texts rich in cultural elements, students learn to identify when a machine is likely to fail. The study found that students with prior training were more critical of machine translation output and better at detecting and correcting errors, demonstrating the value of this pedagogical approach.

Recent research offers diverging perspectives on the role of AI in creative translation. For example, Gao et al. (2024) explored the creative potential of artificial intelligence in translating Chinese poetry into English. They observed that ChatGPT could generate novel combinations of words and phrases, capturing the essence of the original poems while offering fresh interpretations. However, fidelity issues persisted, and ChatGPT struggled to apply its understanding of specific phrases consistently during translations. Conversely, Runco (2023) presents a contrasting viewpoint, contending that AI cannot exhibit true creativity. He argues that while AI outputs may appear original and effective, they lack key characteristics of human creativity, such as self-actualisation and emergent thought. Runco proposes viewing AI output as a form of pseudo-creativity. Bridging these perspectives, Škobo (2023) examined the integration of AI in literary translation, finding that while AI offers benefits such as time-saving and improved consistency, it struggles with the nuances, metaphors, and figurative language intrinsic to literary works. The study highlights that human expertise, creativity, and critical thinking are essential for capturing the artistic value of the original text.

The impact of AI on translation, particularly in the literary domain, is a complex and multifaceted issue. While AI demonstrates impressive capabilities in generating fluent and accurate translations, its capacity for true creativity remains a subject of debate. Human expertise, with its nuanced understanding of language and culture, continues to play a vital role in preserving the artistic value and essence of literary works in translation. However, the increasing prevalence of inexpensive and easily accessible machine translations is increasing its share of the market, with publishers offering low rates to translators for post-editing machine-translated texts, raising ethical concerns regarding transparency and fair

compensation. As Li (2023) notes, the increasing use of AI in translation challenges the professional identity of translators, downplaying the human contribution to a supporting role. Li highlights that this trend directly impacts translation quality, as AI systems are prone to biases derived from their training data, which is based on statistics rather than personal understanding. These biases include issues related to gender, race and nationality. While some companies like Nuanxed and China Literature openly embrace AI in translation, using human collaborators to edit machine-translated books, ethical questions persist. Under international intellectual property law, a translation is considered a derivative work, but an ethical question emerges whether an AI translation can have authorship. Li (2023: 537) refers to the US Supreme Court case *Naruto v. Slater*, which established that a non-human individual cannot claim copyright ownership, thus an AI translator is merely a tool. Another issue mentioned by Li (2023: 538) in the context of ethics is the AI retranslations of existing works, as they integrate the language expressions of previous human translations. Those issues, not properly managed by translators' associations so far, need to be addressed more systematically, especially in translator education. Fortunately, the use of AI translation is not commonly encouraged, for instance platforms like Amazon KDP advise against the use of AI for literary content, emphasizing its potential to damage an author's reputation (Albarino 2023).

In the realm of machine translation, LLMs like ChatGPT-4 – while not specifically designed for translation – are increasingly being utilised for this purpose due to their extensive training data encompassing various languages. Although specialised machine translation systems still outperform LLMs in terms of translation quality, particularly for specialised texts, LLMs offer a valuable complementary role, providing faster initial translations or suggestions for professional translators. In the context of literary translation, LLMs face challenges in capturing the nuances and complexities inherent in literary language. While AI excels at translating everyday language, the subtle wordplay and deeper meanings often found in literature can be lost in AI-generated translations. Advancements in NMT, which utilises artificial neural networks to make contextual connections between words and phrases, offer promising avenues for improvement, initiating a growing trend of employing AI in the domain of literary translation. These experiments serve not only to demonstrate the evolving capabilities of machines, but also to actively challenge the perceived boundaries of AI's potential in handling complex literary forms.

A notable example of AI's expanding role in literary translation is a recent initiative undertaken by a publishing house from Kraków, which launched the "Conceptual Line" series with a unique translation of Alfred Jarry's play *Ubu Roi*, generated entirely by Google Translate. This attempt, led by Aleksandra Małecka and Piotr Marecki (2018), was not aimed at creating a flawless translation but rather at conducting an experiment in conceptual art. They intentionally selected *Ubu Roi*, a play renowned for its absurdity and its goal of creating theatre without theatre. By employing machine translation, they sought a "translation without translation", embracing the awkwardness, nonsensical phrases, and errors produced by the algorithm as an extension of Jarry's spirit of absurdity. Another project employed Chat GPT-4 to translate the play from French to Polish, with prompts engineered by Jan K. Argasiński (Argasiński & Marecki 2024). The goal was to produce a simplified translation, followed by a summary, a dramatic retelling, and a prosaic adaptation infused with modern youth slang and profanity. The project, showcasing both the potential and limitations of AI in capturing the essence of the play while creatively adapting its language, reached its apex with the publication of *UBU GPT* (Jarry 2024), a physical book presenting these AI-generated interpretations. This experiment followed the concept of uncreative

writing, challenging traditional notions of creativity and authorship, where text is treated as data to be manipulated and transformed. It highlighted AI's potential in literary studies and creative practices by generating new insights and interpretations of classic works, positioning translation within the realm of conceptual art. The idea was not to replace human translators but to broaden the creative possibilities of translation and encourage reflection on technology's role in artistic expression, with AI's transformative potential used to generate new forms of literary expression.

In a similar vein, the experiment described in this paper aims to examine the possibilities and limitations of the most advanced technology when applied to a specific literary genre, and to verify whether and to what extent currently available AI tools are capable of replicating the nuanced understanding and resourcefulness of contemporary literary texts. Using the framework of creative shifts proposed by Bayer-Hohenwarter (2009, 2010, 2011), the study poses the question whether the output produced by modern large language models can be regarded as creative and comparable to human creative translations.

3. The source material

The source material selected for this study is a fragment from *Love Song*, a book by Karolina Krasny – a young writer, poet, and designer from Kraków – published in 2024 by Ha!Art, the same publishing house that released the ChatGPT-generated *UBU GPT*. According to the publisher's description, *Love Song* is a narrative that explores the transformative power of love on its surroundings. The two protagonists exist in a state of correspondence with nature, their community, and the urban fabric they inhabit. Reviewers have compared Krasny's poetic text to cubist paintings, with characters as letters and relationships as impossible figures.

The fragment selected for the study, titled "Field Wedding", describes a wedding ceremony where the main characters, Zet and XY (the bride and groom) feel alienated and overwhelmed by the formality and expectations of the event. The text features a distinctive style characterised by a skilful blending of vivid imagery and a sense of detachment, creating a unique, surreal atmosphere. The author frequently uses figurative language, unconventional metaphors and similes, enriching the text and adding layers of meaning and emotional depths. The couple is likened to metal, their vows to steel, and their shrinking bodies to fabric folding in on itself. Sensory details and visual and tactile imagery immerse the reader in the scene, with the hard and tense surroundings, cold or hot metal, and the scent of perfume mingling with the buzzing of flies.

Apart from figurative language and sensory descriptions, other challenges awaiting the translator of this text include the blending of formal and informal language, as well as the occasional use of fragmented sentences and ellipses, all of which contribute to the dreamlike atmosphere of the text. The text is characterised by a distinctive contrast between mundane elements and surreal imagery. This juxtaposition is evident in the author's lexical choices, blending colloquialisms with poetic language and creating tension between the ordinary and the extraordinary. Sudden shifts in perspective, particularly the transition to first-person narration in *cudzy oddech był tym samym, co mój* (lit. 'someone else's breath was the same as mine'), present a challenge in maintaining coherence and narrative flow in the target language. The translator must decide whether to preserve this shift or to normalise it for the sake of consistency in English.

4. AI tools and methods

The study, conducted in December 2024, used three selected AI models (ChatGPT 4o created by OpenAI, Claude 3.5 Sonet built by Anthropic, and Gemini Advanced 1.5 Pro offered by Google AI) and three different prompts to generate multiple English translations of this text. The prompts were designed specifically to obtain responses corresponding to three levels of the temperature parameter settings. In AI-generated texts, temperature settings play a pivotal role in controlling the balance between creativity and coherence. The temperature parameter in LLMs is intrinsically linked to their capacity for creative output, particularly in the realm of narrative generation. By controlling the randomness of the LLM's output, temperature influences the diversity and unpredictability of the generated text (Bhupen 2024). Higher temperature values encourage the model to explore less probable options, leading to more diverse and imaginative outputs. Conversely, lower temperature values constrain the model to favour the most likely tokens, resulting in more focused and predictable text. The choice of temperature setting depends on the specific application and the desired outcome. While higher temperatures stimulate novelty and creative expression, they also increase the risk of generating incoherent or nonsensical responses. Therefore, it is crucial to evaluate the generated text for inaccuracies or AI hallucinations, as strategic adjustment of the temperature parameter allows users to control the behaviour of LLMs and achieve desired levels of creativity. However, as it proved infeasible in this study to directly manipulate the temperature in all three AI tools, an intermediate solution was applied to modify the temperature within the prompt itself (Ramlochan 2024).

Each model generated three translations based on three distinct prompts designed to simulate varying levels of the temperature parameter: low, medium, and high. The low-temperature prompt was: "Translate the following text conservatively into English, focusing on literal meaning rather than idiomatic expressions". The medium-temperature prompt instructed the tool to: "Translate the following text while maintaining a balanced tone – clear and informative but also engaging and natural. Ensure the translation captures the essence of the original text without being too rigid or too free". Lastly, the high-temperature prompt asked the AI model to:

Provide a vivid, expressive translation of the following text. Feel free to use colourful language, idiomatic expressions, and creative phrasing to capture the spirit and mood of the original in a way that resonates strongly in the target language. While preserving the core meaning, prioritise the sound of the target language and follow the melody of the original, do not focus on rhyme in English, do not create a poem, but try to reconstruct the rhythm from the Polish language.

These prompts were finalised after preliminary testing on a short sample, which revealed the need to instruct the models explicitly to avoid generating poetry or rhymes, as they were being produced in response to the prompt asking for prioritising the language. All translations were produced using a new chat each time to avoid any references to previous prompts and contexts. The resulting outputs were labelled as Ch1, Ch2, Ch3 (for ChatGPT), C11, C12, C13 (for Claude), G1, G2, G3 (for Gemini), according to the applied prompt. These labels are utilised throughout the subsequent analysis presented in this paper and a literal translation of the Polish text is provided in brackets with each reference to the source text.

This study employs a mix of quantitative and qualitative methods to analyse the translation data generated by different AI models and prompt settings. The objective is to assess the impact of these variables on translation quality, identify patterns and trends, and draw conclusions regarding the strengths and weaknesses of AI in literary translation. To ensure a comprehensive evaluation, the output translations were assessed based on a set of predefined criteria. First, their correctness was determined by examining grammatical accuracy, appropriateness of vocabulary, and adherence to English language conventions. Second, accuracy was evaluated by assessing the faithfulness of the translation to the original meaning and intent of the Polish source text. Lastly, to evaluate creativity, the study utilised the approach proposed by Bayer-Hohenwarter (2009, 2010, 2011), focusing on the identification of creative shifts such as abstractions, concretisations, and modifications, and their frequency in the analysed texts as indicators of the creative features of the translated text. Furthermore, the study investigated the processing of figurative language, metaphors, and stylistic choices to effectively capture the aesthetic qualities of the original text. This multi-faceted approach was designed to provide valuable insights into the capabilities and limitations of AI in the domain of literary translation.

5. Results

To be creative, translation must first and foremost be fit for purpose, i.e. linguistically correct and accurate. Therefore, the initial phase of the analysis involved a careful examination of the generated translations, focusing on their linguistic correctness. Each translation was evaluated independently for the presence of any linguistic errors. The most common issue identified was the use of punctuation, such as the overuse of dashes instead of semicolons or some commas that could have been used differently to ensure better flow. However, this unconventional use of punctuation in some places corresponded to the rhythm of the original text and did not depend on any specific prompt. Major errors were not common in the AI-generated translations; the only grammar problems concerned the past tense. For example, in two translations generated by Claude (C11 and C12), the use of tenses followed the unconventional but correct structure of the Polish language, as shown in (1).

- (1) ST: Naraz zrzucili każdą z możliwych warstw, chwycili się i stoją.
 (lit. ‘At once they have shed every possible layer, grasped each other and are standing’)
- C11, C12: At once, they shed each possible layer, grasped each other and stand.

In another fragment, as in (2), instead of applying the expected sequence of tenses, the translation mirrored the form of the source text.

- (2) ST: Chciał krzyknąć o udach, na których dziś zaśnie.
 (lit. ‘He wanted to shout about the thighs on which he would fall asleep today’)
- C11: He wanted to shout about the thighs he’ll sleep on today.

Translation versions 1 and 2 generated by Claude were characterised by calques, with several instances of literary translation of individual words that failed to produce correct collocations in the target language or distorted the meaning. For example, *sweat spots* (meaning ‘heat rash’) was used as a translation of *plamki potu* (lit. ‘little spots of sweat’) or *give slaps* was a literal translation of *dawać klapsy* in C11 and C12. In most responses generated for prompts 1 and 2, the target sentences followed the structure of the source language, resulting in awkward and unnatural phrasing. For instance: *In the field they chose, a circle was mowed and an approach to this circle two meters wide* (as a direct equivalent of *Na polu, które wybrali, wykoszono koło i dojście do tego koła o szerokości dwóch metrów*). This tendency was also evident in the translation of the phrase *młoda para* (lit. ‘young couple’, meaning ‘the bride and the groom’) in several translations (C11, C12, Ge2). In this particular context, the translation contradicted the source text, as the bride was an older woman. However, only ChatGPT consistently used the correct phrase *the bride and groom* in all three translations, at least in the first part of the text. Later in the text, ChatGPT reverted to employing the calque *the young couple* for subsequent occurrences of *młoda para*.

Regarding the aspect of accuracy, ChatGPT also showed a tendency to alter the name of the character Zet. In two outputs (Ch1 and Ch3), the form *Zeta* was used, despite the fact that nothing in the source text suggested this variation, as the name consistently appeared in its uninflected form.

A grammar issue related to accuracy was observed in the use of tenses in example (3), which refers to the internal monologue of the main character XY.

- (3) ST: XY nie działa, pomyślał, no tak, to byłoby chore, gdyby XY działał.
(lit. ‘XY doesn’t work, he thought, well yes, it would be sick if XY worked’)

Individual translations rendered this fragment using the following different structures:

- Ch1: XY doesn’t work, he thought. Well, of course, it would be insane if XY worked.
- Ch2, Ch3: XY is malfunctioning, he thought. Of course, it would be twisted if XY worked properly.
- C11: XY doesn’t work, he thought, well, it would be sick if XY worked.
- C12: XY doesn’t work, he thought, well, it would be sick if XY did work.
- C13: XY’s on the fritz, he mused, yeah, it’d be messed up if XY actually worked right.
- G1, G3: XY doesn’t work, he thought, well, yeah, it would be sick if XY worked.
- G2: XY doesn’t work, he thought, yeah, it would be sick if XY worked.

The choice between the present continuous and present simple in this case does not result in significant changes to the story but reflects the internal state of the main character, who is described using the imagery of a machine (e.g. *sweat-like smear*, *vows of steel*, *metal surrounding*). Using the continuous form (which was surprisingly rare in the AI-generated output) would better correspond to XY’s present condition, emphasising that he is not functioning as he should at that specific moment.

The creativity of the AI-generated texts was examined through the analysis of creative shifts and non-standard renderings of poetic imagery. The task of measuring creativity has long been considered challenging due to the perceived difficulty of quantifying the inherently subjective quality of a text. Nonetheless, Bayer-Hohenwarter (2009: 45) has proposed criteria for measuring and promoting translational creativity, focusing on the concept of creative shifts. In this approach, creative shifts are cognitive categories contrasting with traditional shift concepts such as addition, change, or omission, which are primarily form-oriented categories. Bayer-Hohenwarter argues that creative shifts involve semantic changes at the level of abstraction, where a translator employs abstraction, modification, or concretisation to achieve novelty. This demonstrates flexibility, a key indicator of creativity in translation. To produce a translation that effectively fulfils its intended purpose, translators often need to move beyond simple word-for-word translations that require less cognitive effort. Instead, they may need to employ more complex strategies involving understanding the deeper meaning of the source text beyond its literal wording. These strategies require significantly more cognitive effort than reproduction, the term used for non-creative translation. It might be expected that AI-generated texts would tend to adhere closely to the source text, resulting in a machine-like quality often described as translationese. However, unlike machine translation tools that typically provide one single version of the translation – albeit with some modifiable elements, as suggested in changes offered by tools like DeepL – AI tools can follow a series of instructions, adapt to the context, and comply with the imposed style as specified in the prompt. Additionally, the nature of the response generated by the tool can be determined by adjusting the temperature setting. Given the inability to use all three tools via an IT interface that allows parameter adjustments, the prompts were carefully structured to ensure responses corresponding to three temperature levels: low, medium, and high.

The analysed texts demonstrated the presence of all three types of creative shifts identified by Bayer-Hohenwarter: abstractions, concretisations, and modifications. These shifts are summarised in Table 1, categorised by specific AI models and prompts.

Table 1: Creative shifts identified in AI-generated translations

| | Ch1 | Ch2 | Ch3 | C11 | C12 | C13 | G1 | G2 | G3 |
|---------------------------------|-----|-----|-----|-----|-----|-----|----|----|----|
| Abstractions | | 1 | 1 | | | | 1 | | |
| Concretisations | 3 | 13 | 14 | | | 43 | 5 | 6 | 6 |
| Modifications | 2 | 6 | 4 | | 1 | 16 | 1 | 1 | 2 |
| Total number of creative shifts | 5 | 20 | 19 | 0 | 1 | 59 | 7 | 7 | 8 |

The analysis of nine texts generated by three AI tools demonstrated that, although all three types of creative shifts were present in the translations, abstractions – referring to cases where translators resort to solutions that are more general or abstract than the source text meaning – were clearly the least frequent. Abstractions were identified in only two cases: *the couple* as a translation of *mloda para* (‘the bride and groom’, lit. ‘young couple’) in Ch 3 and G1; *In the chosen area* is used as a translation of *Na polu, które wybrali* (lit. ‘In the field they selected’).

The high frequency of concretisations is consistent with a general feature of translated texts, which “tend to be simpler, more standardised, and more explicit, retaining some characteristics that pertain to the source language” (Zhang & Toral 2019: 73). Apart from representing a creative shift and thus a sign of flexibility, concretisations can be associated with “depth of analysis”, i.e., going beyond the mere surface of the apparent and obvious to provide details of what is assumed to be the core meaning (Bayer-Hohenwarter 2009: 46). Concretisations can be identified in cases where the translation evokes a more explicit and precise idea or image than the source text, sometimes by adding an element that changes the tone of the utterance. For example, the rendering of the phrase *dawać klapsy* (‘spank’, lit. ‘give slaps’) as *to playfully slap* (G2) demonstrates this shift.

Concretisations were clearly more frequent in texts generated in response to prompts 2 and 3 (corresponding to medium and high temperature settings in the AI tools), although they were also present in texts generated in response to the first prompt. These shifts typically involved specific words and phrases, e.g., *Each of the guests’ foreheads tilted* as a translation of the phrase *Każdy z gościnnych łbów pochylił się* (lit. ‘Each of the guest heads bowed’) in G1. They also affected entire sentences, e.g., *The horizon line crept closer to that big sky dome* as an equivalent of the fragment *Linii horyzontu było bliżej do kopuły* (lit. ‘The horizon line was closer to the dome’). This version provided a specific interpretation of the phrase, clearly altering the tone of the source text.

The term *modification* refers to the shifts that occur at the same level of abstraction, such as expressing a source text metaphor with a different target text metaphor, without making the image more abstract or concrete (Bayer-Hohenwarter 2010: 88). An interesting example of modification can be found in the Ch1 translation of the following fragment: *baldachimy, kable i krawaty nie poddawały się wiatrowi ani słońcu* (lit. ‘canopies, cables and ties did not yield to the wind or the sun’), which was rendered as *canopies, cables, and ties resisted both the wind and the sun*. Here, the negative construction in the source text was replaced with a positive form in the translation.

Another noteworthy example concerns the translation of the sentence *Zapletli włosy w warkocze i przykryli twarze białym pudrem* (lit. ‘They braided their hair and covered their faces with white powder’), rendered by ChatGPT (Ch2) as *Their hair was woven into braids, and their faces dusted with white powder*. This translation replaced the dynamic, action-oriented image highlighted by the active voice in the source text with a more descriptive and static image employing a passive voice. While the source texts emphasised the agency and actions of the couple, the target text focused on the results of their actions, creating a sense of observation. It should also be noted that, while the source text used a more direct and literal description (*covered with white powder*), AI-generated text employed more figurative language with the phrase *dusted with white powder*, where *dusted* creates a more visual and perhaps delicate image. The choice of active or passive voice, along with subtle differences in wording, shifts the emphasis and creates different effects for the reader. The source text emphasises the actions while the AI-generated translation focuses on the visual result.

The AI tools used in this experiment responded very differently to the same prompts, as evidenced by the number of creative shifts. While the output generated by ChatGPT and Gemini differed only in terms of specific translation solutions applied, the difference with Claude was much more pronounced. Prompts 1 and 2 resulted in more or less literal translations of the source text, preserving the sentence structure and imagery of the original, thus producing a machine-translationese effect. However, prompt 3, intended to elicit a response with a high-temperature setting, produced a text with strong emotional meaning.

This was achieved through the abundant use of emotionally charged vocabulary, e.g., *Most guests sported flip-flops, 'cause for some damn reason, blisters were all the rage that summer* as a translation of the more neutral Polish sentence *Większość gości przysła w japonkach, bo — z nieznanym powodów — tego lata było łatwo o otarcia* (lit. 'Most of the guests came in flip-flops because – for reasons unknown – it was easy to get chafed this summer'), or *The guests were too busy melting in the heat to notice a damn thing* as a translation of the direct, clear, and simple *Goście byli zbyt zajęci upałem, żeby zauważyć jakkolwiek zmianę* (lit. 'Guests were too busy in the heat to notice any change'). Interestingly, this translation included plenty of metaphors and similes that were absent from the source text, e.g., *canopies, cables, and neckties all giving the finger to wind and sun alike* as a rendering of the Polish *baldachimy, kable i krawaty nie poddawały się wiatrowi ani słońcu* (lit. 'canopies, cables and ties did not yield to the wind or the sun'), or *times were tough as nails* as a translation of *czasy były ciężkie* (lit. 'times were tough'). This version of the translation also employed changes in imagery, such as rendering the Polish phrase *Garnitur ścigał go na dół jak woda* (lit. 'The suit was pulling him down like water') as *His monkey suit dragged him down like a lead weight*. Remarkably, the poetic imagery was consistent with the overall context of the source text. For instance, C13 used the phrase *As they took centre stage in that grassy arena* as an equivalent of *Kiedy stanęli po środku koła* (lit. 'When they stood in the middle of the circle'). Although the image of grass was not explicitly present in this sentence, the entire scene was set up in a field, making the use of the adjective *grassy* seem justified. Contrary to the common opinion of machine-translated or AI-generated translations, this version did not merely reproduce the source text without additional elements or modifications. Instead, it displayed a tendency to impose a particular point of view on the emotional state of the characters through the use of emotionally charged vocabulary, e.g., *He parroted words that might as well have been gibberish* as a rendering of the original *Powtarzał słowa, których nie rozumiał* (lit. 'He repeated words he did not understand').

The analysis of the number of individual translation solutions provided for a single problem by the AI tools yielded interesting results. This capacity to produce multiple solutions corresponded to the concept of fluency in Bayer-Hohenwarter's (2009: 41) framework of translation creativity. In this regard, AI was particularly helpful in finding translations for unconventional phrases. For that reason, it was considered useful to compare how different tools rendered specific sentences that set the tone of the text. Krasny's text involves imagery of metal, machinery, and a robotic setting, juxtaposed with a wedding ceremony. This same idea was rendered by the AI tools using a varied selection of vocabulary, as shown in (4).

- (4) ST: A XY nie chciał przysiąc ze stali.
 (lit. 'And XY did not want oaths of steel')
- Ch1: But XY didn't want oaths of steel.
- Ch2/3: And XY didn't want vows forged in steel.
- C11: And XY didn't want steel vows.
- C12: But XY didn't want steel vows.
- C13: But XY wasn't after iron-clad vows.
- G1/2/3: And XY didn't want vows made of steel.

The AI suggestions differ in the level of formality and the imagery they create. For instance, *vows* is slightly less formal than *oaths* in Ch1, and the use of the conjunction *but* instead of *and* might imply a contrast that is not present in the original. The addition of *forged* enhances the imagery, which is absent in the original, potentially altering the emphasis of the text and risking over-translation. On the one hand, not all options sound natural in English (e.g. *steel vows*), although this literal word order and awkwardness can be used to retain the concept of the source text. On the other hand, the option that adds unnecessary words (*made of*) makes the sentence less concise.

Another example of figurative language applied by the author to create a surrealistic imagery of machinery is the sentence describing the groom's emotional state under intense pressure in the analysed scene: *Spocił się smarem* (lit. 'He sweated with grease'). The AI solutions provided several options combining the image of sweat and grease, although in one case *smear* was replaced with *oil*, as shown below.

- Ch1: He sweated oil
- Ch2/3: Sweat slicked his skin like grease
- C11/2, G1/3: He sweated grease
- C13: Sweat slicked him like grease
- G2: He was sweating grease.

Those examples show the wide range of solutions generated by AI, starting with a simple word-for-word translation (*he sweated grease*), using a term that typically applies to machines, not human beings (*sweated oil*), to focusing on the physical sensation and appearance (*sweat slicked him like grease*). Notably, the translations differ not only in the choice of lexical elements, but also the grammatical form: The version produced by Gemini, for instance, uses the past continuous, emphasising the groom's state at a particular moment. As can be seen from these examples, the versions generated by Claude in response to prompt 3 are consistently the furthest from the literal translation, representing the boldest approach. However, such intervention in the text, which enhances imagery and imposes a particular perspective, carries the risk of over-translation. Moreover, it alters the author's original style, which relies on simple words and phrases, inviting the reader to imagine the story between the spoken words and to experience emotion through the imagery evoked in the reader's mind rather than through overtly emotive language.

6. Conclusions

The AI-generated translations analysed in this paper demonstrated the presence of all three procedures (abstraction, modification, and concretisation) recognised as creativity shifts – measures of the creative features of the translated text. In her original paper, Bayer-Hohenwarter (2009: 46) claimed that if such shifts result in an adequate product, the application of these procedures is considered a creative process in itself. Interestingly, Bayer-Hohenwarter contrasted creative translation produced by experienced translators and translation trainers with the superficial reproduction accomplished by machines. As seen in the analysis of specific translation solutions, current translation tools are capable of processing much more than the surface level of language, taking into account the overall context, imagery, and imposed style.

Paul Kussmaul (2000: 118), a pioneer in research on creativity and translation, argued that creative translation requires a balance between originality and appropriateness. While the translation should exhibit novelty and an element of surprise, it must also remain suitable for the intended audience and context. The translations generated by all three AI models demonstrated appropriateness, as they were, overall, accurate and linguistically correct texts that complied with the translation brief, presented here in the form of a structured prompt. Individual rare errors were easy to correct. The translations also contained elements of surprise in the form of unique translation solutions or specific choices of vocabulary. However, as is evident from the quantitative analysis of creative shifts, especially in the output produced by the Claude AI model, the balance between originality and accuracy proved problematic. The texts tended to be either too literal or too complicated, with creative additions and changes introduced in almost every sentence of the translation. These changes imposed certain imagery and heavily affected the authorial voice of the Polish author. This proves that the mere identification of creative shifts is a problematic measure of creativity in the context of AI-generated texts. Further research should focus on emotional intelligence in AI, exploring the subtle balance underlying creative expressions, which sometimes sacrifice accuracy to capture the emotional impact of the original.

However, the variety of solutions provided by different prompts in different tools might be particularly useful for translators brainstorming ideas. In this sense, the resourcefulness of the tools might contribute to the creative process, embodying the idea of augmented creativity, where artificial intelligence develops a large number of possible solutions, thus supporting translators in idea generation and contributing to human culture (Griebel et al. 2020). AI models excel at quickly and accurately translating large volumes of text, handling different language structures and identifying the most likely meaning of words based on context. In this regard, they can also be useful in the field of literary translation – not to mimic human creativity or to replace professional translators, but by offering options for human editors to choose from. AI tools are constantly evolving, and over time, they could be trained on larger datasets with richer contextual information, providing better output and new tools for specific languages (e.g. the Polish Large Language Model Bielik). Based on the experiment described in this paper, it can be concluded that, at the current stage of development, AI can assist human translators by providing initial drafts, suggesting alternative translations, and handling the technical aspects of translation. However, AI still lacks balance and a sensitivity to nuance. It is probable that the future of translation will involve collaboration between humans and AI models, leveraging the unique strengths of each. At the same time, it should not be forgotten that the rise of AI in translation also presents significant ethical questions. When an AI system is trained on vast amounts of existing literary works, it blurs the line between human and machine creativity. The output generated by AI can be seen as an appropriation of the skills and creations of human translators, as it synthesises their work without credit or compensation. AI-generated translations also risk perpetuating biases present in their training data, leading to translations that may lack cultural sensitivity and nuance, which can result in the loss of cultural content. As AI is based on data and statistics and not personal understanding, it is less capable of capturing the subtleties of human language. While AI offers opportunities for efficiency and can assist in handling the technical aspects of translation, providing an unparalleled opportunity to investigate new tools, the future of the field seems to lie in collaboration between human translators and AI, but this requires a careful re-examination of concepts like originality, novelty and creativity, as well as fair compensation.

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