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Могілевець Вероніки Олександрівни
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факультету германської філології і перекладу
денної форми здобуття освіти
Спеціальності 035 Філологія

Науковий керівник
кандидат філологічних наук, доцент
Редька Інна Анатоліївна

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Course Paper

Stylistic peculiarities of computer poetry

Veronika Mohilevets
MLa 03-20
The Faculty of Germanic Philology and Translation
Full-Time Study
Speciality 035 Philology

Research Adviser
Assoc. Prof. Redka I. A.
PhD (Linguistics)

Kyiv 2024

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INTRODUCTION

Relevance of research. In the ever-evolving realm of literature, the convergence with artificial intelligence (AI) signals a significant transformation in the creative landscape. With ongoing technological progress, the fusion of AI and literature has birthed innovative modes of artistic expression, disrupting conventional concepts of authorship and human creativity. AI's venture into literature opens up uncharted avenues, challenging the limitations of human imagination and inventiveness. This exploration is especially pertinent in poetry, where the intricate interaction of language, emotion, and creativity traditionally encapsulates the essence of the human condition.

There are various scholars that have contributed to the study of computer poetry, among them R. Bailey, P.Bootz, K. Choi, C.T.Funkhouser, L.P.Glazier, Ch. Hartman, J.Hutson, Ch.Linardaki, and others.

However, research literature still lacks a systematic study of stylistic peculiarities of computer poetry. This determines the relevance of this work.

The aim of the research is to explore stylistic peculiarities of computer poetry.

To meet the research aim, we need to address the following tasks:

- Tracing the development of computer-generated poetry;
- Investigating technological influences on poetic style:
- Analysing the impact of algorithmic structure on style;
- Examining the use of language and imagery in computer-generated poems.

The object of the research is computer poetry.

The subject of the research is stylistic peculiarities of computer poetry.

The research methodology includes the use of the following methods: selective observation, stylistic analysis, discursive analysis, analysis and synthesis.

PART 1
CHARACTERISTICS OF COMPUTER POETRY

1.1. Evolution of computer-generated poetry

In 1959, in Stuttgart, West Germany, Max Bense, a German linguist, along with engineer Theo Lutz, created the earliest electronic free verses using a machine referred to as a "calculator" rather than a computer (Bailey 1973). This is considered to be the birth of computer-generated poetry[1].

Due to advancements in technology, in the subsequent years, further experiments in electronic poetry emerged in Canada and France (Jackson et al. 1996). In 1959, a French engineer named François Le Lionnais persuaded Raymond Queneau to establish the "Séminaire de Littérature Expérimentale", which later evolved into the renowned Oulipo, the "Ouvroir de Littérature Potentielle", in 1960 (Funkhouser 2012). It's worth noting the poem *Tape Mark* by Nanni Balestrini, which was created in 1961 using an IBM calculating machine (Bootz 2007). In 1985, during an international exhibition at the Centre Georges Pompidou in Paris called "Les Immatériaux", the Alamo group debuted their initial computer-generated poems, marking the emergence of a novel form of visual poetry animated by this innovative medium (Bootz and Baldwin 2010).

In addition to this technological revolution, we must highlight another significant development in 1993, when the technology that popularized the internet was invented (Funkhouser 2007). From that point on, there was a surge in websites dedicated to "cyber-poetry", giving rise to a new generation of digital authors (Glazier 2002). The emergence of the internet marked a distinct departure from the past and offered unforeseen possibilities for literary creation. Not only did it offer new avenues for literary and poetic works, but the World Wide Web also empowered individuals to become their own publishers (Gold 2012). Since then, we've seen a continuous proliferation of poetic creations being published online.

[1] Around the same time in the United States, Brion Gysin achieved a similar feat.

While it's accurate that each medium evolves its unique structure, also valid, narratively speaking, to acknowledge that the same medium can produce various outcomes, such as books and newspapers. McLuhan's famous equation (1962) suggests that digital poetry can undergo redefinition: unable to solely rely on language, poetry must adapt to the medium. Electronic writing offers numerous creative opportunities by visually presenting the various elements that influence the interpretation of a sign, incorporating verbal signs and audio-visual images within the same visual space (Hartman 1996). While these "new" technologies render the writing space, or the medium, immaterial, the sanctity of poetic expression remains rooted in materiality (Greimas, 1972). By heightening the disruption of communicative language structures (Kristeva, 1974), digital technologies appear to amplify poetic diversity. The computer and the Internet introduced a novel spatial and temporal dimension to text, including within poetic works.

There are various types of electronic poetry (Hayles 2007; Hayles 2008). For example:

- Dynamic electronic poetry or flash poetry: emphasizes word and image dynamism, essential for constructing meaning.

- Visual e-poetry: images interact with or aid in deciphering the text.

- Digital poetry with passive interaction: readers click on existing links to progress through the text, not necessarily in a linear manner.

- Digital poetry with active interaction: readers contribute to the creation of the text.

- Generative e-poetry: utilizes text generators.

- Collaborative e-poetry: involves collaboration between multiple contributors.

- ASCII poems: focus on the use of code.

1.2. Technological influences on poetic style

Computer poetry is created by computers using Machine Learning technology, which is a crucial subset of artificial intelligence (Higgins et al. 2012a;

Higgins et al. 2012b). The fundamental process involves training a machine-learning algorithm with a specific dataset, and its predictive capabilities can be remarkably surprising. While humans play a role in this process, machine learning remains a collaborative effort between humans and machines.

Let us consider as an example the collaboration between machine-learning technology and the English poet William Shakespeare. In the UK, SwiftKey, a technology and artificial intelligence company, focuses on improving the interaction between keyboards, smart devices, and users. It enhances smartphone keyboards to facilitate faster typing by employing artificial intelligence to learn from each user, enabling autocorrection and prediction of their next word or phrase.

SwiftKey's programmers undertake the task of training the application using the complete works of Shakespeare. Consequently, the application can suggest lines from Shakespeare's plays, ranging from Macbeth to The Tempest, allowing users to type Shakespearean passages more efficiently directly from the keyboard. By continuously learning from users' input and incorporating Shakespeare's sonnets and complete works, SwiftKey gradually adapts to Shakespeare's language. The keyboard can identify which play the user is quoting from and suggest popular phrases to incorporate into their typing.

Through this endeavour, SwiftKey's programmers expand the capabilities of machine-learning technology to specifically assist in poetry creation (Kac 2007). This initiative, dubbed "Swift-Speare", results in a unique outcome: co-created pieces of poetry blending Shakespeare's genius with machine-learning technology (see Appendix A).

So, we can conclude that computer poetry, with its unique blend of algorithms and creativity, showcases several distinctive characteristics.

Firstly, it transcends traditional human limitations, exploring linguistic landscapes beyond human imagination.

Secondly, it often employs algorithms to generate verses, blending logic with artistic expression.

Thirdly, computer poetry is highly versatile, capable of producing a wide

array of styles and forms, from traditional sonnets to experimental verse.

Finally, it challenges conventional notions of authorship, inviting us to ponder the role of machines in shaping our cultural and artistic landscapes.

PART 2
STYLISTIC ELEMENTS IN COMPUTER POETRY

2.1. Algorithmic structure and its impact on style

As for "The topic model-based corpus construction and computer-aided creation research" (Pandi and Rajendran, 2016), the topic model employing LDA uses reference word recommendation to examine and analyse word characteristics in poetry, including vocabulary semantic analysis and style feature analysis. Another study (Mojaveriyan, 2016) uses the vector space model (VSM) to represent poem texts and proposes two classification models for classical poems: bold and graceful, and graceful. These classification models, based on machine learning and natural language processing, effectively classify poetry styles, yielding satisfactory results.

Additionally, (Nayak and Nayak, 2015) segments poems based on poetry metrics and statistical word segmentation methods, establishing a poetry vocabulary database. Machine learning methods are then applied to analyse poetry style characteristics, perform classification evaluations, and conduct sentiment analysis. Furthermore, research in related fields concentrates on enhancing the algorithm of the poetry style machine classification model to enhance the accuracy of poetry style evaluation. Overall, the early-stage corpus construction and computer processing procedures in this domain are well-defined.

The treatment of poems can be seen as a specialized form of text processing (Soleymanpour and Marvi, 2016). T. Oki (2015) developed a "Poetry Computer Aided Research System", which focuses on the poem's vocabulary as the primary research unit, enabling word retrieval, word frequency statistics, and image indexing. A. Tommaseland and D. Godoy (2017) introduced a natural language processing technique based on word connections for understanding poetic language, conducting successful tests involving poetry vocabulary material labelling, preliminary analysis of poetic language, and evaluations of poetic language styles.

G. Wu, M. Zhao, and L. Han (2016) combined naive Bayes with genetic algorithms to propose a computational model for assessing the bold and graceful

style of classical poetry, using each character of the poem as the smallest unit. This approach yielded promising results when tested on a corpus of classic poetry. Furthermore, Z. Robati, M. Zahedi, and N. F. Far (2015) integrated Bayesian classification technology into poetry research from a thematic perspective, yielding favourable experimental outcomes.

T. Zia, Q. Abbas, and M. P. Akhtar (2015) introduced a classification approach for poem topics utilizing point mutual information and LDA, achieving favourable classification outcomes concerning the correlation between poem topics and the evolution of time periods. T. Zia, M. P. Akhtar, and Q. Abbas (2015) employed the vector space model (VSM) to transform poetry texts into vectors and selected word features through the chi-square test. Subsequently, a text classifier was constructed using the naive Bayes and support vector machine algorithm, resulting in an average classification accuracy rate of 74.7%.

With the emergence of deep learning, D. Li, Z. J. Xue, and C. Lih (2016) implemented the RNN neural network for generating ancient Chinese poetry, utilizing the entire historical corpus of poetry as the training dataset. Certain constraints were imposed between words and lines in the generated poetry to enhance its effectiveness compared to traditional poetry generation systems. K. Yan, Z. Li, and C. Zhang (2016) used the RNN model to generate poetry quatrains and successfully incorporated an attention mechanism, enabling the poetry to learn semantics, structure, rhyme, and other information simultaneously. G. Kumar and K. Vivekanandan (2017), building on the RNN model, optimized the word vectors of poetry and introduced attention mechanisms and hybrid training. This approach resulted in a model capable of generating topic-related poems based on keywords, yielding promising outcomes (Zia et al 2015).

Assessing poetry style follows a process akin to general text classification. Initially, the algorithm pre-processes poetry documents within the corpus and maps them to a vector space suitable for computer processing. Pre-styled poem documents are chosen as the training and test corpora. Next, machine learning methods are employed to generate model data for style classification. Finally, based on the tested

model data, the algorithm constructs a machine judging tool for poetry style, which can assess the style of other poetry documents within the corpus. The flowchart depicting the style evaluation process is illustrated in Appendix B.

Poetry, comprising textual content, falls under unstructured data, posing challenges for quantitative analysis methods. Introducing measurable data indicators becomes essential for effective data analysis and processing. A common approach involves segmenting text content and then tallying word frequency data. High-frequency words, frequently occurring in poems, often convey the emotional inclination and stylistic traits reflected in the poet's choice of imagery. To classify and group poets and their styles, researchers primarily employ high-frequency word statistics to categorize and consolidate the stylistic attributes of poets. The cluster analysis of word styles is presented in Appendix C.

2.2. Use of language and imagery in computer-generated poems

We will select an AI-generated poem along for analysis. This method involves choosing specific units that fit the study's requirements precisely (Patton, 1990), allowing for a detailed examination of the selected poem to gain focused insights into ChatGPT 4's creative abilities and outputs.

A unique poem was created using ChatGPT 4. The author then conducted an extensive self-examination of the poem, noting prevalent themes, stylistic elements, and literary devices. This analysis didn't adhere strictly to any single literary theory or model; instead, it embraced a holistic and adaptable approach to grasp the individual qualities of the poem and the creative capabilities of AI. This method ensured that the analysis suited the specific attributes of AI-generated poetry.

The examination of the AI-created poem (see Appendix D) illustrates the significant but anticipated interaction between the specificity of the prompts and the resulting output.

The poem, drawing heavily from E.E. Cummings' style permanently displays his distinctive minimalism and unorthodox punctuation. The inclusion of rhyme in the concluding lines, as directed by the prompt, offers a poignant conclusion to the

poem, emphasizing its thematic depth. While the prompt is sufficiently detailed, it lacks the depth needed for extensive user-training, which could lead to a more intricate outcome.

"Whispers in Solitude" distinguishes itself with its introspective nature, employing paradox and vivid imagery to evoke mystery and depth. The poem delves into the exploration of presence and absence, as highlighted by the phrase *"I am here (not here)",* which resonates deeply. Solitude and introspection are central **themes** of the poem, aligning with the prompt's thematic direction. In terms of **literary devices**, the poem uses contrast, such as *"shadow within shadows"* and *"(un)seen",* to enhance the portrayal of an intricate inner world that often goes unnoticed. By juxtaposing a single shadow with multiple shadows, the poem emphasizes a deeper layer of obscurity. This interplay enriches the imagery, suggesting hidden depths within the poem. Similarly, the use of parentheses around *"un"* creates a contrast between "seen" and "unseen". Metaphors involving space and stars effectively convey the feeling of insignificance yet significance. Additionally, alliteration, like "**l**one**l**y, yet in **l**one**l**iness" and "a **s**hadow within **s**hadows", enhances the rhythmic flow of certain lines, contributing to the poem's captivating effect.

In accordance with the instructions, the poem adopts a free-flowing style, suggesting internal reflections of the poet or speaker. It employs parentheses (*"i am here (not here) in the quiet"*) and irregular capitalization (*"i speak fluently"*) as distinctive **stylistic choices**. This unconventional use of punctuation and capitalization mirrors the approach often found in modernist, free-form poetry, akin to the works of E.E. Cummings. Emotionally, the poem evokes a sense of melancholy and introspection, portraying a feeling of solitude intertwined with peace. The concluding lines, *"lonely, yet in loneliness, I meet",* beautifully capture the bittersweet solace of solitude. Regarding the rhyme scheme, the poem adheres to the prompt by introducing rhyme only in the final couplet.

Regarding the perspective, the poem adopts a first-person viewpoint, offering an intimate and direct glimpse into the speaker's innermost thoughts and emotions. The use of "i" (though not capitalized) accentuates the personal and subjective nature

of the solitude experienced by the speaker.

We thus can conclude that while the poem itself is satisfactory, AI's limited grasp becomes apparent in certain poetic nuances, such as rhythmic and structural variations that could enrich it. Consequently, the poem's structure tends to be formulaic, closely mirroring E.E. Cummings' renowned works without deviation. While not inherently negative, this adherence to Cummings' minimalist style may diminish the poem's artistic merit, as it risks appearing overly derivative and stifling AI's own poetic voice. Some lines' lengths disrupt the poem's flow, and the absence of sensory details hinders the evocative portrayal of solitude. Although Chat GPT 4 can adhere to prescribed structures and patterns, it lacks an innate understanding of the deliberate breaking or bending of conventions, often employed by human poets like E.E. Cummings for dramatic or emotional impact.

CONCLUSIONS

The advent of computers and the Internet introduced a new spatial and temporal dimension to text, extending to poetic works. There are several types of computer poetry, including:

- Dynamic electronic poetry or flash poetry: prioritizes the dynamic interplay between words and images to construct meaning.
- Visual e-poetry: involves images that interact with or assist in interpreting the text.
- Digital poetry with passive interaction: readers navigate through the text by clicking on existing links, often in a non-linear manner.
- Digital poetry with active interaction: readers contribute to the creation of the text.
- Generative e-poetry: uses text generators.
- Collaborative e-poetry: involves cooperation among multiple contributors.
- ASCII poems: focus on the use of code.

Computer-generated poetry is produced by computers employing Machine Learning technology, which is a vital component of artificial intelligence. The basic procedure entails training a machine-learning algorithm with a designated dataset, and its predictive abilities can be remarkably unexpected. Although humans are involved in this process, machine learning remains a cooperative endeavour between humans and machines.

Computer-generated poetry, which consists of textual material, is categorized as unstructured data, presenting obstacles for quantitative analysis techniques. Incorporating measurable data markers becomes crucial for efficient data analysis and manipulation. A typical strategy involves dividing the text material into segments and then compiling data on word frequency. Words that occur frequently, common in poems, often convey the emotional tone and stylistic characteristics reflected in the poet's selection of imagery. To classify poets and their styles,

researchers primarily utilize statistics on high-frequency words to categorize and unify the stylistic elements of poets.

Cutting-edge conversational AI models like ChatGPT have transformed text generation in today's world, and poetry creation is no exception. However, while AI-generated poems might appear identical to human-written ones to the untrained observer, studies reveal distinct disparities between AI-generated and human poetry. AI-generated works are often regarded as artistic endeavours rather than masterpieces.

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RÉSUMÉ

This research aims to investigate the stylistic peculiarities of computer poetry. Computer-generated poetry is crafted through the using of Machine Learning technology by computers, an integral facet of artificial intelligence. The fundamental process involves training a machine-learning algorithm with a specified dataset, often yielding unexpectedly remarkable predictive capabilities. Despite human involvement in this process, machine learning remains a collaborative effort between humans and machines.

Textual material constituting computer-generated poetry is classified as unstructured data, presenting challenges for quantitative analysis methods. It becomes imperative to introduce measurable data indicators for effective data analysis and manipulation. A common approach involves segmenting the text material and compiling data on word frequency. Frequently occurring words, typical in poems, often convey the emotional tone and stylistic attributes reflected in the poet's choice of imagery. Researchers primarily employ statistics on high-frequency words to classify and unify the stylistic elements of poets and their styles.

Cutting-edge conversational AI models such as ChatGPT have revolutionized text generation in contemporary society, extending to the creation of poetry. However, while AI-generated poems may seem indistinguishable from human-written ones to the untrained eye, research reveals distinct differences between AI-generated and human poetry. AI-generated works are often perceived as artistic endeavours rather than masterpieces.

Key words: Computer poetry, Machine Learning technology, Imagery, ChatGPT, AI-generated poems.

APPENDICES

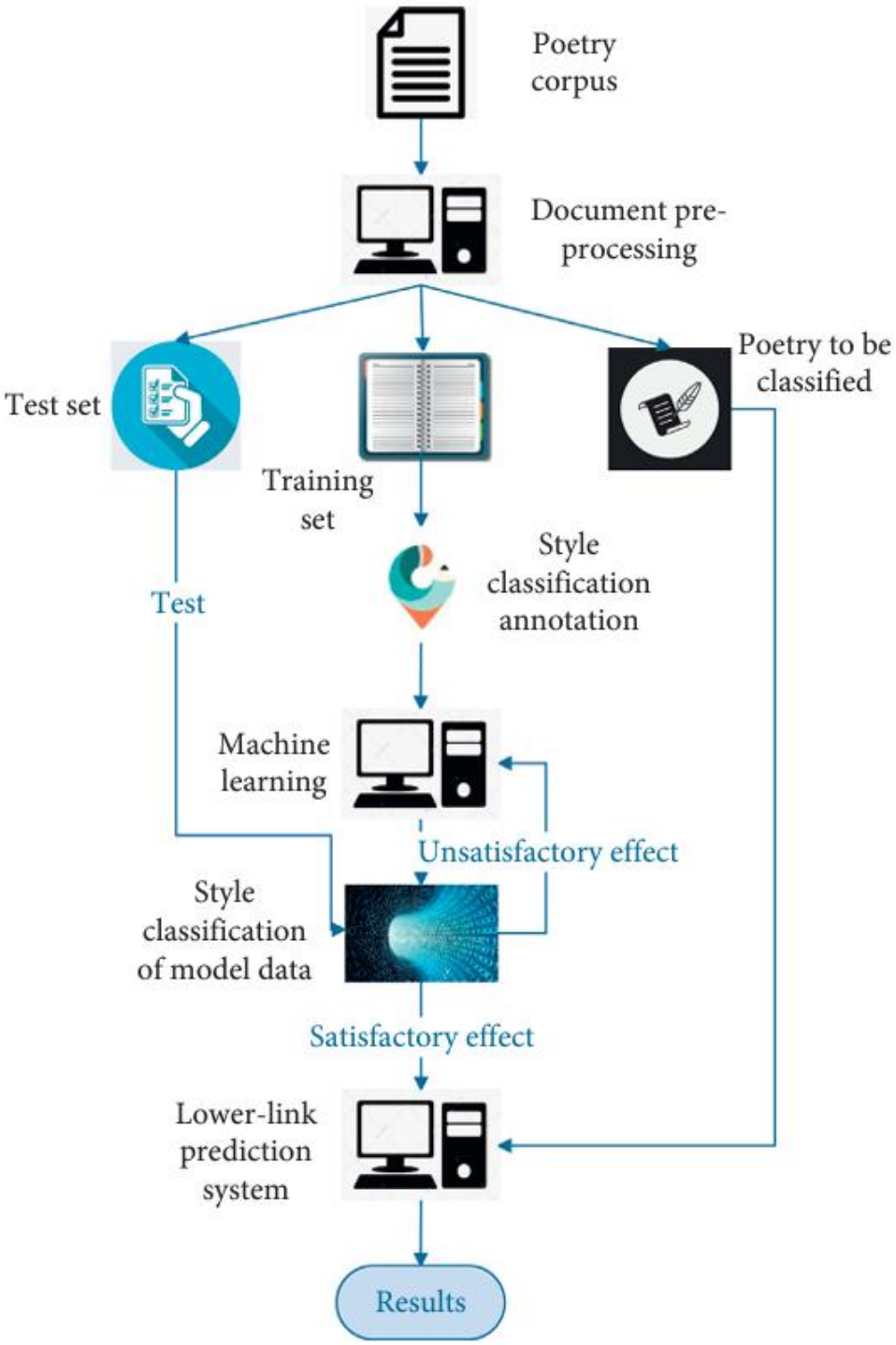
Appendix A

"Swift-Speare"

When I in dream behold thy fairest shade
Whose shade in dreams doth wake the sleeping morn
The daytime shadow of my love betray'd
Lends hideous night to dreaming's faded form
Were painted frowns to gild mere false rebuff
Then shouldn't my heart be patient as the sands
… (Daily Mail 27 January 2014)

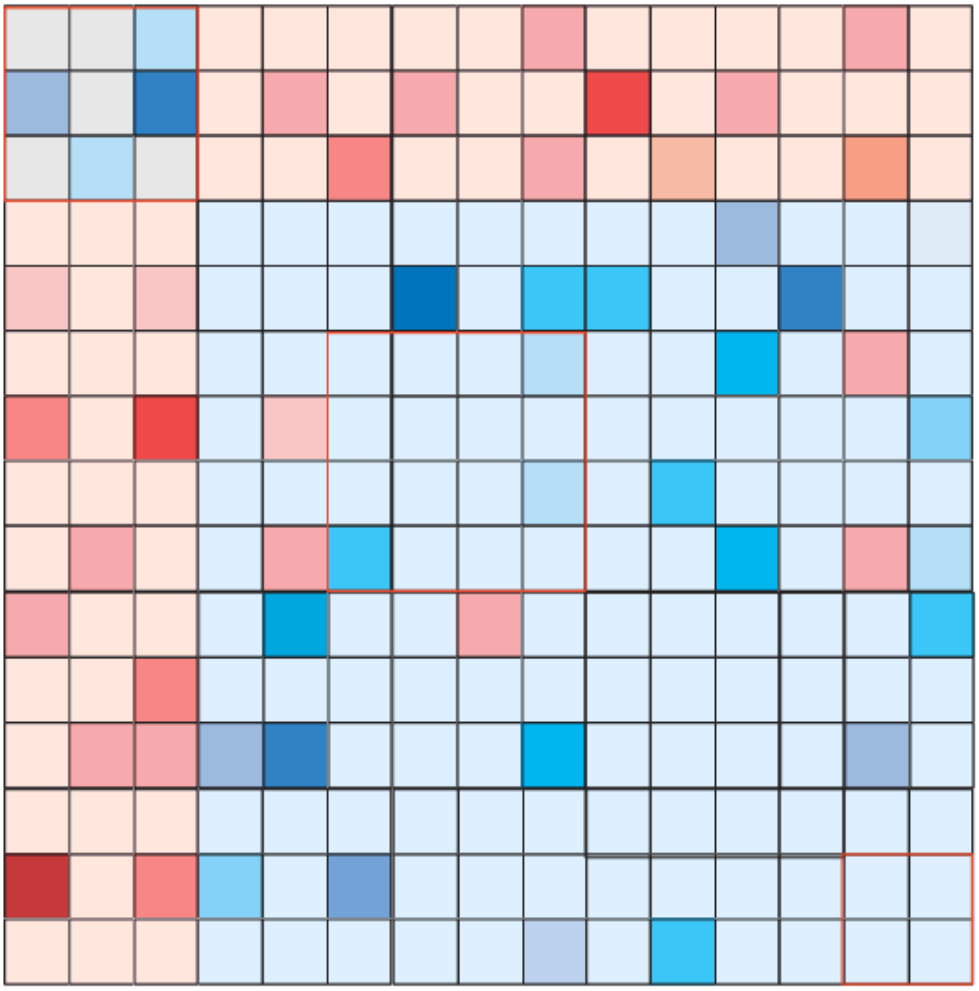
Appendix B

Poetry classification process



Appendix C

Cluster analysis of word style



Whispers in Solitude

in this solitude, i am (un)seen,
a shadow within shadows, whispering to the void,
world(s) spin, unaware of my silent echo,
i am here (not here) in the quiet.

spaces between stars, like the gaps in my words,
fragmented, yet whole in their brokenness,
a paradox, wrapped in the enigma of alone,
solitude, a language only i speak fluently.

in this stillness, my heart finds its beat,
lonely, yet in loneliness, i meet.