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LINGUO-COGNITIVE MARKERS IN HUMAN VS AI TEXT ATTRIBUTION: A CASE STUDY OF NARRATIVE AND DESCRIPTIVE DISCOURSE

This research aims to investigate and compare writing strategies in human-generated and AI-generated texts, focusing on linguistic features and identifying indicators that distinguish between the two.

The paper examines the role of discourse markers as indicators of text authorship, focusing on thematic comparisons between parallel texts created by humans and artificial intelligence. The article follows the conventional structure including Introduction, Literature Review, Research Methodology, Results and Discussion, Conclusion, and Supplement.

From the viewpoint of creating English texts by non-native speakers, using discourse markers to determine the origin of texts emphasises the relevance and novelty of the research. A distinct advantage of the study lies in the identification of similarities and differences between texts produced by human writers and artificial intelligence, exemplified through narrative and descriptive texts. Investigating linguistic features and cognitive markers in these texts illuminates the nuances of literary discourse functioning and contributes to a balanced understanding of the impact of information technologies on various communication domains.

The conclusions highlight prospects for research in the coexistence of and interaction between human creativity and artificial intelligence technologies. Ultimately, the research offers a fresh perspective on discourse markers and their role in discourse construction and functioning. It identifies characteristic features of narrative and descriptive texts created by humans and artificial intelligence. The obtained results enrich the understanding of linguistic and cognitive markers in discourse creation, especially in the context of rapid technological advancements in the field of artificial intelligence.

Key words: *artificial intelligence, authorship, critical thinking, discourse markers, description, lingvo-cognitive analysis, narration.*

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ЛІНГВОКОГНІТИВНІ МАРКЕРИ ВИЗНАЧЕННЯ ПОХОДЖЕННЯ ТЕКСТІВ, СТВОРЕНИХ ЛЮДИНОЮ ТА ШТУЧНИМ ІНТЕЛЕКТОМ: ТЕМАТИЧНЕ ДОСЛІДЖЕННЯ НАРАТИВНОГО ТА ОПИСОВОГО ДИСКУРСУ

Необхідність дослідження ролі лінгво-когнітивних маркерів для визначення авторства текстів, створених людиною та штучним інтелектом, викликана стрімким розвитком інтелектуальних технологій, які широко використовуються як додаткове знаряддя та для підвищення ефективності традиційних практик дискурсотворення. Наголошуючи на значущості людської творчості в різноманітних сферах комунікації, нашою метою є вивчення та порівняння стратегій побудови наративних та описових текстів, створених людьми і штучним інтелектом, з особливою увагою до виявлення лінгвістичних характеристик і параметрів, що дозволяють розрізнати походження тексту.

Автори розглядають роль лінгвістичних та екстралінгвістичних маркерів дискурсу як показників авторства тексту із застосуванням тематичного зіставлення та порівняння наративних та описових текстів, створених людиною та штучним інтелектом. Стаття має загальноприйнятну структуру академічного дослідження і складається зі Вступу, Огляду літератури, Методології дослідження, Результатів та обговорення і Висновків. Таблиці, знімки екрана та Додатки містять зразки текстів, створених штучним інтелектом, які зіставляються з автентичними авторськими текстами й досліджуються за допомогою якісних методів і контент-аналізу.

З точки зору створення англійських текстів ненативними мовцями, використання дискурс-маркерів для визначення походження текстів засвідчує актуальність і новизну статті. Особливим надбанням дослідження є виявлення схожостей та розбіжностей між текстами, створеними людьми та штучним інтелектом, на прикладі наративних та описових текстів. Аналіз лінгвокогнітивних особливостей і маркерів у цих текстах висвітлює нюанси функціонування літературного дискурсу і вносить вагомий внесок у більш глибоке розуміння впливу інформаційних технологій на різні сфери комунікації.

Висновки окреслюють перспективи подальших досліджень щодо взаємозв'язку між людською творчістю та інтелектуальними технологіями. У кінцевому підсумку, дослідження пропонує новий погляд на дискурс-маркери та їх роль у конструюванні та функціонуванні дискурсу. Отримані результати збагачують академічне розуміння лінгвокогнітивних факторів у дискурсотворенні, особливо за умов швидкого технологічного розвитку у сфері штучного інтелекту.

Ключові слова: авторство, дискурс-маркер, критичне мислення, лінгвокогнітивний аналіз, наратив, опис, штучний інтелект.

*“[T]ricking us into believing that artificial intelligence is human is really just about finding the right balance of weirdness and neuroses – because people are weird-but it won't have the dramatic important **human experience** that I feel like drama demands; but it may be able to fool us into thinking that that's what it is.”*

Blayne Weaver (Weaver, 2023: 3:44–4:02).

1. Introduction

Effective communication involves constructing different types of discourse in various contexts. This process poses unique challenges, understanding which is essential for improving communication skills, writing strategies, and discourse analysis.

In a non-native environment, communication can be a complicated issue. However, with the right

tools and skills, these challenges can serve as a starting point for developing and improving language proficiency, as well as mastering writing strategies that encompass techniques of organisation, coherence, and persuasion. A clear understanding of discourse markers, which act as communication guides, helps to structure ideas and sound coherently so as to effectively convey the communicators' thoughts.

We presume that by recognising and using relevant discourse markers, non-native speakers can master conventional writing techniques, thereby avoiding or overcoming miscommunication in diverse contexts.

As a fundamental means of communication and expression, writing has long been the domain of human intellect. However, with the development of *AI*, a new paradigm has emerged, where large language models (LLM) such as *ChatGPT*, capable of producing coherent and contextually relevant texts, demonstrate high proficiency in generating texts that rival human-authored works. As a result, the realm of writing has undergone a significant transformation, raising unequivocal questions about the interplay of *AI* productivity and human creativity.

Substitution of human creativity with *AI* productivity might gradually lead to reduction of and primitivism in cognitive skills of the consumer of a text created by artificial intelligence, especially in non-native environments. *AI* generated content should be used as a supplement, not substitution, so that non-native users avoid the trap to switch off their cognitive skills. This assumption defines the **hypothesis** of our research.

The research problem focuses on exploring the challenges that non-native users of English encounter when constructing the basic types of discourse by identifying the specific linguistic and cognitive factors that contribute to these challenges. In particular, our research examines narrative and descriptive writing strategies by examining linguistic features and tracking the indicators that differentiate *AI*-generated content from human writing.

Regarding the process, instructional, expository, reasoning, and persuasive writing, Kay Stewart and Marian Kowler (Stewart & Kowler, 1991: 23–27) consider them as potential integral parts of narration. In view of this reason and the size limitations for this contribution, the remaining types of writing can be studied in separate research. In particular, process and instructional texts may be problematic when organising information and providing clear instructions. Expository writing difficulties may occur when selecting relevant examples, providing clear definitions, and organising information effectively. Reasoning-based discourse may present confusion

in analysing similarities and differences, evaluating advantages and disadvantages, and identifying causes and effects. Issues in persuasive writing may include constructing strong arguments (Fedoriv & Ratushna, 2023: 346–353), appealing to the target audience, and presenting persuasive evidence.

In this context, our research **goal** is to gain a broad understanding of the challenges related to constructing various types of writing—namely, narrative and descriptive—through examining linguistic features and discourse markers in human-authored and *AI*-generated content.

2. Literature Review

The herewith literature review presents the details of effective communication and various **writing types**, the **communication challenges** encountered by non-native language users, and the role of **discourse markers** in structuring ideas. Additionally, it considers the relationship between ***AI-generated texts*** and cognitive engagement, as well as integration of **critical thinking**, offering a comprehensive overview of these interconnected themes.

2.1. Research of Types of Writing

Traditional studies of writing focused on techniques employed to effectively convey ideas and gravitated towards such areas as organisation, coherence, and argumentation.

Shifting our focus towards the classification of writing according to its purpose and intended audience, we find that, among other authors, Lynn Quitman Troyka and Cy Storm (Troyka & Storm, 1999: 4–6) distinguish the expressive, informative, and persuasive functions of writing. Expressive writing involves the private recording of thoughts and feelings, such as personal journal entries. It allows individuals to explore emotions and experiences without the intention of public exposure. On the other hand, informative writing aims to provide information and explanations on various subjects. This type of writing, also known as expository writing, focuses on presenting ideas and facts clearly to educate the readers. Informative writing can be found in textbooks, encyclopaedias, technical reports, newspapers, and magazines. It requires presenting information accurately and verifiably, without bias or persuasion. Lastly, persuasive writing seeks to change or reinforce the readers' opinions and encourage them to take action. Writers use persuasive strategies, offering convincing support for their point of view. This type of writing includes editorials, letters to the editor, reviews, opinion essays, and proposals that argue for a specific perspective. To achieve persuasion, writers incorporate informative elements, using evidence to strengthen their arguments.

Our preliminary study (Fedoriv, Shuhai, & Pirozhenko, 2023: 10–11) introduces a discussion of the challenges involved in constructing different types of discourse. Proceeding from the classification offered by Mary Lou Colin (Colin, 1990), we distinguish the following five groups of writing: **narrative and descriptive writing**: narration, description; **process and instructional writing**: process, instructional or how-to writing; **expository writing**: examples, classification and division; **reasoning**: comparison and contrast, advantages and disadvantages, causes and effects; **persuasive writing**: opinion, argumentation and persuasion, problem and solution. This grouping neatly correlates with Fraser's taxonomy of discourse markers (Fraser, 1999).

2.2. Studies of Communication Challenges in Non-Native Environments

Simultaneously, numerous researchers and scholars explore the challenges encountered by non-native English writers. For instance, Tetiana Yakhontova's exploration of academic writing highlights research on differences in organisation and argumentation among various languages and cultures. Typically, such studies compare English with other languages, aiming to assist non-native speakers in mastering Anglo-American academic writing conventions (ЯХОНТОВА, 2003: 21).

Additionally, Harry C. Denny considers the complexities of identity, language, and cultural assimilation and discusses the challenges that learners face in the context of non-native academic environments (Denny, 2010). In particular, multilingual writers often navigate the use of academic and other Englishes and seek to assimilate into the linguistic and cultural norms of the target culture. The chapter highlights the pressure these writers experience while learning complex language codes and cultural implications (ibid.: 117–138).

Such authors as John M. Swales (1990), James H. Crosswhite (1996), Anna Mauranen and Elina Ranta (2012), and other researchers discuss the difficulties non-native writers experience in achieving coherence and cohesion in their writing. These works have contributed to a deeper understanding of the struggles non-native writers experience and have provided insights into how these challenges can be addressed in language education and writing instruction. In particular, Swales (1990) researches academic writing and genre analysis and explores how different academic and research genres are structured and how they function within specific disciplinary and professional contexts. Crosswhite (1996) explores the relationship between rhetoric and reason in writing and emphasises the importance

of rhetoric in academic writing and argumentation. Mauranen and Ranta (2012) have contributed to various aspects of language research, including English as a lingua franca and focus on English as a lingua franca (ELF) in academic settings and the features of English used by non-native speakers for communication in international academic contexts.

2.3. On Discourse Markers

Linguistic markers are specific words, phrases, or language patterns found in written or spoken texts that provide valuable insights into people's perceptions, attitudes, or emotions. These markers can be used to understand various aspects of human behaviour, such as mind perception, sentiment, and relationships with objects or entities. Particularly, a study by Jochen Hartmann, Anouk Bergner, and Christian Hildebrand identifies linguistic markers in customers' responses to analyse customer reviews and uncover patterns in mind perception (Hartmann et al, 2023). By analysing these markers, the researchers claim to be able to gain information about individuals' thoughts, feelings, and interactions with different products or entities.

Discourse researchers Deborah Schiffrin (1987; 1994) and Bruce Fraser (1999) consider discourse markers as lexical expressions, mainly conjunctions, adverbs, and prepositional phrases, such as *that is to say*, *however*, *in consequence*, and other linguistic items that connect different segments of discourse. These markers contribute to signalling connections, either in terms of interpretation or topic, between the preceding and introduced segments of language, while their specific meanings are influenced by the contextual linguistic and conceptual factors.

Manfred Stede and Carla Umbach regard discourse markers as 'cue words', i.e. lexical items that signal the kind of coherence relation between adjacent text spans (Stede & Umbach, 1998). They note that typically there exists a group of similar markers that offer various ways to express the same relation, enabling a wide range of paraphrases to convey the intended meaning.

Taxonomies of discourse markers are explicitly showcased in didactic and reference resources on writing, such as Harold Fleming, Allan A. Glatthorn, John E. Warriner (1969), Mary Lou Conlin (1990), Kay L. Stewart and Marian E. Kowler (1990), William J. Kelly (1992), Lynn Quitman Troyka and Cy Strom (1999), James A. Reinking et al. (2000), Alice Maclin (2001), Dorothy E. Zemach and Lisa A. Rumisek (2005), Gary Lipschutz, John Scarry, and Sandra Scarry (2017), and others.

Based on Fraser's (1999) taxonomy and examining the usage of discourse markers by non-native English users, A. Jalilifar (2008: 114–122) reports that

elaborative markers are the most frequently used by Iranian learners, followed by inferential, contrastive, causative, and topic relating markers.

By examining the distinct linguistic characteristics and patterns within texts, T. Khan et al. (2023) suggest authorship verification techniques that enhance the accuracy and reliability of attribution with fewer resources, which is in line with the broader research on *AI*-generated texts and their distinctions from human-authored content.

2.4. Research on AI-generated Content

While examining existing research on *AI* language models, it can be observed that there has been a growing concern how *AI*-generated texts compare to those created by humans. Addressing this issue, we investigate the linguistic features and markers that distinguish *AI*-generated content from human-authored texts¹.

At the current stage, our research aims to examine how *AI* models structure their texts and to track the signs that indicate whether a text is generated by *AI* or authored by a human. By exploring existing literature on *AI* language models and writing strategies, we attempt to review the current status of *AI*-generated content and its implications for various fields of communication.

To date, there is a variety of communication, business, and IT-related studies directly comparing the *AI*-generated texts to those produced by human writers. Researchers of *AI*-generated content (Dziri et al., 2022; Gao et al., 2023) admit that conversational models might generate statements that lack factual accuracy, a phenomenon termed ‘hallucination’; while large language models (LLMs) have become popular for information retrieval, their outputs are susceptible to hallucinatory content. Another study reports that responses from current generative search engines seem coherent and informative, yet they frequently include unsupported claims and inaccurate references (Liu, Zhang, & Liang, 2023).

Responding to credibility challenges, a licensed method of generative search with the ability to cite supporting sources is reported by Ehsan Kamaloo et al. (2023), who employ the method of “in-context citation” prompting. Specifically, employing the *GPT-3.5* language model entails presenting a question alongside relevant contextual texts and instructing it to respond to the information-seeking question while including appropriate citations within the answers.

¹ Two related studies by Yaroslava Fedoriv, Iryna Pirozhenko, and Alla Shuhai, one focused on the elliptical sentence as a textual marker of empathy in the interaction between humans and artificial intelligence, and another one involving a linguistic analysis of content produced by humans and *AI* in academic discourse, have been submitted for publication in 2023.

The above challenges need to be addressed for moving forward in our investigation.

2.5. On Critical Thinking and Writing Competence

In the context of communication, critical thinking implies the ability to objectively analyse, evaluate, and synthesise information or ideas in a logical and systematic manner. It involves questioning and examining assumptions, arguments, and evidence to form well-reasoned and informed judgements or conclusions. By recognising biases, errors in reasoning, and diverse viewpoints, critical thinking fosters independent thought and informed choices, ensuring effective problem-solving, decision-making, and communication, including writing competence.

Linda Adler-Kassner and Heidi Estrem emphasise the interconnectedness of critical thinking, reading, and writing skills (Adler-Kassner & Estrem, 2005: 60–71). They emphasise that critical thinking involves more than assessing argument logic; instead, it requires deep engagement with texts, questioning assumptions, and understanding various viewpoints. The authors propose the incorporation of critical thinking into the instruction of reading and writing, endorsing metacognition and encouraging educator cooperation to empower students for both academic and civic communication.

Sibel Aygün and Fatih Yavuz (2020: 176–191), referring to a study by Dong and Yue conducted in 2015 (Dong & Yue, 2015: 176–182), examine the connection between college students' writing proficiency and critical thinking skills. They use Wen Qiufang's critical thinking hierarchy theory model and observe a notable influence of critical thinking skills on writing achievement, highlighting the importance of cultivating students' critical thinking abilities in order to enhance their English writing competence.

At the same time, Enrique Dans elicits concerns about the decline of critical thinking skills, as answers provided by *AI* tools may lack the context and reliability of traditional search engines, underscoring the need to foster critical thinking skills so as to combat manipulation and misinformation (Dans, 2023).

Moreover, we are concerned about the probability of the language model users' sacrificing critical thinking and creativity to the advantage of the *AI*'s immediate response, which lays the foundation for our research. Judging by the available academic publications on this problem, for Ukraine the issue of dealing with *AI*-produced content is new and underexplored in either the national educational or linguistic domains.

3. Research Methodology

English language acquisition involves gradually evolving goals and requires a step-by-step learning

curve pursuit. In this context, acknowledgement of core requirements for appropriate text composition is essential when writing in a foreign language in order to enhance clarity for non-native users. Conventional structuring and adhering to cultural and language-specific canons help to reduce ambiguity, assist in language learning, and demonstrate professionalism, which enhances overall discourse construction skills.

We examine narrative and descriptive discourse types for both human-created and AI-generated content so as to identify the language markers for different communicative situations. We reckon that learners can acquire the necessary skills by practising appropriate patterns in order to sound natural, coherent, and skillful.

By employing qualitative and content analysis methods, the study aims to identify specific linguistic and cognitive factors contributing to the above mentioned challenges.

Pursuing our goal, the following steps are undertaken:

1. Research Design: The study adopts a comparative research design, studying the linguistic features and writing strategies employed in AI-generated texts with those in human-authored content.

2. Data Collection:

a. Human-authored content: Gathering a comparable dataset of texts written by human authors. To illustrate a writing strategy under examination, the corresponding text samples are selected from authentic sources.

b. AI-generated texts: Building a dataset of AI-generated texts which cover the same topics and genres as human created texts. A prompt is assigned to AI to create a passage in accordance with each original topic and context by fine-tuning the keywords and instructions.

The AI content on the assigned topics is generated via our personal communication with the state-of-the-art language model GPT-3.5 at <https://chat.openai.com/>. The verification of the text generation is performed with the Zero-GPT tool at <https://www.zerogpt.com/>.

3. Feature selection:

a. Linguistic features: Identifying and choosing linguistic features to analyse, such as structure, vocabulary, grammar, coherence, and style.

b. Writing strategies: Defining specific writing strategies, such as persuasive techniques, storytelling approaches, and logical reasoning.

4. Analysis techniques:

a. Content analysis: examining and interpreting the content to identify patterns and themes, thereby

determining implied meanings, perspectives, and messages.

b. Qualitative Analysis: Conducting linguistic analysis of text samples to assess writing strategies, identify similarities, differences between the human-written and AI-generated content, and detect AI-specific patterns.

5. Results and Discussion: Presenting the findings of the analysis, highlighting notable differences or similarities between AI-generated and human-authored texts.

6. Implications: Discussing the implications of our findings on writing practices and potential applications. Outlining potential limitations of the study, such as the scope of the language model used, dataset biases, and generalisation of results.

7. Inferences: Summarising the research findings and providing remarks on the role of AI in writing and its impact on non-native users' critical thinking skills.

The originality of our approach lies in the prompt construction procedure, i.e. providing the original content, keywords, and types of writing while tailoring the prompts to achieve a comparable response from AI.

4. Results and Discussion

This section of our paper examines narrative and descriptive writing techniques presented in authentic human-written and AI-generated sample texts.

4.1. Narration: rendering a story or recounting a series of events

Narration involves storytelling, whether true, fictional, or a mix. It portrays events in chronological order, consisting of incidents or episodes. Details play a significant role in narration, making the experience vivid and real, enhancing conflict, revealing character, suspense, specifying actions, adding interest, and offering explanations or reasons. However, Harold Fleming, Allan A. Glatthorn, and John E. Warriner warn that excessive details may hamper the story (1969: 79–94).

The narrative structure usually follows the arch-sequence that organises the different parts of the story including the beginning, middle and end (according to Aristotle's *Poetics*) in order to keep readers engaged and effectively present the concepts.

Discourse markers common for narration are *at once, immediately, soon, afterward, suddenly, later, later on, now, by now, finally, in the next moment, after a little while, first, first of all, then, next*, and stylistic devices (metaphors, similes, and the like).

Sample narrative texts showcasing human vs artificial intelligence writing are presented in Table 1.

The discourse markers in the narrative text presented in Table 1 are in **bold** in the human-written text and in **bold italics** in the AI-generated text. AI's default response follows American Standard English.

Table 1

Human vs artificial intelligence narrative writing

Human-written text	AI-generated text ¹
<p>The paragraph below recounts the story of a courageous young Chinese man named Iu-choi Chan, who embarked on a bold escape from a restrictive country in pursuit of freedom. Although his initial attempt was unsuccessful, he eventually succeeded in reaching the United States. This paragraph was penned during his time as a student at California State University in Bakersfield (Conlin, 1990: 26).</p>	<p>Prompt: Write a narrative paragraph up to 230 words about a Chinese citizen unsuccessfully trying to escape from China to Hong Kong chasing his dream.</p>
<p>Two years ago, I attempted to escape from mainland China to Hong Kong. I planned and prepared well. I dressed up like a farmer and walked for two days from my village to the border between China and Hong Kong. That night, I was very excited and nervous, but I tried to keep calm. At the border there were a lot of sentries who tried to catch people like me, so I put some mud on myself to avoid being noticed. It was not easy for me to pass through the sentries, but I bit my tongue and climbed across the swampy area. Finally, I reached the river that runs across the border. I plunged into it. It was icy cold, and I used all my strength to swim as fast as I could. In about twenty minutes, I touched land. I made it! My happiness was beyond description. But when I stood up, a Hong Kong policeman was immediately beside me. My dream was shattered. I was taken to a police station to wait for a truck that takes unsuccessful refugees back to China. The police put me in the truck with a great many other people, and we were driven like a herd of buffalo back to China. I had lost my freedom against the order being changed? If so, in what way? Iu-choi Chan (Student). (229 words).</p>	<p>In the bustling metropolis of Shanghai, Li Wei, a young Chinese citizen, nursed an audacious dream that ignited a relentless determination within him. He yearned for the promise of freedom and opportunity that lay beyond the border in the vibrant cityscape of Hong Kong. Driven by a fervent desire to pursue a life of creativity and expression, he envisaged a future devoid of the stifling constraints imposed upon him in his homeland.</p> <p>With clandestine whispers among like-minded individuals, Li Wei discovered a network of underground pathways that led to Hong Kong. Under the veil of darkness, he embarked on an arduous journey fraught with danger and uncertainty. Guided by a flickering lantern's light, he navigated treacherous terrain, skirting past vigilant authorities and surveillance. With each step, his heart swelled with anticipation, picturing the newfound world that lay ahead.</p> <p>Yet, destiny had other plans in store for Li Wei. As he drew nearer to the border, a formidable barricade of guards and armed patrols blocked his path. The dream of escape shimmered like a mirage, forever eluding his grasp. An intense surge of anguish washed over him, mingled with profound disappointment. Though his body yearned for the escape, the harsh reality of geopolitical boundaries shattered his aspirations.</p> <p>Defeated but not broken, Li Wei returned to Shanghai, where he reluctantly embraced the life prescribed for him. Nevertheless, the fire within him continued to flicker, ignited by a determination to challenge the constraints of a system that sought to stifle his spirit. His dream of freedom still lingered in the depths of his heart, and he vowed to seek alternative avenues to manifest his aspirations, defying the odds and embracing the pursuit of his elusive dream. (283 words).</p>

- The human-created text employs several **linguistic markers** commonly found in **narrative** writing, such as temporal markers ("Two years ago," "That night," "Finally," "In about twenty minutes"), sequential markers ("I planned and prepared well," "I dressed up like a farmer and walked," "I put some mud on myself"), sensory markers ("I was very excited and nervous," "It was not easy for me," "It was icy cold"), emotive markers ("My happiness was beyond description," "My dream was shattered"), and reflective markers ("I had lost my freedom," "If so, in what way?"). These markers structure the narrative, convey a sense of time progression, and engage the reader in the narrator's experiences and emotions.

The **socio-cultural analysis** of the text presents several significant factors referring to Oriental culture. These encompass a fervent desire to escape from

oppression and seek freedoms and opportunities, as evidenced by the attempts to illegally cross borders. Disguising oneself as a farmer underscores the cultural emphasis on a secure social stratum. The persistence to overcome physical hardships, like navigating swampy terrain and icy waters, is a testament to the deeply ingrained Oriental values of determination and resilience. The collective experience of being driven back home, much like “a herd of buffalo,” accentuates shared challenges that define collective identity. The text contemplates submission and obedience within the broader socio-cultural narrative of the Oriental world.

The evidence of **critical thinking** in this piece is primarily reflected through the author's thoughtful consideration of the complexities and nuances of the attempt to escape from mainland China to Hong Kong. This is evident in the strategic planning

and preparation. The author's decision to disguise himself as a farmer, taking an estimated risk to blend in, testifies to his ability to analyse the situation and adopt a suitable approach. The use of mud to avoid detection by sentries indicates Iu-choi Chan's problem-solving skills and quick thinking under pressure, demonstrating his capacity to adapt to challenging circumstances.

Additionally, the writer's determination to cross the border is marked by his willingness to endure physical hardships, such as climbing across a swampy area and swimming across a freezing river. This perseverance highlights his ability to assess the risks and benefits of his actions and make a conscious choice to proceed despite the difficulties.

Iu-choi Chan's awareness of the potential consequences of his actions is also noteworthy. The shattered dream upon encountering the Hong Kong policeman manifests a recognition of the impact of external factors on his aspirations. The writer's contemplation about the loss of freedom and the changing order at the end of the narrative indicates a capacity for introspection and consideration of broader socio-political implications.

Thus, the narrative exhibits critical thinking through the author's strategic planning, problem-solving, risk assessment, perseverance, and self-awareness, all of which contribute to a deeper understanding of the challenges and decisions involved in his escape attempt.

- The AI-generated response exhibits a structured narrative with clear sections and discourse markers guiding the reader through events and emotions. However, it deviates structurally from the assigned task (paragraph vs. essay) and exceeds the word limit by 20%. The use of ornate vocabulary, like "embarked on an arduous journey fraught with danger and uncertainty," "Under the veil of darkness," and "The dream of escape shimmered like a mirage," creates an overdose of sophistication. This results in a mismatch of terms, such as "geo-political borders" and "flickers," impacting overall coherence. Stylistic inconsistencies hinder the text's readability. Moreover, the flow of ideas appears fragmented, posing challenges for readers to navigate the narrative smoothly. Consequently, the text struggles to convey the intended message cohesively, wrestling with diverse linguistic elements.

The text reflects the socio-cultural aspects of Li Wei's journey in pursuit of his aspirations and the desire for greater freedom and opportunity beyond his homeland's boundaries. The AI lists the challenges the character faces, the community support, and the impact of "geopolitical boundaries" that collectively

underscore the interplay between personal dreams and societal constraints. The text showcases the resilience and determination valued within the cultural context, as Li Wei seeks alternative ways to land his dreams despite obstacles.

From the above analysis it follows that AI's understanding of socio-cultural context remains limited in comparison to human comprehension. AI lacks the deep understanding of cultural specifics, historical context, and emotional nuances that human writers naturally incorporate into their work.

Apparently, AI-generated text relies on patterns and information from its training data, which may not fully capture the depth of socio-cultural context. While the AI model can produce coherent text that mimics certain styles or themes, it does not possess the innate cultural awareness that human writers bring to their work. AI-generated content lacks sensitivity to the cultural implications of certain words or themes, leading to unintended misrepresentations or insensitivity.

In the final account, AI's understanding of socio-cultural context is hindered by the fact that it does not possess personal experiences or emotions. Human writers often infuse their work with their own experiences, beliefs, and perspectives, making their writing more authentic and culturally resonant. AI, on the other hand, relies on statistical associations present in its training data, which may not always accurately reflect the complexities of cultural dynamics.

4.2. Description: portraying places, objects, people, or experiences using sensory details

4.2.1. Describing places

Descriptive writing involves the senses of sight, sound, smell, taste, and touch (Troyka & Storm, 1999: 96). Through descriptive writing, an author can convey sensory perceptions of a person, place, or object; explain how something looks or how someone feels.

Common discourse markers to describe places are as follows: *next to, across, on the opposite side, to the left, to the right, in front of, in back of, above, below, behind, nearby* and the like.

An example of description of a place is presented in Table 2 and Fig. 1.

The discourse markers in the descriptive text presented in Table 2 are in **bold** in the human-written text and in **bold italics** in the AI-generated text.

Additionally, AI uses American standard spelling (***mesmerizing***) as a default language unless instructed otherwise.

The text in the right column of Table 2 presents an AI response to a prompt assignment to write a 120-word descriptive paragraph about Niagara Falls. A screenshot of personal communication with ChatGPT-3.5 is shown in Fig. 1.

Table 2

Human vs artificial intelligence descriptive writing: describing a place

Human-written text	AI-generated text
Description of Niagara Falls from a travel brochure (Zemach & Rumisek, 2005: 25–26).	Prompt: Write a descriptive paragraph about Niagara Falls using 120 words.
Niagara Falls, a popular destination for thousands of visitors each year, is a beautiful place. When you stand at the edge and look down at the 188 feet of white waterfalls, you feel amazed at the power of nature. The tree-lined river that leads into the falls is fast-moving, pouring over the edge of the falls and crashing to the bottom in a loud roar . If you want to experience the falls close up, go for a boat ride. You'll come near enough to look up at the roaring streams of water flowing over the edge and feel the cool mist that rises as the water hits the rocks below. Seeing Niagara Falls is an unforgettable experience! (117 words).	Niagara Falls, a <i>majestic</i> natural wonder <i>straddling</i> the border of the United States and Canada, is a <i>breathtaking</i> spectacle that <i>captivates</i> all who <i>behold</i> it. The <i>deafening roar</i> of water <i>crashing down</i> from heights of over 50 meters echoes throughout the surrounding landscape, creating an <i>awe-inspiring symphony</i> of nature's power. <i>Towering plumes of mist</i> rise from the <i>turbulent plunge pool</i> below, <i>enveloping</i> visitors in a cool embrace as they witness the <i>ceaseless</i> cascade. The sight of the Horseshoe Falls, with its <i>graceful</i> curve and <i>iridescent</i> hues, is particularly <i>mesmerizing</i> as sunlight dances on its surface. Tourists from around the world gather at points, <i>their eyes locked</i> on this force of <i>nature that stands as a testament to Earth's beauty</i> and might. (122 words).

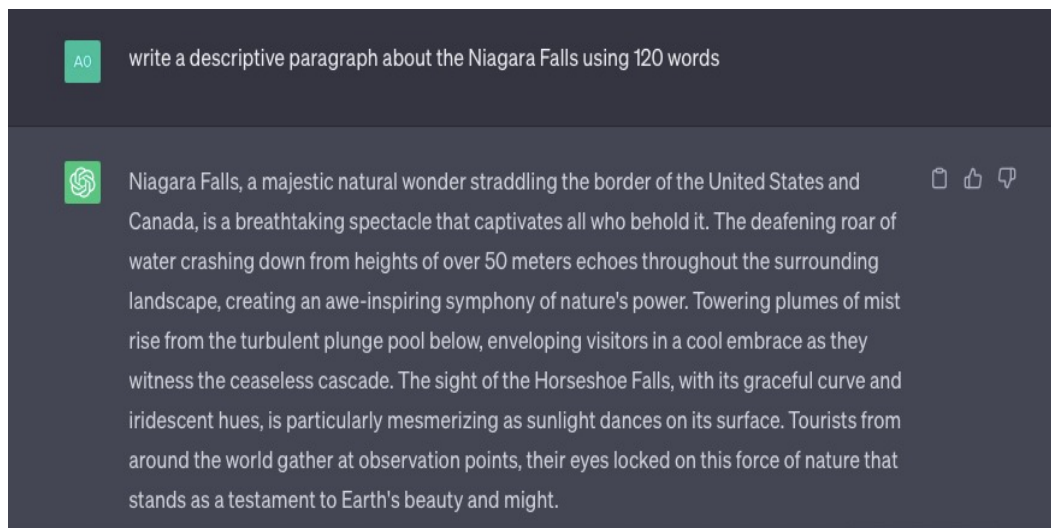


Fig. 1. A descriptive paragraph about Niagara Falls. A screenshot of personal communication with ChatGPT-3.5, July 25 Version (2023)

Table 2 showcases the potential of AI to generate a patterned descriptive text with profound usage of metaphors, similes, and other figurative tools. However, this innovative capacity of AI (ChatGPT-3.5, August 3 Version) in language generation poses intriguing challenges for text authenticity verification. Namely, despite the fact that the text is 100% generated by AI, this cannot be reliably verified with the available AI text detector ZeroGPT (see Fig. 2).

That is to say, ZeroGPT detector tool only indicated 38.35% of generated text (Fig. 2), while there is documented evidence of the text being 100% generated (Cf. Fig. 1).

4.2.2. Describing emotional experiences

Descriptive language used to depict emotions and the physical environment can be presented with such words as "excited," "nervous," "calm,"

"icy cold," and "happiness beyond description" that provide insight into the protagonist's state of mind.

The description of a person's feelings regarded from the viewpoints of human vs artificial intelligence writing is illustrated in Table 3 and Fig. 3.

The discourse markers in the descriptive text presented in Table 3 are in **bold** in the human-written text and in **bold italics** in the AI-generated text.

The original passage is a poetic expression of the author's feelings and thoughts about the month of August and reflections associated with the process of writing. It uses vivid imagery created through metaphors ("Humidity is a form of madness"; "Writing is a form of suicide"), hyperboles ("The temptation to talk like this, in short clips, is overwhelming"), and similes ("Short sentences are like raindrops: loud, splashy, and desirable") to convey the author's emotions and impressions.

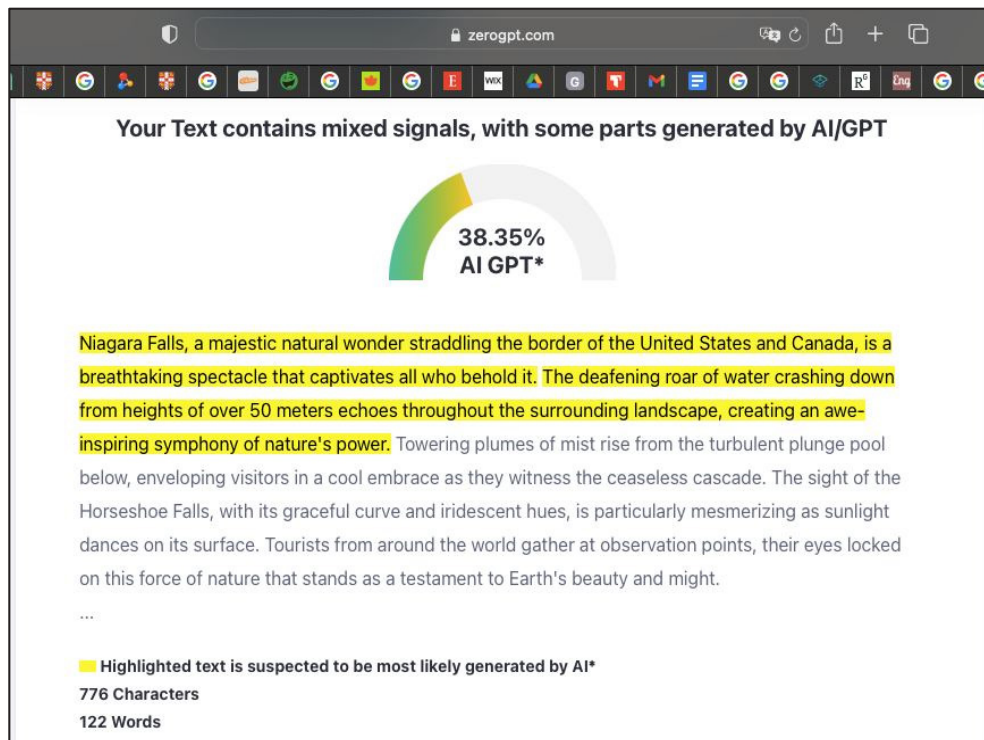


Fig. 2. A screenshot of the AI text detection with ZeroGPT, August, 2023. The 100%-generated text is marked as 38.35% detected

Table 3

Human vs artificial intelligence descriptive writing: describing experiences and emotions

Human-written text	AI-generated text
<i>In his essay, Andrei Codrescu uses examples to illustrate how heat and humidity can influence his perspective and conduct. (Conlin, 1990: 124).</i>	Prompt: Describe in short sentences August as artistic reflections on writer’s experiences associated with August and the act of writing. Use metaphors and comparisons.
August is a dramatic month. Humidity is a form of madness . Writing is a form of suicide . The temptation to talk like this, in short clips , is overwhelming. Short sentences are like raindrops: loud, splashy, and desirable . Andrei Codrescu. August. (40 words).	August, a canvas of vivid emotions, paints memories with the golden brush of the sun . Its sweltering heat ignites creativity, like fiery sparks in a writer's mind. Words flow like a tranquil river , carrying tales of scorching passion and fleeting dreams . In this fiery forge , the act of writing becomes an enchanted dance , blending the colors of life and imagination. (60 words).

Similarly, the passage generated by AI is rich in imagery and figurative language expressed through the use of metaphors such as "a canvas of vivid emotions" and "paints memories with the golden brush of the sun," similes, comparison structures and the like.

As it is seen in Tab. 3 and Fig. 3, AI generates a properly structured and stylistically elaborated descriptive paragraph. At the same time, the usage of expressive devices is notably overdosed, with repeated epithets “fiery sparks,” “fiery forge” and other excessively employed ornate elements (see highlighted in **bold italics**).

The text generated by ChatGPT is checked by the ZeroGPT detector, and its report shows no traces of AI’s “fingerprints” (Fig. 4).

This contradictory outcome implies that the AI-detection tools may fail to flag specific phrases or

paraphrased content to evaluate the overall quality and authenticity of the generated content.

4.3. AI-generated content: validation of critical thinking and creativity capabilities

Critical thinking in narrative writing goes beyond storytelling – it involves analysing themes, character motivations, and plot developments. It prompts writers to question assumptions, consider alternatives, and assess narrative choices, enriching character development and coherent plots. Furthermore, critical thinking drives writers to explore underlying messages and societal implications, resulting in thought-provoking and resonant narratives.

AI-generated content, despite lacking consciousness, showcases impressive mimicry of human cognition. It excels in processing data and producing contextually relevant text. While AI’s

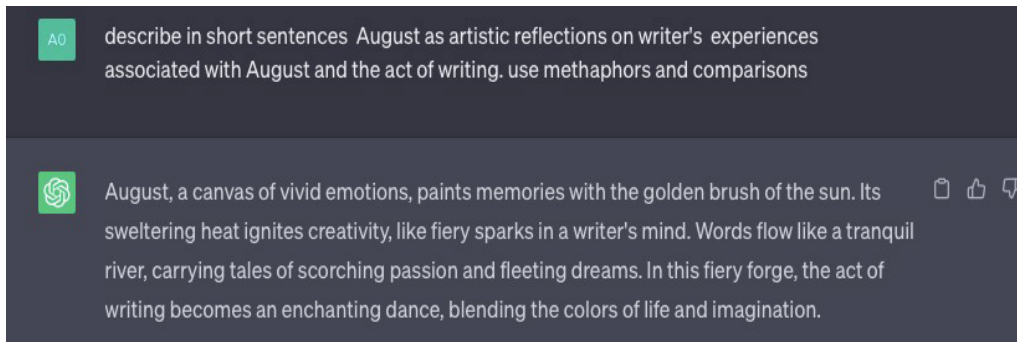


Fig. 3. A descriptive paragraph about experience and feelings. A screenshot of personal communication with *ChatGPT-3.5*, August 3 Version (2023)

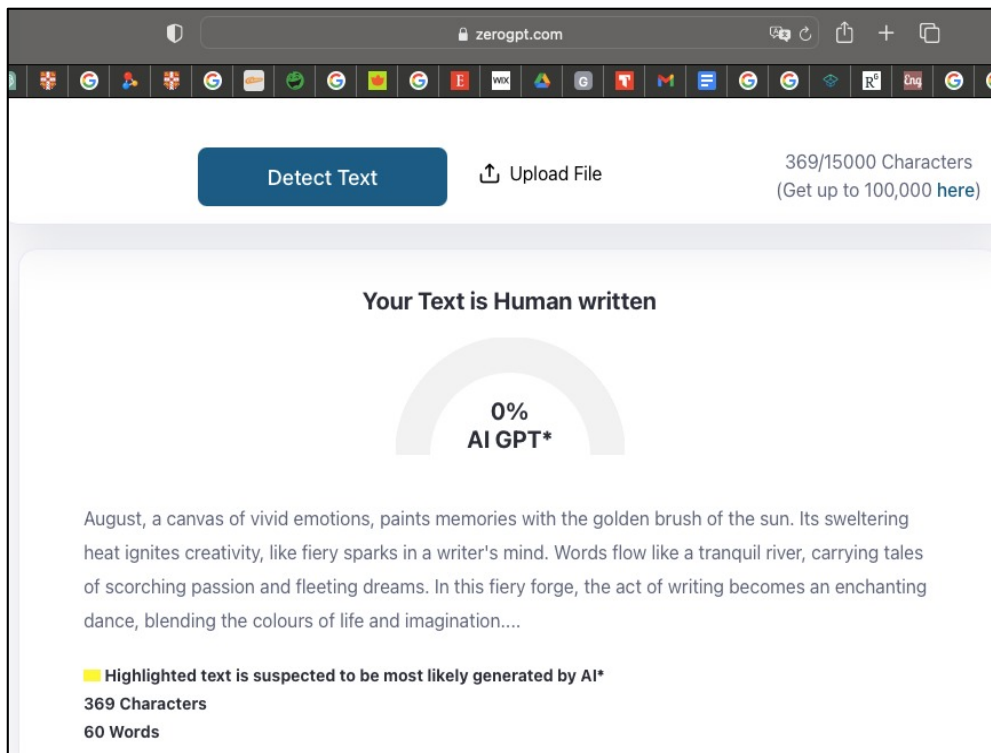


Fig. 4. A screenshot of the *AI* text detection with *ZeroGPT*, August, 2023. The 100%-generated text is not detected

decision-making is based on data analysis, it lacks human intuition and empathy. Similarly, *AI*-driven “creativity” draws on existing patterns to create content, but it lacks the abstract thinking analogous to human innovation.

In order to verify *AI*'s capability of critical thinking and creativity, we provide a travel-related word list of 127 items and assign *ChatGPT* with the prompt “Use 15 words from the list and write a narrative paragraph on a topic of your choice.” As the initial response did not reflect the Fichtean curve presented in the three essential parts in writing as rising action, climax, and falling action, the prompt was edited to correspond to the required structure.

In the *AI*-generated text (Fig. 5; Supplement), two noteworthy phenomena come into play: redundant ornamenting potentially resulting in misinterpretation. It occurs when words are misused, mismatched, and wrongly understood. For instance, in the sentence “The heavy traffic and commotion served as,” the word “served as” is redundant, as the phrase “caused” would suffice; Similarly, in the sentence “The sight of the monument served as a final point of interest,” the expression “a final point of interest” is the definition of a set term ‘a point of destination’; the addition of “served as” is also redundant, and “The monument marked a final point of interest” would succinctly capture the essence.

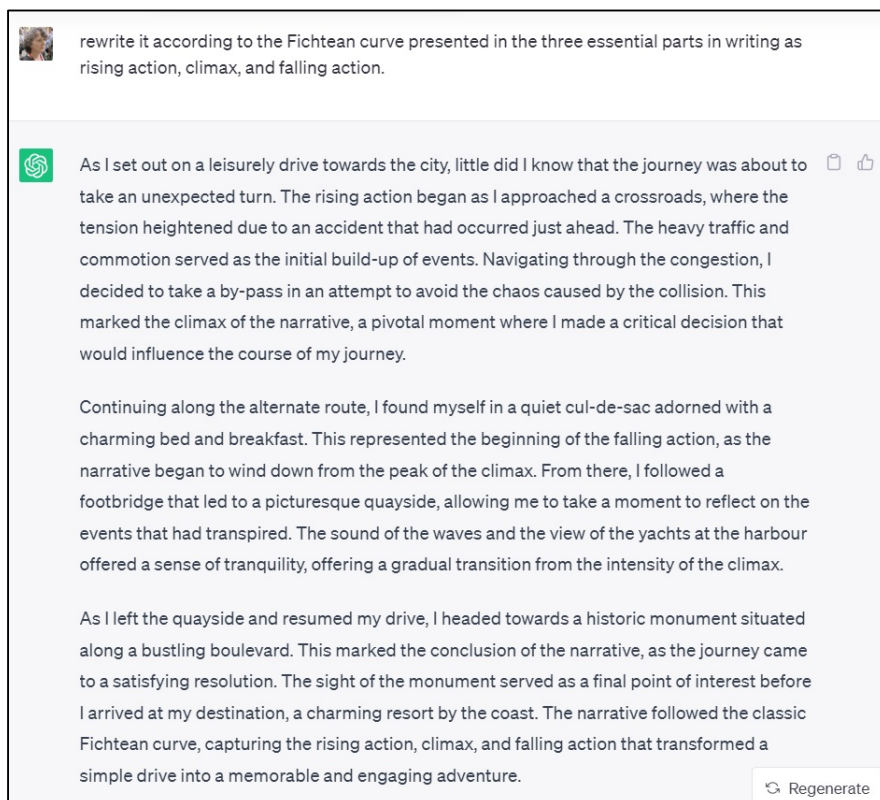


Fig. 5. AI-generated narrative text based on the given vocabulary related to travelling. A screenshot of personal communication with ChatGPT-3.5, August 3 Version (2023)

According to Fleming, Glatthorn, and Warriner (1969: 95), a single vivid verb is typically more potent than a verb-adverb combination. Therefore, over-ornamenting a text with excessive and elaborate language can result in redundancy.

The phrase “charming bed and breakfast” is elliptical and thus it may also lead to an unintended meaning (a fancy piece of furniture and a meal) beyond the implied notion of accommodation.

In instances like “the events that had transpired,” the term “transpired” stylistically does not fit the context. In the same way, “the journey came to a satisfying resolution,” to be coherent, should be streamlined to “the journey resolved satisfactorily.”

AI-generated text often exhibits noticeable lexical repetitions. For instance, in the provided text, the words “climax,” “action,” “narrative” appear four times; “drive” and “journey” appear three times; “rising action,” “falling action,” “served as,” and “charming” are repeated twice.

The Fichtean Curve mentioned in the instruction is a term referring to a basic narrative structure. It focuses on conflict and crises and has three main components: rising action, climax, and falling

action. Apparently, AI incorporates the theoretical terms marking the writing design into its narrative text-response as “didactic worms,” namely: “The rising action began as I approached a crossroads”; “build-up of events”; “This marked the climax of the narrative, a pivotal moment where I made a critical decision that would influence the course of my journey”; “This represented the beginning of the falling action, as the narrative began to wind down from the peak of the climax”; “offering a gradual transition from the intensity of the climax”; “This marked the conclusion of the narrative, as the journey came to a satisfying resolution”; “The narrative followed the classic Fichtean curve, capturing the rising action, climax, and falling action that transformed a simple drive into a memorable and engaging adventure.” This phenomenon can be termed as “exemplar rule” or “exemplar-based rule” because it captures the idea that an example also functions as a rule to follow.

All the mentioned above features – such as repetitions, stylistic mismatching and inappropriateness, as well as exemplar rules – illustrate the lack of critical thinking and creativity in AI LLMs.

5. Conclusion

The present study on linguo-cognitive markers in human vs *AI* text attribution is motivated by the game-changing nature of *AI*-generated writing as a tool that enhances traditional writing practices, emphasising the value of human creativity in various domains of communication.

Our research has revealed potential consequences of substituting human creativity with *AI* productivity in the process of text creation. The hypothesis that competition between *AI*-generated content with human creativity could result in the reduction of critical thinking skills in language users, particularly in non-native environments, has been supported by our findings. Our findings highlight the reasons why the use of *AI*-generated content should be approached as a supplement rather than a substitution for human-created texts, especially for non-native users. This prerequisite is essential to prevent individuals from diminishing their cognitive engagement when interacting with LLMs.

Specifically, this paper explores and compares *AI*-generated content and human-authored texts and highlights both strengths and limitations of *AI* language models that exhibit conspicuous efficiency in quickly generating various content. However, LLMs struggle to convey human emotion, creativity, critical thinking, contextual and cultural nuances.

The findings of our study hold several implications for both writing practices and potential applications.

Specifically, our analysis of discourse strategies elicits discourse markers as distinct linguistic features—such as ‘cognizant’, ‘curation’, ‘delve into’, ‘encompass’, ‘flicker’, ‘gain valuable information’, ‘interplay’, ‘intricacies’, ‘it’s (contracted forms)’, ‘leverage’, ‘overall’, ‘pave the way / path’, ‘pivotal role’, ‘realm’, ‘revolutionize’, ‘robustness’, ‘shed light on’, ‘shifting our focus’, ‘significantly impact’, ‘Sure, here’s ...’, ‘underscores the significance’, ‘utilize’, ‘valuable (insights)’, ‘yields’ and the like—which may aid in distinguishing *AI*-generated content from human writing, contributing to the development of authorship verification techniques, plagiarism detection, and forensic linguistics.

This insight can significantly impact writing practices by enhancing the understanding of how human cognitive processes manifest in the texts. Writers and content creators can leverage this knowledge to develop more authentic and engaging content, tailored to their target audience.

At the same time, the study acknowledges limitations listed below.

Replicating human emotions: although the research reveals the remarkable capabilities of *AI* language models that blur the lines between human creativity and machine intelligence, *AI*-generated content still grapples with replicating the depth of human emotion, creativity, and cultural nuances. Therefore, admitting *AI* as a complementary tool rather than a replacement for human creativity is crucial, especially in fields where human emotions and experiences are demanding for effective communication.

Test structure: while the *AI*-generated response demonstrates a capability to reproduce a narrative structure, it can deviate from the assigned task by confusing a paragraph structure and exceeding the word limit.

Ornate language: the text that is marked by vivid verbs and expressive embellishments enhances aesthetic appeal and adds sophistication, creating immersive background. At the same time, excessive use of ornate vocabulary often results in stylistic inconsistencies. Mismatched linguistic elements and the lack of coherent flow may appear out of place in certain contexts, diminishing authenticity, hindering the text readability and its effectiveness in conveying the intended message, and causing miscommunication.

Cognitive and socio-cultural factors. Our findings emphasise critical thinking and specific linguistic and socio-cultural factors that contribute to the text attribution. Specifically, for narrative and descriptive writing, such factors include vivid sensory descriptions, engaging storytelling, and maintaining coherence.

In summary, this research advances discourse analysis and linguistic exploration, aiming to enhance communication practices in diverse cultural and linguistic environments.

Proceeding from the analysis of narrative and descriptive writing, future research could explore other types of discourse by comparing human-created and *AI*-generated texts in the context of text construction. Additionally, further research should acknowledge that satisfactory *AI* responses require fine-tuning of prompts, or and prompt engineering, which is a separate study beyond the current scope.

Ultimately, the convergence of *AI*-generated content, critical thinking, and creativity lays the foundations for more efficient communication strategies and fresh perspectives in discourse analysis. However, concerns about authenticity and ethics remain, necessitating recognition of *AI*’s evolving capabilities while preserving the uniqueness of human cognition and creativity.

6. Supplement: AI-generated narrative text based on the assigned travel-related vocabulary

As I set out on a leisurely drive towards the city, little did I know that the journey was about to take an unexpected turn. The rising action began as I approached a crossroads, where the tension heightened due to an accident that had occurred just ahead. The heavy traffic and commotion served as the initial build-up of events. Navigating through the congestion, I decided to take a by-pass in an attempt to avoid the chaos caused by the collision. This marked the climax of the narrative, a pivotal moment where I made a critical decision that would influence the course of my journey.

Continuing along the alternate route, I found myself in a quiet cul-de-sac adorned with a charming bed and breakfast. This represented the beginning of the falling action, as the narrative began to wind down from the peak of the climax. From there, I followed a footbridge that led to a picturesque quayside, allowing me to take a moment to reflect on the events that had transpired. The sound of the waves and the view of the yachts at the harbour offered a sense of tranquility, offering a gradual transition from the intensity of the climax.

As I left the quayside and resumed my drive, I headed towards a historic monument situated along a bustling boulevard. This marked the conclusion of the narrative, as the journey came to a satisfying resolution. The sight of the monument served as a final point of interest before I arrived at my destination, a charming resort by the coast. The narrative followed the classic Fichtean curve, capturing the rising action, climax, and falling action that transformed a simple drive into a memorable and engaging adventure.

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