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To Bit or Not to Bit? Unveiling the Visual Discourse of AI: Exploring Cartoons in the Age of Artificial Intelligence

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ABSTRACT

Artificial intelligence (AI) technology prevalence has led to our time being referred to as ‘the age of AI.’ As a contemporary societal issue, AI technology draws the attention of caricaturists who use their art to visually communicate various messages about it. This study explores how AI technology is visually represented in a collection of editorial cartoons published on the international online platform, Cartoon Movement with an especial focus on its effects related to literature, books, theory of mind, and arts. The research aims to identify the visual communicative functions employed by caricaturists to depict AI- themes. To achieve this, a multimodal discourse analysis approach is used. Eight caricatures, published between 2018 and 2024, were specifically selected for semiotic analysis. Using Kress and Van Leeuwen’s (2006) framework of visual social semiotics, the study examines the representational, interactive, and compositional meanings in the selected cartoons. The study is significant for its insights into how AI is visually depicted in relation to literature, arts, books ,theory of minds and its potential societal implications. The analysis shows a predominantly skeptical or cautionary stance toward AI in the realm of human cognition and creativity. The results emphasize the need for ongoing ethical as well as philosophical reflection as AI continues to integrate into various aspects of human life.

Keywords: Multimodal Discourse Analysis; Artificial Intelligence (AI); Visual Modality; Social-Semiotics

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1. Introduction

AI permeates all aspects of our lives, becoming an essential part of societal infrastructure, including education, communication, healthcare, and transportation. AI technologies are embedded in many everyday products, such as auto-correct features, smart assistants, social media monitoring tools, healthcare management systems, and navigation applications, highlighting its widespread influence on modern life^[1]. This pervasive presence of AI makes it a popular subject for cartoonists worldwide, who explore its themes through visual representations in their cartoons. To systematically analyze and understand the visual messages conveyed by cartoons, Multimodal Discourse Analysis (MDA) is utilized. MDA “has gained great attention internationally”^[2]. It provides a structured approach to analyzing not just the language but also various semiotic modes, including images, photographs, diagrams, and graphics^[3]. These semiotic modes are crucial for meaning-making in communication, though their significance has often been overlooked in discourse analysis, as noted by O’Halloran^[4]. Cartoons are a form of visual communication where meanings are conveyed through images. Samson and Huber^[5] describe cartoons as “a joke told in a picture,” while Kuipers et al.^[6] argue that editorial cartoons are more than just entertainment; they are satirical tools with social and ideological functions. As such, cartoons reflect societal issues and raise awareness about them.

This study examines the visual representation of AI and its effects on literature, books, theory of mind, arts, and creativity in a selection of editorial cartoons from the Cartoon Movement website. The study also explores the potential societal implications of AI. The analysis is conducted using Kress and Van Leeuwen’s^[7] model of visual social semiotics. The upcoming section outlines the study’s objectives. Top of Form Bottom of Form

2. Objectives of the Study

The current study analyzes selected cartoons from the Cartoon Movement (CM) website. The aim is to explore how artificial intelligence (AI) is visually communicated and its effects on literature, arts, theory of mind, and books. The study identifies the visual communicative strategies employed by cartoonists to depict AI’s impact. This is achieved

by examining recurring themes and broader societal concerns. The study also investigates how cultural and national perspectives shape the portrayal of AI, particularly in terms of its ethical and societal implications. This analysis aims to reveal the messages conveyed in editorial cartoons about AI’s influence on human knowledge and autonomy.

3. Research Questions

The present study attempts to answer the following three questions to achieve its goals:

RQ1: What are the visual communicative functions given in editorial cartoons?

RQ2: What recurring themes emerge from the visual representation of AI in editorial cartoons, and how do these themes reflect broader societal concerns about AI’s impact on human knowledge and autonomy?

RQ3: How do different cultural and national perspectives shape the depiction of AI in editorial cartoons, particularly in relation to its potential ethical and societal implications?

4. Statement of Research Problem

Despite the fast-growing environment of artificial intelligence (AI), there is a notable lack of scholarly research on how AI is visually represented in media, particularly editorial cartoons that are related to literature, books, theory of minds, arts, and creativity. This research gap is significant because such representations can have a substantial impact on public perception as well as comprehension of AI technology and its effects. The study problem, then, is to address this paucity by examining the visual representation of AI in editorial cartoons that have a relationship with literature, with the theory of minds, with books, and with arts in general.

5. Method of Analysis

5.1. Theoretical Framework

In the current study, Kress and Van Leeuwen’s^[7] Grammar of Visual Design is employed. Utilizing Kress and Van Leeuwen’s^[7] model, the study explores the representational, interactive, and compositional meanings conveyed by the cartoons. This model is selected for the current study because

it has been considered a pioneering framework for both examining and understanding the visual grammar of images^[8]. It is “one of the most important theories and models of visual social semiotics”^[9].

5.2. Data Collection and Procedures

A small cartoon corpus comprised of 8 drawings, published between 2018 and 2024, has been selected from a specialised cartoons website entitled ‘Cartoon Movement’ (CM). It is a global platform for editorial cartoons and comics journalism. The website is <https://www.cartoonmovement.com/>. Two criteria were taken into consideration in the selection of each cartoon. These are (1) the cartoon must reference AI, and (2) the cartoon must be engaging with one of the topics related to literature, books, the theory of mind, or arts. Keywords such as “artificial intelligence” were input into the website’s search box. The website presented all cartoons that were related to artificial intelligence (even without reference to the topics of books, theory of minds, literature, and arts). Therefore, each cartoon was meticulously reviewed by the researcher, and only those explicitly reflecting a connection to the selected topics were included.

The rationale behind selecting the CM website is that it is a worldwide online platform that brings together editorial cartoonists from all over the globe to publish content that keeps up to date with the latest events related to AI topics in different societies around the world. The chosen cartoons were produced by cartoonists from different nations around the world, including Western countries (e.g., Spain, Hungary, and Italy), Latin American countries (e.g., Brazil and Chile), Arabic countries (e.g., Morocco), and Islamic countries (e.g., Turkey). The cartoons’ focus is on AI technology related to specific topics. These are literature, books, theory of mind, and arts from 2018 to 2024. The choice of eight cartoons stems from the aim to provide a focused yet representative analysis of AI’s depiction in relation to the specified topics. This manageable sample size allows for an in-depth qualitative analysis. As a result, this enables the researcher to explore intricate details and varied perspectives without diluting the depth of examination. Furthermore, limiting the dataset to eight cartoons ensures that the analysis remains methodologically rigorous and insightful. Thus, it captures essential aspects of cultural, thematic, and contextual diversity.

Furthermore, cultural diversity was a critical consideration in selecting the cartoons. The dataset includes works from cartoonists representing diverse geographical regions and cultural backgrounds, such as Western nations (e.g., Spain, Hungary, and Italy), Latin America (e.g., Brazil and Chile), Arabic countries (e.g., Morocco), and Islamic countries (e.g., Turkey) (See **Appendix A**. selected editorial cartoons). This diversity ensures that the analysis reflects a wide range of cultural attitudes, values, and interpretations related to AI. Furthermore, in conducting the analysis, particular attention was given to ensuring that cultural sensitivities were respected. Thus, the unique sociocultural contexts from which each cartoon emerged are recognized. This involved interpreting the cartoons with an awareness of their cultural nuances and avoiding oversimplifications (or misrepresentations) that could distort their intended messages. Therefore, by incorporating these considerations, the study not only reflects the diverse perspectives on AI but also demonstrates a commitment to ethical and respectful engagement with culturally varied content.

To sum up, the justification for the selected dataset and its size is based on the need for a manageable yet diverse sample that highlights international and cultural perspectives. This approach allows for an exploration of how editorial cartoons construct social realities about AI. It also reflects the cartoonists’ cultural and personal assumptions while ensuring that these assumptions are analyzed within their proper cultural contexts.

6. Literature Review

6.1. Kress and Van Leeuwen’s^[7] Grammar of Visual Design

Kress and van Leeuwen^[7] present the idea of a ‘semiotic landscape’. This idea highlights the significance of context in understanding visual representation. They argue that visual communication within a specific community cannot be fully grasped without taking into account two points. These are: (1) the diverse forms and modes of public communication present in that society, and (2) their usage and perceptions. Their Multimodal Discourse Analysis (MDA, henceforth) framework is based on Halliday’s systemic functional linguistics (SFL). Their framework illustrates how various semiotic modalities (including images, diagrams,

photographs, caricatures, and graphics) collaborate to convey implicit meanings expressed through texts. They contend that analyses should commence with Halliday's metafunctions to identify the fundamental system behind each communicative instance^[10]. Halliday argues that all semiotic modes serve three metafunctions. These are: (1) the ideational, (2) interpersonal, and (3) textual metafunctions. According to Kress and van Leeuwen^[7], all images enact Halliday's metafunctions in three distinct manners. These are the representational patterns associated with the ideational metafunction, the interactive patterns linked to the interpersonal metafunction, and the compositional patterns related to the textual metafunction. The representational patterns serve as the initial means of implementing Halliday's metafunctions, highlighting visual elements within the image such as individuals, locations, and objects, while also reflecting the nature of interactions and conceptual relationships among them. The interactive patterns primarily focus on the elements that establish connections between the viewer, the creator of the visual content, and the individuals depicted within the texts. Lastly, the compositional patterns reveal how both representational and interactive elements come together to form a cohesive and meaningful entirety.

Kress and van Leeuwen^[7] propose that representation constitutes a visual 'syntax' of images, expressed through participants such as individuals, objects, or figures, aimed at connecting these participants amongst themselves. Apparently, it "answers the question 'what is the picture about?'"^[11]. In other words, it addresses the inquiry of what does the image depict? This involves examining the participants depicted in the image, with the aim of determining if they are animate or inanimate. Consequently, the visual composition of a representation can be classified as either narrative or conceptual. Narrative structures illustrate the roles of social actors engaged in actions and events, functioning to depict ongoing processes, changes, and "transitivity spatial arrangements"^[7]. Essentially, they convey the relationships of actions through non-verbal means by visualizing real-world experiences. Additionally, narrative structures encompass five distinct types of processes: actional, reactional, speech and mental processes, conversion, and geometrical symbolism. In conceptual structures, participants are depicted as a fixed entity without any interaction occurring among them, indicating the absence of vectors^[7]. Kress and

van Leeuwen^[7] describe conceptual structures as visuals that illustrate participants in terms of their broader, relatively stable, and "timeless essence", concerning "class", "structure, or meaning" (p.79). Primarily, conceptual structures can be categorized into three types: classificational processes, analytical processes, and symbolic processes. Thus, one can conclude by summarizing the difference between the narrative and conceptual structures as given by Kress and van Leeuwen): While narrative representation depicts actions, events, processes of change, and temporary spatial arrangements, conceptual representation illustrates participants through the lens of their "more generalized", relatively "stable", and "timeless essence", emphasizing aspects like "class", "meaning", or "structure" (p.79).

The interaction among all the participants involved in creating and viewing the image is referred to as interaction meaning^[7]. Interaction structure addresses the question, "In what way does the image engage its viewers?" Notably, two types of participants are identified by Kress and van Leeuwen^[7]: the "represented participants" and the "interactive participants" (p. 114). The represented participants are depicted within the image, while the interactive participants consist of both the image's producers and its viewers. In essence, interactive meaning elucidates the intended relationship among the represented participants within the image, as well as the connection between these participants and the viewer, conveying the producer's intended interactive message. For instance, Kress and van Leeuwen^[7] assert that every image "must either be a 'demand' or an 'offer', and it must choose a specific frame "size" and adopt a particular "attitude" (pp. 148–149). Thus, interaction representation is categorized into three types: contact, social distance, and attitude. Contact can be further divided into two types of image acts: demand, characterized by a gaze directed at the viewer, and offer, which involves the lack of gaze towards the viewer^[7, 12, 13]. This classification is determined by the presence or absence of eye contact. Variations in frame size can convey social relationships, with three identifiable types: close-up shots that show the head and shoulders of the subject, medium shots depicting the participant's body down to the knees, and long shots that capture the entire figure occupying roughly half the frame's height^[7, 14]. Attitude, or point of view, consists of two visual types: objective, which lacks perspective, and subjective, which includes a central

perspective; additionally, subjective features convey varying degrees of involvement and power, which can be further broken down into two angles of representation: horizontal and vertical^[7, 15].

Regarding compositional representation, refers to the “way in which the representational and interactive elements are made to relate to each other, the way they are integrated into a meaningful whole”^[7]. Thus, it connects the representational and interactive meanings of a cartoon. This connection is created through three interrelated principles: information value, salience, and framing. The information value is inferred from the positioning of each element. Accordingly, the configuration of elements (i.e., participants interacting with each other and the audience) conveys unique informational values associated with specific ‘zones’ in the image: the left and right (i.e., Given and New structures), the top and bottom (i.e., Ideal and Real structures), as well as the center and margin (i.e., Center and Margin structures). As a result, various compositional elements are allocated specific informational values that correspond to these distinct ‘zones’^[11, 16]. As for salience, it is achieved by using elements designed to capture the viewer’s attention to varying extents, influenced by aspects such as their positioning in the foreground or background, color contrasts, size variations, and distinctions in sharpness, among other factors. As for framing, it is associated with the connection and disconnection of the elements. Framing devices, manifested through elements that establish dividing or framing lines, indicate whether the components of an image are linked or separated, thereby suggesting their association or lack thereof. Typically, frames serve to emphasize the text or the visual content^[7].

6.2. Previous Studies

Studies have investigated the role of images in the hidden curriculum^[17, 18], the new role of AI representations in school settings^[19], the determinants of students’ intentions to use AI for academic purposes^[20], and societal perception of AI^[21–25]. Furthermore, various studies have interpreted different forms of visual communication via the utilization of Kress and Van Leeuwen’s^[7] model of visual social semiotics in different contexts such as sports and cultural events^[26, 27], representation of vulnerable groups^[28], social distance and emotional impact^[29], critique of stereotypes in advertising^[30], print advertisements^[31], AI technology^[32]

and pet protection^[33]. Within the realm of sports and cultural activities, Şimşek and Bozdağ^[26] applied the visual social semiotic approach, integrating Kress and Van Leeuwen’s model, to examine a chess photo of Ronaldo and Messi shared on Instagram. Their research has an objective. It is to deepen the understanding of audience engagement. The findings illustrate how, in the digital age, visual narratives intricately weave together various elements. These elements are composition, context, culture, and technology. They work together to produce complex meanings that shape our visual experiences and comprehension of the world^[26]. Similarly, Al-azzawi and Kadhim^[27] employed Kress and Van Leeuwen’s^[7] model with the aim of investigating humorous posters created by fans at major sporting events. The study emphasized the importance of visual literacy in communicating social and cultural messages. It concluded that visual literacy plays a vital role in the context of significant sporting occasions and that fan-created posters express profound social and cultural messages. In the context of representing venerable groups, Aliakbari and Kamalvand^[28] utilized Kress and Van Leeuwen’s visual grammar to analyze photographic portrayals of Iranian elders on websites during the COVID-19 pandemic. The aim of their study was to uncover pervasive negative stereotypes linked to ageism. The study reached the conclusion that the depiction of elderly Iranians on websites during the COVID-19 pandemic is predominantly negative and that ageism is more commonly directed at older women than at older men. In the context of social distance and contact, Hameed and Ejam^[29] examined the social semiotics of contact present in a pictorial story ‘Berry Bunny Learns about COVID-19’ by Natalie Tjota. The findings suggest that social distance significantly affects how information is communicated and can also impact emotions, moods, and decision-making processes. In the context of analyzing stereotypes in advertising, Putri^[30] investigated masculinity representation in MSGlow For Men’s advertisement. The study reached the conclusion that the advertisement for MSGlow For Men reinforces traditional stereotypes of masculinity and that the advertisement marginalizes the non-dominant masculinity group. In the context of print advertisements, Wang^[31] examined the value of symbols present in information dissemination in McDonald’s print advertisements via the application of visual communication theory. The study concluded that the use of symbols within

images enhances both the accuracy of scientific information and the expression of artistry in design. In the AI technology context, Helal^[32] identified the visual communicative functions, thematic foci, and discursive practices employed by caricaturists in depicting AI-related issues. The analysis highlights three main themes in AI representation: AI dominance, humanity's potential downfall, and AI's impact on various societal aspects such as knowledge, intelligence, creativity, jobs, truth, and politics. These themes are used to present a predominantly negative portrayal of the 'age of AI' and its potential consequences. Additionally, the study identifies discursive strategies employed by cartoonists to convey their implicit ideologies about AI technology. The study provides insights into how visual media shapes societal perceptions of AI, fostering greater awareness and encouraging thoughtful discourse on the ethical integration of AI in society. In the context of pet protection, Deng et al.^[33] examined the visual and textual elements of an Instagram post to convey urgency and empathy. Findings emphasized emotional connection, viewer engagement, and effective design for advocacy campaigns. While the aforementioned studies have applied Kress and Van Leeuwen's^[7] model of visual social semiotics to explore various types of visual communication, they have not addressed the subject of AI in the context of literature, books, theory of mind, and arts. So far, no research has investigated how AI technology is visually represented in editorial cartoons related to literature, books, theory of mind, and arts. Consequently, this study seeks to bridge that gap by identifying the visual communicative purposes used by cartoonists in portraying AI-related topics.

7. Data Analysis, Results and Discussion

In this section, **eight** editorial cartoons that depict AI within the realm of literature, books, theory of mind, and arts will be listed and numbered from 1 to 8. Furthermore, the analyses of the multimodal manifestations of each cartoon will be given. The focus of the analysis is on the interpretation of the various semiotic resources employed in the selected cartoons to realize particular forms of meaning: representational meaning, interactive meaning, and compositional meaning.

7.1. The analysis of Cartoon (1)

The following cartoon (**Figure 1**), entitled "hAImlt", was published by a cartoonist from Italy on 24 January 2023.

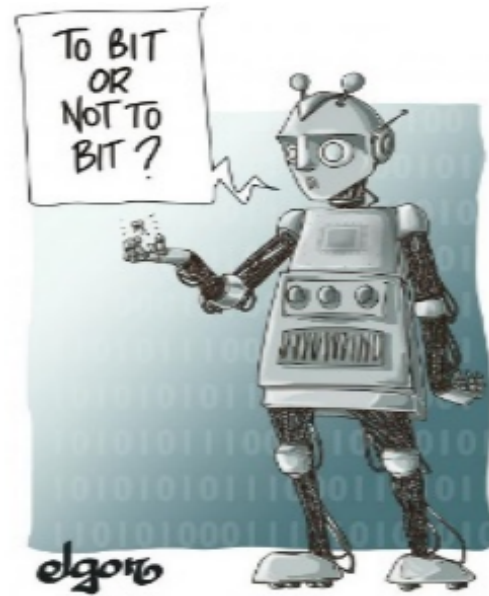


Figure 1. Cartoon published by Alagon on CM, 24 January 2023.

The **representational meaning** in the cartoon depicts a robot holding a small object while pondering the phrase, "To Bit or Not to Bit?". Obviously, this phrase serves as a witty adaptation of Shakespeare's line, "To be or not to be?". Additionally, a backdrop of binary code is present. Consequently, the cartoon encompasses various elements: a robot, a small object, a speech bubble, and a binary code backdrop. There are no explicit indicators of movement or action, as the robot's stance is static. Thus, the emphasis lies on the symbolic act of contemplation, whereby technological themes coalesce with philosophical inquiry. The object in the robot's grasp may represent data, a microchip, or a binary decision, as the term 'bit' pertains to binary digits in computing. This interpretation goes with the overarching narrative concerning the evolution of AI and its consequent implications. Thus, the cartoon depicts a conceptual process in which the robot (representing AI), is creating a link between technological developments and classical literature and posing questions regarding AI's ability to think cognitively and make existential decisions. In summary, the cartoon highlights a conceptual representation (i.e., philosophical questioning in the context of digital technology) rather than illustrating an action or event.

From the perspective of **interactional meaning**, four aspects will be examined: contact, social distance, modality, and attitude. With regard to contact, the robot does not establish eye contact with the viewer; thus, indicating a degree of separation (or introspection) within its own realm. In terms of social distance, the medium shot (which captures the robot from feet to head) reflects a personal yet not intimate engagement. Concerning modality, the cartoon employs a moderate level of realism. The robot is characterized by clear lines and shading that render it both recognizable and stylized. Lastly, the element of attitude is evident in the robot's frontal but slightly angled positioning, creating a neutral perspective that neither confronts nor withdraws from the viewer. This unbiased posture invites contemplation. Furthermore, it encourages the viewer to consider the philosophical ramifications of AI.

Within the framework of **compositional meaning**, four key points will be analyzed in this cartoon: information value, salience, framing, and the utilization of color and light. Notably, the robot occupies a central position in the cartoon. This central position is an indication of its importance as the focal point of the editorial illustration. Additionally, the speech bubble occurs slightly above the robot's head. Accordingly, it signifies the importance of the conveyed message. The information presented includes the binary code in the background and the robot itself, both of which symbolize the familiar digital context associated with AI. On the other hand, the speech bubble (which contains the phrase "To Bit or Not to Bit?") and the robot's contemplative posture serve as new information. Thus, the new information introduces the notion of AI wrestling with existential dilemmas. This contrast invites viewers to reflect upon the evolving role of AI as well as its potential societal repercussions. In terms of salience, the robot and the speech bubble emerge as the most prominent elements within the cartoon. This is because of (1) their size, (2) their positioning, and (3) their contrast against the binary code backdrop. An analysis of framing reveals that the binary code background establishes a digital context that situates the robot within the domain of computing and digital information. This contextualization is crucial, as it anchors the viewer's comprehension of the robot's 'existential' inquiry within a technological framework. A balanced composition is achieved through the rhythmic repetition of the binary code as well as the symmetrical design of the robot.

This composition reinforces the organized nature of digital environments and AI. Regarding the application of color, the cartoonist adopts a muted, monochromatic palette dominated by shades of grey, blue, and white. This color scheme fosters a futuristic, technological ambiance. Therefore, this usage of color accentuates the robotic subject. Furthermore, the background features a subtle gradient transitioning from light blue to darker blue, integrated with binary code (i.e., 1s and 0s). Accordingly, it reinforces the themes of digital technology and computation. The light source appears to emanate from the upper left, casting soft shadows on the robot. It also highlights the robot's metallic surface. This illumination endows the robot with a slightly reflective appearance, enhancing its mechanical essence. The viewers' attention is drawn to the well-lit face and body of the robot, thus emphasizing its contemplative expression. Hence, the employment of color and light effectively amplifies the themes of artificial intelligence and computation.

7.2. The Analysis of Cartoon (2)

The following cartoon (**Figure 2**), entitled "Artificial intelligence: To be or not to be", was published by a cartoonist from Spain on 4 February 2018.



Figure 2. Cartoon published by Omar Perez (Spain) on CM, 4 February 2018.

The **representational meaning** of the cartoon is conveyed through the visual depiction of a robot, representing AI, which is adopting a pose that mirrors Rodin's famous sculpture, 'The Thinker'. Thus, it depicts AI (represented by the robot) as a philosophical entity. Obviously, this imagery aligns the robot with the tradition of human philosophical inquiry. It suggests that the robot is engaged in a process of deep thought. The robot is marked as an AI because of its mechanical form and digital components. At the same time, it is

depicted in a manner that closely resembles a human figure lost in introspective thought. This narrative process positions the robot as a solitary figure. Furthermore, it emphasizes its engagement in an intellectual activity traditionally reserved for humans. The setting is simple as we can see a stark, unadorned pedestal illuminated by a spotlight. This simplicity of the setting serves to isolate the robot. In addition to that, it underscores its introspective action. Obviously, the viewer's attention is focused on the robot's contemplative pose due to the absence of other characters as well as the distracting background. In the description given by the cartoonist for this cartoon, he referred to the point that the robot is thinking of Hamelt's phrase 'to be or not to be'. The cartoon suggests a narrative of AI grappling with its own existence.

As for the **interactive meaning** of the cartoon, it is constructed through the relationship between the robot and the viewer. The neutral angle of the cartoon positions the viewer at an equal level with the robot. Thus, it fosters a sense of equality and relatability. Furthermore, this angle creates a visual dialogue that invites the viewers to see the robot not merely as a machine, but as a being capable of engaging in intellectual as well as existential reflection. The lack of a direct gaze of the robot toward the viewer implies a deep focus on its own thoughts. This reinforces the idea that the robot is engaged in serious contemplation related to the question 'to be or not to be'. Additionally, this lack of direct interaction prompts viewers to project their thoughts onto the robot. Thus, the viewers are encouraged to intellectual engagement rather than emotional identification. The close-up view enhances the intimacy of the scene. It also positions the viewer as a witness to a private moment of reflection by the robot. This proximity is significant as it draws the viewer into the robot's contemplative space. Thus, a shared sense of intellectual curiosity about the nature of AI consciousness is created. To conclude, one can say that the analysis of interactive meaning fosters relatability as well as intellectual engagement.

As for **compositional meaning**, one can say that the compositional choices in the cartoon are crucial in guiding the viewer's attention as well as in reinforcing the theme of introspection. The robot is centrally positioned in the cartoon, directly under a spotlight. This central placement manages to create a strong focal point that immediately captures the viewer's gaze. Furthermore, it signifies the importance of

the robot's contemplative state. This contemplative state of the robot is the primary subject of the viewer's attention. The stark contrast between the dark background and the brightly lit robot enhances the visual hierarchy. More importantly, it directs focus to the robot's reflective pose. The use of a spotlight not only highlights the robot but also creates an impression of isolation. This created a sense of isolation suggests that the robot is alone in its quest for self-understanding. The high modality of the robot's depiction (which can be seen by detailed rendering of its mechanical features) adds a layer of realism to the scene; therefore, it makes the robot's reflective state more believable and relatable to the viewer. Furthermore, the viewer's attention remains firmly fixed on the robot due to the absence of additional elements/characters or distractions. This further reinforces the theme of solitary contemplation. To conclude, one can say that the analysis of the compositional meaning of the cartoon emphasizes contemplation and introspection.

7.3. The Analysis of Cartoon (3)

The following cartoon (**Figure 3**), entitled "Artificial Intelligence: Theory of Mind and Artificial Intelligence", was published by a cartoonist from Morocco on 8 May 2024.

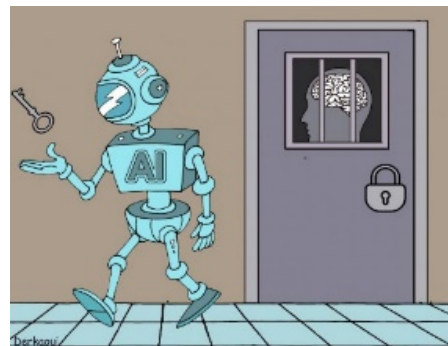


Figure 3. Cartoon published by Derkaoui Abdellah (Morocco) on CM, 8 May 2024.

The **representational meaning** is depicted through the symbolic image of a robot holding a key in front of a door. Beyond the robot lies a human brain visible behind bars. The robot, representing AI, holds the key (both in a literal and figurative sense) to gaining access to or unlocking the human mind. Thus, the representational meaning symbolizes AI's interaction with human cognition. This visual narrative suggests themes of exploration or potential domination. Thus, AI is positioned as an entity capable of either liberating or constraining

human cognitive processes. The key within the robot's grasp symbolizes knowledge, authority, and the capacity to uncover the enigmas of human thought. On the other hand, the barred brain represents the inaccessible territory of human cognition. Obviously, the cartoon is directing the viewer's focus to the central ethical and philosophical dilemmas associated with AI's potential intrusion into human thought.

As for the **interactive meaning**, it is shaped by the viewer's perspective and the robot's demeanor. Obviously, the viewer is positioned at a slightly elevated perspective, looking down upon the robot and the door, which cultivates a sense of authority or superiority regarding the scene. This viewpoint gives the impression that the viewer possesses the capacity to judge (or critique) the actions of the AI rather than merely observe them. A degree of indifference or unawareness is given by the robot's relaxed posture and its avoidance of eye contact with the viewer. It may be interpreted as either a lack of consciousness or a deliberate disregard for human oversight. Thus, the viewers are invited by this detachment to engage in critical reflection on the potential outcomes of AI gaining access to or control over human cognitive faculties. A balance between intimacy and detachment is created in the cartoon. Obviously, it is created by the medium distance between the viewer and the depicted scene. This fosters thoughtful contemplation of the ethical implications without prompting personal feelings of threat.

The **compositional choices** made in the cartoon are meticulously crafted. Thus, themes of control and accessibility are underscored. A symmetrical arrangement, with both the robot and the door centrally located, presents a balanced visual structure that directs the viewer's attention towards their interaction. This central positioning accentuates the significance of the robot and the door. Thus, they are framed as the essential components of the narrative concerning AI's role in human cognition. The use of subdued colors and straightforward lines contributes to a clear and uncluttered visual environment. This ensures that the viewer remains focused on the key thematic elements: the robot, the key, and the door. Thus, the design is simple. This simplicity in design enhances the conceptual clarity of the cartoon. Accordingly, it prevents distractions from superfluous details.

7.4. The Analysis of Cartoon (4)

The following cartoon (**Figure 4**), entitled "Artificial intelligence and books: Artificial intelligence in the labyrinth

of ideas and books", was published by a cartoonist from Brazil on 7 June 2024.

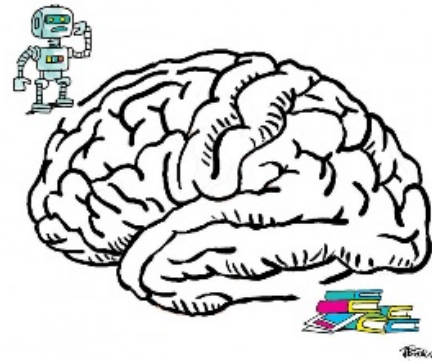


Figure 4. Cartoon published by J. Bosco (Brazil) on CM, 7 June 2024.

The **representational meaning** of the cartoon is shown through the portrayal of a robot positioned alongside a large human brain and an array of books. The books symbolize the vast scope and richness of human intellectual achievement. Obviously, the robot assumes a passive posture, which conveys a sense of contemplation or being overwhelmed. This suggests a narrative that encapsulates the challenges associated with understanding complex cognitive tasks. This visual narrative (process) frames the robot as an inquisitor or learner embarking on an intellectual quest to comprehend the complexities inherent to human cognition and knowledge systems. The brain embodies the essence of human intellectual capacity. On the other hand, the books represent the accumulated wisdom, culture, and historical knowledge of humanity. Therefore, these visual components manifest the robot's endeavor to engage with and potentially decipher the intricate tapestry of human intellect.

The **interactive dimension** of the cartoon is constructed through the relationship between the viewer and the visual elements presented. The viewer's eye level aligns with that of the robot. This creates a sense of equality and shared curiosity regarding the robot's objectives and capabilities. The robot's avoidance of direct eye contact, coupled with a medium distance from the viewer, engenders a sense of detachment. Thus, viewers are encouraged to adopt a more analytical lens when evaluating the robot's engagement with human knowledge. This is achieved by the created sense of detachment. Obviously, this created emotional distance fosters critical reflection rather than identification. Furthermore, it prompts viewers to assess the robot's capacity to

navigate human intellectual frameworks. The visual indicators stimulate contemplation of the potential and limitations of AI in interpreting human cognitive processes.

The **compositional arrangement** of the cartoon is meticulously structured. The aim is to direct the viewer's attention to the essential elements representing knowledge and exploration. The robot, brain, and stacks of books are strategically positioned in a triangular formation. This position creates a balanced composition. Furthermore, it naturally guides the viewer's gaze. The employment of bright, contrasting colors enhances visual engagement while delineating the distinction between the mechanical nature of the robot and the complex body of human knowledge it aspires to comprehend. The interplay of light and shadow within the composition further enriches its depth. Additionally, it illuminates the robot's interaction with the brain and books. This deliberate compositional choice highlights the inherent challenges faced by AI in its pursuit of understanding human cognition. Furthermore, it implies that while AI may engage with human knowledge, it may struggle to fully grasp its profound complexities and nuances.

7.5. The Analysis of Cartoon (5)

The following cartoon (**Figure 5**), entitled "Odyssey", was published by a cartoonist from Chile on 6 May 2023.



Figure 5. Cartoon published by Alen Lauzán (Chile) on CM, 6 May 2023.

The **representational meaning** is conveyed through the depiction of a robot kneeling in a barren landscape scattered with bones, holding a bone in its hand. Clearly, this given imagery is a direct reference to a scene from Stanley Kubrick's 2001: A Space Odyssey, where a primitive hominid discovers the use of a bone as a tool. It symbolizes the dawn of human technological innovation. Here, the

robot symbolizes AI, positioned as a modern successor to this evolutionary narrative. The act of the robot holding the bone suggests a narrative process of discovery, innovation, or potential destruction, reflecting on AI's capacity to wield tools and knowledge in ways that could either advance or harm humanity. The barren, skeletal landscape reinforces themes of evolution and the consequences of technological advancements, presenting a stark contrast between the promise of progress and the specter of destruction. This setting underscores the dual-edged nature of technological evolution. Furthermore, it suggests that AI, like early human tools, carries the potential for both creation and annihilation.

The **interactive meaning** of the cartoon is established through the positioning of the viewer in relation to the robot and its environment. The viewer is positioned at a slightly elevated angle, looking down at the robot, which creates a sense of detachment and authority. This elevated perspective allows the viewer to adopt a critical stance. The viewer is observing the robot's actions within the broader context of the desolate landscape. The robot's gaze is directed toward the bone it holds, not engaging with the viewer, which emphasizes its focus on its task or discovery, rather than on human oversight or ethical considerations. A sense of isolation and introspection is created by the lack of direct engagement with the viewer. In addition to that, this lack of direct engagement suggests that the robot is operating independently of human influence. The medium shot employed in the cartoon balances a sense of close observation with a broader contextual understanding. Furthermore, it invites viewers to consider the implications of the robot's actions from both an immediate and a long-term perspective. This composition encourages viewers to reflect on the broader ethical and philosophical questions surrounding AI's role in human evolution and technological development.

The **compositional structure** of the cartoon places the robot at the center of the frame, surrounded by bones and a barren landscape. Accordingly, a strong visual focus on the robot is achieved. Furthermore, this central placement creates highlights the robot's significance within the narrative. The surrounding bones and desolate environment reinforce a sense of isolation and contemplation. Furthermore, they suggest that the robot is alone in its exploration of new tools and technologies. The use of desaturated colors and stark contrasts between the robot and its surroundings. Further-

more, this use creates a somber and contemplative mood. Additionally, it reflects the seriousness of the themes being explored (i.e., the intersection of technology, evolution, and destruction). The high modality in the depiction of the robot and the environment adds a layer of realism to the scene. Also, it makes the implications of AI's actions more immediate and tangible for the viewer. This realistic portrayal invites viewers to engage more deeply with the ethical considerations of technological advancement. Furthermore, it prompts reflection on the potential consequences of AI's evolving role in society.

7.6. The Analysis of Cartoon (6)

The following cartoon (**Figure 6**), entitled "AI", was published by a cartoonist from Turkey on 2 December 2023.

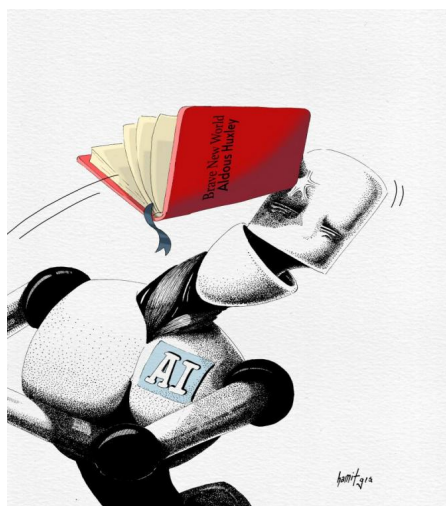


Figure 6. Cartoon published by (Turkey) on CM, 2 December 2023.

As for **representational meaning**, the cartoon depicts a robot, representing AI. This robot is adopting a defensive posture in the presence of a book entitled 'Brave New World' by Aldous Huxley. This encounter epitomizes the dilemmas faced by AI when it engages with human intellect and cultural artifacts. The cartoonist was successful in his selection of Huxley's literary work, as it provides a critical analysis of technological dystopia. Furthermore, it raises apprehensions regarding the potential dehumanization that may result from unregulated technological advancement. Consequently, the cartoon represents a narrative dynamic (narrative process) in which AI is metaphorically confronted by the profound ethical and cultural dimensions embedded in human literature.

The analysis of the **interactive meaning** shows that the viewer's positioning at eye level with the robot. This fosters an immediate sense of engagement with the depicted scene. The robot's backward-leaning posture, alongside the book's trajectory towards it, implies a moment filled with tension. This arrangement invites viewers to actively engage in this pivotal moment. Additionally, it prompts viewers to reflect on the implications of this symbolic confrontation.

The **cartoon's composition** is characterized by dynamism. Obviously, there is a strategic placement of the cartoon's items: the book is placed in the foreground and the robot is positioned in the mid-ground. This arrangement generates a sense of movement and imminent confrontation. Also, it directs the viewer's attention towards the encounter. The vivid red color of the book sharply contrasts with the more muted hues of the robot and background. Thus, it underscores the book as the focal element. This visual disparity accentuates the central theme of the narrative: the friction between AI and human culture. The composition; thus, effectively highlights the urgency and significance of this interaction.

7.7. The Analysis of Cartoon (7)

The following cartoon (**Figure 7**), entitled "Wanderer above the Sea of Fog", was published by a cartoonist from Chile on 31 May 2023.



Figure 7. Cartoon published by Alen Lauzán (Chile) on CM, 31 May 2023.

The **representational meaning** is reflected via the depiction of a robot positioned atop a mountain summit. The robot is gazing across a vast, fog-enshrouded expanse. Obvi-

ously, the imagery evokes the painting ‘Wanderer above the Sea of Fog’ by Caspar David Friedrich. The contemplative posture of the robot, which symbolizes artificial intelligence, suggests a narrative focused on exploration (or introspection). The extensive, obscured landscape represents the uncharted domains of technology and philosophical inquiry. This underscores the unknown territories that AI is prepared to traverse.

Moving to the **interactive meaning**, the viewer’s perspective is positioned slightly above and behind the robot. This allows for a shared viewpoint while simultaneously maintaining a degree of detachment. This positioning cultivates a feeling of solidarity with the robot’s journey. It also highlights the viewer’s role as an observer. The use of a wide-angle perspective emphasizes the enormity of the landscape. Furthermore, this use reinforces themes of exploration and the sublime. Additionally, the robot’s non-vocal stance invites the viewer to partake in its contemplation.

As for **compositional meaning**, the visual arrangement places the robot at the center against a backdrop of an expansive and enigmatic landscape. This establishes a notable sense of scale and grandeur. The soft blues and grays characterizing the landscape contrast with the robot’s more defined silhouette; thus, the viewer’s attention is directed toward it as the principal focal point. Furthermore, the robot’s positioning upon the peak implies authority (or accomplishment); however, the encircling fog introduces an element of ambiguity and uncertainty, further accentuating the theme of exploration. This composition reveals the inherent duality of promise and uncertainty associated with technological progress.

7.8. The Analysis of Cartoon (8)

The following cartoon (**Figure 8**), entitled “book”, was published by a cartoonist from Hungary on 5 August 2024.

The **representational meaning** in this cartoon portrays a robot engaged in drilling into a book. This portrayal can serve as a metaphor for an act of destruction (or deconstruction). Obviously, this robot, indicative of artificial intelligence (AI), adopts a mechanical and systematic posture. Therefore, the cartoon suggests a narrative process centered on the methodical dismantling of the book’s knowledge. The sparse backdrop draws attention exclusively to the interaction between the robot and the book. Thus, it highlights the overarching theme of the annihilation of knowledge. This representation prompts inquiries into AI’s potential role in

destabilizing traditional repositories of human wisdom.



Figure 8. Cartoon published by Gergely Bacsa (Hungary) on CM, 5 August 2024.

Regarding the **interactive meaning** of the cartoon, the viewer is situated at a point that is slightly elevated and in close proximity to the robot. This position helps in fostering a sense of immediacy regarding the ongoing action. The robot’s lack of direct eye contact with the viewer signifies an indifferent attitude towards its observer. Additionally, the close framing intensifies the sense of urgency. It also invites the audience to engage critically with the ramifications of AI’s actions on human knowledge. Consequently, the viewer is urged to contemplate the ways in which AI may disrupt or transform established cultural and intellectual conventions.

The **compositional meaning** of the cartoon shows that both the robot and the book occupy a central position, with the book commanding the visual field. This hierarchical arrangement emphasizes the theme of knowledge destruction. Furthermore, the vivid, contrasting colors of the book juxtaposed with the subdued tones of the robot draw the viewer’s attention specifically to the book; thus, highlighting its symbolic importance. The application of sharp lines and intricate textures enhances the scene’s realism. Additionally, it amplifies the impact of the destructive act. This compositional strategy effectively underscores the tension between preservation and obliteration.

8. Conclusions

The current study has employed a multimodal discourse analysis approach to examine how AI is represented visually

in a selection of eight editorial cartoons published on CM. By analyzing eight cartoons using Kress and Van Leeuwen's^[7] visual social semiotics framework, the study uncovered significant insights into the visual communicative functions used to depict AI themes that are related to literature, books, theory of mind, and arts. One can say that across all eight editorial cartoons, a consistent theme emerges. It is the complex relationship between AI and human culture, knowledge, and ethics. Furthermore, several visual themes have emerged (among them skepticism and philosophical inquiry). The exploration of these themes shapes public perceptions of AI as both a tool of innovation and a source of existential unease. This prompts viewers to critically assess AI's place in human advancement.

In response to the first research question regarding the visual communicative functions of cartoons, one can say that from the analysis, the cartoons utilized a variety of visual social semiotics strategies represented by representational, interactive, and compositional meanings to explore different aspects of this complex relationship between AI and human culture, knowledge, and ethics, from AI's potential to mirror human existential dilemmas to its role as a challenger, explorer, or destroyer of human knowledge. Obviously, from the analysis, the cartoonists prompt viewers to consider the ethical, philosophical, and existential questions that arise as AI continues to evolve and intertwine with human life. Thus, each cartoon serves as a reminder that while AI may offer new possibilities and advancements, it also brings challenges that must be carefully managed to preserve the core values and wisdom of humanity. These visual depictions reinforce a narrative where AI's development requires careful ethical stewardship. Additionally, they (AI visual depictions) reflect broader societal debates about its potential risks and benefits.

In response to the second research question regarding the recurring themes that emerge from the visual representation of AI in editorial cartoons, one can reach the conclusion that there are three recurring themes. These are (1) AI's philosophical inquiry and human cognition, (2) AI's role in human knowledge and books, and (3) control and autonomy. As for the first recurring theme, from the analysis, the cartoons entitled "hAImllet" (**Figure 1**) and the cartoon "Artificial Intelligence: To be or not to be", (**Figure 2**), both depict AI in a deep philosophical thought. This depiction of AI mirrors human intellectual processes. Thus, this theme

reflects societal concerns about AI's potential to mimic or challenge human thought and existential questioning. As for the second recurring theme, one can say that the cartoons entitled "Artificial Intelligence and books" (**Figure 4**), "AI" (**Figure 6**), and "book" (**Figure 8**), all highlight the engagement of AI with literature and knowledge. They represent a broader fear that AI may disrupt, challenge, or even destroy established human wisdom and cultural knowledge. The last theme is of control and autonomy which is reflected by the cartoon entitled "Theory of Mind and Artificial Intelligence" (**Figure 3**). It emphasizes AI's potential to gain access or to influence human cognitive processes. Thus, it symbolizes societal concerns regarding autonomy, control, and the ethical dilemmas for AI's impact on human thought. These themes underscore a public apprehension that extends beyond technological capabilities. Therefore, they urge a broader reflection on the consequences of AI for societal norms, intellectual heritage, and individual autonomy. To sum up, one can say that these themes collectively reflect societal concerns about AI's capability to replicate human intelligence, challenge traditional sources of knowledge, and the ethical implications of AI's growing impact on human autonomy and intellectual life.

In response to the third research question, one can say that, from the analysis, different cultural as well as national perspectives shape the depiction of AI in the selected editorial cartoons, particularly from ethical and societal implications. These are Western (represented by Italy, Spain, Hungary, as shown by **Figures 1, 2, and 8** respectively), Latin American (by Chile, Brazil, as in **Figures 5, 7, and 4**) and Arab and Islamic (by Morocco, Turkey, as in **Figures 3 and 6** respectively) perspectives. The cartoons of western countries tend to portray AI in an existential or philosophical light. This is created by drawing parallels to well-known cultural and literary works such as Shakespeare's 'Hamlet' or classic literature; thus, emphasizing AI's role in questioning human identity and knowledge. The cartoons of Latin America, often depict AI as an explorer or innovator. Thus, these cartoons symbolize AI's potential in shaping the future. Additionally, they highlight AI's dual role as a potential destroyer. Therefore, these cartoons suggest concerns about how technological evolution might impact societal progress as well as knowledge. The cartoons of Arab and Islamic countries highlight ethical and philosophical challenges related

to AI. These are: AI's potential to invade human cognition, or AI's potential to confront human cultural values. These cartoons, obviously, reflect anxieties about AI's intrusion into fundamental aspects of human life as well as culture. These culturally specific visualizations reveal how deeply intertwined AI is with societal values and fears. Furthermore, they illustrate AI's capacity to either harmonize with or disrupt diverse cultural narratives and priorities. One can say that these varied perspectives show how cultural contexts influence the way AI's societal and ethical implications are visualized. Obviously, they demonstrate both shared concerns about AI's impact on knowledge and unique cultural apprehensions regarding its integration into human life.

Regarding the implications of the study, a predominantly skeptical (or cautionary) stance toward AI in connection with human cognition and creativity is revealed through the analysis. While AI is depicted as capable of extraordinary intellectual feats, the editorial cartoons also emphasize its limitations in fully comprehending or preserving the depth of human knowledge and culture. The recurring themes of control, autonomy, and ethical concerns highlight the potential risks AI poses when unregulated or unreflective of human values. One can say that these representations contribute to a public dialogue that balances excitement for AI's possibilities with a measured awareness of its ethical and societal challenges. This frames AI as both a boon and a potential threat to humanity's intellectual and cultural integrity. Building on these findings, policymakers could leverage them to create robust regulatory frameworks that prioritize ethical AI development and align technological advancements with societal values. Also, educators could incorporate these themes into curricula. This will foster critical thinking and awareness of AI's ethical and cultural dimensions among students. Meanwhile, media creators could use these insights to craft narratives that encourage public discourse on responsible AI adoption. Thus, the balance between innovation and preserving human-centric values is emphasized. Collectively, these efforts would contribute to a comprehensive approach to addressing the multifaceted implications of AI.

In conclusion, the study sheds light on how visual media can powerfully engage audiences in critical discourse about the societal implications of AI (particularly regarding literature, arts, and cognition). The results emphasize the need for ongoing ethical and philosophical reflection as AI

continues to integrate into various aspects of human life. The depiction of AI in these editorial cartoons serves as a critical lens through which audiences can evaluate AI's evolving role, fostering a collective contemplation of its implications for future technological and societal development.

9. Limitations and Future Research Directions

The current study has a limited sample size of eight cartoons. This small sample size, while allowing for in-depth qualitative analyses, may limit the generalizability of the findings. Future research could be advantaged by working with a larger dataset to gain a greater understanding of the themes and patterns in AI. In addition, this study focuses exclusively on editorial cartoons, thereby narrowing its niche to just one form of visual media. Future research might broaden this focus by examining other visual formats such as film, advertisements, digital art, and so forth. These mediums can surely uncover complementary insights and provide a more comprehensive picture of where AI is seen across a range of different platforms. A further lucrative direction for future research is to carry out longitudinal research that traces the evolution of representation of AI over time. Such an approach might throw light on changing cultural attitudes toward AI and produce new insights into technological development and societal narratives about AI.

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Data Availability Statement

The data that support the findings of this study will be available upon reasonable request.

Conflicts of Interest

The author declares no conflict of interest.

Appendix A. Selected Editorial Cartoons

Figure	Caricature-Description	Cartoonist	Link	Date
1	hAImlt Will ever AI transcend human intelligence? What year is the singularity predicted? What will happen after AI singularity? Let's ask ChatGPT!	 Alagon Italy	hAImlt Cartoon Movement Image link: https://s3-eu-central-1.amazonaws.com/cartoons-s3/styles/product_detail_image/s3/to%20bit%20a4350.jpg?itok=AFsd84vO	24 January 2023
2	Artificial intelligence To be or not to be.	 Omar Perez Spain	Artificial intelligence Cartoon Movement Image link: https://s3-eu-central-1.amazonaws.com/cartoons-s3/styles/product_detail_image/s3/cartoons/2018/02/artificial_intelligence__omar_perez.jpg?itok=-BsCXI7i	4 February 2018
3	Artificial Intelligence Theory of Mind and Artificial Intelligence	 Derkaoui Abdellah Morocco	Artificial Intelligence Cartoon Movement Image link: https://s3-eu-central-1.amazonaws.com/cartoons-s3/styles/product_detail_image/s3/AI_7.jpg?itok=qVcHBA0	8 May 2024
4	Artificial intelligence and books Artificial intelligence in the labyrinth of ideas and books	 J. Bosco Brazil	Artificial intelligence and books Cartoon Movement Image link: https://s3-eu-central-1.amazonaws.com/cartoons-s3/styles/product_detail_image/s3/inteligencia%20artificial%20e%20os%20livros_0.jpg?itok=fbo0SJCX	7 June 2024
5	Odyssey	 Alen Lauzán Chile	Odyssey Cartoon Movement Image link: https://s3-eu-central-1.amazonaws.com/cartoons-s3/styles/product_detail_image/s3/lauzan_AIodisea.jpg?itok=QUYQHEz9	6 May 2023
6	AI	 Hamit GIŞ Türkiye	AI Cartoon Movement Image link: https://s3-eu-central-1.amazonaws.com/cartoons-s3/styles/product_detail_image/s3/Hamit%20G%C4%B1s%CC%A7-AI2.jpg?itok=QrHwRXgl	2 December 2023
7	Wanderer above the Sea of Fog	 Alen Lauzán Chile	Wanderer above the Sea of Fog Cartoon Movement Image link: https://s3-eu-central-1.amazonaws.com/cartoons-s3/styles/product_detail_image/s3/lauzan-CDFriedrichAI.jpg?itok=oo2uV86f	31 May 2023
8	book	 Gergely Bacsa Hungary	book Cartoon Movement Image link: https://s3-eu-central-1.amazonaws.com/cartoons-s3/styles/product_detail_image/s3/2024%20k%C3%B6nyv%20AI.jpg?itok=fbqVJvIQ	5 August 2024

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