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Original Paper

A Multimodal Analysis of Metaphors in Artificial Intelligence-Related Cartoons

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Abstract

This paper, adopting a multimodal perspective and Critical Metaphor Analysis (CMA) approaches, examines 50 cartoons about artificial intelligence published on American cartoon websites from 2023 to 2024. The study finds that AI cartoons mainly construct metaphors through a cross-modal mapping "text as target domain, image as source domain" structure. These cartoons are based on metonymy, presenting metaphorical scenes through the interaction of metonymy and metaphor. The abstract concept of "artificial intelligence" is often metaphorically represented as robots, thereby deepening readers' understanding of the role of technological image in the socio-cultural context. By analyzing four major metaphorical scenes—devouring, competing, chasing, and hijacking—this paper elucidates the dual perceptions of the opportunities and challenges brought by technological advancements in AI as well as cautious attitude towards AI development.

Keywords

multimodal metaphor, metaphor scenarios, Artificial Intelligence

1. Introduction

Multimodal metaphors are used extensively across various media platforms, expressing complex ideas and emotions in a rich and nuanced manner. Cartoons, acting as a bridge between reality and fiction, creatively combine visual images and textual elements to vividly convey abstract concepts, thus offering excellent opportunities for the exploration of multimodal metaphors (Refaie, 2009). Existing research on multimodal metaphors has primarily focused on topics such as public service advertisements, environmental issues, healthcare, and education (Forceville & Urios-Aparisi, 2009; Zhao & Zhang, 2013; Wu & Feng, 2022), with relatively little attention given to technology-related cartoons. However, as Artificial Intelligence advances rapidly, technology cartoons have become a noteworthy genre on social

media platforms both domestically and internationally. These cartoons play an indispensable role in addressing ethical issues, shaping readers' cognitive frameworks, and helping audiences understand industry developments (Gunkel, 2012; Nguyen & Sidorova, 2018). Thus, this paper, taking a multimodal perspective, explores cartoons related to AI on American social media platforms. The aim of this research is to explore metaphorical scenarios and genre characteristics of these cartoons, offering insights to both readers and cartoonists.

2. Theoretical Background and Related Research

2.1 Multimodal Metaphor Theory

Multimodal metaphor refers to the phenomenon where multiple semiotic systems (such as text, images, and sounds) work together to construct metaphorical meaning. Forceville (2009, p. 24) defines multimodal metaphor as "metaphors in which the source and target domains are exclusively or predominantly represented by two or more modes". Modes are interpretive sign systems that convey meaning through sensory input, including written language, images, spoken language, gestures, sounds, music, smells, tastes, and tactile experiences (Forceville & Urios-Aparisi, 2009, pp. 19-23). Additionally, Kress and van Leeuwen's (2006) multimodal discourse analysis provides the theoretical foundation for understanding the interaction between images and texts. More recent studies, like those of Miltner and Highfield (2017), have focused on visual content in social media, particularly GIFs and emoji packages, examining their role in social discussions. Furthermore, Forceville (2016) and Feng Dezheng (2011) provide detailed classifications of multimodal metaphor types and mapping structures within "text-image metaphors" offering valuable frameworks for subsequent research.

2.2 Metaphor Scenarios

The term "metaphor scenario" was introduced by Musolff (2004, pp. 8-28) in his work "Metaphor and Political Discourse: Analogical Reasoning in Debates about Europe". A metaphor scenario is not just a single metaphor, but a complex structure involving a set of interconnected situations, roles, events, and relations. This structure describes the surface meaning of a metaphor, while revealing deeper cognitive and cultural implications. Since politics is a part of social life, it is often organized and understood metaphorically. Mohamed (2018) further develops Musolff's ideas, explaining how metaphorical scenarios, such as "Brexit is divorce" and "UK at the heart of Europe", create narrative frameworks that can be exploited by proponents and opponents. Over time, it can also be the key to understanding how metaphor works in discourse, which provides a model for subsequent scholars to study the multiple meanings of metaphor and its application in specific contexts.

There is a wealth of empirical research on multimodal metaphors and metaphor scenarios. Scholars have conducted metaphor construction and analysis of news cartoons related to the China-U.S. trade war, revealing conceptual mapping between the two countries and thematic elements through symbolic objects and thematic meanings, providing readers with useful guidance for understanding metaphorical

meanings and cultural background knowledge (Ma & Gao, 2020). Hu and Liu (2018) conducted an empirical analysis of environmental public service advertisements and explained that the main metaphorical representation modes in public service genre cartoons are images, text, and text-image combinations, with the representational forms of domains being image-text and image with text-image. Zhao (2022) carried out a scenario metaphor study and ecological discourse analysis on bioenergy genre cartoons, guiding the public to uncover the pseudo-ecological nature of such depictions, employing an ironic construction and advocating for beneficial ecological stances. Meanwhile, in the study of cartoons themed on the COVID-19 pandemic, Xie and Kuang (2021) explored the process of meaning construction under conceptual integration by selecting metaphor scenarios, deepening the public's understanding of social issues. Pandemic prevention cartoons hold significant emergency linguistic capabilities (Zhan, 2022); they also contain discourse on epidemic prevention which is accepted and recognized by audiences, helping to construct a national image in the context of new media (Liu, 2022). Furthermore, they allow the public to grasp the meanings and values conveyed by the cartoons, thus promoting patriotism and the great spirit of fighting the pandemic (Cao & Li, 2022). In light of this, given the broad influence of the "technology" genre, which involves various aspects such as technology, ethics, and social impact, this article argues the necessity of application of the theory of multimodal metaphors to cartoons in the "technology" genre, aiming at explaining the genre's representational features, thereby enriching the empirical scope of multimodal research.

2.3 Critical Metaphor Analysis

Critical Metaphor Analysis (CMA) integrates cognitive linguistics and Critical Discourse Analysis (CDA) to examine the social and cultural significance of metaphors in language. Charteris-Black (2004) applied CMA to reveal the ideological and power structures behind metaphors, analyzing their implications for cognition and emotion within social and cultural contexts. The theoretical framework of CMA is grounded in Lakoff and Johnson's (1980) Conceptual Metaphor Theory (CMT), which deems that metaphors are not merely linguistic phenomena, but ways of thinking. According to CMT, metaphors concretize abstract concepts, enabling people to understand and express complex ideas and emotions. CMA has been widely applied in multimodal metaphor research. Forceville (2002, 2009) applied CMT to multimodal studies, examining visual metaphors that convey complex commercial messages through the integration of images and text. More recent studies have focused on discourse, illustrating how metaphors in U.S. media shape negative perceptions of China (Wu, Xie, & Li, 2022). This research combines CMA with multimodal analysis to explain metaphors in AI cartoons, shedding light on the social attitudes towards AI and its influence on readers' cognition and emotions.

3. Research Design

3.1 Corpus

The corpus for this study is sourced from https://politicalcartoons.com/, a famous U.S.-based cartoon website. Using the keyword "Artificial Intelligence", 50 cartoons published between 2023 and 2024 were collected. The study aims to answer the following research questions: What are the genre characteristics of AI cartoons? What metaphorical scenarios are constructed, and how do multimodal metaphors, metonymy, and narratives interact to express cognitive and emotional meanings?

3.2 Analytical Framework

The study follows three steps of CMA proposed by Charteris-Black (2004): metaphor identification, metaphor interpretation, and metaphor explanation. Additionally, it adopts an empirical framework for analyzing metaphor scenarios in cartoons (Zhao & Dai, 2016; Zhao, 2017, 2022; Zhao & Wu, 2024). The five-step analysis process is summarized in Figure 1.

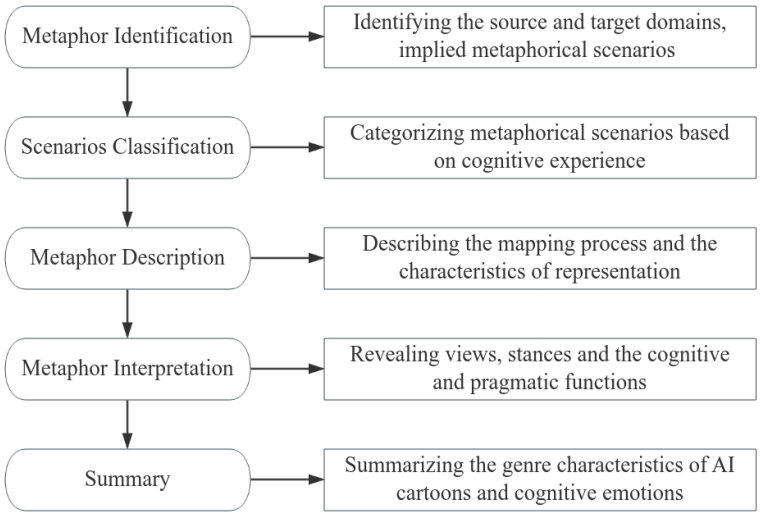

Figure 1. Process of Corpus Analysis

4. Analysis of Metaphor Scenarios

4.1 Genre Characteristics

Drawing on Feng's (2011) classification of text-image metaphor mapping, this study reveals that AI cartoons primarily use cross-modal mappings, where the target domain is represented by text, and the source domain by images (see Figure 2). Structural metaphors, such as AI IS ROBOTS, allow readers to comprehend abstract concepts through embodied experiences. Metonymy plays a foundational role in constructing metaphors, with metonymy being primary and metaphor secondary (Forceville & Urios-Aparisi, 2009, p. 329). The study also applies Fauconnier and Turner's (2003) Conceptual

Blending Theory to analyze how metaphor scenarios involving AI (as robots, monsters etc.) reflect human-AI interactions and the resulting sense of crisis.

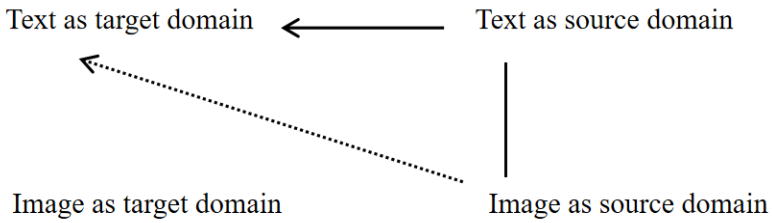

Figure 2. Cross-domain Mapping Diagram

4.2 The "Devouring" Scenario

The cartoon "INTELLIGENCE TAMER" constructs metaphor AI IS A LION, depicting the "devouring" scenario. The image shows a massive blue lion (AI) poised to devour a human figure, symbolizing uncontrollable and potentially dangerous power of AI. The size and posture of the lion emphasize the concept POWERFUL IS Big (Forceville & Urios-Aparisi, 2009, p. 14), conveying threat AI poses to humanity. The human figure represents researchers trying to control AI, but concerns about AI's uncontrollable nature in society.

Figure 3. INTELLIGENCE TAMER

4.3 The "Competing" Scenario

In the cartoon "AI BULLFIGHTING", a robot bull (AI) charges at a matador (human), symbolizing the tense and competitive relation between AI and humans. The metaphor AI IS A BULL highlights the unpredictability and power of AI, while the matador represents human attempts to control it. This metaphorical scenario conveys the idea that AI poses both opportunities and challenges, necessitating careful human management.

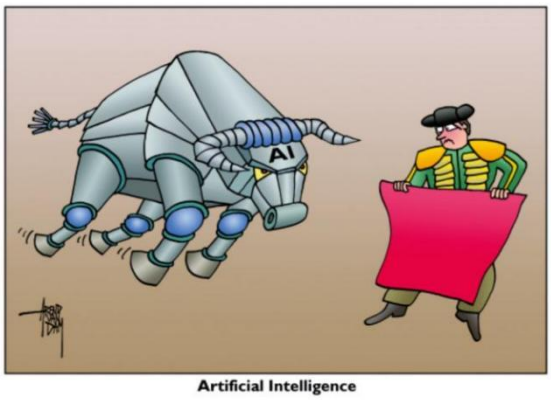

Figure 4. AI BULLFIGHTING

4.4 The "Chasing" Scenario

Figure 6 illustrates the metaphor AI IS A CANDIDATE, where the Democratic Party is symbolized as a donkey, the Republican Party as an elephant, and both parties are depicted as race competitors. The verbal expressions in dialogue box on the left express the contextual background: "just when you thought politics couldn't get any weirder..." In this cartoon, the AI robot, personified as a new candidate in the 2024 election, is shown pursuing the symbolic donkey (Democratic Party) and elephant (Republican Party), both of whom become anxious, reflecting the pressure and challenges that traditional parties face in the wake of technological change.

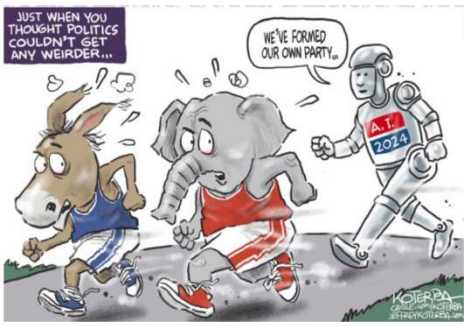

Figure 5. AI FOR CANDIDATE

The metaphorical foundation for understanding the source domain draws from the iconic cartoons by Thomas Nast in the 19th century. Over time, these animals became lasting symbols of the two major U.S. parties. The donkey is often associated with stubbornness and persistence, metaphorically representing the one party's perseverance in certain policies, even when it seems obstinate. On the other hand, the elephant represents strength, dignity and memory, symbolizing the other party's steadfast stance on traditional values and power. These symbols, reinforced by cultural and historical context, have become

ingrained in U.S. culture, making complex ideas and positions easier to understand and remember for the public.

Through these symbolic representations, the cartoon conveys a clear and concise message about the competition between artificial intelligence and traditional entities. The AI candidate is portrayed as a disruptive new force in politics, putting pressure on the established parties, who seem overwhelmed by the prospect of competing with AI. This metaphorical chasing scenario underscores the significant impact that AI could have on politics, suggesting that AI may disrupt not only industries but also governance systems, raising questions about leadership, ethics, and decision-making in contexts.

Brynjolfsson & McAfee (2014) pointed out that while AI and machine learning have shown great potential in many fields, they also bring new ethical and governance challenges. The metaphorical scenario in Figure 6 evokes this cognitive and emotional response from the public, where readers draw parallels between a race and the increasing role of AI in politics. On the one hand, this metaphorical scenario portrays AI as a new force with transformative potential in the social arena. On the other hand, it reveals the complex ethical questions that arise when new technologies intersect with human governance systems.

4.5 Hijacking Scenario

Figures 6 to 8 collectively construct a metaphorical scenario of "hostage-taking", in which AI is metaphorized as a robot, seizing weary laborers with an indifferent expression, conveying cognitive and emotional judgments on workers. Specifically, Figure 6, titled "PLANNED OBSOLESCENCE", depicts target domain where a single character metonymically represents human laborers, while the source domain is inferred through the title and textual modality, thus constructing the contextual metaphor "HUMANS ARE DISCARDED GOODS" (Forceville, 2016). The anthropomorphized AI, in machine form, says, "It's really just junk", implying that laborers, like obsolete goods, will be discarded after a certain period, further revealing how AI is redefining and reassessing human value. In Figure 7, a worker labeled "Humans" releases a giant robot from a magic lamp, with the text "Artificial Intelligence" inscribed, depicting a text-image metaphor of AI IS A GENIE. The robot's expression and posture show its dominance. In mythology, a genie is described as a powerful supernatural being typically sealed in a lamp or bottle. Here, AI is endowed with mysterious and immense power, difficult to control once released. The robot says to the scientist, "Thank you for freeing me. You will now start granting me my wishes!"—adding urgency to the cartoon. In Figure 8, the robot tightly grasps a frightened laborer, ready to throw him into a trash bin, while a speech bubble above the other workers reads, "AI tools are coming to our workplace, shall we be up in arms?"—reflecting the need for human action to protect their rights and work environments in this transformative period. This cognitive-emotional response reflects not only concern for personal situations, but also anxiety over the potential fundamental changes to society and the labor market structure.

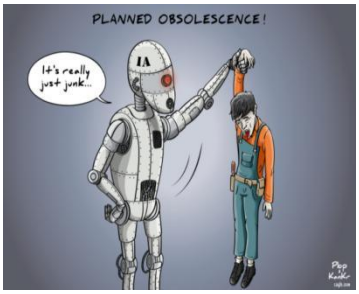

Figure 6. PLANNED OBSOLESCENE

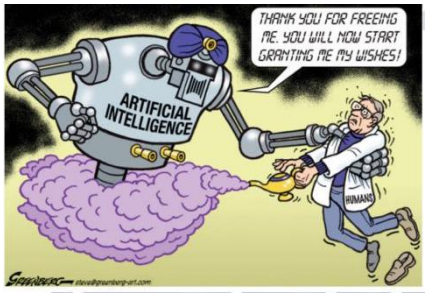

Figure 7. A I Genie

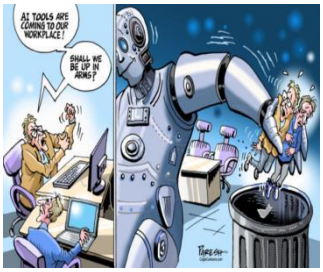

Figure 8. AI Tools At Work

The three cartoons metaphorically express deep concerns and skepticism about the development of AI and technology, with their narratives showcasing various aspects of AI in societal contexts. As Acemoglu and Johnson (2023) mentioned, after OpenAI's ChatGPT made headlines in November 2022, OpenAI CEO Sam Altman remarked, "Many people in AI always outwardly claim that this technology will only bring benefits, acting as a mere auxiliary tool, and that no one will lose their job". However, he added, "Job positions will undoubtedly disappear, there is no question about that". Two significant labor strikes this year—those of the Writers Guild of America (WGA) and the Screen Actors Guild (SAG-AFTRA)—have further raised awareness of the threat AI poses to high-paying jobs. Dizikes (2022) also pointed out in MIT News that while technological advancements can enhance productivity, they may also lead to widespread unemployment and social inequality. Generally speaking, in terms of character and relations, human laborers, though creators and developers of technology, experience a transition from being dominant to becoming passive or controlled, ultimately being counteracted by technology. In terms of actions and behaviors, the robot's grip on the laborer's body symbolizes the looming fate of being replaced by technological progress. Thus, this metaphorical scenario reflects uncertainty and fear surrounding technological advancements, especially regarding the potential loss of control and the devaluation of human labor brought about by AI. These metaphorical scenarios, through the medium of cartoons, visually express concerns about the social and economic impacts of AI and automation technologies, prompting viewers to reflect on the direction of technological development and the future of humanity.

5. Conclusion

This study delves into American social media comics regarding Artificial Intelligence (AI), focusing primarily on cross-modal mappings between text and image, with metonymy playing a fundamental role in the construction of metaphorical scenarios. Through the analysis of four major metaphorical scenarios—"devouring", "competition", "chasing", and "hijacking"—tense interactions between

humans and AI are vividly portrayed, highlighting AI's impact on traditional systems and the labor market. These metaphorical scenarios convey deep concerns about the uncertainty brought by technological advancement and the devaluation of human labor, calling for a cautious approach and sound governance in AI development.

The corpus-based research enriches the empirical scope of multimodal metaphor theory, offering new perspectives for understanding the role of technology-related comics in socio-cultural contexts and providing valuable insights for future research on multimodal metaphors. Despite the contributions of this study, limitations remain. Future research should expand the corpus size and further explore multimodal metaphors in technology-themed comics across different cultural backgrounds to reveal both their diversity and commonality in a global context. There is much room for improvement in these areas.

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