

# Framing the Fallout: AI-Generated Visual Disinformation and the Fukushima Wastewater Narrative on Chinese Social Media

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**Abstract:** This paper explores the intersection of artificial intelligence (AI), visual disinformation, and nationalist narratives through a case study of Fukushima wastewater-related imagery on China's social media. Using Rodriguez and Dimitrova's four-layer visual framing model, the study analyses AI-generated visuals from Xiaohongshu, revealing how these images shape public discourse. The findings highlight the nuanced interplay of denotative symbols, stylistic elements, connotative meanings, and ideological frames in reinforcing nationalist sentiment. This paper argues for a more comprehensive analytical approach to understanding AI-driven visual disinformation in digital ecosystems.

**Keywords:** AI-generated Visuals; Indexicality Manipulation; Digital Disinformation; Text-to-image Synthesis; Platform Algorithmic Influence; Visual Framing Analysis

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## 1. Introduction

Advances in media technology have ushered in a new era of visual communication, where images increasingly dominate the dissemination of information. Social media platforms amplify this trend, fostering environments where visual disinformation can spread rapidly and influence public perception. While visual disinformation has drawn significant attention in Western contexts, its impact extends globally, shaping public discourse and fuelling tensions in diverse societies. In India, fake WhatsApp videos exacerbated communal violence (Banaji et al., 2019), while falsified images on Facebook in Myanmar incited ethnic conflicts (Young, Swammy, and Danks, 2018). Deepfake technologies featuring politicians have emerged in Russia (Samoilenko and Suvorova, 2023), and manipulated photos have targeted political opponents in Venezuela (De la Torre, 2017). Unlike textual misinformation, visual content often carries an aura of authenticity that can obscure its manipulative origins. In the context of China, AI-generated imagery has emerged as a significant medium for shaping nationalist discourse. This study focuses on the Fukushima wastewater controversy, where manipulated visuals proliferated on Xiaohongshu, a prominent Chinese social media platform. Employing Rodriguez and Dimitrova's four-layer visual framing model, the study dissects the semiotic mechanisms underlying these images. The findings contribute to our understanding of how AI-generated visuals function as tools of disinformation, particularly in politically charged contexts.

## 2. Background: Fukushima Wastewater Controversy

On August 24, 2023, Japan began releasing treated radioactive water from the Fukushima nuclear plant into the Pacific Ocean. While international organizations, including the United Nations, affirmed minimal environmental risks, the move provoked widespread outrage in China. The Chinese government and media framed the release as a selfish act of environmental sabotage, stoking anti-Japanese sentiment rooted in historical animosities. Social media platforms like Xiaohongshu became battlegrounds for public opinion, where AI-generated visuals played a pivotal role in amplifying nationalist narratives. These images, often surreal and emotionally charged, manipulated viewers' perceptions, reinforcing the ideological framing of Japan as an aggressor.

## 3. Theoretical Framework

### 3.1 Visual Disinformation

Unlike misinformation caused by inadvertent sharing or dissemination of false or inaccurate information without any intent to deceive (Tsfati et al., 2020), disinformation involves the deliberate spread of false or misleading information with the explicit intention to deceive, manipulate, or achieve specific objectives (Chadwick and Stanyer, 2022). This distinction is particularly pertinent in visual communication, as the construction of false or misleading visual content necessitates conscious actions and, in certain instances, specific skills (Weikmann and Lecheler, 2023). In this research, visual disinformation is defined as the purposeful creation, manipulation, or dissemination of deceptive or false visual content, encompassing images, videos, graphics, or animations, with the overarching goal of deceiving, misinforming, or exerting influence over individuals or the public. Such

disinformation employs visual elements to spread distorted information, often in a visually compelling manner that exploit the trust individuals place in media content.

### 3.2 Four-Layer Visual Framing Model

In Mary Angela Bock's conceptual framework encompassing the constructs of "selection" (re-contextualized image), "creation" (de-contextualized image), and "solution" (framing effect), the operationalization of "creation" centres on the message encapsulated within the image, a message guided by established conventions such as distance, angle, and composition (Bock, 2020). This study therefore adopts a similar approach by subjecting various forms of visual frames to analysis within the delineated discourse surrounding the Fukushima wastewater on China's social media platforms. Within this nuanced context, the research shifts its focus from the textual regulation applied to the visual and instead concentrates on the framing effect intrinsic to the visual medium itself. Rather than employing a "glut" inductive approach akin to quantitative content analysis, which involves the identification and quantification of frames (Bock, 2020), this study employs a qualitative frame analysis method designed to unveil the graphical representations that captures the essence of a given event.

Building upon Rodriguez and Dimitrova's framework (2011), this research seeks to conduct a comprehensive investigation of the semiotic mechanisms underlying visual framing, which can be categorized into four distinct levels: denotative systems, stylistic-semiotic systems, connotative systems, and ideological representations. In summary, 1) denotative meaning in visual framing pertains to the initial mental image constructed by the audience based on the primary and inherent subjects featured in the image; 2) stylistic-semiotic framing encompasses the social meaning embedded within the visual modalities and pictorial style variables, including considerations such as colour, poses, and camera angles; 3) connotative meaning of visuals delves into the symbolic values deeply rooted within specific cultural contexts that evoke strong emotional responses from viewers; 4) ideological representation aims to address questions concerning the unequal power dynamics underpinning the symbolic meaning of the graphic content. To exemplify this framework, Rodriguez and Dimitrova conducted an extensive analysis of a news photograph featuring displaced Sudanese women and their children in Darfur (2011). However, it is crucial to acknowledge that when examining AI-generated visuals, a fundamental difference from traditional photography is evident.

### 3.3 AI-Specific Dynamics

The concept of indexicality, central to semiotics, refers to the perceived direct causal link between an image and the reality it depicts, making traditional photographs powerful tools of authenticity and persuasion. With the rise of AI-generated images, this relationship has become increasingly malleable. AI technologies have transformed image production, allowing creators to simulate realism through computational algorithms. This shift is particularly significant in societal contexts where visual manipulation amplifies existing beliefs and social divides. Unlike traditional image-making, where human creativity dominates, the text becomes the driving force in AI visual production, guiding the creation and manipulation of imagery through detailed prompts. By translating natural language into visual representations, AI narrows the interpretive scope of both creators and audiences, confining their interaction within predefined semiotic contexts and raising ethical and communicative challenges. Algorithms play a pivotal role, translating textual prompts into visual representations while imposing aesthetic and cultural biases derived from data repositories, often rooted in Western-centric datasets. Algorithmic moderation and platform policies further regulate user-generated content, raising critical questions about censorship, freedom of expression, and authenticity. These intertwined layers of technology, language, and platform design demand an interdisciplinary analytical framework. This study incorporates these dimensions into frame analysis to dissect the semiotic and ideological significance of AI visuals, using the Fukushima nuclear wastewater discourse as a case study to explore the broader implications of visual misrepresentation in shaping public perception.

## 4. Methodology

### 4.1 Data Collection

This study analysed AI-generated visuals related to the Fukushima wastewater issue from Xiaohongshu. Using keywords such as "nuclear wastewater" and "AI," three high-engagement images as indicated in Table 1, were selected based on likes, comments, and user interactions. The three selected images illustrate recurring motifs in AI-generated visuals, such as exaggerated marine life symbolizing ecological devastation, juxtaposed with industrial backdrops to evoke blame toward Japan. These images were chosen for their high engagement metrics

and their alignment with prevalent nationalist narratives on Xiaohongshu, ensuring they are representative of broader trends on the platform.

**Table 1: Information about the Three Visual Samples**

<p>1 Account: RUILYN CINEMAS Like: 3082 Comments: 564</p>	<p>2 Account: 异世界摄影_Potter Like: 2713 Comments: 588</p>	<p>3 Account: 不卖肉 Like: 5431 Comments: 1895</p>
		
<p>Prompt: "a men is standing next to a large fish on a beach in the style of otherworldly beings, Chinapunk, movie still, close-up, eye-catching, surrealistic dreams, porcelain, captivating documentary photos -- ar 43:64"</p>	<p>Prompt: "dead fish in the middle of a dirty river with factory in the background, demonic photography, surreal landscape, photo-realistic hyperbole, misty atmosphere, industrial surrealism, apocalyptic visions shot on 70mm -- ar 61:64"</p>	<p>Prompt: "a women is holding an enormous sea creature, in the style of dystopian atmohsphere, Japanese-inspired imagery, atmospheric shots, exaggerated facial features, filthy sculptures, undefined anatomy -- ar 39:64"</p>

## 4.2 Analytical Approach

The selected images were analysed using Rodriguez and Dimitrova’s four-layer framework. The study also employed Midjourney’s reverse function to decode the relationship between textual prompts and visual outputs, offering insights into the interplay of language and imagery in AI-generated content.

## 5. Findings: Visual Framing of Fukushima Wastewater

### 5.1 Denotative Signs

Water serves as the primary symbol across all images, anchoring them to the Fukushima incident. The visuals depict exaggerated marine life—giant, mutated fish and oversized shrimp stranded on polluted shorelines. These elements immediately evoke associations with environmental catastrophe, reinforcing the narrative of a damaged ecosystem. Hashtags like “nuclear wastewater” further contextualize the images, ensuring their alignment with ongoing social media discourse. The stark juxtaposition of industrial backdrops and distorted marine creatures emphasizes the perceived consequences of the wastewater release.

### 5.2 Stylistic Variables

The images employ surreal and dystopian aesthetics, achieved through prompts like “apocalyptic” and “dystopian.” A subdued colour palette dominated by greys and browns conveys a bleak, post-industrial landscape. Lighting effects mimic natural conditions, enhancing the realism of the scenes. Camera angles play a critical role in framing human figures as vulnerable and insignificant against the backdrop of environmental devastation. For instance: A wide shot features a lone figure dwarfed by a massive, stranded fish; A close-up portrays a woman cradling a grotesque sea creature, her expression reflecting fear and despair. These stylistic choices evoke emotional responses, ranging from awe to alarm, drawing viewers deeper into the narrative.

### 5.3 Connotative Meanings

The visuals construct a dystopian future marked by environmental collapse and human helplessness. Symbols like mutated marine life and polluted waters evoke themes of death and decay, critiquing industrial exploitation and ecological neglect. The portrayal of human figures fosters a sense of empathy and moral responsibility, while their proximity to grotesque sea creatures suggests an uneasy coexistence with a damaged natural world. These connotations resonate with broader societal fears about environmental degradation and human vulnerability.

### 5.4 Ideological Representations

The images subtly reinforce nationalist narratives, framing the Fukushima release as an act of aggression by Japan. By depicting East Asian features in human figures, the visuals embed the controversy within a Sino-Japanese historical and cultural context. The unsettling portrayal of marine life and polluted environments amplifies the ideological framing of Japan as a reckless polluter. This aligns with state-driven propaganda, which leverages such visuals to consolidate nationalist sentiment and direct public outrage outward.

## 6. Discussion

### 6.1 AI's Role in Shaping Visual Narratives

AI-generated images offer unprecedented flexibility in visual storytelling, enabling creators to craft hyper-realistic yet entirely fabricated scenes. The reliance on textual prompts introduces a unique dynamic where language shapes visual content. However, this process also raises ethical concerns about the intentionality and accountability behind disinformation.

### 6.2 Platform Amplification and Content Governance

Platforms like Xiaohongshu play a critical role in amplifying visual disinformation. By prioritizing Fukushima-related content and omitting disclaimers about AI origins, Xiaohongshu facilitated the dissemination of manipulated visuals. This selective amplification underscores the platform's complicity in shaping public discourse, often blurring the lines between user-generated content and state-sponsored narratives.

### 6.3 Emotional Resonance and Public Opinion

The emotional impact of these images is a key driver of their virality. By evoking fear, empathy, and outrage, the visuals bypass rational scrutiny and reinforce preexisting biases. This underscores the power of visual framing in shaping public opinion, particularly in politically charged contexts.

## 7. Conclusion

This study highlights the transformative impact of AI-generated visuals on public discourse, particularly in the realm of nationalist narratives and disinformation. Through the Fukushima wastewater case, we demonstrate how denotative, stylistic, connotative, and ideological frames converge to create potent visual messages that resonate with audiences. As AI technology continues to evolve, its role in shaping visual disinformation demands critical scrutiny. The findings underscore the transformative role of AI in visual storytelling, highlighting its potential to manipulate public perception. The ethical implications are significant, as platforms like Xiaohongshu facilitate the spread of such content without adequate disclaimers. Regulatory measures, such as algorithmic transparency and AI-content labelling, are essential to address platform liability and mitigate the impact of visual disinformation. Comparative studies across cultural and regional contexts would provide a more nuanced understanding of these challenges, enabling tailored policy responses. Future research could explore how cultural and platform-specific dynamics shape the use of such visuals in varying socio-political landscapes. Future research should explore comparative contexts, platform-specific dynamics, and audience reception to develop a more comprehensive understanding of this phenomenon.

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