Technology in Anthropocene: A Comparative Study of The Wandering Earth and Avatar

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Abstract: This analysis deeply explores the interplay of CGI technology, artificial cinematic worlds, and the Anthropocene in disaster films from China and the United States. It highlights CGI's role in filmmaking's evolution and its vital contribution to crafting visually immersive artificial realms. *Avatar* and *The Wandering Earth* serve as prime examples, demonstrating how CGI aids in world-building and narrative progression. Within the Anthropocene context, marked by human-induced Earth changes, this analysis examines how these films tackle environmental themes. It investigates the stark contrast between idealized cinematic worlds and real-world environmental challenges, emphasizing the tension between escapism and addressing urgent environmental realities. Moreover, this study scrutinizes technology's dual role within these films, both as a narrative solution and ethical dilemma. It questions whether CGI in these narratives offers escape or reflects an aspiration to confront environmental dilemmas using technology. The analysis also acknowledges cultural nuances influencing CGI and Anthropocene portrayals in Chinese and American cinema. Societal and cultural factors shape the depiction of technology and environmental issues in these films. In conclusion, this exploration offers insights into CGI, artificial worlds, and the Anthropocene in disaster cinema. It illuminates their potential to shape public perceptions of environmental challenges and technological solutions, emphasizing the cinematic medium's capacity to engage with real-world environmental issues.

Keywords: *The Wandering Earth, Avatar*, science fiction, CGI technology, anthropocene

1. Introduction

Since the beginning of the industrial age, human beings have heavily exploited the earth's resources in exchange for rapid development. As a result, human activities have deepened their impact on the Earth, among which global warming is one of the problems caused by human activities on the planet. And problems like this have led to a significant increase in catastrophic climate events around the world. For example, heat waves, floods, and other extreme weather events are occurring more frequently, with greater intensity, and with greater harm. Today, humans live in a world they have built without realizing that their survival and development are in potential jeopardy. The film is one of the products of the industrial age, as well as the most powerful media to represent issues of the real world [1].

According to Jennifer Fay, the existence of artificial worlds in films can be both a reversion of the world of the past and a speculation of the world of the future [2]. In such a special context of the times, Chinese and Western films both take natural disasters as the narrative background, striving to find solutions to ecological disasters that have already occurred or predicting future ecological crises through technology in the cinematic form. Hunter Vaughn [3] argues that this underscores the problems that exist between humans and the real world in the present. It also underscores the significant level of concern and a profound sense of ecological awareness present in both China and the West. Nevertheless, it showcases notably distinct approaches. This paper aims to analyze the climate change solutions presented in *The Wandering Earth* and *Avatar*, providing insight into how China and the West diverge in their perspectives on leveraging technological capabilities to address the challenges of the Anthropocene

2. Literature Review

2.1. Definition of the Anthropocene

In today's world, technology plays a pivotal role in improving human lives and addressing the challenges posed by natural disasters and environmental issues [4]. While the emergence of technology has undeniably bestowed numerous benefits upon humanity, it has also fostered an increasing dependence on it. As a result, a prevailing consensus exists, suggesting that the continuous advancement of science and technology contributes significantly to raising the current human standard of living.

Simultaneously, there is a faction that advocates for the relocation of humanity from Earth to other planets, seeking novel ways of existence [5]. This perspective has led to a contemporary obsession with allocating substantial financial resources and energy toward resource extraction. This pursuit fuels the relentless progression of science and technology to explore uncharted territories. While technology boosts productivity to meet human needs, the insatiable desire to exploit Earth's resources for personal gain has surged. Consequently, human consumption of resources has escalated beyond the Earth's capacity to sustain such a pace [6].

This cycle amplifies the strain on Earth's ecosystems, creating a detrimental feedback loop. It underscores a paradoxical situation where technological progress, ostensibly benefiting humanity, deepens our dependence on it while often disregarding its adverse environmental consequences.

2.2. Concepts and Practice of CGI

Computer-generated Imagery (hereinafter called CGI) is a powerful tool predominantly employed in the realm of visual effects. It represents the ultimate manifestation of creators' boundless imaginations and grants them the liberty to manipulate seemingly authentic elements [7]. This technique effectively merges reality with artistic representation, offering audiences a window into the film's intricate universe [8]. CGI serves as a cornerstone for crafting cinematic worlds and is particularly prevalent in the science fiction genre. Consequently, in both Chinese and Western science fiction films, technology emerges as a transformative force reshaping human existence and the environment.

The trajectory of technological advancement inexorably intertwines with humanity's relentless exploration and exploitation of Earth's resources [9]. In these meticulously crafted cinematic realms, the natural world, characterized by blue skies and white clouds, is often conspicuously absent, replaced by a predominantly artificial landscape devoid of a genuine ecological environment.

2.3. Research on the Anthropocene and the Science Fiction Movies

The portrayal of science and technology serves as a fundamental building block in the construction of cinematic worlds within science fiction films. These filmic universes are entirely products of human creation, mirroring the way present-day human activities shape the world they inhabit [2]. In essence, the cinematic world becomes a miniature replica, faithfully reproducing real-world issues on screen.

Within the realm of science fiction, a portion of films takes imaginative leaps, envisioning the choices humanity might make in the face of impending environmental crises and the repercussions of those choices, often based on existing scientific and technological foundations. These movies explore, in a fantastical manner, the paths that humans may choose when confronted with Earth's environmental dilemmas and the potential outcomes of such decisions. In these cinematic narratives, there's a prevailing belief that technology holds the key to resolving humanity's existential challenges on Earth. This belief stems from the fact that similar notions exist in the collective consciousness of real-world individuals [10].

As a result, these films offer glimpses into how, in the future, humans might utilize science and technology to address ecological crises and ensure their survival. Interestingly, Chinese and American films portray these scenarios in distinct ways, reflecting varying perspectives on the role of science and technology in confronting environmental problems and securing human existence.

3. Realist Register in *The Wandering Earth* and *Avatar*

Directed by James Cameron and released in 2009, the film *Avatar* is set in the year 2154, portraying a world where humans have exploited resources on the planet Pandora, resulting in devastating consequences. In their quest for Pandora's rare ore, Unobtanium, humans hope to solve Earth's escalating energy crisis while pursuing profits. The film starkly contrasts Pandora's lush, natural ecological environment with the dystopian Earth depicted in the movie.

While the film does not extensively describe the future of Earth's living environment, it highlights the omnipresence of science and technology in people's lives. *Avatar* opens with the audience immersed in the perspective of the male protagonist, soaring through the forest. However, this idyllic scene is merely a fantasy. As soon as he awakens, CGI technology unveils a human environment saturated with cyberpunk elements, devoid of a natural ecological setting.

The term 'cyberpunk' encapsulates a society that seems technologically advanced but is fundamentally decaying at its core [11]. Just as in the movie, the characters appear indifferent to these problems, prioritizing their pursuit of maximum benefits. The film also portrays a significant increase in population density, symbolized when the hero gazes upon a sky devoid of blue and white, a stark contrast to Pandora's natural beauty. These issues, although exaggerated for dramatic effect, reflect prototypes of real-world problems.

Today, the deteriorating relationship between humanity and nature exacerbates issues related to climate change, posing threats to the environment in which we live. Factors such as significant population growth [6] and extensive deforestation intensify warming, altering insolation and rainfall patterns [12]. Furthermore, the reliance on fossil fuels for large-scale industrial development leads to excessive carbon dioxide emissions, contributing to the warming problem.

The consequences of global warming, including melting glaciers and rising sea levels [13], are a harbinger of a potential future akin to the scenarios portrayed in Chinese science fiction films. Sea levels may rise by approximately one meter in the latter half of the next century, echoing themes found in these films [9].

The Wandering Earth, directed by Guo Fan and released in 2019, is set in the year 2075, depicting a world grappling with the impending death of the sun. Climate change results in rising sea levels,

flooding cities, and the necessity of 'underground cities.' These underground sanctuaries, located 5km beneath the surface, are not always suitable for human habitation. The film's vision of a future Earth submerged by seawater is rooted in China's greenhouse gas emissions, which surpassed those of Western countries as early as 2007 [14]. China, as a preemptive measure, invested in 'urban sponge' technology in coastal cities like Shanghai [15]. Reichstein argues that seemingly minor problems can trigger a cascade of related issues, a theme mirrored in the film [16].

In *The Wandering Earth*, climate change and its consequences are attributed to human activities. The film portrays a domino effect, where seemingly insignificant events, such as a mountain fire or a drought, can lead to species extinction or even the disappearance of entire cities. These problems are interlinked and escalate as humans initially neglect them, only taking action when their survival is threatened. This neglect ultimately leads to humanity's inability to survive on Earth. The film underscores how a minor change can snowball into a much larger catastrophe, affecting the entire world and causing devastating repercussions on the ecosystem. The severity of these problems is exacerbated by climate change, resulting in the extinction of numerous species.

Despite the well-documented extinction of species due to human activities, comprehensive legislation to curb these behaviors remains lacking [17]. This has led to some skepticism regarding the extent of species threatened with extinction [18].

4. Exploiter or Saver: Analyzing the Role of Technology in Crisis-Solving in Two Films

The choice to rely on advanced technology to go into space to find a way to solve or escape the various ecological problems on Earth becomes the decision of human beings in the movie *Avatar*. As one of the Western science fiction films, such an idea cannot be created without the influence of the capitalist system and the historical background. In the film, technology is given a confident and aggressive image. Although the technology shown in the movie is somewhat science fiction, there are prototypes of them in real life. For example, the huge spacecraft, the precise computer control program, and so on. This is as if the film foreshadowed that humans may have the ability to travel freely in the universe in the future. In addition, human beings are in Pandora's living environment as they do on Earth, but also the technology to create an artificial environment. Among them, the beginning of the movie will be mentioned the cloning technology has been fully demonstrated here. Humans, through the reproduction of the Avatar's DNA, create an artificial human Avatar. And then, through the technology of the human brain, nervous system, and artificial human Avatar connected to this control. The embodiment of this technological capability also indicates that humans may be able to directly replace other aborigines in the future through similar technology. Nowadays, the most famous example of cloning technology is the birth of Dolly the sheep in 1997. Although this technology is currently strictly forbidden for experimental research on humans, its success will be a sign of what will have to be done in the future for the survival of humans [19]. *Avatar* is a good foretaste of this possibility.

And in the movie *The Wandering Earth*, technology is used more as a tool for humans to save the planet. And as one of the Chinese science fiction films will produce, such ideas cannot be separated from the socialist system and the influence of the historical background, leading them to rely more on their own land. So, technology can realize such an idea for them. In this case, nuclear fusion technology is shown for most of the movie [20]. In the film, people have mastered nuclear fusion technology and use the technology as the core to build a number of huge planetary engines to push the Earth out of the solar system. The engines are fueled by rocks, and humans must mine the land resources in the movie. Nowadays, however, the technology has not been broken to make fusion technology controllable [21]. But so far, this technology is being studied and partly used in various commercial and other applications. For example, "new technologies for cleaning and detoxifying waste" and "semiconductor chips and integrated circuits" [22]. Although this technology is still being

researched by humans, Bruns shows that its successful mastery will have a beneficial impact on the future of humanity [21]. In addition, China's research on this technology will reach the level of other major research countries by 2019 [23]. The movie *The Wandering Earth* is a good reflection of China's confidence and affirmation of technology.

5. Conclusion

In conclusion, the scenarios depicted in movies such as *Avatar* and *The Wandering Earth* serve as cautionary tales that could potentially become reality. In our contemporary world, an increasing number of individuals are focusing on climate change issues stemming from human actions. It is the progress of science and technology that provides humanity with a wider range of options when confronting crises. However, the development of science and technology, much like a double-edged sword, carries both benefits and risks for humankind. These contrasting perspectives are shaped by distinct cultural and ideological frameworks, leading to divergent viewpoints and solutions to shared problems.

Through cinematic storytelling, these films present their unique stances on climate change to the audience, utilizing CGI technology to create immersive artificial worlds grounded in reality. While seeking to provide audiences with visual, auditory, and emotional experiences, these films also aim to evoke feelings of apprehension and empathy, underscoring the pressing issues humanity faces in its relationship with the natural world. While technology represents a source of strength for humanity, it is imperative to recognize the uncontrollable nature of science and technology, emphasizing that they are merely tools. The ultimate responsibility for charting the path to humanity's future lies with humanity itself.

Both films celebrate the possibilities of advanced technology while also shedding light on the potential harm stemming from unchecked industrial development and technological advancement. Due to the disparities between these two fictional societies, real-world individuals gain a fresh perspective on the functioning of their own societies, prompting reflection and observation. Regardless of the narrative conveyed by science fiction films, it is essential that we continue to create diverse works in this genre, allowing for deeper cultural insights that reflect our real-world society. In essence, these films serve as a mirror to our world, urging us to contemplate the consequences of our actions and the power of human agency in shaping our destiny.

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