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Marvel Movies: Film Manufacturing in the Digital Agecomic

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Abstract: As technology continues to develop and innovate, the movie manufacturing industry is also evolving. Through the use of digital technology, film production has become more efficient, precise and realistic. Movie production, because of technological innovations should develop a new vitality. This thesis will explore how technological innovation has helped movie manufacturing and the application of digital technology in Marvel movies. Firstly, this paper will introduce the concept and development history of special effects in film and television, including traditional special effects techniques in film and television and special effects techniques in the digital era. Then, this paper will focus on the application of digital technology in Marvel movies, including the application of technology in artificial intelligence, special effects technology and marketing and promotion. Finally, this paper will summarize the impact of technological innovation on film manufacturing and look forward to future trends.

Keywords: technological innovation, film manufacturing industry, film and television special effects, digital technology, Marvel movies

1. Introduction

Technological innovations are affecting film production in many ways, and current research advances include advanced visual effects techniques to help create realistic special effects scenes, and VR and AR technologies to change the mode of film viewing and enhance the audience interaction experience. However, there are still some research gaps, for example, the large-scale application of AI to create realistic virtual actors and characters remains a challenge. How to introduce more interactivity in films to meet the audience's individual needs is a future research direction.

This paper focuses on how technological innovation can help film manufacturing and the application of digital technology in Marvel movies, including artificial intelligence, special effects technology, and the application of technology in marketing and promotion. The literature review method is used to summarize the performance of the film, and the big data analysis method is used to study the film market and audience feedback. It is important to study the development of technological innovation in the film manufacturing industry, as it has a wide range of impacts on the film industry and culture, specifically in terms of improving the competitiveness of the industry, assisting in the creation of films, enhancing the visual effects, and enhancing the audience's interactive experience.

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2. The concept and development of special effects in film and television

2.1. The concept of film and television special effects

Film and television special effects refers to a technical means to enhance the visual impact and artistic expression of film and television works through computer graphics technology and other digital technology means, as well as the combination of live images and animation, to create a special effect that cannot be realised in reality or needs to be emphasised. [1] Film special effects can include, but are not limited to, the following: the creation of virtual scenes; the digital processing of characters or objects; the generation of special effects such as special movements, explosions, fires, water flows, etc.; as well as the modification and enhancement of colours, light, shadows, and textures. Film and television special effects have a wide range of applications and can be used in various film and television works, such as movies, TV dramas and advertisements. Through the reasonable use of film and television special effects, you can make the film and television works more real, wonderful and shocking.

2.2. Development of Film and Television Special Effects Technology

2.2.1. Traditional film and television special effects technology

Before the digital era, film and television special effects mainly relied on traditional means such as models, artificial synthesis and physical stunts. For example, creating explosion scenes by building model cities and using explosion stunts; synthesising special effects images by optical printing and rotoscope animation [2]; and creating animation effects by using lines, light, and shadow.

Make-up is also one of the most important means of traditional film and television special effects. Through make-up techniques, actors can transform into different characters, such as monsters and aliens. Make-up artists use special cosmetics and props to make the actor's appearance match the character through fine techniques and meticulous treatment.

In general, traditional film and television special effects technology mainly relies on physical props, photographic techniques, and post-processing to achieve this, although there are certain limitations. It has still played an important role in past film and television works.

2.2.2. Special effects technology for film and television in the digital age

In the digital era, virtual reality algorithm technology is very comprehensive, with interactive, immersive, perceptible, autonomous, and other characteristics. At present, it has become one of the core technologies for film and television special effects production, providing comprehensive technical support for movie production and broadcasting. It plays an important role in the whole process of movie production. [3] Whether it's creating virtual worlds, restoring historical scenes, or realising the deformation and movement of characters, digital special effects can help filmmakers realise their creativity.

The development of film and television special effects technology in the digital era also makes film and television works more commercially competitive. With the advent of digital special effects technology, special effects production has become cheaper and easier. Many small film production companies and independent producers are now able to create high quality special effects using digital special effects technology. This has made the film market more competitive and has also brought more diverse choices to the audience.

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3. The use of digital technology in Marvel movies

Marvel, a leader in technological cinema, has used digital technology to rework the social practices by which film is produced and consumed. [4]

3.1. Application of Artificial Intelligence in Marvel Movies

In Marvel movies, artificial intelligence technology is widely used in all aspects of film creation. First of all, AI can help screenwriters come up with more attractive and innovative storylines and character settings by analysing a large amount of comic book originals and audience feedback data in the script creation stage. Secondly, AI also plays an important role in character design and special effects production. For example, AI technology can capture actors' movements and expressions more accurately, making their performances more realistic and vivid.

3.2. Application of special effects technology in Marvel movies

3.2.1. Application of digital special effects technology

In Marvel movies, digital effects technology is widely used to create amazing superpowers, monsters and scenes. On the basis of computer-generated films, realistic CG characters are used with special effects technology and appropriate special effects to enrich the basis of the original film and increase the realism of the communication. [5] For example, in the *Avengers series* [6], digital special effects techniques were used to create superhero superpowers, such as Iron Man's flying ability and energy weapons, and Hulk's huge body and destructive power. These special effects allowed the audience to see realistic battle and action scenes in the films.

In addition, digital special effects technology has been used to create a variety of monsters and creatures. For example, in the *Guardians of the Galaxy series* [7], viewers can see a variety of bizarre alien creatures and cosmic fleets. The appearance and movements of these creatures and fleets are created through digital effects technology.

3.2.2. Application of Live Action Special Effects Technology

Live-action special effects technology refers to the technology of applying special effects to actual shooting scenes. In Marvel movies, live-action special effects techniques are used to enhance the realism and visual effects of the actual shooting scenes. For example, in the *Iron Man series* [8], live-action effects techniques were used to create Iron Man's suits of armour. These armour suits were worn by actors and enhanced by special effects in post. Through the use of live-action special effects techniques, viewers can see how realistic the armour suits look and move in the film.

In addition, live-action special effects techniques were used to create various battle scenes and special effects in the Avengers series. For example, in the battle scenes in the film, LFX technology was used to add special effects such as explosions, flames and debris, allowing the audience to feel the tension and excitement of the battle.

Overall, the application of digital special effects techniques and live-action special effects techniques in Marvel movies has enabled the filmmakers to create realistic superpowers, monsters and scenes, presenting the audience with amazing visual effects. The use of these special effects techniques makes Marvel movies more visually spectacular and engaging.

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3.3. Application of Technology in Marketing Promotion

3.3.1. Application of virtual reality technology in film marketing

Virtual reality technology has great potential in film marketing. Movie producers can use virtual reality technology to create virtual scenes of a film, allowing viewers to experience the scenes and plot of the film first-hand in the trailer. For example, before the release of *Avengers: Infinity War*, *Regal Entertainment*, a US-based film projection company, launched Movie bill, a new magazine for films featuring AR. Viewers could scan the QR code on the poster to enter the virtual reality world and interact with the characters in the film. [9] This application of technology not only increases the fun of the film, but also gives fans a taste of digital technology.

Virtual reality technology can also be used in the marketing activities of the film. Producers can use virtual reality to create a variety of games, experiences and interactive content related to the film. This can engage the audience, increase their interaction with the film, and increase the visibility and exposure of the film.

3.3.2. Social Media in Film Promotion

Social media has become one of the most important channels for film promotion. Producers can use various social media platforms, such as Facebook, Instagram, and Twitter, to promote their films. They can post trailers, stills and behind-the-scenes footage of their films, interact with their fans, and provide updates on their films and events.

In addition, producers can establish a direct connection with film fans through social media. They can answer audience questions, explain the film's background and storyline, and even conduct online Q&A sessions. This kind of direct interaction can increase audience engagement and loyalty, while also collecting feedback and opinions from the audience, which can inform the improvement of the film.

Social media can also be used for word-of-mouth marketing of films. Viewers can share their opinions and reviews of a film through social media, which can influence other people's viewing decisions. UK-based influencer and actor Dujon Anderson, who posts content around Marvel, sci-fi and genre films, says that “There comes a point where you have to take a stance and be like, ‘I do have an opinion on this film and that’s okay,’ It’s about being honest with your audiences. The fact that you’re discussing the film gets people talking about it and wanting to make their own opinion on it.” [10] Producers expand the reach and exposure of their films by encouraging viewers to share their film content and participate in discussions on social media.

In summary, the application of virtual reality technology and social media in film marketing has great potential. Producers can use these technological tools to increase the visibility of their films, attract audience participation, and increase audience engagement and loyalty, thereby driving box office and word-of-mouth for their films.

4. The Impact of Technological Innovation on Film Manufacturing Industry

4.1. The enhanced efficiency of film manufacturing industry

Scientific and technological innovation has a significant impact on the film manufacturing industry, one of which is to improve the efficiency of the industry. Through scientific and technological innovation, all aspects of the film manufacturing process have been improved, from pre-script creation to post-production. Filmmakers can use the power of science and technology to improve production efficiency.In the pre-script writing process, technological innovation has enabled creators to create and revise more easily. For example, through computer software, screenwriters can quickly

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revise scripts and communicate with directors and producers in real time, improving creative efficiency. In the filming process, technological innovation has brought more convenient filming tools and equipment to the film manufacturing industry. For example, the emergence of high-definition cameras has led to higher-quality filming while reducing the time and cost of filming. In addition, the photography of modern cinema no longer resembles the recorded images of traditional cinema. It reimagines the production process around creative choices, creating a new unity of art and technology through the creation of virtual photographic images. [11] In the post-production process, technological innovations have provided the film manufacturing industry with more efficient post-production tools and software. For example, digital post-production technologies have enabled filmmakers to make special effects and editing easier, while also increasing the speed and quality of production.

Overall, STI has improved the efficiency of the film manufacturing industry by providing more advanced tools and equipment, enabling filmmakers to create and produce more efficiently.

4.2. The changed way film viewers experience film

Technological innovation has not only had an impact on film manufacturing and creation but has also changed the way film audiences experience. Through technological innovation, film audiences can enjoy a more immersive and diverse viewing experience. Firstly, STI has provided audiences with a more high-definition and realistic visual experience. For example, high-definition and 3D technologies allow viewers to see the details in a movie more clearly, bringing the audience completely into the environment of the movie. [12] In addition, big-screen technologies such as IMAX enable viewers to watch films on a larger screen, enhancing the immersion of the viewing experience. Secondly, technological innovations have provided audiences with richer and more diverse ways of watching films. For example, viewers can choose to watch films at home on their TVs or computers, and are no longer limited to cinema viewing times and locations. At the same time, viewers can also watch films on mobile devices and enjoy them in public places or on the go. Finally, technological innovations also provide audiences with opportunities to interact with films. For example, virtual reality technology moves the viewer from observer to participant and open a new branch of immersive storytelling. [13]

Overall, technological innovations have changed the way filmgoers experience cinema, enabling them to enjoy a more immersive and diverse viewing experience. At the same time, technological innovation also provides audiences with more convenient and interactive ways of watching films.

4.3. The challenge faced in film making

However, special effects technology in film and television in the digital era also faces some challenges. Firstly, the development of digital special effects technology has made the production of special effects cheaper and easier, but it has also led to the overuse of special effects. Some films rely too much on special effects, neglecting the development of the plot and characters, and making the audience get lost in the gorgeous special effects, thus forgetting the theme and ideological connotation of the film. In addition, the widespread use of digital special effects technology has also brought about some ethical and legal issues. For example, digital special effects can be used to create false scenes or characters, which may raise ethical and privacy issues. At the current stage, artificial intelligence has inherited the ethical problems of previous information technology, but also because AI algorithms are opaque, difficult to interpret, adaptive, and widely used, which may bring a series of ethical risks in many aspects, such as basic human rights, social order, and national security. [14] Finally, the popularity of digital special effects technology has also had an impact on physical special effects. Many traditional special effects techniques, such as model-making and physical explosions, have

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been gradually replaced due to the development of digital special effects. Although digital special effects can be more convenient and economical, it also makes some traditional special effects artists lose their jobs. ‘We mustn’t forget that behind the wonder of novelty could lie thousands of jobs destroyed and suffering, often discreet,’ says filmmaker Benoit Chieux. [15]

Overall, film and television special effects technology in the digital era has brought much convenience and innovation to film production, but it also faces some challenges. The overuse of special effects, ethical and legal issues, and the impact on traditional special effects are all problems that need to be faced and solved in the development of digital special effects technology.

5. Conclusion

Technological innovation has brought a great boost to the film manufacturing industry, improving the efficiency and quality of film manufacturing, creating more creative possibilities, and changing the audience's viewing experience. In the future, with the continuous development of science and technology, artificial intelligence, virtual reality technology and other technologies will continue to play an important role in film manufacturing and promote the further development of the industry. Without the dynamic development of science and technology, the all-round upgrading of the art of cinema, the active development of different film movements, and the experimentation of multi-dimensional film genres would all be powerfully limited.

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