DeepFake vs CGI

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*Abstract*— This research paper aims to compare and contrast the use of Deepfake and Computer-Generated Imagery (CGI) in the entertainment industry, specifically in film and media. Deepfake is a relatively new technology that has rapidly gained popularity due to its ability to manipulate existing footage and create hyper-realistic simulations of people and objects. In contrast, CGI has been used for decades in the film industry and is a well-established technique for creating digital effects.

# Introduction

Computer-generated imagery (CGI) and deepfake technology are two types of digital image manipulation that have become increasingly popular in recent years. Both CGI and deepfake have been used to create stunning visual effects in movies, video games, and other media, but there are some key differences between the two techniques.

This paper will explore the similarities and differences between CGI and deepfake, as well as their respective strengths and limitations.

# Background and Applications

## CGI: Background and Applications

CGI has been around for several decades and has been used in various industries, including movies, television shows, and video games. CGI is a technique that allows creators to generate computer-generated images, animations, and special effects.

In movies, CGI is often used to create realistic-looking creatures and environments that would be impossible to create using traditional methods. In video games, CGI is used to create the game's characters, environments, and special effects.

Some of the most popular games that use CGI include World of Warcraft, Final Fantasy, and League of Legends.

## Deepfake: Background and Applications

Deepfake technology is a relatively new phenomenon that has been gaining popularity in recent years. It is an AI-based technique that allows creators to manipulate existing images or videos to create new content. Deepfake is often used to create fake videos and images that appear to be real.

For example, a deepfake video can be created by replacing the face of one person with that of another. Deepfake is also used to create fake news and propaganda videos. The technology has become so sophisticated that it is difficult to tell whether a video is real or fake.

# Similarities and Differences

## Similarities between CGI and Deepfake

There are several similarities between CGI and deepfake. First, both techniques involve digital image manipulation. Both CGI and deepfake require advanced software and hardware to create realistic-looking images and videos.

Second, both techniques require a high level of skill and expertise to create. Creating realistic images and videos using either technique requires a deep understanding of digital image manipulation and a lot of practice.

Finally, both techniques are used in various industries, including movies, television shows, and video games.

Differences between CGI and Deepfake

While there are some similarities between CGI and deepfake, there are also some key differences. The most significant difference between the two techniques is their purpose. CGI is primarily used to create special effects in movies and video games, while deepfake is used to create fake videos and images.

Another difference between CGI and deepfake is their level of complexity. CGI requires a lot of time, effort, and resources to create realistic-looking images and videos, while deepfake can be created relatively quickly and easily using advanced software.

Finally, CGI is a well-established technique that has been around for several decades, while deepfake is a relatively new technology that is still in its infancy.

# Strengths and limitations

## Strengths and Limitations of CGI

One of the main strengths of CGI is its ability to create realistic-looking images and videos. With CGI, creators can create creatures, environments, and special effects that would be impossible to create using traditional methods. CGI is also a cost-effective solution for special effects, as it eliminates the need for expensive practical effects.

However, CGI also has some limitations. One of the main limitations of CGI is its cost. Creating realistic-looking images and videos using CGI requires a lot of time, effort, and resources, which can be expensive. CGI also has limited flexibility, which makes it difficult to create subtle changes in an image.

## Strengths and Limitations of Deepfake

One of the main strengths of deepfake is its speed and ease of use. With deepfake, creators can create fake videos and images relatively quickly and easily using advanced software. Deepfake is also cost-effective, as it eliminates the need for expensive actors or sets.

However, deepfake also has some limitations. One of the main limitations of deepfake is its visual quality. While deepfake technology has improved significantly in recent years, it still has a long way to go before it can create truly realistic-looking images and videos. Deepfake also has ethical implications, as it can be used to create fake news and propaganda videos that can be difficult to distinguish from real videos.

# Reference Articles of CGI

Given the technical and frequently spectacular nature of CGI, it is not difficult to find information on the design and making of high-tech movies, profiles of individuals and companies important to the industry, and celebrations of particular techniques (see Industrial and Technical Resources). While such texts can be useful aids in navigating the technological complexity of digital image creation, their implicit promotional inflection and sometimes too-tidy ways of narrating the history of CGI, special effects, and cinema are insufficient; it is a good idea to also consult more-inclusive, critical work. Baker 1993 is one possible source, written at an important juncture in CGI’s development, around the time of Terminator 2: Judgment Day (1991), Jurassic Park (1993), and Forrest Gump (1994), which brought digital imaging to broad popular consciousness as a new weapon in the arsenal of blockbuster cinema. More than a decade later, Enticknap 2005 meticulously mapped a cinematic landscape transformed by the processes first identified by Baker.

Baker, Robin. “Computer Technology and Special Effects in Contemporary Cinema.” In Future Visions: New Technologies of the Screen. Edited by Philip Hayward and Tana Wollen, 31–45. London: British Film Institute, 1993.

Proposes a set of categories for understanding the emergent aesthetics of computer-generated imagery, followed by a detailed survey of key moments in CGI’s deployment in narrative film throughout the 1970s and 1980s. Dated but informative.

Enticknap, Leo. “New Moving Image Technologies.” In Moving Image Technology: From Zoetrope to Digital. By Leo Enticknap, 202–231. London: Wallflower, 2005.

A useful, admirably clear-eyed survey of digital technology’s effect not just on film imagery but sound, editing, exhibition, and archiving, as well as the related media of film, television, and the Internet. Sceptical toward the wooliness of conceptualizations of the digital.

# Reference Articles of deepfake

There have been existing survey papers about creating and detecting deepfakes, presented in[19,20,32]. For example, Mirsky and Lee[19] focused on re-enactment approaches (i.e., to change a target’s expression, mouth, pose, gazeorbody), and replacement approaches (i.e., to replace a target’s face by swap or transfer methods). Verdoliva [20] separated detection approaches into conventional methods (e.g., blind methods without using any external data for training, one-class sensor-based and model-based methods, and supervised methods with handcrafted features) and deep learning-based approaches(e.g., CNN models). To losanaetal.[32] categorized both creation and detection methods based on the way deep fakes are created, including entire face synthesis, identity swap, attribute manipulation, and expression swap. On the other hand, we carry out the survey with a different perspective and taxonomy. We categorize the deepfake detection methods where we divide papers into two major groups, i.e., fake image detection and face video detection. Odds based on the datatype., images or videos, With fakeimage detection methods, we focus on the features that are used, i.e., whether they are hand crafted features or deep features. With fake video detection methods, two main subcategories are identified based on whether the method uses temporal features across frames or visual artifacts within a video frame. We also discuss extensively the challenges, research trends and directions on deep fake detection and multimedia forensics problems.

# Conclusion

In conclusion, CGI and deepfake are two different techniques that are used for digital image manipulation. While they share some similarities, they also have some key differences in terms of their purpose, complexity, and limitations.

CGI is primarily used to create special effects in movies and video games, while deepfake is used to create fake videos and images. Both techniques have their own strengths and limitations, and their use will continue to be shaped by advances in technology and changes in the industries that they serve. As technology continues to evolve, it will be interesting to see how CGI and deepfake are used in new and innovative ways.

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