

Deepfake: Understanding the Technology Background, Content Differences from Traditional Forgery, and Impact on Public Trust

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Abstract. The latest development of deepfake technology has had a significant influence on the creation and distribution of content on online media. It brings all kinds of possibilities, particularly in the area of false information, therefore it also presents significant challenges. Deepfake content, involving the use of artificial intelligence to create super-realistic but fake videos and images, can potentially deceive the audience and manipulate public opinion. Based on these phenomena, the paper explores three major topics— technology background of deepfake, content differences between deepfake and traditional forgery, and the impact of deepfake content on public trust. The paper also provides three specific examples in different areas (Politics, Entertainment, and News Media) to help people understand the relationship between deepfake content and public trust.

Keywords: deepfake content, artificial intelligence, public trust, cross-field psychological impact

1. Introduction

On February 7, 2020, the day before the Delhi Legislative Assembly elections, two videos of Manoj Tiwari, the chairman of the Bharatiya Janata Party, criticizing the current government of Delhi, Arvind Kejriwal, quickly spread on WhatsApp. In one of the videos, Tiwari speaks in English, and in another, he speaks in the Haryana dialect of Hindi. “(Kejriwal) deceived us based on commitment. But now Delhi has a chance to change all that. Please press the Lotus button on February 8 to form a government led by Modi.”, he said. According to VICE India, these videos are shared among more than 5,800 “WhatsApp” groups, reaching about 15 million people. Surprisingly, Manoj Tiwari does not speak Haryanvi, nor has he ever recorded the video message in English or any other language [1]. Both of these videos were faked and often referred to as deepfake content. The convenience of Deepfake technology is reflected in that it requires only a little initial input to create output that appears genuine to the untrained eye, and Deepfake software is available for whoever is online, which enables any user with the requisite computer skills to use it to produce fake audio, image, and video content.

Deepfake content is synthetic media created using artificial intelligence techniques and intense learning, to manipulate or generate audio and visual material that convincingly mimics real people and situations. It often raises ethical and misinformation concerns. The spread of such content on social media platforms can influence public trust, making it a critical issue for researchers, policymakers, and platforms.

Previous studies have generally documented the impact of fake information on public trust. These studies have shown that exposure to false information can lead to cognitive dissonance, which is a negative psychological state in which people feel uncomfortable due to conflicts of beliefs or information [2]. In addition, cognitive dissonance often prompts people to seek information consistent with previous beliefs, a phenomenon known as confirmation bias [3]. Some studies have also explored the concept of verification motivation. Verification motivation refers to the driving force that people want to verify the accuracy of the information they are exposed to [4]. Studies have shown that cognitive dissonance can enhance people's information verification motivation and encourage people to more actively verify the authenticity of facts [5]. However, this enhanced motivation may also lead people to selectively contact and support information that conforms to their beliefs and even cause the polarization of trust [6]. Additionally, the role of social media in amplifying false information and affecting public trust has also been confirmed by a large number of studies [7].

Although there is a lot of literature on disinformation and public trust, there are still several gaps in the academic field. First of all, the difference between deepfake content and traditional forgery content has not been explored. Secondly, compared with other forms of misinformation, the specific impact of deepfake content on public trust has not been studied in depth.

Our research aims to explore the relationship between deepfake content and public trust, and to explore three main topics—technology background of deepfake, content differences between deepfake and traditional forgery, and the impact of deepfake content on public trust. Our research has made several contributions to the existing literature. In theory, it provides a comprehensive explanation for understanding the danger of deepfake content triggering nasty social events, the higher realism and customizability of deepfake content compared to traditional forgeries, and the trust issues in different areas raised by deepfake content. In practice, the findings obtained from this study can provide an effective reference for the development of strategies to mitigate the impact of deepfake content on public trust, benefiting policymakers, educators, social media platforms, and so on.

2. Deepfake technology

2.1. Fundamentals of deepfake technology

In the fields of artificial intelligence (AI) and computer vision, deepfake technology is a fascinating and contentious development. The word "deepfake," a parody of "deep studying" and "fake," refers to random media that resembles a real person's image in contemporary images or images [8]. Schemers will use the false image to make the control figure do something they haven't done. Because of its potential applications and social consequences, this architecture has become a popular topic in both academic and popular talk.

Deepfake mainly relies on deep learning technology, especially generative adversarial networks (GANs). Ian Goodfellow and his team created the idea of GANs in 2014. It mainly contains two neural networks: a generator and a discriminator. The generator is responsible for generating synthetic data, while the discriminator strives to distinguish between real data and synthetic data.

This adversarial relationship drives the two networks to iteratively improve, resulting in highly realistic composite media [9].

This iterative lifting process begins with the operator's training of GANs on a data set consisting of a large number of images or videos. The generator learns and replicates the style and features input by the operator, and then generates new images or videos. The operator then "feeds" the discovered or recorded images or videos to the generator for learning and copying. It becomes extremely difficult for the discriminator to determine whether these generated images or videos are real or fake as the number of different types of this process grows. In the end, this incremental process resulted in the creation of incredibly deepfake content.

2.2. Development of deepfake technology

Since its founding, the deepfake techniques have developed rapidly. At first, active pictures were created using this technology. Lastly, using the technology for voice cloning and video synthesis has become more common among experts. In 2017, online areas started using deepfake techniques for spiteful purposes, including making fake celebrity videos and sexual content [10].

Moreover, more advanced techniques have been developed in the fields of science and technology to enhance the quality of deepfakes or to detect them. These improvements, such as the use of more sophisticated cerebral designs and the inclusion of rigorous training data, make it easier to portray a strong fake in the traditional press.

2.3. Current situation of deepfake technology

Since the deepfake technology came out, it has often been used for illegal purposes. With the help of this artificial intelligence technology, the forgery behavior that was once considered extremely difficult has become easy to do—its users just need enough sample data for learning as well as copying. The deepfake content blurs the line between reality and fiction, posing a significant danger to society, such as infringing upon the privacy of others, spreading fake information, and affecting the trust between people. Anyone, from ordinary citizens to celebrities and politicians, could be a victim of deepfake content. As we entered Generation Z, the deepfake content began to spread rapidly like a virus through social media platforms, penetrating all aspects of people's daily lives and causing widespread public anxiety.

In recent years, deepfake crimes that specifically frame women have become increasingly rampant in South Korea. Victims' information and details about affected schools are constantly surfacing on their local social media, especially in the Telegram group, an online social platform based on Telegram applications. According to 《Korea Herald》, Park Ji-hyun, the former co-chairman of the committee that exposed the "N room" incident, said that the number of criminals involved in deepfake crimes in South Korea may reach 220,000, including possible double counting, which puts many South Korean women in extreme anxiety and fear [11]. On August 29, 2024, an 18-year-old woman claiming to be from South Korea quickly became popular after a post on the Chinese social media platform Weibo, a popular social app commonly used in China. Her post accuses the current deepfake "face-changing" phenomenon in South Korea of deeply infringing on the serious issue of women's privacy in South Korea, and implores Chinese netizens to help South Korean women who are suffering from the harm of deepfake content. The post quickly became the hottest topic of the day, gaining more than 11,000 comments, 29,000 shares, and 216,000 likes. Soon after, several Korean women posted similar posts on Weibo. This incident highlights the significant

harm caused by the spread of deepfake content, which has caused widespread panic and strong public protests around the world.

Deepfake content has a significant influence on politics, too. According to a 2020 study, 62 percent of politicians believe that deepfake content may contain a significant impact on how the vote turns out, while a 2021 study found that 50 percent of voters have encountered political deepfakes during the conflict. Additionally, more and more incidents involving political deepfakes have been reported. For example, the deepfake video of Ukrainian President Vladimir Zelenskiy was spread during the Russian invasion in 2022, aiming to manipulate public perception. To address the difficulties posed by deepfake technology in elections, these occasions demonstrate the need to create complete regulatory systems and increase social media literacy. Deepfake content has a profound influence on public trust in social sites.

3. Deepfake content versus traditional forgery content

With the development of network media, the speed and scope of information dissemination have been greatly improved in today's era, making it easier for false information to spread and influence public opinion. When discussing deepfake content, it is very important to distinguish between deepfake content and traditional forgery content. Deepfake content is a composite media in which a person's image is convincingly altered to describe something they say or do that doesn't actually happen. This process utilizes advanced artificial intelligence technology, especially generative adversarial networks [12]. In contrast, traditional forgery content involves more direct manipulation at the technical level, such as simple photo or video editing, which was common and popular prior to the development of editing techniques [13]. Although both types of content may be deceptive to viewers, the complexity and authenticity of deepfake pose special challenges and require in-depth research. Compared with traditional forgery, the two salient features of deepfake content to be discussed are high realism and customizability.

3.1. High realism

One of the characteristics of deepfake content is “high realism”. The main attraction of traditional forgery content is not the organized media itself, but the story it tells. However, the advantage of deepfakes lies in the high audiovisual realism created by its technology. Unlike traditional forgery, which tends to leave a perceptible error, deepfakes can produce output that is almost indistinguishable from real media. This characteristic can be attributed to the complex neural network trained on large data sets, which has the ability to replicate facial expressions, voice nuances, and subtle movements [14].

Although deepfake technology can be actively applied in the fields of psychological therapy and film production due to its high realism, it also causes important social problems. The misuse of deepfake technology for defamation or false information has the potential to manipulate the audience's perception and shape public discourse since it is often difficult for individuals to identify deepfake content accurately [15]. Therefore, the necessity of truth is reduced, described as “post-truth” phenomenon in contemporary society, which has aroused great concern about media information [16].

3.2. Customizability

In addition to high realism, deepfake content also shows significant “customizability”. This means that deepfake technology can generate content that suits particular issue, follower, or environment. Users can effectively modify a person’s appearance or discourse to create what they want to show, increasing personal connection and pertinence. It has been shown that customization can improve the effectiveness of content delivery, because customized messages are more likely to resonate with viewers [17].

This customizability makes deepfake technology attractive for a variety of applications, such as marketing and political campaigns. In marketing area, Advertisers can create personalized advertisements, utilizing the power of familiarity to trigger a stronger emotional response from viewers [18]. In the political area, customized videos can influence the candidate's popularity in elections by highlighting their strengths or negatively portraying opponents. Although deepfake may enhance creativity, it can also be used for negative purposes, such as pornographic content creation and cross-border fraud. As a result, the society is facing issues such as privacy violations and rights protection, requiring technical defense and legal support.

4. Impact of deepfake content on public trust

The rapid development of deepfake content poses a major challenge to public trust. As deepfake becomes more advanced and accessible, its potential to cause psychological phenomena like cognitive dissonance and verification motivation among individuals has raised great concerns. These phenomena caused by deepfake are worthy of attention since they can shape how people process information and ultimately affect their trust in various sources.

4.1. Cognitive dissonance

Cognitive dissonance is the psychological discomfort experienced by individuals when facing conflicting beliefs, values, or information [19]. The development of deepfake content makes this discomfort worse, because the technology blurs the boundary between reality and fiction. When people encounter deepfake content that can refute their pre-existing ideas or opinions, they may find it difficult to overcome this new knowledge with their current views.

Imagine a politically active adult watching a deepfake video of a candidate making inflammatory remarks. Cognitive dissonance may occur if the content of the video conflicts with the candidate's previously considered credible views. In order to alleviate this discomfort, individuals may either deny or accept it, leading to a second evaluation of previous beliefs. This process shows the vulnerability of public trust, because people may switch between doubt and acceptance according to their own cognitive framework.

In addition, cognitive dissonance can lead to a phenomenon known as “confirmation bias”. This is the easiest strategy for individuals to choose in the face of cognitive dissonance, that is, they tend to seek information consistent with existing beliefs and ignore counter evidence [20]. In the context of deepfake, this bias may lead individuals to only accept the content that confirms their views, strengthen the echo chamber, and further divide the society.

4.2. Verification motivation

Deepfake content challenges the traditional concept of authenticity and makes people feel an urgent need to verify. Verification motivation is the desire to confirm the accuracy of information before

forming a judgment or belief [21]. For now, with the continuous spread dissemination of deepfake content, people are increasingly motivated to verify the authenticity of the media content they come into contact with [22].

This enhancement of verification motivation is manifested in a variety of ways. Firstly, individuals will actively verify information through fact-checking websites or authoritative information sources. However, the effectiveness of these verification efforts actually depends on people's trust in these sources. If individuals are skeptical about the fact-checking organizations or sources they use, their verification attempts may yield weak results, thereby maintaining a state of distrust [23].

Secondly, the pursuit of verification may show an psychological state of uncertainty and anxiety. When meeting deepfake content with opposite views, individuals may not only begin to question the specific content they encounter, but also turn to question the credibility of all information. Such questioning can further raise concerns about the inability to confirm the truth and may lead to a complete withdrawal from media participation, resulting in social disengagement.

4.3. Trust outcomes

Different trust outcomes are caused by psychological effects like cognitive dissonance and verification motivation. An immediate consequence is the decline of trust. As technology develops, individuals may adopt a blanket skepticism, questioning the authenticity of all audiovisual content [12]. The occurrence of this situation will damage the credibility of formal news and undermine the public trust in democratic organizations.

Moreover, these consequences go beyond individual beliefs and impact social cohesion. When the distrust deepens divisions, polarized groups may become more firmly convinced in their views, creating an environment where constructive dialogue becomes increasingly impossible. Since informed public debate relies on shared truths, this fragmentation actually undermines democratic processes.

In extreme cases, trust decline can lead to conspiracy theories becoming popular. Individuals seeking alternative explanations for perceived deception may be drawn to fringe beliefs, worsening the loss of trust in mainstream media organizations and further deepening social divisions [24]. When the whole environment becomes more likely to be affected by disinformation, the recognition of disinformation among the public increases, and the effectiveness of information regulation decreases, thereby intensifying the cycle of distrust.

5. The impact of deepfakes in politics, entertainment, and news media

Deepfake technology has become a powerful tool for controlling audio-visual content in various fields such as politics, entertainment, and news media. The implication of deepfake content has caused very different trust results in these fields, such as the polarization of political beliefs, the questioning of the authenticity and aesthetics of entertainment content, and the challenge to the credibility of the news media information ecosystem. This paper discusses these effects in combination with specific cases and related literature.

5.1. Politics: trust polarization

In the political field, the deepfake content is likely to affect the level of trust between different groups and intensify the polarization of public trust [25]. Manipulating images, videos, and other

content can create a misleading image of a politician, negatively impacting that politician and potentially reducing public support for him or her. When this external manipulation is combined with internal psychological effects such as cognitive dissonance and verification motivation, deepfake content can successfully influence public perception and ultimately opinion tendency [23].

A notable example of this occurred during the 2019 Indian elections, when a deepfake video emerged that showed prominent political leader Rahul Gandhi making angering comments about the Bharatiya Janata Party (BJP). In the video, Gandhi called the supporters of the opponent party “ignorant blind followers”, implying that they lacked judgment and the ability to think independently. This action has created a negative image of Gandhi as being disrespectful towards his opponents. The video quickly became popular and caused anger among BJP supporters, further deepening the polarization of voters. Even after the video was debunked, it still allowed critics to push narratives that inspired distrust of Gandhi's character and intentions. Moreover, when confronted with such events regarding support tendencies, people tend to interpret the videos through their own political beliefs, which then makes their pre-existing views even stronger [26].

In countries with similar multi-party systems such as the United States, deepfake content has been proved to intensify existing political divisions. Through creating content that affect a politician's image, deepfake can influence the supporters' political opinions. Moreover, studies have shown that highly partisan individuals are more likely to accept misleading information consistent with their beliefs, leading to a phenomenon known as “confirmation bias” [26]. This bias creates a cycle in which individual loyalty to one's beliefs reinforces the acceptance of misleading information, leading to a polarization of public trust, posing a significant risk to electoral integrity and even the development of the country [25].

5.2. Entertainment: trust erosion and aesthetic skepticism

In the entertainment industry, deepfake content has led to trust erosion and aesthetic skepticism. The ability to digitally modify the image of an actor has aroused people's doubts about the authenticity of what they see. Moreover, it brings about ethical concerns about the star's identity and agreement with the act, especially the image of a star who has died.

The image use of the deceased actor Carrie Fisher in "Star Wars: The Rise of Skywalker" can help explain this issue. The filmmakers used archive footage and computer-generated image (CGI) technology to give Carrie Fisher's character life in the film performance. Some praised the respect, while others expressed the social problem of how to use her portrait after her death. Critics argue that this reduces the authenticity of the film's narrative and raises ethical questions about the digital re-creation of actors using modern technology [27]. According to the relevant research on this, many people are more and more skeptical about the authenticity of film performances and their aesthetic value. Audiences may be unsure whether the performances they see are “real” or “faked”, which reduces their enjoyment and satisfaction with the film's content [28].

Moreover, the emergence of deepfake content in celebrity obscene porn videos has further influenced the public's trust in digital media. The placement of celebrities' faces onto pornographic content without permission has violated relevant laws and ethical issues, complicating the discussion around the appropriate use of deepfake technology in the entertainment industry [29].

5.3. News media: challenges to information ecosystems

Deepfake content poses a significant threat to the news media and the broader information ecosystem. The public's ability to distinguish credible information is affected since the line between

fact and fabrication becomes increasingly blurred, raising concerns about media literacy and verification capability.

A worrying case is a deepfake video produced by American comedian Jordan Peele and BuzzFeed CEO Jonah Peretti, starring former President Barack Obama. The purpose of the video was to demonstrate the potential dangers of deepfake technology and how easily disinformation can spread. In the first half of the video, Obama gives a heated speech, insulting former President Donald Trump as “a total and complete dipshit”. But in the second half of the video, Jordan Peele appeared and explained that the speech was actually his own performance. However, deepfake technology was used to overlay his facial expressions and voice on the image of Barack Obama [30]. Despite the clear teaching purpose of the case, it may also unintentionally intensify the public's confidence crisis in online media.

Deepfake content may lead to skepticism towards all media organizations, regardless of their reliability. When the impression of manipulation techniques such as deepfake becomes more deeply rooted in public consciousness, a broader distrust of media organizations will be resulted, weakening belief in previous reliable information and reducing future engagement [8]. As the extend deepens, people may turn to echo chambers, only consuming information that aligns with their beliefs. This can lead to further ideological polarization and engagement decline, posing a challenge to the whole information ecosystem [10].

6. Conclusion

This paper discusses the background of deepfake technology, the content comparison with traditional forgery and the impact on public trust. Found out that, (1) Using advanced artificial intelligence technologies such as Generative Adversarial Networks (GANs), deepfake content can create highly realistic synthetic media that can trigger important social events. (2) Deepfake content has the characteristics of high realism and customizability, made it more deceptive than traditional forged content, posing a severe challenge to network information security. (3) Deepfakes will cause psychological effects such as cognitive dissonance and verification motivation, leading to trust problems in different fields.

Despite some progress has been made in the research of deepfakes, there are still some shortcomings. Firstly, current deepfake detection technology is difficult to keep up with the rapid development of deceptive technology. Future research can focus on developing more powerful algorithms to achieve correct end efficient identification of deepfake content. Secondly, there have not too much studies on the long-term effects of deepfakes to different population. In an era of data glut, it's vital to understand how deepfake affects people across different age groups, races, and social backgrounds, and how these effects change over time. Finally, the active application of deepfake technology in medical, education and other fields has not been fully developed. Deepfake technology has the potential to play a role in these fields, such as personalized medical training or educational content. We need to explore the future of deepfake applications in these areas, as well as potential risks and challenges to ensure responsible use. By filling these gaps, future research can provide a deeper understanding of deepfake.

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