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Current Usage Areas of Deepfake Applications with Artificial Intelligence Technology[1]

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Abstract

The concept of artificial intelligence has gained significant prominence throughout history, persisting as a subject of regular discussion and exploration in contemporary times. Artificial intelligence (AI) has been a recurring theme in numerous literary works and films, with its projected significance in future contexts. This thematic exploration of AI has been a subject of creative endeavors spanning several decades. In recent years, deepfake technology has emerged as a prominent subject of interest within the realm of artificial intelligence. Deepfake technology is widely recognized as an artificial intelligence and deep learning-based innovation. Numerous deepfake applications have had a big impact on the public recently. In addition to the production of manipulation films targeting individuals of high popularity, it is evident that deepfake technology possesses many potential applications across several domains. The objective of this study is to explore the potential applications of deepfake technology across many domains. Deepfake technology was examined in the study by concentrating on the concept of deep learning and referencing artificial intelligence technology. The study involved the classification of the many applications of deepfake technology by conducting a comprehensive literature analysis and analyzing examples of its usage in diverse domains. Based on the findings of the study, it is possible to categorize the significant applications of deepfake technology into four distinct groups. The previously mentioned categories include arts and entertainment, advertising and marketing, the film industry, political communication, and media.

Keywords: Artificial Intelligence, Deep Learning, Deepfake, Hyperreality.

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Yapay Zekâ Teknolojisi Olan Derin Sahte (Deepfake) Uygulamaların Günümüzdeki Kullanım Alanları

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Öz

Yapay zekâ geçmişten günümüze sıkça gündeme gelen bir kavram olarak bilinmektedir. Pek çok edebi eser ve sinema filminde yapay zekânın gelecekte önemli bir yer tutacağı ön görülmekte ve on yıllardır yapay zekâ temasıyla ilgili eser üretilmektedir. Günümüzde ise pek çok yapay zekâ temelli teknoloji arasından deepfake'in insanların ilgisini çektiği görülmektedir. Deepfake; yapay zekâ temelli, derin öğrenmeye dayanan bir teknoloji olarak bilinmektedir. Yakın tarihlerde birçok deepfake uygulaması kamuoyu üzerinde önemli etkiler sağlamıştır. Bununla birlikte, popüler kişileri hedef alan manipülasyon videolarının yanında, deepfake'in farklı alanlarda farklı kullanım imkanları olduğu görülmektedir. Bu çalışmanın amacı deepfake teknolojisinin farklı alanlarda kullanım imkânlarını tartışmaktadır. Çalışmada, yapay zekâ teknolojisine değinilerek, derin öğrenme kavramına odaklanılarak deepfake teknolojisi irdelenmiştir. Çalışmada, literatür taraması yapılarak ve farklı alanlara ait uygulama örnekleri incelenerek deepfake'in kullanıldığı alanlar örnekler çerçevesinde sınıflandırılmıştır. Çalışmanın sonuçlarına göre deepfake'in belirgin olarak kullanıldığı alanlar 4 (dört) başlık altında sınıflandırılabilmektedir. Bunlar sanat ve eğlence, reklam ve pazarlama, film endüstrisi, siyasal iletişim ve medya alanları olarak tanımlanabilmektedir.

Anahtar Kelimeler: Yapay Zekâ, Derin Öğrenme, Deepfake, Hipergerçeklik.

Introduction

Technological advancements have played a pivotal role in shaping several aspects of human existence. As a result of these advancements, individuals' ways of living have undergone transformation, influencing their cognitive processes as well. The advent of the wheel facilitated long-distance travel and the transportation of personal belongings, so relieving individuals from the burden of relying solely on their memory and necessitating the development of written records. It can be stated that the various advancements and progressions witnessed throughout history have had a significant role in shaping the current state of humanity.

The impact of technology on human life encompasses both advantageous and detrimental impacts. Following numerous advancements in technology, there has been a notable emergence of ethical discussions and controversies. In addition to these arguments, the advantages and disadvantages of technology are integral to individuals' daily lives. According to Özdemir (2022, p. 290), digital technologies possess the capability to disrupt individuals' connection with reality by permeating many facets of existence and assimilating them within a virtual realm. At this juncture, the significance of utilization takes precedence over the configuration of the technology. Furthermore, the manner in which individuals utilize specific technologies is crucial, as each technical advancement is intrinsically linked to human agency.

Artificial intelligence is widely recognized as a significant technological advancement in recent years when considering the historical trajectory of technology progress. Artificial intelligence (AI) frequently serves as a platform for ethical deliberations within the realm of technology. In addition to engaging in ethical deliberations, it may be anticipated that artificial intelligence will progressively permeate several aspects of human existence in the forthcoming years. Artificial intelligence, a subject of debate over its potential benefits and drawbacks, has emerged as a significant determinant in human existence, akin to earlier technological advancements. Currently, a plethora of technologies have been developed as a result of advancements in artificial intelligence, and numerous aspects of individuals' everyday routines are reliant on artificial intelligence.

Deepfake is a prominent technology in the field of artificial intelligence that is worth considering in contemporary times. The creation of deepfake technology is facilitated by the utilization of deep learning, a prominent component within the field of artificial intelligence. Deepfake technology has gained significant attention in recent years due to the proliferation of numerous videos. Its prominence lies in its ability to manipulate and alter the appearance of actual individuals, effectively presenting fabricated content as authentic. Nevertheless, it is worth noting that deepfake technology has demonstrated potential applications beyond the realms of manipulation and deceit. Consequently, there has been a growing academic interest in the field of deepfake technology, leading to an increase in research projects focused on this topic.

According to Karnouskas (2020, p. 138), in his study on deepfake, it is contended that society is unready to effectively address the advent of deepfake

technology across all domains. According to Jones (2020, p. III), an examination of the potential threat posed by deepfake technology calls for collaborative efforts among governments, corporations, and academics in order to provide the necessary infrastructure for safeguarding against the misuse of deepfakes. In their scholarly article, Kietzmann et al. (2020, p. 135) introduced a framework called R.E.A.L. to categorise different forms of deepfakes. The authors aimed to provide insights into the potential risks and opportunities associated with deepfake technology, with the intention of assisting enterprises in their strategic considerations for the future of deepfakes. Consequently, it is imperative to emphasize certain criteria in order to ensure plausible deniability, including the process of recording the authentic material, early detection of deepfakes, provision of legal safeguards, and the distinction between trust and credibility. According to the article, adherence to these measures may enhance societal preparedness against deepfake technology. In his paper, Caporusso (2021, p. 235, 241) acknowledged his primary focus on the malevolent applications of deepfake technology. However, he also presented a system that harnesses deepfake technology for positive purposes. The findings demonstrate that deepfake technology has the potential to serve practical purposes, such as reconstructing memories or generating animations that aid in the process of grief management. Additionally, deepfake can enhance the realism of scenes by producing image-based avatars that surpass the capabilities of their three-dimensional counterparts. Furthermore, it can be employed in the entertainment industry to incorporate user-selected special characters into movies, commercials, and shows.

This paper provides a comprehensive analysis of the various domains in which deepfake technology is employed. The emergence of artificial intelligence technology has led to the establishment of a comprehensive description for deepfake, an extension of artificial intelligence. Researchers have also explored its potential applications and categorized its usage regions based on the intended aims of deepfake. The initial reference of artificial intelligence technology was made in the paper. Furthermore, the notion of deepfake technology has been elucidated within the context of deep learning. Lastly, attention has been directed towards the various domains in which deepfake finds application.

1. Artificial Intelligence Technology

The concept of artificial intelligence has attracted considerable interest in contemporary society. Artificial intelligence has generated a great deal of interest and discussion regarding its future implications, thereby becoming a subject of scientific study. In various future scenarios, artificial intelligence is widely considered a key factor in shaping future developments. In recent times, there has been a notable proliferation of artificial intelligence (AI) technologies, propelled by technological advancements. The integration of these technologies has resulted in the emergence of diverse applications, thereby fostering the advancement of innovative artificial intelligence (AI) applications.

According to Öztürk and Şahin (2018), artificial intelligence is characterized by its capacity to address challenges, grasp information, derive meaning, acquire knowledge from past encounters, and develop connections that are typically associated with human cognitive abilities (p. 28). Artificial intelligence (AI) is a

complex social and cognitive phenomena that facilitates the integration of machines into society, enabling them to undertake diverse activities and engage in communication with other entities within the societal framework through message exchange (Abbass, 2021, p. 95). Artificial intelligence (AI) is a field within the realm of science and technology that focuses on the development of intelligent machines and computer programs capable of executing a diverse range of tasks that typically necessitate human intelligence (Anjila P K, 2021, p. 65). According to Arslan (2020), artificial intelligence refers to the capacity of a computer to do complex cognitive tasks typically associated with human beings (p. 76).

Although artificial intelligence is widely recognized in contemporary society, it has undergone substantial historical advancements. The history of contemporary artificial intelligence technologies, while relatively short, demonstrates a notable historical progression through preliminary experiments. The automaton known as Turk, constructed by Austrian engineer Wolfgang von Kempelen in 1769, is recognized as a notable instance of artificial intelligence experimentation and endeavors. According to Glaeser and Strouhal (2000, p. 351), The phrase "artificial intelligence" was initially introduced by John McCarthy during the Dartmouth Conference in 1956, which is widely regarded as the inaugural conference on the subject (Arslan, 2020, p. 76). The question "Can Machines Think?" by Allen Turing and the introduction of the idea of artificial intelligence with the Turing test also have a role in the history of artificial intelligence (Turing, 2009). According to Öztürk and Şahin (2018), artificial intelligence experienced various stages between the years 1965 and 1980. These stages include the dark period, renaissance period, partnership period, entrepreneurship period, and the final stage where it extended beyond laboratory settings and prioritized integration into social life (p. 24).

In the early days of computer technology, Alan Mathison asked, "Is it possible for machines to exhibit cognitive abilities?" He advanced artificial intelligence by asking the question. Military technology during World War II popularized artificial intelligence. The above scenario is considered a major computer machine development advance (Sucu & Ataman, 2020, p. 41). Initial AI development occurred from 1957 to 1974. Computer technology has improved information storage, processing speed, and user accessibility. Machine algorithms have improved at identifying human problem-solving algorithms. Due to increased funding and algorithmic toolbox expansion, artificial intelligence developed rapidly in the 1980s. Future popularity and recognition of "deep learning" methods, which help computers learn through experience, have increased (Anyoha, 2017). In the current context, it can be argued that the key component of the historical progression relates to the computational capabilities of computers. A major concern in artificial intelligence is the rapid development of data storage computer systems.

In historical terms, artificial intelligence is a major technological advance. Edward Fredkin, a prominent figure and director at the esteemed Massachusetts Institute of Technology (MIT) computer laboratory, spoke to the British Broadcasting Corporation (BBC) about three significant historical events. A major topic is the origins of the universe. Second, life begins. Pirim (2006) lists artificial

intelligence as the third major development (p. 82). Perhaps artificial intelligence, once the stuff of science fiction, has entered daily life. According to Anjila P K (2021, p. 65), artificial intelligence is expected to play a major role in many industries, including production and healthcare, improving performance and productivity. Additionally, artificial intelligence has been used in art, entertainment, advertising and marketing, healthcare, and defense. AI in military applications includes command, control, communication, information, monitoring, and recognition. Autonomous and semi-autonomous systems enable these capabilities (Carlo, 2021, p. 269). Artificial intelligence is studied in advertising and marketing for its role in information acquisition, analysis, and visualization (Costa et al., 2019, p. 445). Therefore, artificial intelligence has made it possible to create customized ads and make recommendations based on consumers' preferences, especially online. From film production to marketing, artificial intelligence (AI) is important in the film industry. Artificial intelligence is increasingly used in film production. Predicting a film's success, writing scripts, using robot cameramen, AI actors, robot editors, and customizing screening experiences are all part of this. The use of algorithms like AARON in art and painting has grown in popularity (Ballı, 2020, p. 288-289). Health focuses on disease identification and diagnosis and assisting physicians (Karal & Turan, 2021, p. 100).

Some of the most widely recognized examples of artificial intelligence applications in contemporary society include Siri, Alexa, and Chatgpt. Numerous uses exist, including digital assistants and chat robots. These programs are capable of responding and offering ideas by accepting input in the form of voices, images, and user-provided information. According to Brill (2018), these applications operate by comprehending individuals' inquiries and delivering tailored responses (p. 26). By utilizing these technologies, numerous institutions have the ability to enhance their potential for influence through active engagement with their clients.

Given the extensive range of applications for artificial intelligence (AI), there is a prevailing belief that AI will supplant human involvement across diverse domains within the business sector. Nevertheless, there exist concerns over the potential for artificial intelligence to precipitate the demise of mankind in its entirety. A declaration has been signed by prominent figures in the field of artificial intelligence, highlighting the growing concern regarding the possible risks associated with artificial intelligence and emphasizing the need to prioritize addressing these risks (Collier, 2023). This emerging phenomenon challenges the prevailing notion that artificial intelligence will exclusively yield positive outcomes in the forthcoming years, hence engendering deliberations regarding the future implications. At this juncture, the utilization of artificial intelligence assumes significance.

Hence, in the context of artificial intelligence, the notion of ethics arises. Artificial intelligence acquires knowledge regarding ethical judgments solely from the data it is provided with. According to Çelebi and İnal (2019), the ability of AI to make independent judgments based on personal experiences and adapt its behavior accordingly is constrained. (p. 657) In this regard, it might be posited that the ethical principles governing artificial intelligence are contingent upon the

human agent responsible for its creation. Hence, the identification of the individual or group responsible for programming the artificial intelligence assumes a significant aspect. Theoretically, it is possible to develop artificial intelligence that encompasses both the virtues present in and absent from human beings. Given the current limitations in developing an artificial intelligence system that possesses human-like self-learning capabilities and ethical sophistication, the focus of ethical deliberations has shifted towards examining the impact of human influence. Although various researchers have proposed the ethical principles that artificial intelligence should have (Floridi and Cowls, 2021, p. 5; Ashok et al., 2022, p. 1), the ethical perspective that artificial intelligence should have is much more complex and requires further discussion.

2. Deepfake Technology

The term "deepfake" is derived from the amalgamation of the lexemes "deep" and "fake." The term "deep" inside the description of deepfake underscores the significance of deep learning, while the term "fake" underscores the nature of the output as a simulated reality. Within this particular context, a comprehensive comprehension of the operational framework of deepfake technology necessitates an initial exploration of the fundamental notion of deep learning.

Deep learning is widely acknowledged as a key driver of the ongoing artificial intelligence revolution. The term "Deep Learning" has gained widespread recognition in contemporary discourse, mostly because to its association with prominent corporations such as Google and Facebook. The inception of the historical trajectory of deep learning can be traced back to the collaborative efforts of Walter Pitts and Warren McCulloch in 1943, whereby they developed a computational model of the human brain that relied on neural networks. The initial advancements in the field of deep learning algorithms were pioneered by Alexey Grigorevich Ivakhnenko, who made significant contributions to data business management in 1965, and Valentin Grigorevich Lapa, who specialized in cybernetics and project engineering (Foote, 2022). Following this, in the latter part of the 1990s, there was a conspicuous increase in central processing unit (CPU) technology, resulting in valuable progressions in the domain of deep learning.

Deep learning refers to a set of methodological methods utilized for constructing neural networks with multiple layers, commonly known as "deep" neural networks. These networks are designed to address complex issues in various domains such as supervised classification, generative modeling, and reinforcement learning (Saxe, 2021, p. 55). According to O'Mahony et al. (2020, p. 128), deep learning refers to a technological approach employed in the domain of digital image processing to address many challenges, including picture coloring, classification, segmentation, and detection. Deepfake technology operates on the principles of deep learning. With the advancement of deep learning technology, there is an increasing capability to generate professional-grade deepfake videos.

Deepfake refers to a computer-based technology that use deep learning methodologies to generate artificial photographs (Etienne, 2021, p. 558). According to Westerlund (2019, p. 40), the term "deepfake" refers to the manipulation of videos by digital means, resulting in the portrayal of individuals

engaging in actions or making statements that are factually inaccurate. Deepfake refers to a multimedia representation, encompassing visual, auditory, or textual elements, that is generated through the utilization of deep learning techniques. These representations possess a high degree of realism, effectively mimicking the original content, with the intention of deceiving individuals (Özyigit, 2022, p. 481). In essence, the term "deepfake" refers to fabricated visual or auditory content, encompassing manipulated photographs, films, or audio recordings, generated by the utilization of artificial intelligence techniques. The technique enables the generation of authentic visual and auditory representations by overlaying the facial features or vocal expressions of one individual over those of another individual.

The technique known as deepfake is frequently employed to substitute the visage of a renowned someone with that of another. The objective of this utilization is manipulation. The process involves the utilization of a substantial number of photographs, ranging in the hundreds to thousands, of the individual being targeted. These photographs are then employed to generate fabricated movies, sounds, and images that possess a convincing appearance of authenticity, despite their inherent falsity. Consequently, it becomes feasible to generate videos whereby individuals appear to be uttering or engaging in actions that they have not actually expressed or performed.

While certain deepfake movies may exhibit a convincing semblance of authenticity, others may be discerned as artificial. The phenomenon of blurring the boundary between counterfeit and authentic entities is indicative of the significant advancements achieved in the field of artificial intelligence. As the field of artificial intelligence progresses, there is a notable enhancement in the authenticity and convenience of generating videos. Therefore, in relation to its potential for production, it attains a broader audience and achieves widespread dissemination.

The accessibility of various hardware has facilitated the production and dissemination of altered videos by a multitude of individuals (Patterson, 2019). The accessibility of open-source platforms has led to a rise in the availability of realistic deepfakes, which can be utilized for the purpose of disseminating disinformation (Waters, n.d.). Hence, individuals lacking advanced technical proficiency can engage in video editing, face swapping, expression alteration, and speech synthesis. Similar to the picture manipulation capabilities offered by the photoshop software, deepfake software likewise assists individuals in these domains.

The term "deepfake" is commonly used to describe synthetic media, as discussed by Pan et al. (2020). The concept of synthetic media encompasses various aspects such as the potential for harmful utilization, the intersection of truth and freedom of expression, the dissemination of disinformation, and the manipulation of media. Moreover, it underscores the presence of misinformation. The initial instance of deepfake, as substantiated by Westerlund (n.d.), may be traced back to 2017 when a Reddit user employed this technology to create an adult film. Nevertheless, deepfake technology is accessible to a wide range of individuals, as it is not limited to a select group due to its availability to the

general public (Berk, 2020, p. 1511). Plenty of apps, like FakeApp, FaceSwap, Zao, and Deepfacelab, have been developed in response to this prevailing trend.

The utilization of deep learning necessitates the availability of extensive datasets. Consequently, a substantial number of diverse photos are required in order to generate a deepfake video (Vyas, 2020, p. 961). This is the reason why renowned artists, politicians, and other notable individuals. According to Nguyen et al. (2019), as their popularity increases, individuals become more susceptible to being targeted by deepfakes, which involve the manipulation of their videos and photographs. Deepfake technology has the capability to amalgamate, alter, and include these elements. Nevertheless, social media sites can serve as a medium for disseminating misinformation. However, the progress of artificial intelligence and digital imagery has the potential to facilitate immersive encounters in both virtual and physical realms (Kwok & Koh, 2020).

In the present context, it can be posited that deepfake technology possesses the potential to be employed for both nefarious and beneficial objectives. The technology known as deepfake holds significant potential for a wide range of applications, including but not limited to provocation, defamation, propaganda, manipulation, fraud, and theft. Nevertheless, deepfake technology can also be employed for the manipulation of public sentiment. Numerous unethical tactics may be employed to orchestrate a conspiracy or to disseminate fabricated material under the guise of official sources. According to Elitaş (2022), the emergence of artificial intelligence-generated fake movies, texts, and news has led to a blurring of the distinction between what is fake and what is real. This phenomenon has the potential to impair individuals' perception of reality and their sensitivity towards it (p. 121). Nevertheless, it can be argued that the utilization of deepfake technology holds potential advantages for entities or persons who adhere to stringent ethical principles. In authoritarian contexts, the utilization of deepfakes has the potential to safeguard the anonymity of activists and journalists, thereby facilitating the concealment of their identities and ensuring the preservation of their privacy. This approach facilitates the expansion of individuals' aims and ideas through the provision of autonomy in the process of self-expression, achieved by developing online avatars (Anıkaydın, 2022, p. 741). Currently, it can be asserted that the ethical deliberations surrounding deepfake technology remain ongoing, with an emphasis on the manner in which the technology is employed rather than its inherent characteristics. As is the case with all forms of technology, it can be asserted.

3. Uses of Deepfake

The utilization of deepfake technology is prevalent across various domains, including but not limited to the realms of cinema, advertising, media, art, and entertainment. Contemporary discussions surrounding deepfake videos predominantly revolve around prominent figures such as celebrities and politicians, as the creation of convincing and sophisticated deepfake videos necessitates a substantial amount of source material in the form of photos and videos. These videos have gained significant popularity, particularly due to their rapid dissemination on various social media platforms.

The emergence of deepfake videos gained prominence in 2017 when a user on the social media platform Reddit shared manipulated adult videos wherein the individual superimposed their own facial features onto the bodies of others (Pan et al., 2020, p. 135). Subsequently, its application persisted within the realms of disingenuous journalism and political discourse, serving to shape societal perceptions. In addition to the adverse applications of deepfake technology, such as its utilization for propaganda, dissemination of false information, and intentional misguidance, there exist constructive applications in various domains, including acting, voice-over work, education, art, and advertising.

While the primary focus of analyses on deepfake technology revolves around its potential for manipulating faces and voices to propagate fake news and influence public perception, it is important to acknowledge that deepfake also has applications in the realm of entertainment (Demircan, 2021, p. 734).

3.1.Use in Arts and Entertainment

Some of the well-known museums across the globe derive advantages from the integration of artificial intelligence and art, facilitating the revival of renowned artists or their artworks, as well as providing diverse experiences to the viewership.

For instance, St. A deepfake representation of Salvador Dali was generated at the Dali Museum in St. Petersburg, Florida, with the purpose of welcoming visitors and narrating anecdotes pertaining to his biography (Lee, 2019). The integration of artificial intelligence and deep learning techniques facilitated the combination of archival footage belonging to Dalí with recently captured footage executed by a professional stuntman. The outcome yields a verisimilar avatar that bears no discernible differences from the authentic representation of Dalí (Figure 1). The deepfake technology was incorporated into the museum setting as an integral component of the interactive exhibition titled "Dali Lives".

Figure 1. Kiosk Area where Dali Welcomes Visitors

When the visitors activate the button on the kiosks, a visual representation of Dali is displayed on the screen in their immediate vicinity, engaging in verbal communication with them. Within the comprehensive interactive encounter, Dali possesses the capability to respond to inquiries regarding his life and artistic endeavors, engage in humorous exchanges with visitors, capture self-portraits,

and correspond through electronic messages (Figure 2). Furthermore, due to its programming incorporating a vast array of word and phrase combinations, Deepfake offers a unique encounter to each individual visitor (Isabelle, 2019). According to Kwok and Koh (2021), the utilization of advanced deepfake techniques, which involve the integration of high-resolution image blending, has the potential to significantly alter the visitor's encounter, thereby introducing a novel aspect to personalized service (p. 1799).

Şekil 2. A Snapshot of Dali Taking a Selfie with Visitors

The project "Dalí Lives" represents a commitment to embracing innovative approaches in museum settings, where technology and unconventional methods are employed to educate visitors about Salvador Dalí and his artistic oeuvre. The utilization of deepfake technology in the exhibition "Dali Lives" (2019) marks a pioneering endeavor by The Dali Museum, establishing it as the first museum to employ this technique. The deepfake created by Dali serves as a compelling illustration of the vast capabilities inherent in this technology.

The utilization of deepfake technology has the potential to facilitate the creation of immersive and authentic experiences, thereby aiding individuals in their acquisition of knowledge pertaining to historical events and cultural practices. In this context, it assumes a significant function in the revitalization of a historical persona. Demircan (2021) suggests that the utilization of deepfake technology could enable the creation of an animation depicting Martin Luther's depiction of the church reform process (p. 742). Nevertheless, it is imperative to employ this technology in a responsible and ethical manner.

The utilization of deepfake technology enables the generation of humorous videos through the superimposition of celebrities' facial features onto the countenances of other individuals. Furthermore, the utilization of deepfake technology enables the production of videos wherein individuals assume the identities of other characters by superimposing their own facial features onto the visages of distinct characters. One illustrative instance is the FakeApp software, a tool employed for generating deep fake videos wherein the visage of one individual is superimposed onto the countenance of another individual. The development of FakeApp involved the utilization of artificial intelligence techniques, enabling the generation of highly authentic videos. To facilitate the alteration of individuals' facial features, the program necessitates a collection of face images comprising both the source face and the target face. The FakeApp software utilizes deep

learning algorithms to identify common features and resemblances between two facial images (Dickson, 2018) (see Figure 3). The model is subsequently prepared for exchange. According to Techsmartest (n.d.), the management of the application's operating system is facilitated by automatic encoders. These encoders are capable of encoding image representations, which are subsequently utilized in the production of the ultimate video output. Proficiency in graphic design or mechanical engineering is not a prerequisite for utilizing FakeApp, as it does not necessitate the use of costly or specialized equipment.

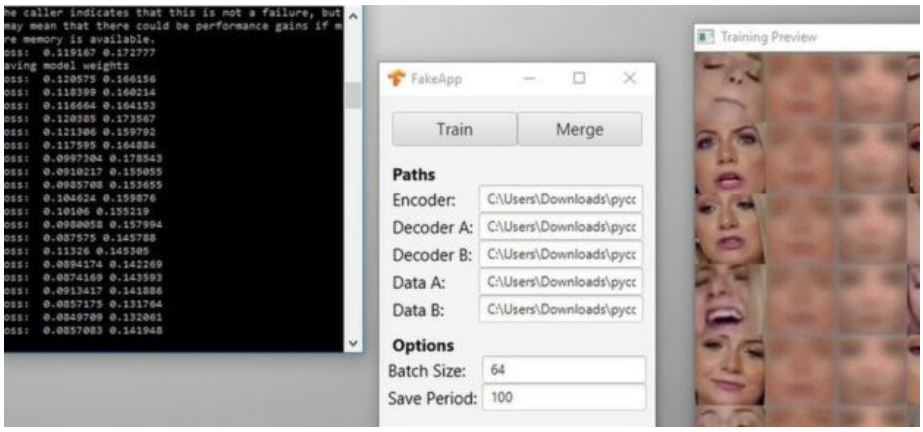

Figure 3. FakeApp Working System

The utilization of deepfake technology has gained traction on various social media platforms, leading to a surge in the popularity of videos created using this technique. Fan bases actively engage with and consume videos that disseminate fabricated images of celebrities. The dissemination of fabricated Tom Cruise content on the TikTok platform garners a substantial following. TikTok is an online platform that facilitates the sharing of brief video content, as well as the live broadcasting of such content, with the added potential for users to generate financial gains through these live broadcasts (Taşoğlu & Koca, 2022, p. 8122). The TikTok platform has witnessed a surge in popularity of videos featuring the manipulation of Tom Cruise's facial features onto the body of another individual, creating a realistic representation akin to the actual Tom Cruise (see Figure 4). Tom Cruise's dedicated fan base has been observed to actively engage with a TikTok account specifically created for this purpose (Inspiredelearning, 2022).

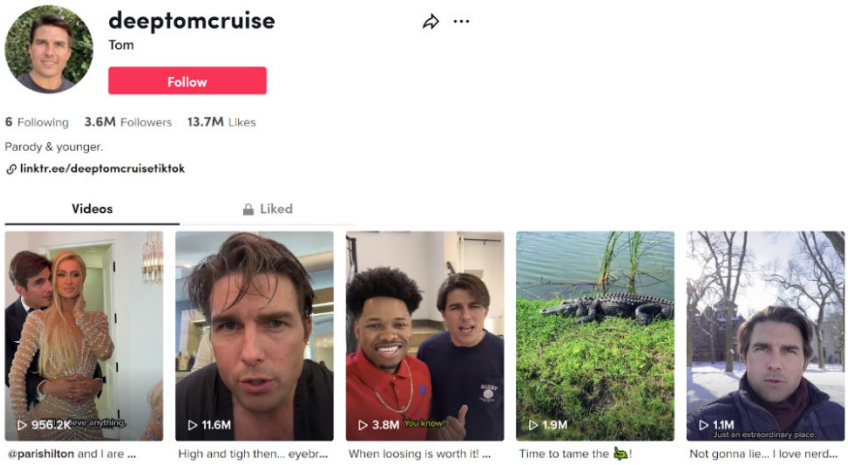

Figure 4. TikTok “deeptomcruise” Account

Photography applications also employ deep learning techniques. The application known as "Deep Angel," developed by the MIT Media Lab, is a deepfake tool that utilizes artificial intelligence and media manipulation techniques. This application is designed to identify and remove objects from photographs without requiring explicit user input (MITMediaLab, 2020) (Figure 5).

Figure 5. First and Last Image Example from Deep Angel Application

According to Brandon (2018), technology has also been employed as a means to assist individuals in managing the emotional challenges associated with the loss of significant others. Deepfake technology, in this context, possesses the capacity to serve as a potent instrument for establishing a connection with deceased family members. The application known as MyHeritage is a digital platform accessible through both web browsers and mobile devices, designed to facilitate the investigation and analysis of one's genealogical lineage. Individuals have the ability to upload personal photographs and important documents, generate family trees, and establish connections with their relatives. One distinguishing characteristic of this particular application is its ability to enable users to restore and bring back to life aged photographs of their family members (Figure 6). In addition to its existing functionalities, MyHeritage has incorporated the Livestory feature into its application, enabling the inclusion of audio elements (Esther, 2022).

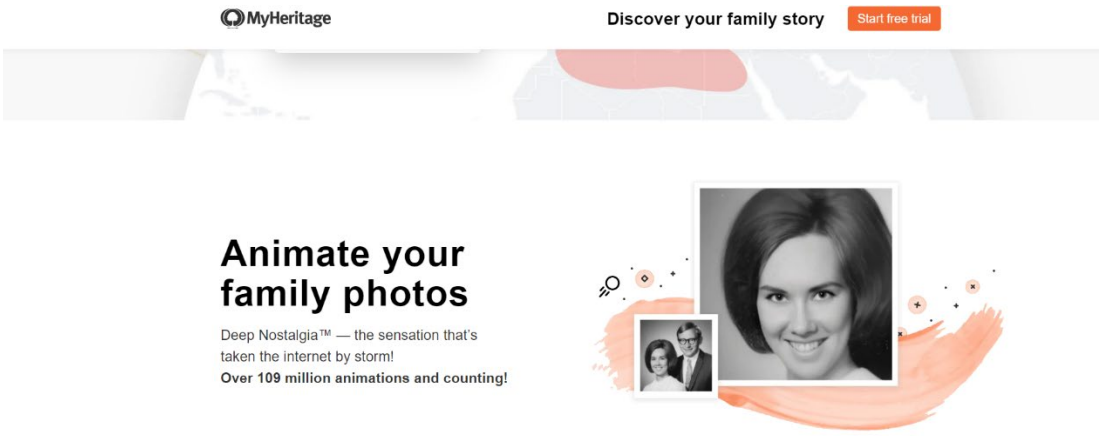

Figure 6. MyHeritage Website

Furthermore, it has been predicted that virtual characters have the potential to be animated through the utilization of deepfake technology. These virtual characters can then be effectively employed within the realm of computer games (Thies et al., 2019, p. 2387).

These applications have the potential to serve both recreational and malevolent intentions. In addition to serving as a source of entertainment, applications like FakeApp have the potential to be utilized for the creation of videos that can detrimentally impact individuals' reputations or be employed for political manipulations when used with malicious intent (Dickson, 2018).

3.2.Advertising and Marketing

Deepfake technology enables the association of renowned individuals, such as celebrities, with products or services for promotional purposes in advertisements. This has the potential to enhance the appeal and captivation of advertisements.

According to Kwok and Koh (2021, p. 1799), the utilization of renowned individuals in advertising campaigns has demonstrated the feasibility of creating digitally authentic videos featuring these individuals, even in the absence of their physical presence. The advertisement for Ziraat Bank, released in 2019, showcases the work of Kemal Sunal, a prominent figure in Turkish cinema who is no longer alive. Similarly, the Aksigorta advertisement featuring Barış Manço, who passed away several years ago, serves as a noteworthy project within the Turkish context.

The utilization of deepfake technology for entertainment and advertising objectives is exemplified by Kemal Sunal's Ziraat Bank advertisement. The advertisement featured a video that incorporated Sunal's photographs, with Sunal's voice being synchronized with the visuals in the video (see Figure 7). The advertisement garnered significant attention on various social media platforms and was positively received by a large number of individuals. Nevertheless, certain experts have raised concerns regarding the presence of visual imperfections in terms of eye depiction and color coordination, asserting that the advertisement lacks a professional aesthetic (Çeber, 2023, p. 27). According to

Çeber (2023), there is a belief that the effective communication of the alignment between a brand and a celebrity to the audience is insufficiently achieved (p. 24).

Figure 7. Ziraat Bank Ad Kemal Sunal's Deepfake

The Aksigorta advertisement incorporated a visual presentation featuring photographs of Barış Manço, accompanied by a dubbed rendition of Manço's voice. In the advertisement, Manço articulates Aksigorta's insurance services by employing the slogan "Aksigorta, perpetually in your company." A project was undertaken to highlight the potential hazards associated with digitalization by employing deepfake technology to reunite Barış Manço with his fans, a remarkable feat accomplished 23 years following his demise (Aksigorta, n.d.). In the context of this advertising initiative, Aksigorta demonstrated a conscientious approach towards social responsibility by highlighting the favorable and manageable aspects of digital risks, in contrast to the prevailing negative perception within society. Furthermore, the project sought to enhance awareness regarding the risks associated with digital security.

Figure 8. Aksigorta Ad Barış Manço's Deepfake

Upon examining the global usage instances, it was observed that in March 2023, the internet witnessed a significant surge in the popularity of videos generated by artificial intelligence, showcasing the renowned fashion brand Balenciaga. The luxury fashion brand Balenciaga strategically leveraged the

extensive recognition of the Harry Potter film franchise to creatively promote its brand. According to Jennings (2023), Balenciaga has the potential to generate substantial revenue by leveraging Youtube ads).

Figure 9. Balenciaga Youtube Ad

The audience was taken aback by the unconventional aesthetic of the 86-year-old religious leader, Papa Francis, who was attired in a Balenciaga ensemble. Balenciaga disseminated a digitally manipulated image, commonly referred to as a deepfake, depicting the Papa adorned in a lengthy white puffer jacket, via the internet. This image swiftly proliferated across various online platforms (Figure 10).

Figure 10. Balenciaga Ad is Papa's Deepfake

The accessibility of images, videos, and deep fakes generated by artificial intelligence has witnessed a notable surge as a result of advancements in the field of artificial intelligence. According to a study conducted by The Conversation in 2023, there is a growing concern that the proliferation of deceptive visual content in professional contexts will pose challenges for users in discerning between authentic and fabricated imagery.

The comprehensive understanding of the implications of deepfake technology in the advertising domain remains incomplete. One plausible inference that can

be derived from the aforementioned instances is that the media generated through the utilization of artificial intelligence holds the potential to be captivating and potentially thought-provoking in forthcoming times (Jennings, 2023). The potential of this technology to influence the trajectory of advertising in the future is evident. Enhancing the verisimilitude and captivating nature of deepfake advertisements has the potential to enhance the efficacy of marketing strategies. Consequently, this can facilitate the enhancement of brand recognition, augmentation of sales figures, and elevation of customer contentment. Simultaneously, the implementation of personalized advertisements has the potential to enhance marketing effectiveness and facilitate the development of diverse and impactful advertising strategies in the future, owing to its innovative nature.

The utilization of deepfake technology within advertising campaigns also presents certain inherent risks. This technology has the potential to be utilized for the dissemination of disinformation. This phenomenon has the potential to deceive consumers, leading them to make erroneous choices. The violation of privacy has the potential to adversely impact individuals' identities or reputations. Furthermore, it has the potential to be utilized in the production of illicit materials. This phenomenon has the potential to facilitate the perpetration of criminal acts or the engagement in illicit behaviors. The responsible utilization of deepfake technology in advertising is of utmost significance. Several strategies can be implemented to mitigate the drawbacks associated with this technology and maximize its benefits. It is advisable for consumers to diligently assess all advertisements they encounter and verify their authenticity. Furthermore, it is imperative for advertising agencies and brands to employ deepfake technology in an ethical manner and implement strategies to mitigate the potential drawbacks associated with this technology. Regarding this, a law has been passed in Turkey through the Advertising Board within the Ministry of Commerce, where advertisements are penalized because they are not based on objective research and are manipulated by distracting the masses from reality (T.C. Ticaret Bakanlığı, 2023).

3.3.Film Industry

According to Temir (2020, p. 1014), contemporary advancements in deep learning have significantly facilitated the production of fabricated videos. Deepfake technology based on deep learning has the potential to offer several advantages to the film industry. According to Brandon (2018), this technology enables filmmakers to replicate iconic scenes from past films and produce new movies featuring the likeness of deceased actors. The face of the lead actor Paul Walker, who died during the filming of Fast and Furious 7, was placed on his brother, and the film was completed in this manner (Temir, 2020, p. 1015). The utilization of CGI and deepfake technology to animate Peter Cushing's character in the film "Rogue One: A Star Wars Story" has been documented (Hollister, 2021) (Figure 11).

Figure 11. Peter Cushing's Deepfake

The utilization of deepfake technology in the film industry has the potential to enhance the realism and captivation of movies. Prior to the advent of this technological advancement, the production of lifelike fabricated videos was still feasible within the realm of visual effects studios or through the utilization of computer graphics in the film industry. However, it is worth noting that this approach incurred higher expenses (Dickson, 2018).

Deepfake technology also encompasses the capability to manipulate audio, enabling the synthesis of digital sounds that closely resemble an individual's original voice. This functionality proves beneficial for individuals who have experienced voice loss due to various circumstances. Or, if the actors struggle with their lines, they can correct the incorrectly spoken lines on the images and create professional dubbing of actors speaking different languages (Marr, 2019). This technology enables the rectification of inaccurately delivered lines by overlaying corrected dialogue onto the corresponding visuals, thereby facilitating the creation of proficient multilingual voiceovers by actors (Marr, 2019). Thies et al. (2016) demonstrated that facial animation can be employed to transfer the voice actor's expressions onto the actor in the film, thereby achieving synchronization between the auditory and visual elements.

The advancement of deepfake technology is currently progressing at a rapid pace. A deepfake model known as "Talking Head" has been developed by researchers from Stanford University, enabling the synchronization of videos featuring renowned individuals with varying textual content (Myers, 2019). The present software application offers users the capability to manipulate the spoken content of a video by enabling functions such as addition, deletion, and modification of words. The application utilizes phoneme recognition to identify the sound units present in the original video. It subsequently associates these phonemes with the corresponding facial expressions depicted alongside each sound. Ultimately, the software generates a three-dimensional representation of the lower facial region of the individual by utilizing the designated video footage. Additionally, technology presents opportunities for malicious purposes. The identification of deepfakes or voice clones poses challenges due to the exceptional fidelity of the audio output.

In recent times, the application of deepfake technology has extended to the realm of serial productions. Neighbor Wars is a British television comedy series that commenced its broadcast in January 2023. This series employs deepfake technology as a means to produce comedic sketches. The television series showcases a group of performers who assume the identities of well-known individuals, including Kim Kardashian, Idris Elba, and Conor McGregor. The series narrates a narrative of a conflict among prominent individuals that originates from minor disputes and culminates in acts of physical aggression (Lees, 2023). The television series "Deepfake Neighbor Wars" has garnered significant attention due to its ethical controversies, yet it simultaneously serves as a notable illustration of the creative and innovative application of deepfake technology. The series prompts significant inquiries regarding the ethical implications of this technology and its potential for both beneficial and detrimental applications.

Figure 12. Deepfakes of Idris Elba and Kim Kardashian in Deepfake Neighbor Wars

These fictional narratives prompt contemplation regarding the potential trajectory of the film industry in light of the incorporation of said technology.According to Temir (2023), an alternative perspective suggests that deepfake technology has the potential to enable "avatar experiences" for individuals with disabilities (p. 1015). Chandler (2020) argues that despite the prevailing perception of deepfakes as a significant menace to democratic processes, their overall impact on society is likely to yield positive outcomes for humanity. Due to their efforts, individuals are able to perceive "entities that have ceased to exist or were never in existence." This opportunity is highlighted by Temir (2023, p. 1015).

Consequently, the utilization of deepfake technology enables the facilitation of various conveniences, including the ability to depict an actor assuming a role that they did not originally portray in a film, altering a scene to deviate from its actual occurrence, and enhancing a character's visual attributes to align with the narrative of the movie. Simultaneously, difficult and dangerous scenes can be entirely computer-generated, virtually imperfect, and rendered as real, thereby

saving the lives of actors and other personnel and reducing costs. This has the potential to decrease the overall expenditure associated with the production of films, expedite the filmmaking process, and enhance the artistic ingenuity exhibited in films.

The utilization of deepfake technology among consumers remains relatively infrequent at present. However, existing instances of its application demonstrate the ease with which deepfake can be employed to manipulate video content (Marr, 2019).

3.4. Political Communication and Media

The media constitutes a potent instrument for political communication. The utilization of deepfake technology in the political realm through media channels carries the inherent risk of its potential for misuse. The dissemination of fabricated videos on online platforms has the potential to undermine the reputation of politicians and manipulate societal perceptions. The production of false information, commonly referred to as "fake news," involves the creation of content that mimics genuine and trustworthy information, thereby facilitating its widespread dissemination through social media platforms (Kaliyar et al., 2020, p. 1016). The dissemination of such news is driven by financial and political motives, with the potential to exert influence on public sentiment. The aforementioned phenomenon has been found to have adverse effects on the societal fabric (Sharma et al., 2019). The emergence of artificial intelligence technologies has raised significant concerns regarding the protection of data privacy in the media, ethical considerations, and the potential displacement of human workers by machines (Kırık & Özkoçak, 2023, p. 87).

A collection of videos has been created wherein prominent global figures, including Donald Trump, Barack Obama, and Vladimir Putin, are depicted uttering statements that they did not authentically make. Millions of viewers have engaged with the one-minute video featuring Barack Obama. Figure 13 depicts the ex-president of the United States positioned alongside the American flag as a backdrop, engaging in direct communication with the viewers. The video in question is a deep fake production wherein actor-director Jordan Peele skillfully imitates the vocal patterns of former President Barack Obama. The video was produced by Peele with the intention of illustrating the perils associated with fabricated audio and video material, wherein individuals are depicted uttering or engaging in actions that they have not genuinely expressed or performed. In the video titled "Obama," the speaker's lip movements are impeccably synchronized with his speech as he discusses Donald Trump. The speaker commences by stating, "We are embarking upon a period in which adversaries possess the capability to fabricate the illusion of uttering statements at any given moment, even if such statements were never actually made" (Mack, 2018).

Figure 13. Obama's Deepfake on the left, Jordan Peele Imitating Obama on the right

According to Aviv Ovadya, a technologist who accurately forecasted the proliferation of misinformation during the 2016 elections, advancements in technology have enabled users to manipulate audio or video content to create a convincing illusion of authenticity (Mack, 2018). There are still observable instances that serve as examples in the present day.

In the context of the political tensions between Russia and Ukraine in 2022, a deepfake video purporting to show Russian President Vladimir Putin declaring peace was disseminated on Twitter, a prominent social media platform (Wakefield, 2022).

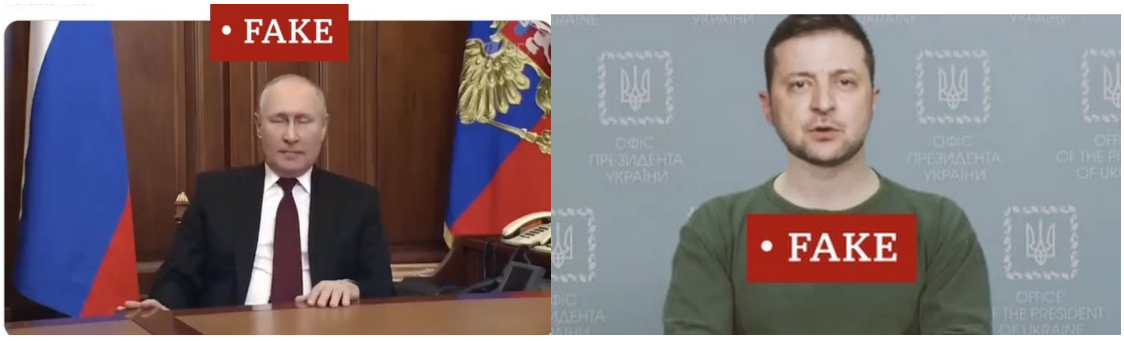

Figure 14. Russian President Deepfake on the left, Ukrainian President Deepfake on the right

During a concurrent period, a deep fake video featuring the Ukrainian president discussing the act of surrendering to Russia was uploaded onto the YouTube platform. However, the video was subsequently taken down due to its infringement upon the misinformation policies established by the platform (Wakefield, 2022).

An illustrative instance pertains to the videos featuring Tesla CEO Elon Musk, wherein he seemingly utters or engages in actions that are inconsistent with his actual statements or behaviors. Elon Musk has been subjected to the proliferation of deepfake content. Elon Musk was summoned to provide sworn testimony

regarding his alleged assertions pertaining to the safety and functionalities of autopilot functionalities (The Guardian, 2023).

Conversely, there is an argument positing that deepfake technology has the potential to deceive military investigators and analysts through the fabrication of satellite imagery that incorporates non-existent objects. As an illustration, the strategic deployment of Generative Adversarial Networks (GANs) can potentially mislead a military unit tasked with crossing a bridge during a conflict, as demonstrated by Tucker (2019).

The aforementioned examples illustrate that deepfake technology is readily accessible and can be employed as a tool for social manipulation. This technique has the potential to influence individuals' thoughts and behaviors by instilling in them a belief in misinformation. Certain nations have initiated measures to mitigate this circumstance. According to Kwok and Koh (2021, p. 1801), the Chinese Cyberspace Administration, Ministry of Culture and Tourism, and National Radio and Television Administration collaboratively implemented a prohibition on the utilization of deepfakes and the dissemination of deepfake broadcasts within China.

Within the media industry, deepfake technology is employed to cater to the preferences and aspirations of individuals, without any intention of deceiving society. The deepfake incident involving Kim Joo-Ha prompts an inquiry into the potential real-world ramifications of deepfake technology on the media industry. The visage of broadcaster Kim Joo-Ha is additionally employed in the morning news broadcast and real-time traffic reports of the aforementioned channel (Inspiredelearning, 2022).

Figure 15. Deepfake of newscaster Kim JOO-Haa

In 2023, a letter was published by the Artificial Intelligence Security Center, highlighting the potential risks associated with artificial intelligence (Field, 2023). According to an open letter penned by industry experts and technology leaders, the advent of artificial intelligence has the potential to result in the eradication of the human race. Consequently, mitigating risks associated with technology should be regarded as a paramount concern on a global scale (Chiang, 2023).

XAI, the recently established artificial intelligence enterprise led by Elon Musk, is currently engaged in the research and development of innovative technologies aimed at addressing the challenges posed by deep learning methodologies. The aforementioned endeavor is positioned as an exploration into the mathematical underpinnings of deep learning, a constituent facet of artificial intelligence. Additionally, it aims to cultivate a comprehensive framework for large-scale neural networks, thereby propelling artificial intelligence to new heights (Field, 2023).

It is evident that the utilization of deepfakes has the potential to generate internal conflicts and can be exploited to disseminate fabricated information with the intention of deceiving the general populace or manipulating the outcomes of electoral campaigns. The act of discrediting political candidates and distorting political discourse is a phenomenon that undermines the integrity of the political process. In summary, it is evident that the utilization of Deepfake technology possesses the capacity to exert a substantial impact on political processes. In response to the potential risks posed by deepfake technology, researchers are actively engaged in the development of detection methods and conducting comprehensive studies.

Conclusion

Currently, there is a significant advancement in the field of artificial intelligence (AI) owing to the rapid development of techniques such as deep learning and artificial neural networks. The aforementioned advancements have played a substantial role in the rise and progression of deepfake technology. The term "Deepfake" commonly refers to fabricated visual and auditory media generated through the utilization of artificial intelligence. This technology enables the creation of lifelike images and sounds by superimposing the facial features or vocal expressions of one individual onto another individual's face or voice.

Based on the findings of various studies, it is evident that while the initial emergence of deepfake videos can be traced back to 2017, their prominence and public awareness have notably increased since 2019. The utilization of this medium has historically encompassed a range of objectives, including but not limited to entertainment, influence, manipulation, and propaganda. In accordance with these objectives, it is evident that it manifests itself across various media and communication platforms, as well as in museums, advertising campaigns, and cinema endeavors. The application domains of deepfake technology encompass various fields, including art and entertainment, advertising and marketing, the film industry, as well as political communication and media.

When examining the beneficial impacts of deepfake technology, it facilitates the cultivation of individuals' creative abilities. This phenomenon facilitates individuals to assume diverse personas and engage in varied experiences. This feature enables individuals to imbue specific characters with enhanced realism and depth. This approach enables a reduction in both time and cost associated with the re-enactment of deceased or retired renowned characters. Advertising is rendered efficacious. Given its capacity to create sound montages, this technology enables individuals who have lost their own voice for various reasons to replicate

their own vocal characteristics through digital means. This technological advancement enhances the immersive and realistic qualities of movies while simultaneously reducing production expenses. From a particular perspective, it is imperative to contemplate the decline in the demand for human labor, as it encompasses the notion of generating substantial financial gains with a reduced workforce. There exists a contentious discourse surrounding the potential ramifications of artificial intelligence technologies on the field of art, with arguments positing both the possibility of deleterious outcomes and the potential for enhancing human creativity. There exists a potential risk associated with the promotion of artistic institutions, such as galleries and museums, which may lead to the transformation of individuals into entities that prioritize influence and financial gain.

The potential of artificial intelligence in generating media content is highly promising and awe-inspiring, as it has the capability to actualize aspirations. However, it is important to acknowledge that in certain instances, it can also serve as a potent instrument for disseminating misinformation. Given its detrimental consequences, it is evident that it engenders a substantial proliferation of misinformation across various forms of media communication, with a particular emphasis on social media platforms.

The responsible and ethical utilization of this technology holds significant importance. The advent of Deepfake technology has facilitated the production of video or audio recordings without the explicit consent of the individuals involved. This technology has the capability to generate fabricated videos or audio recordings, thereby simulating the appearance of an individual engaging in actions or uttering statements that they have not actually performed or spoken. This tool possesses the potential to tarnish an individual's reputation or disseminate fabricated information pertaining to a political candidate. This technology has the potential to be utilized for fraudulent activities or coercive purposes such as blackmailing individuals.

The following are some considerations to keep in mind when using deepfakes, as shown by the research findings:

• It is important to be clear about the purpose of deepfake. The question of whether the utilization of this technology serves utilitarian purposes or poses potential harm is a significant matter of concern.

• It is evident that the deepfake lacks authenticity. By explicitly indicating that an image is artificial and not intended to represent reality, one can mitigate the occurrence of adverse circumstances.

• Respecting the privacy of individuals involved in Deepfake technology necessitates obtaining consent from their relatives in cases where the individuals themselves have not provided consent. Furthermore, it is imperative to refrain from utilizing Deepfake technology for the purpose of generating content that is either detrimental or deceptive.

The utilization of deepfakes is currently in its nascent stage, yet it possesses the capacity to become a formidable instrument for communication and narrative construction. In order for this technology to effectively fulfill beneficial objectives,

it is imperative that its utilization is conducted in a responsible and ethical manner. The emergence of this novel technology has appropriately elicited apprehensions regarding privacy and identity. If it were feasible to generate our facial features using an algorithm, could we potentially duplicate our individual digital identity or vocal characteristics, or even fabricate an accurate physical replica of ourselves? One is prompted to consider the following inquiry.

Ongoing efforts are being made to detect counterfeit videos. Despite the absence of any ongoing research in Turkey, prominent global companies specializing in artificial intelligence are actively engaged in the development and implementation of deep learning detection and software. There is a notable prevalence of scholarly articles focusing on the topics of deep learning and the detection of deepfake videos within the existing literature.

Universities also fulfill a significant role at this juncture. There is a need to promote the establishment of artificial intelligence centers within universities. Collaboration between academics, experts, and organizations in the development of novel algorithms holds significant potential for advancing science, fostering innovation, and benefiting society.

In forthcoming times, it is imperative that artificial intelligence (AI) serves as a supplement to human endeavors rather than supplanting them entirely. In order to facilitate the advancement of technology for the betterment of society, it is imperative to establish and uphold mechanisms that safeguard against the improper utilization of technology. Simultaneously, it is essential to establish a suitable framework and foster collaboration among diverse specialists.

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