Facial Recognition Technology

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Introduction

Have you ever unlocked your phone or tablet without touching a button, or accessed your bank account with just a glance? These are just a few common examples of how facial recognition technology (FRT) is becoming an integral part of today's society. FRT is a cutting-edge innovation that enables artificial intelligence (AI) to recognize and identify an individual based on their unique facial features. By using advanced algorithms, FRT was able to scan and compare an individual facial features with its database to verify a match. As a result, FRT has become commonly used by law enforcement agencies to assist with identifying potential suspects, or locating missing individuals (Ryan, 2023). Furthermore, FRT has been adapted for general use due to the technology providing a convenient, and secure way to prevent unauthorized access to sensitive information, such as banking account and personal information. However, despite its widespread use, FRT sparked significant concerns regarding issues such as potential misuse, privacy violation and the potential risk of false identification. Thus, to better understand these issues, one must explore the background of FRT and its development.

Background

According to Raviv (2020), the development of facial recognition technology can be traced back to the pioneering efforts of engineers Woody Bledsoe and Helen Wolf in the early 1960s. Bledsoe and Wolf attempted to train computers to recognize human faces, but this proved challenging due to the machine's inability to accurately decipher human facial expressions and emotions, which lead to inconsistent results. Despite these challenges, their groundbreaking research eventually laid foundation for future advancement and inspired others to take up the mantle. One notable figure is Takeo Kanade, a Japanese computer scientist, who was able to develop a computer program that would successfully recognize an individual facial structure

such as noise, mouth and eyes (Raviv, 2020). However, it wasn't until the early 2000s that FRT started to gain significant momentum and wider influence, largely due to the advancements in technology that enable facial data to be capture perfectly and provide a more accurate assessment. The advancement make in FRT has brought about transformative changes across various sectors, such as the Law enforcement and commercial, offering improved security, efficiency and especially convenience.

Potential Benefits

Facial recognition technology (FRT) offers numerous potential benefits, particularly in the field of security. One of the most notable application of FRT is in aiding law enforcement and improving public safety. By accurately identify an individual in a crowded area, FRT can help police officers track down and locate suspect or a missing persons with great precision. Additionally, it may also assist law enforcers in verifying the identity of individuals that refuse to cooperate or provide false information about their identity. Beyond law enforcement, FRT can enhance efficiency and convenience in high-traffic areas such as airports by accelerating the check-in processes (Weiss, 2005). According to Pasquarelli (2019), FRT is often used in the retail sector to recognize customers at the store, and then use the data collected to personalize the customer shopping experience. As a result, this helps boost the sales at the stores, and improve customer satisfaction, making it likely for the customer to return to the store again to shop. Despite these benefits, the growing use of FRT raises significant legal and ethical concerns, particularly related to privacy and data protection. Thus, addressing these issues is crucial as technology continues to evolve.

Legal and ethical issues

Despite the widespread use of facial recognition technology (FRT), it faces significant opposition from the public particularly concerning the issues of privacy and data protection. One of the primary criticisms of FRT is the collection of sensitive personal information, which leads to the concern about security and protection of these data, and whether individuals have the right to opt out. According to Ryan (2023), the public fears that FRT could cause public places like restaurants or parks to start collecting personal information without individuals' knowledge or consent, resulting in a breach of privacy. Additionally, there are also concerns about misuse of FRT. Many worry that constant surveillance would infringe on individual's right to privacy and create an environment where people conformity out of fear of being watched or unfairly targeted. Lastly, deployment of FRT in law enforcement causes concern that certain demographic groups will be more likely to be targeted than others, and potentially lead to discriminatory practices. As a results, all these issues highlighted the need for stricter regulation of FRT, and the importance of transparency regarding data collection. However, legal and ethical issues weren't the only issue that FRT is currently facing, there is also a rising concern regarding the security measures of FRT.

Security concerns

As the world becomes more technologically advanced, the threat of hackers or deepfake technology has become a critical issues. Like any other technology, facial recognition technology (FRT) is vulnerable to these types of attacks. Since FRT collected sensitive biometric data on an individual, if a hacker manages to break into FRT security systems, the hacker will have access to all the sensitive data, allowing the hacker to use the data indefinitely for identity theft or other wicked means. Unlike password or PIN where you can change or reset easily once it

compromised, biometric data is much harder to change. As a result, if biometric data is breached, it will likely remain a permanent damage and can lasted throughout a person's lifespan. Furthermore, another security issues that FRT is facing concerns the use of deepfake technology. According to Lai and Rau (2021), people with access to deepfake technology could swap face with someone else, and thus enable them to impersonate another individuals for fraudulent purposes. As a result, this technology could be used to manipulate or bypass the security measures of FRT and allow access to sensitive information when it shouldn't have been allowed. Therefore, FRT needed to strengthen its security measures against hacker and deepfake technology. One possible way to address this issues is by having multi-factor authentication or encryption of biometric data to minimize these risks, and ensure the protection of sensitive information being collected by FRT. While multi-factor authentication or encryption can provide a possible solution to the ongoing security issues, FRT is still plague by social issues concerning biases that disproportionately affect certain demographic groups.

Social problems

One of the major concerns with facial recognition technology (FRT) is that it has been shown to demonstrate bias against certain demographic groups. Benedict (2022) highlights numerous instances such as the case with Robert William, where the FRT inaccurately identifies him as the main suspect, leading to him being detain for about thirty hours. As a result, this was one of the many cases that demonstrate FRT bias, and inaccuracy in identify people of color. Due to this bias, it often leads to innocent individuals, particularly people of color, being detain or even arrested for crimes they didn't commit. Additionally, FRT has the potential to be misuse for harmful purposes, such as cyberbullying. According to Lai and Rau (2021), there have been cases where individual misuse FRT to track and harass another individual online, which raises

concerns about privacy and personal safety. Thus, if FRT is to become an integral part of our society, further research into AI training, law or regulation is required to address these essential issues.

Further Required Research

Although facial recognition technology (FRT) brings a lot of benefits to society, it also has some drawbacks that will required further research. Future studies on FRT should focus on improving the accuracy and fairness of the FRT system. One possible way is to train artificial intelligence (AI) using a larger and more diverse database, which could potentially reduce biases and improve its performance across all demographic groups (Benedict, 2022). Another possible studies could be on possible security measures, such as encryption or multi-factor authentication, to deploy on FRT to safeguard the sensitive data it collects and prevent possible misuse. Lastly, there should be a lot more research to find an effective way to regulate FRT, so that it can be utilize for its benefits without infringing on individual rights of privacy. According to Ryan (2023), currently there is no comprehensive federal regulation on the use of FRT. However, some states in the USA, such as Illinois, have taken initial steps to adopt a law known as Biometric Information Privacy Act (BIPA). This law grant individuals' complete control over their own biometric data and requires companies to obtain consent and notify people when FRT is being used to collect information. As a result, BIPA not only helps protect an individual right of privacy, but it also helps promotes transparency in the use of FRT, which could help to build FRT image and gain public trust in it. Therefore, the federal government should consider adopting similar principles from BIPA and put more effort into further research to develop a comprehensive federal regulation over FRT use.

Conclusion

Overall, facial recognition technology (FRT) offers various benefits to society, such as enhancing security, identifying criminals, locating missing persons, and even improving shopping experiences. However, like any other technology, it also has its downside. Public perception of facial recognition technology (FRT) is often negative due to the concern regarding privacy, potential misuses, and discriminatory practices. Despite these concerns, FRT is still evolving and has demonstrated its value across various sectors, including law enforcement, commercial use and security. With enough research and proper implementation, FRT has the potential to improve security, achieve higher accuracy rates, and further enhance customer shopping experience and satisfaction.

References

Benedict, T. J. (2022). The computer got it wrong: Facial recognition technology and establishing probable cause to arrest. *Washington and Lee Law Review, 79*(2), 849-898. Accessed 10 Sep. 2024. Retrieved from http://mutex.gmu.edu/login?url=https://www.proquest.com/scholarly-journals/computer-got-wrong-facial-recognition-technology/docview/2681520570/se-2

In this scholarly journal, it mentions ways in which facial recognition technology (FRT) is widely use in the law enforcement field. Additionally, it highlights the social issues of FRT, and how it could be bias or discriminatory against certain demographic groups. One comparison it makes was between FRT and a drug dog, where one already has a building bias against certain demographic groups while the other treats everyone fairly. Throughout the journal, it provides various cases in which FRT misidentified people of color. The article suggests that having the AI trains using a more diverse database could potentially minimize or reduce the chance of bias occurring in FRT. Lastly, this source is reliable because it is a scholarly journal, meaning that it went through peer-review process by experts to verify all the information written in it.

Lai, X., & Rau, P. P. (2021). Has facial recognition technology been misused? A public perception model of facial recognition scenarios. *Computers in Human Behavior, 124*, 1. Accessed 13 Sep. 2024. doi: https://doi.org/10.1016/j.chb.2021.106894

In this scholarly journal, it talks about ways in which facial recognition technology (FRT) has been misuse. One of the cases it mentioned was regarding how FRT was being used to track

an individual location, and then they were being cyberbully after their location been found. In addition, the article also mentions the security risk that FRT faced, especially regarding deepfake technology. It talks about the dangers of deepfake technology being used to deceive or manipulate FRT system into giving sensitive information to hackers. Furthermore, the article also talks about the public perception of FRT based on various scenarios. Overall, this article's sources can be trusted and are reliable because it is a scholarly journal, which mean it went though a tough peer-review process by experts.

Pasquarelli, A. (2019). FACE VALUE: MARKETERS ARE USING FACIAL RECOGNITION TECHNOLOGY TO TRACK YOUR BEHAVIOR—AND PERSONALIZE YOUR SHOPPING—BUT PRIVACY ADVOCATES ARE WORRIED. *Advertising Age*, *90*(22), 23. Accessed 13 Sep. 2024. Retrieved from http://mutex.gmu.edu/login?url=https://www.proquest.com/trade-journals/face-value/docview/2316548187/se-2

In this trade journal, it talks about the various ways facial recognition technology (FRT) is being used in the retail industry. It mentioned how most stores would often use FRT to gather customer information as they stepped into the store. This allows the sale representative to know about the customer purchase history at their store and enables them to assist the customer in a more efficient way. Another way is to act as a deterrent for criminal activity such as stealing or vandalizing. Additionally, the article also mentioned how most store just assume customers consent to have their data collected without asking, just because they decided to step into the store. Although the articles were not peer reviewed, *Advertising Age* is a well-established media

brand that is known for covering news regarding marketing and advertising trends. Thus, this source can be trusted since it provides insight into how the market use FRT, and provide information about potential benefit, legal and ethical issues of FRT in retail.

Raviv, S. (2020, 02). The secret history of facial recognition. *Wired, 28.* Accessed 13 Sep. 2024. Retrieved from http://mutex.gmu.edu/login?url=https://www.proquest.com/magazines/secret-history-facial-recognition/docview/2344224584/se-2

This magazine provides detailed background information about facial recognition technology (FRT). It provides the audience with insight into the life of one of the creator of FRT. Additionally, it also mentioned how the first concept fails due to the limitation of the machine in recognizing human emotions. The magazine also detailed the changes made to FRT throughout the years leading up to 2020. Lastly, the magazine mentions issues FRT is currently facing such as the issues with FRT misidentifying minority groups. Despite the article not being peer-reviewed, *Wired* is a reputable publication known for its coverage of technology trends and its impact on society. Thus, it makes this source valuable for gaining understanding of how FRT became what it is today, and the changes that were made throughout different periods.

Ryan, C. (2023). Facial recognition technology and a proposed expansion of human rights. *Federal Communications Law Journal, 76*(1), 87-114. Accessed 13 Sep. 2024. Retrieved from http://mutex.gmu.edu/login?url=https://www.proquest.com/scholarly-journals/facial-recognition-technology-proposed-expansion/docview/2898770310/se-2

This scholarly article depicts the dangers of facial recognition technology, and its threat against an individual right to privacy. It mentioned how FRT is slowly eroding an individual right to privacy in public places. Furthermore, it mentions that FRT might have been collecting individual biometric data without their knowledge or consent. Additionally, the article mentions that the data collected might not have been used for the purposes that it was originally consent for. Furthermore, the articles also talk about how there is not much law or regulation for restricting the data that is being collected by FRT and that there needs to be changes to ensure a person's right to privacy. Since this is a scholarly article, it has been peer reviewed by experts to make sure that all the information provided in the articles is verify. Thus, it makes this article reliable for gaining understanding into the legal and ethical issues of FRT, and way to protect privacy moving forward.

Weiss, J., & Davis, M. (2005). FACIAL RECOGNITION TECHNOLOGY in law enforcement. *Law & Order, 53*(10), 100-106. Accessed 13 Sep. 2024. Retrieved from http://mutex.gmu.edu/login?url=https://www.proquest.com/trade-journals/facial-recognition-technology-law-enforcement/docview/197230868/se-2

This trade journal depicts the benefits of having facial recognition technology in society, especially in the field of law enforcement. Since FRT can identify an individual based on their unique facial feature, it has been used by law enforcement to solve old crimes. Furthermore, FRT has been super helpful to law enforcement on cases where individuals refuse to cooperate or give false information about their identity. Additionally, the article also mentions how FRT is adapted

for large, populated areas, such as malls or airports to prevent crimes before it happens. However, the articles do mention that the police office should only use FRT to aid in their investigation, however the final decision on whether to arrest or detain a person still rests with the police office, and they shouldn't be overly dependent on FRT. Despite the article being a trade journal, *Law & Order* is a reputable source that focused on issues regarding law enforcement. As a result, this source can be trusted to provide information regarding the benefit of FRT in law enforcement.