A study on AI based facial recognition systems

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Abstract
In this paper, we present a thorough study on the AI based facial recognition system. Facial Recognition technology utilizes biometric software to analyze and map an individual's facial features and store the data as a face print. Through the use of deep learning algorithms, the technology compares a live captured image to the stored face print to verify the person's identity. This technology has become a crucial component in various applications of security, such as criminal detection, airport surveillance, face tracking, and forensic investigation. Unlike other biometric traits, such as palm prints or iris scans, facial recognition is non-intrusive, making it more user-friendly. The process of face recognition involves capturing face images and comparing them with the stored database. These images are trained, classified, and stored, so when a test image is given to the system, it can be classified and compared with the stored database. The work done & presented in this paper is the result of the mini-project work that has been done by the first sem engineering students of the college and as such there is little novelty in it and the references are being taken from various sources from the internet, the paper is being written by the students to test their writing skills in the starting of their engineering career and also to test the presentation skills during their mini-project presentation. The work done & presented in this paper is the report of the assignment / alternate assessment tool as a part and parcel of the academic assignment of the first year subject on nanotechnology & IoT.
Keywords: IoT, Nano, Track, Facial, Mode, Recognition

1. Introduction

AI-based face recognition technology has emerged as a powerful tool with growing significance across various domains. Its superiority in accuracy and security over traditional face recognition techniques has made it highly sought-after. Moreover, the increasing affordability of this technology has expanded its accessibility to a wider range of businesses and organizations. Looking ahead, AI-based face recognition is expected to further advance in terms of accuracy, security, and application diversity, shaping a future where facial recognition plays a pivotal role in numerous aspects of daily life [1].

The ongoing progress in AI algorithms and machine learning techniques holds great potential for enhancing the accuracy and reliability of face recognition systems. As more data is collected and processed, algorithms can continuously improve, resulting in superior performance in facial identification. These advancements will contribute to minimizing false positives and negatives, ensuring that the correct individuals are accurately recognized [2].

2. Security process

Security is a critical aspect of face recognition systems, and AI-based approaches offer increased robustness in this regard. With the ability to detect and analyze intricate facial features, AI algorithms can mitigate potential vulnerabilities associated with spoofing or impersonation attempts [10]. This heightened level of security makes AI-based face recognition an attractive option for applications requiring stringent authentication and identity verification [3].

Furthermore, the widespread adoption of AI-based face recognition is anticipated across diverse sectors and applications. Currently, we witness its utilization in unlocking smartphones and verifying identity for online transactions, but its potential applications are far-reaching. Industries such as banking, retail, transportation, and public safety can benefit from integrating this technology into their operations. For instance, banks can enhance security measures by implementing face recognition in their authentication processes, while retailers can offer personalized shopping experiences based on customer recognition. Moreover, transportation systems can streamline passenger management, and law enforcement agencies can enhance public safety through effective suspect identification [4].
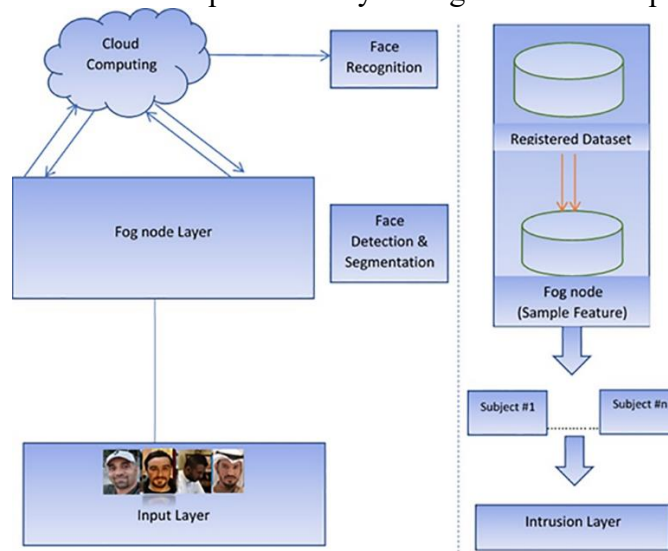

Fig. 1 : Block diagram of the process

3. AI applications in facial recognition process

As AI continues to advance and face recognition technology matures, the costs associated with implementation are expected to decrease. This affordability will enable businesses of all sizes to leverage the benefits of AI-based face recognition, fostering widespread adoption and integration into various sectors [5].
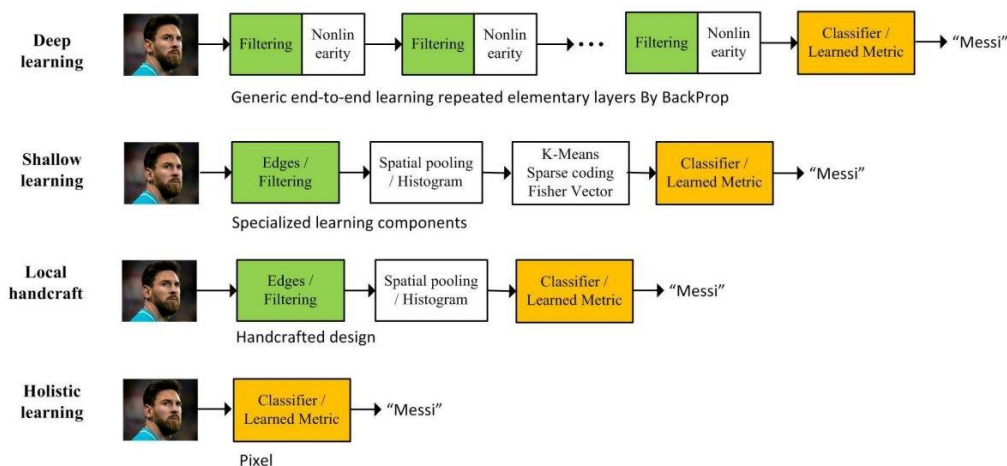

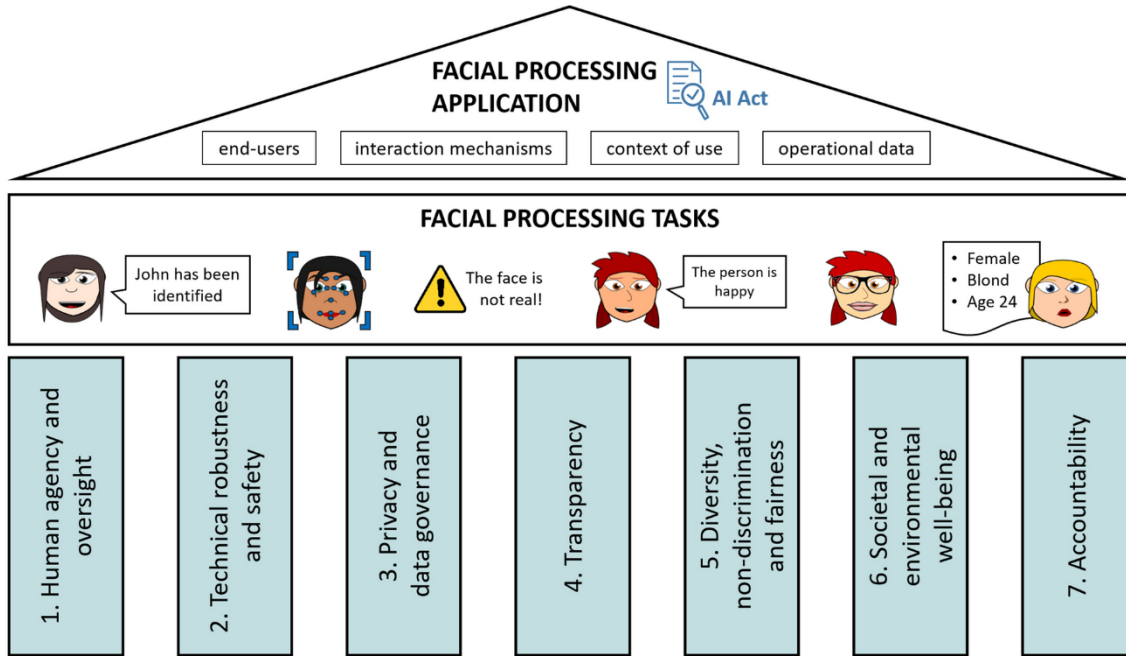Fig. 2 : Facial recognition mode process

Fig. 3 : Seven requirements for a trustworthy AI model for facial recognition process

However, along with these advancements, it is crucial to address privacy concerns and ensure ethical practices in deploying face recognition systems [7]. Striking the right balance between security and privacy is paramount to maintain public trust and acceptance of this technology. By implementing robust privacy frameworks, transparent data usage policies, and stringent consent mechanisms, the potential risks associated with face recognition can be mitigated, allowing individuals to have greater control over their personal information [6].

4. Conclusions

In conclusion, AI-based face recognition technology is revolutionizing the field of biometrics and authentication. Its exceptional accuracy, enhanced security, and increasing affordability are driving its widespread adoption [9]. As AI algorithms continue to advance, we can anticipate even more accurate and secure face recognition systems. In the future, facial recognition is poised to become an integral part of our daily lives, facilitating various tasks ranging from smartphone unlocking to identity verification for online transactions. However, ethical considerations and privacy protection should remain at the forefront to ensure responsible and trustworthy deployment of this technology [8].

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