Essay

“The Integration of Artificial Intelligence in Biometric Systems”

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Artificial Intelligence (AI) has fundamentally transformed various sectors, biometrics being one of them. Biometrics is a term that is used to define technology utilized to recognize and verify an individual on the basis of remarkable physical or behavioral traits. AI deployment in biometric systems has enhanced their speed, precision, and responsiveness, setting a new standard for security and identity verification.

The most significant of AI use in biometrics involves facial recognition. Deep learning technology is now capable of making systems recognize and identify faces at varying levels of light, angles, and even partial obstructions. It helps eliminate false positives and improve identification processes. AI has also improved fingerprint identification by deciphering poor or smudged prints. The previous systems would fail when reading such prints, but AI-driven models can learn and derive meaningful patterns to authenticate users better.

Iris recognition, already extremely accurate, has been reinforced further by AI. Perhaps the most stunning application is in identifying whether an iris is from a living or deceased individual to avoid spoofing using artificial or post-mortem samples. AI systems have performed remarkably well in this area, showcasing how deep learning can strengthen security even in edge conditions.

With the improvement of AI in biometric systems comes the new threats as well. For instance, today there are attackers who employ images and fingerprints produced by AI and referred to as "DeepMasterPrints" to trick recognition systems. Synthetic prints are designed to be compatible with multiple fingerprint templates, so they are indeed a threat to security. Also, data poisoning—altération of the input data used to train AI models—can corrupt system integrity and leave them vulnerable to future attacks (Yurdasen, 2023).

The use of AI-based biometric systems is growing in several sectors. At airports, facial recognition systems streamline security checks and boarding procedures by instantaneously matching faces of passengers with their passport photographs. At banks, AI-based voice and fingerprint recognition allow customers to safely log in without traditional passwords. Police use AI to recognize suspects in real time from public surveillance video, speeding up and refining investigations. Even cell phones now rely on AI-boosted facial and fingerprint readers to unlock devices, verify identities for transactions, and allow secure app access. Such everyday applications prove growing trust in AI-powered biometrics as a security and convenience solution (Yurdasen, 2023).

The increasing use of AI-based biometric data collection raises ethical and privacy concerns. Centralized storage of sensitive data renders systems an attractive target for cyberattackers. Furthermore, AI-based surveillance and emotion detection technologies raise essential questions about consent, control, and abuse. Some projects involving certain biometric AI have even been put on hold by some firms due to such ethical concerns, indicating the necessity of proper deployment and regulation.

AI has driven biometric systems to new heights by making them quicker, more accurate, and more responsive. From facial identification and fingerprint scanning to iris scan and behavioral monitoring, AI equips systems to authenticate individuals with greater confidence. But the benefits must be counterbalanced with careful consideration of potential threats and ethical implications. There has to be ongoing research, security innovation, and regulation to ensure that these powerful weapons are being used responsibly and securely in our increasing digital era (Yurdasen, 2023).

References

Yurdasen, D. (2023, April 20). *How artificial intelligence (AI) is used in Biometrics*. ARATEK.

https://www.aratek.co/news/how-artificial-intelligence-ai-is-used-in-biometrics