Pixels, Patterns, and Prosecution: AI's Forensic Footprint

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Abstract

Artificial intelligence (AI) is developed enough to begin integrating with various industries, challenging the boundaries of what was once technologically possible. As AI evolves and becomes more prevalent in the world, there comes a deeper necessity for understanding its role in a key part of modern society: the forensic process. This study includes a review of several articles in existing literature to understand how AI is currently being utilized in the detection, monitoring, prevention, and analysis stages of standard forensic processes. The analysis includes a focus on how AI-based tools align with current legal frameworks and their policy implications as these technologies continue to evolve. In light of these findings, emphasis is placed on how investigators can properly use AI to enhance efficiency while operating within both ethical and legal boundaries with respect to the current limitations of AI technology.

Literature Review

Because of the relatively new emergence of AI, especially referring to the sphere of forensic investigations, there has not been much research done on the potential future implications of AI on the forensic process. Nevertheless, there is substantial research regarding AI's current uses in the early stages of digital forensics investigations. According to Raed Faqir, a professor at the American University in the Emirates, AI has the potential to "revolutionize evidence extraction, suspect identification, and digital crime detection" because of its ability to handle large amounts of data and efficiently carry out forensic analyses in comparison to human counterparts (Faqir, 2023, p.81). Other research focuses on the potential implications of such a revolution, especially in how this could influence the quality of investigations as investigators may become more prone to complacency by relying on AI tools without further human intervention (Maschke, 2024). Nevertheless, AI is a tool that absolutely must be explored and used to improve the efficiency of the investigative process, according to university professors and researchers Simon Parkinson and Saad Khan. According to their experiments with both data-driven AI models and model-based reasoning models, given output was 90% accurate with only 0.5 seconds spent analyzing one image as well as a 36% reduction in processing time when the AI was used to empirically analyze several case studies (Parkinson & Khan, 2024). This drastic increase in efficiency makes it all the more important to learn how exactly AI can be used appropriately in the forensic process. As a whole, there appears to be a consensus among researchers that regardless of the specific nature of the AI tool in question, privacy and evidence integrity must stay at the forefront of legal standards relating to AI to prevent unintended consequences.

Analysis

As with many technological advancements, there is no way to backtrack on how AI will be implemented, making it crucial to ensure AI tools in the forensic process are used appropriately. Privacy must always be maintained to the level that regulatory laws and statutes stipulate, especially in the context of training data for use of AI in evidentiary analysis. Additionally, AI must be deterministic since "any unexpected behaviour could be problematic and cast doubt over reliability, which could prove problematic to defend" in most court systems (Parkinson & Khan, 2024). Similarly, AI's use of "neurological prediction" and similar practices must call into question the accuracy of evidence found as a result of such predictions, a concern briefly mentioned by Faqir as it relates to AI hallucinations (Faqir, 2023, p.82). Finally, yet most importantly, there is currently no international consensus regarding how AI should be used, monitored, or regulated in the context of the forensic investigation process. However, a framework needs to be formally enacted in order to create transparency and accountability in legal systems, such as the United States' justice system. With as many factors of current AI there

are to deal with, the lack of a framework to address that appropriate use and create a sense of organizational accountability is likely an incident, or perhaps several, waiting to happen.

Conclusion

While artificial intelligence presents an interesting skill set that can be molded into very powerful and efficient tools, a quantifiable and ethical direction needs to be taken to address the current pitfalls of present technologies in the field of digital forensics. Failure to recognize the shortcomings of what is ultimately just another computer program, albeit a very useful one, will certainly be at someone's detriment if a framework does not exist to categorize responsible use and give best practices for applicable parties and organizations. Maybe humanity has finally built upon artificial intelligence to the point where there is now a driving need to dictate how AI should be used, at least with sensitivity to legal proceedings and forensic processes. Though, what is AI but another man's software? What is software, but another man's AI? Hopefully a distinction will be definitively made, as today there remains little if any formal guidance as to how exactly one should wield this powerful aid.

References

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