

Chapter 1

Introduction to

Digital Forensics and

Artificial Intelligence

Hewa Majeed Zangana

 <https://orcid.org/0000-0001-7909-254X>

Duhok Polytechnic University, Iraq

Marwan Omar

Illinois Institute of Technology, USA

ABSTRACT

This chapter explores the intersection of digital forensics and artificial intelligence (AI), emphasizing the transformative impact AI is having on digital investigative techniques. Digital forensics, traditionally focused on the collection, preservation, and analysis of electronic evidence, is facing new challenges and opportunities in the era of AI. The rapid proliferation of digital devices and the sophistication of cyber threats demand enhanced methods for accurate and timely evidence gathering. AI technologies, including machine learning, natural language processing, and deep learning, are empowering forensic professionals to detect, analyze, and interpret vast volumes of data with unprecedented efficiency. This chapter discusses the fundamentals of digital forensics, examines the integration of AI tools within forensic processes, and addresses the ethical and privacy concerns that arise. The insights provided will help readers understand how AI can bolster digital forensics, enabling more proactive and precise responses to cybercrime.

DOI: 10.4018/979-8-3373-0857-9.ch001

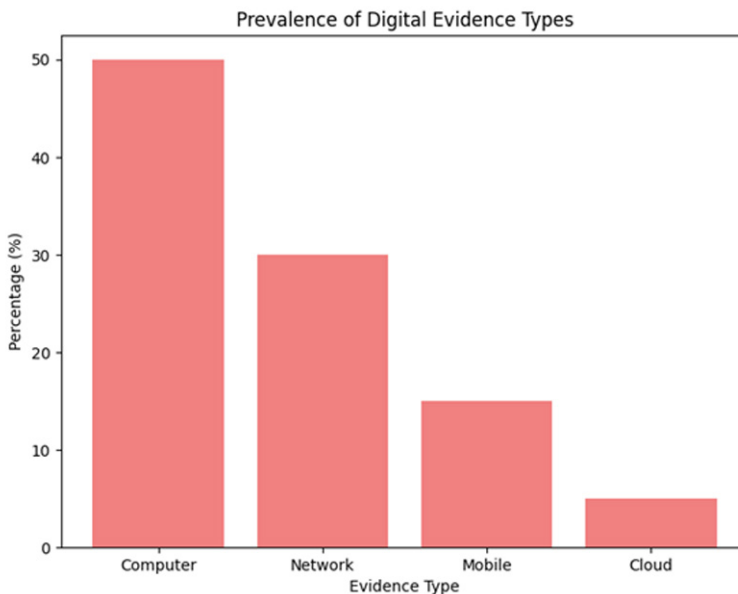
1. OVERVIEW OF DIGITAL FORENSICS

Digital forensics involves the identification, acquisition, analysis, and reporting of electronic evidence from digital devices to investigate cyber incidents, criminal activities, and security breaches. With the widespread adoption of digital devices and networks, digital forensics has evolved into a critical discipline that plays an essential role in supporting law enforcement, cybersecurity, and regulatory compliance. This overview provides insights into the foundational aspects of digital forensics, including key processes, challenges, and the discipline’s growing interconnection with artificial intelligence (AI).

Digital forensics traditionally covers various domains, including computer forensics, network forensics, mobile device forensics, and cloud forensics (Adam & Varol, 2020). Each of these domains focuses on extracting, preserving, and analyzing digital evidence from different environments. For example, computer forensics involves recovering data from computers and storage devices, while network forensics emphasizes monitoring and analysis of network traffic to detect and reconstruct cyber events (Jeong, 2020; Wright, Dawson Jr, & Omar, 2012).

Forensic analysis spans various evidence types, each necessitating specialized handling techniques. This bar chart illustrates common digital evidence types and their relative prevalence in investigations.

Figure 1. Forensic Evidence Types



28 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/introduction-to-digital-forensics-and-artificial-intelligence/367309

Related Content

Smart ATM With Tracking of Criminals Using Novel Di-Pattern and C-LDP (Combined Local Directional Pattern)

Jeyabharathi Duraipandy, Sherly Alphonse A., Sasireka D. and Kesavaraja D. (2023). *Handbook of Research on AI and Machine Learning Applications in Customer Support and Analytics* (pp. 183-200).

www.irma-international.org/chapter/smart-atm-with-tracking-of-criminals-using-novel-di-pattern-and-c-ldp-combined-local-directional-pattern/323120

Assistive Technology: Human Capital for Mobility (Dis)abled Workforce Diversity Development

Ben Tran (2014). *International Journal of Ambient Computing and Intelligence* (pp. 15-28).

www.irma-international.org/article/assistive-technology/147381

Novel Technique for 3D Face Recognition Using Anthropometric Methodology

Souhir Sghaier, Wajdi Farhat and Chokri Souani (2018). *International Journal of Ambient Computing and Intelligence* (pp. 60-77).

www.irma-international.org/article/novel-technique-for-3d-face-recognition-using-anthropometric-methodology/190633

Analysis of Home Furnishing Marketing Based on Internet of Things in the Intelligent Environment

Fang Wang (2024). *International Journal of Ambient Computing and Intelligence* (pp. 1-16).

www.irma-international.org/article/analysis-of-home-furnishing-marketing-based-on-internet-of-things-in-the-intelligent-environment/348964

Generating a Mental Health Curve for Monitoring Depression in Real Time by Incorporating Multimodal Feature Analysis Through Social Media Interactions

Moumita Chatterjee, Piyush Kumar and Dhruvasish Sarkar (2023). *International Journal of Intelligent Information Technologies* (pp. 1-25).

www.irma-international.org/article/generating-a-mental-health-curve-for-monitoring-depression-in-real-time-by-incorporating-multimodal-feature-analysis-through-social-media-interactions/324600