Process-Mining-enabled audit of Information Systems: methodology and an application

The absence of tailored tools for the automatic execution of audits within workflow systems often results in a reliance on manual processes, consuming time and resources. To address this challenge, the integration of Expert Systems (ESs), Artificial Intelligence (AI), and Process Mining (PM) techniques has emerged as a promising approach. By leveraging ESs, AI algorithms, and PM, organizations aim to streamline audit processes, improve efficiency, and reduce reliance on manual interventions.

In the realm of Information Systems (IS) audits, control tests and substantive tests play pivotal roles in ensuring the integrity, reliability, and security of systems and data. These tests are indispensable components of audit procedures, enabling auditors to assess compliance with regulatory standards, identify vulnerabilities, and detect potential fraud or irregularities.

Process Mining, as a methodology, offers a comprehensive framework for analyzing and optimizing business processes. It facilitates process discovery, conformance checking, and process enhancement by leveraging event logs and data-driven insights. By applying Process Mining techniques, organizations can gain deep insights into their operational workflows, identify bottlenecks, deviations, and inefficiencies, and subsequently optimize processes to enhance performance and compliance.

A notable advancement in the intersection of IS audit, AI, and Process Mining is the development of a five-step PM-enabled methodology tailored specifically for IS audits. This methodology, validated in the context of a freight export port process, provides a structured approach for integrating Process Mining into the audit workflow. By following this methodology, auditors can systematically leverage Process Mining techniques, alongside AI algorithms, to enhance audit effectiveness, identify control weaknesses, and drive continuous improvement in IS governance and risk management practices.

The integration of Process Mining into IS audits offers significant benefits beyond just operational efficiency. It has the potential to transform audit practices by providing auditors with real-time insights into process performance, compliance issues, and emerging risks. By leveraging AI capabilities alongside Process Mining, organizations can make data-driven decisions, proactively mitigate risks, and strengthen their overall control environment, thereby enhancing their resilience to cybersecurity threats and regulatory compliance challenges.