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Abstract

Artificial Intelligence (AI) transforms compliance auditing by enhancing automation, improving risk assessment, and streamlining regulatory adherence. However, the rapid adoption of AI in auditing presents challenges such as untrained users, ethical concerns, and bias in automated decision-making. As an answer to the growing need for trained employees, this research develops two graduate-level courses for beginners in compliance auditing, focusing on the integration of Artificial Intelligence (AI) in audit processes. Completing both courses will award students with a reputable award for professional development: "Graduate Certification in Compliance Auditing and AI." We examine compliance frameworks, risk management techniques, and AI-powered audit tools to understand how AI-driven compliance auditing can be effectively implemented while upholding ethical standards. "Using AI-powered technology tools, the auditor can move beyond traditional practices to more efficiently analyze client information and more easily identify risk, thereby enhancing audit quality." (Broom & Thomas, 2024) To address this growing need, we propose an educational framework that equips professionals with AI-driven auditing skills while ensuring regulatory compliance and ethical integrity.

Key Terms: *Compliance Auditing, AI Ethics, Risk Management, Automated Audits, Regulatory Compliance*

1. Introduction

1.1 Compliance Auditing

Compliance auditing ensures that organizations adhere to standards and regulations, including the General Data Protection Regulation (GDPR) (European Parliament and Council of the European Union, 2016), the California Consumer Privacy Act (CCPA) (California Office of the Attorney General, 2024.), and Sarbanes Oxley (SOX) (Sarbanes-Oxley-Act, n.d.), among others. Artificial Intelligence is set to make a change in up to 94% of corporations (Fitzgerald, 2024), but around 61% of internal audit leaders lack expertise (Accountancy Age, 2024). This lack of AI education is a wall that increases the risk of compliance and ethics violations. To alleviate this problem, we bring an educational framework with which to educate future professionals to implement AI within auditing. To do that, we required the answer to three different questions.

1.2 Research Questions

- 1. How does AI improve compliance auditing efficiency?
- 2. What are the risks of AI automation in audits?
- 3. How can educational programs enhance AI-driven compliance auditing?

2. Literature Review

2.1 AI's Ethical Impact

Transparency, fairness, and accountability are ethical challenges with the integration of AI. AI-generated content must emphasize truth and integrity to maintain credibility and avoid misinformation. This is why knowledgeable oversight is essential for validating outputs when implementing these systems. Transparent AI practices such as those from the AI Principles help enforce the moral integrity and accuracy that makes these systems so valuable to our future progress (Organisation for Economic Co-operation and Development (OECD), 2024).

2.2 The Need for AI Compliance Education

Education strengthens compliance by equipping employees and management with the knowledge to navigate regulations effectively. Companies with ongoing training see a 40% reduction in compliance incidents (Stevenson, 2023).

Integrating AI into training ensures auditors can use advanced technologies while upholding ethical standards. This trend helps predict how future efforts will focus on certifications and interdisciplinary approaches for a comprehensive understanding of modern auditing (Lehtimäki, 2024).

2.3 AI's Technical Impact

AI significantly enhances compliance auditing by increasing audit coverage (AuditBoard, 2019), automating fraud detection and anomaly tracking, and reducing manual compliance tasks. However, **untrained auditors** may struggle with AI-driven audits, leading to challenges such as misinterpretation of AI-generated risk scores, ethical concerns over algorithmic bias, and a lack of human oversight in automated decision-making.

3. Planning

3.1 Data Analysis

This study examines case studies of AI-driven compliance audits, regulatory frameworks, and previously established courses and tools to create courses that will prepare professionals for implementing AI into auditing workspaces. Primary sources such as audit reports and AI audit logs and secondary sources such as research papers and guidelines were used in order to provide context to course assessments while supplementing the information of the lessons.

3.2 Course Outline

This proposal consists of two 16-week graduate-level courses designed with the previous data in mind to meet these outlined objectives:

1. Fundamentals of Compliance Auditing

2. AI in Compliance Auditing

Eligibility Criteria:

Applicants must hold a bachelor's degree in a relevant field, such as technology (e.g., Computer Science, Cybersecurity) or business (e.g., Business Administration, Accounting, Data Analytics, Finance). Candidates with advanced degrees, like an MBA or other graduate titles in related disciplines, are also welcome to apply.

Additionally, prior knowledge or experience in auditing, compliance, risk management, or regulatory affairs is strongly recommended to ensure participants can effectively engage with the course material.

4. Courses

Both of the outlined courses will allow students to gain experience in these up-and-coming fields. Completion of both courses will bestow a certification that can be used for professional development.

4.1 Course 1: Fundamentals of Compliance Auditing

Objective:

Establish a strong foundation in compliance auditing, risk management, and regulatory frameworks by examining auditing principles, assessing internal controls, and ensuring adherence to legal and industry standards.

Learning Outcomes:

- Have a theoretical and technical understanding of the compliance auditing process and reporting.
- Be able to conduct a full compliance audit for a company.
- Be able to evaluate organizations based on established regulations and standards.

The course outline for **Fundamentals of Compliance Auditing** is detailed below in Table 1.

Week	Course 1: Fundamentals of Compliance Auditing			
1-2	Introduction to Compliance and Regulations	 Objectives: Define compliance auditing Explore Key Regulations: General Data Protection Regulation (GDPR) California Consumer Privacy Act (CCPA) Sarbanes Oxley (SOX) Case Study: GDPR impact on European businesses. 		
3-4	Risk Management in Compliance Auditing	 Objectives: Understand Risk in Audits Internal vs. external risks. Risk assessment frameworks. Learn to create a Risk Matrix (Likelihood vs. Impact) Assessment: Case Study: Audit failure due to weak risk management. 		

Table 1: Course 1 Outline

5-6	Internal and External Auditing Techniques	 Objectives Learn about Internal Audits: Best practices Key Process Indicators (KPIs). Learn about External Audits: Difference between financial and compliance audits. Importance of third-party audits. Assessments: Case Study: The role of audits in preventing corporate fraud. Hands-on: Using Python to automate compliance checks. 	
7-8	Compliance Audit Reporting	 Objectives: Understand Audit documentation reporting structure. Learn to write audit findings recommendations Explore tools for audit tracking compliance monitoring. Assessment: Case Study: Mock audit report writing. 	
9	Midterm: Practical Assignment	• Scenario-based assessment: Conduct a risk assessment and write an audit.	
10-11	Data Security and Privacy in Compliance	 Objectives: Cybersecurity measures in compliance auditing. Handling sensitive data ethically. Assessment Case Study: Meta's GDPR fines and lessons learned. 	

12-13	Continuous Monitoring in Compliance Auditing	 Objectives: Introduce Real-time compliance monitoring tools. Automation in regulatory reporting. Assessment: Final Project Preparation: Select a compliance framework. Develop a compliance monitoring strategy.
14-16	Final Project	• Final Project: Conduct an end-to-end compliance audit using the previously developed compliance monitoring strategy. Requires class presentation.

Assessments:

Case studies are used to test the efficacy of the course difficulty and students' comprehension in real-world scenarios. An example of a Case Study Assessment is detailed below in Table 2.

Table 2: Case Study Assessment

Meta 's GDPR Compliance Violation

Scenario:

In 2023, Meta, the parent company of Facebook, was fined €1.2 billion by the Irish Data Protection Commission (DPC) for violating the General Data Protection Regulation (GDPR). The violation stemmed from Meta's continued transfer of European user data to U.S.-based servers without adequate safeguards, despite a prior European Court of Justice ruling invalidating the Privacy Shield framework. Regulators determined that these transfers exposed European users to potential U.S. surveillance, failing to meet GDPR's stringent data protection standards.

Audit Focus:

- 1. Review Meta's cross-border data transfer mechanisms and assess compliance with GDPR's data protection requirements.
- 2. Identify deficiencies in Meta's data transfer agreements and evaluate legal risks.
- 3. Determine necessary corrective actions, including implementing stronger safeguards or ceasing unlawful data transfers to achieve compliance.

4.2 Course 2: AI in Compliance Auditing

Objective:

Develop a deep understanding of AI-driven auditing techniques, automation, and ethical AI usages. This course explores real-world AI tools used in regulatory compliance and provides hands-on experience through case studies and practical applications. This course **must** be taken after Course 1: Fundamentals of Compliance Auditing.

Learning Outcomes:

- Learn the fundamental and technical process of developing AI.
- Be able to implement AI into audit procedures.
- Understand the ethical implications of implementing AI and how to adhere to them.

The course outline for **AI in Compliance** is detailed below in Table 3.

Week	Course 2: AI in Compliance		
1-2	Introduction to AI in Compliance	 AI & Machine Learning basics. Exploring the role of AI in compliance auditing. Case Study: AI adoption in fraud detection. 	
3-4	AI-Driven Risk Management	 AI models for risk analysis. Predictive analytics in fraud detection. Case Study: Predicting risk in financial compliance. 	
5-6	Implementing AI in Auditing	 Exploring AI-powered auditing tools (case study: IBM Watson AI). Automation of compliance processes. Hands-on: Using Python to automate compliance checks. 	
7-8	AI Ethics & Bias in Audits	 Understanding AI bias in compliance. Assessments: Case Study: AI bias in automated hiring audits. 	

Table 3: Course 2 Outline

		• Hands-on: Detecting bias in an AI audit model.	
9	Midterm: AI Implementa- tion Project	 Hands-on AI Compliance Project: Apply AI to detect anomalies in a dataset. Write an AI audit report. 	
10-11	AI-Based Continuous Monitoring	 Automating real-time compliance tracking. Building an AI-based compliance dashboard. Hands-on: Using Python for anomaly detection. 	
12-13	Future Trends in AI Compliance	 Exploring AI regulation & future challenges. Exploring the impact of quantum computing on compliance. Final Project Preparation 	
14-16	Final: Certification Test	• Certification Test: 150-question test to assess knowledge after completion of both courses.	

Assessments:

In addition to Case Studies, Hands-On practices are used to develop students' skills early-on with practical exercises. An example of a Hands-On practice Assessment rubric is detailed below in Table 4.

Table 4: Detect Bias in AI Model Hands-On Practice Evaluation Criteria
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Assessment Component	Description	Criteria for Evaluation	Weight (%)
Objective	Analyze an AI audit model to identify and mitigate biases in compliance risk assessments.	N/A	N/A
Dataset Exploration	Examine the dataset for potential biases.	Identifies and explains biases.	20%

Demystifying AI-Driven Audits and its Ethics: A Graduate Certification in Compliance Auditing and AI

Model Evaluation	Test the AI model for biased outputs.	Uses data analysis to detect and justify biases.	25%
Bias Mitigation Strategies	Propose solutions to reduce bias.	Provides effective mitigation techniques.	25%
Ethical Considerations	Discuss ethical and regulatory impacts.	Demonstrates understanding of ethics and compliance.	15%
Report & Presentation	Summarize findings and present key insights.	Clear, structured report and engaging presentation.	15%

5. Impact and Relevance

The integration of AI in compliance auditing represents a transformative shift in regulatory adherence, enhancing efficiency, accuracy, and risk management. This curriculum provides learners with both foundational auditing principles and advanced AI-driven techniques, enabling them to assess, implement, and oversee automated compliance systems. By focusing on operational efficiency, bias mitigation, and ethical AI applications, graduates will be prepared to navigate complex regulatory landscapes. They will play a critical role in helping organizations adopt AI-powered auditing tools while ensuring transparency, fairness, and accountability in decision-making (Greggwirth, 2023).

6. Future Opportunities

Completing both courses will award students a **Graduate Certification in Compliance Auditing and AI**, demonstrating their expertise in traditional and AI-driven auditing practices. This certification will enhance their career prospects in regulatory compliance, risk management, and AI governance, making them competitive candidates for roles in financial institutions, government agencies, and corporate compliance departments.

To further strengthen the program, the courses can integrate Case Studies and Hands-on projects, providing experience with real-world compliance scenarios. Specific tools such as LLMs (Large Language Models) can be introduced to help students automate regulatory adherence checks, and analyze internal audit documentation for potential compliance gaps. Regular updates through industry collaborations will ensure the curriculum remains aligned with evolving regulations and technological advancements. Expanding interdisciplinary connections with fields like cybersecurity and data analytics will offer a broader perspective on auditing, equipping students with valuable cross-industry skills.

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8. References

- Accountancy Age. (2024). Internal Auditors "Flying Blind" on AI Risks Report. https://www.accountancyage.com/2024/11/15/internal-auditors-flying-blind -on-ai-risks-report/#:~:text=The%20%E2%80%9C2025%20Focus%20on%2 othe.among%2014%20kev%20risk%20areas
- AuditBoard. (2019). *Top Metrics to Track in Your Audits*. <u>https://www.auditboard.com/blog/top-metrics-to-track-in-your-audits-check</u> <u>list/</u>.
- Broom, R., & Thomas, E. (2024, February). *What AI Can Do For Auditors. Journal of Accountancy.* <u>https://www.journalofaccountancy.com/issues/2024/feb/what-ai-can-do</u> <u>-for-auditors/</u>
- California Office of the Attorney General. (2024). *California Consumer Privacy Act* (*CCPA*). <u>https://oag.ca.gov/privacy/ccpa</u>
- European Parliament and Council of the European Union. (2016). *Regulation (EU)* 2016/679 of the European Parliament and of the Council of 27 April 2016 on the Protection of Natural Persons with Regard to the Processing of Personal Data and on the Free Movement of Such Data (General Data Protection Regulation). Official Journal of the European Union, L119, 1–88. <u>https://eur-lex.europa.eu/eli/reg/2016/679/oj</u>
- Fitzgerald, A. (2024). *110 Compliance Statistics to Know for 2025*. Secureframe. <u>https://secureframe.com/blog/compliance-statistics</u>.
- Greggwirth. (2023). *The 2023 Thomson Reuters Risk & Compliance Survey Report: A Delicate Balance Between Risk and Reward*. Thomson Reuters Institute. <u>https://www.thomsonreuters.com/en-us/posts/investigation-fraud-and-risk/</u> <u>risk-compliance-survey-report-2023/</u>.
- Lehtimäki, M. (2024). *Navigating Ethical and Practical Challenges in AI-Driven Visual Content Creation.* Theseus. <u>https://www.theseus.fi/handle/10024/865896</u>.
- Organisation for Economic Co-operation and Development (OECD). (2024). *AI Principles*. OECD. <u>https://www.oecd.org/en/topics/sub-issues/ai-principles.html</u>
- Sarbanes-Oxley-Act. (n.d.). *The Sarbanes-Oxley Act of 2002*. https://sarbanes-oxley-act.com/
- Stevenson, R. (2023). 85 Compliance Statistics You Need to Know in 2023. Drata. https://drata.com/blog/compliance-statistics.