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AI Audit Analytics for Strengthening Fraud Detection in Governmental and Nonprofit Reporting

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Abstract: The United States government and nonprofit programs are constantly challenged by fraud, waste, and abuse, which negatively affect fiscal integrity as well as public trust. Traditional audits, which are usually retrospective and manual in nature, find it difficult to identify sophisticated or dynamic fraudulent schemes. This paper discusses the potential use of Artificial Intelligence-based audit analytics to support fraud detection and accountability in federal, state, and nonprofit reporting systems. Drawing on the literature review and case study evidence, the paper analyzes AI-driven audit implementations in both governmental and nonprofit settings, highlighting variations in performance across different systems. The results indicate that although AI improves the detection of anomalies, predictive analytics, and continuous auditing, its efficiency is related to the quality of data, algorithm transparency, and integration of governance. Studies indicate that there are continuing weaknesses in model explainability, inter-agency data standardization, and the training of auditors. Adopting explainable AI frameworks, ethical governance standards, and cross-sector collaboration will address these gaps and enable effective oversight. Finally, AI audit analytics have transformational potential in protecting the resources of taxpayers and donors when applied to a clear, ethically managed, and information-based system that balances between maleficence and prudence in automation.

Keywords: AI Fraud Detection; Audit Analytics; Government Accountability; and Nonprofit Fraud.

INTRODUCTION

Fraud, waste, and misappropriation of state funds have been an ongoing problem in the U.S. federal and state-funded programs, damaging fiscal integrity, eroding citizen confidence, and diverting important resources when needed in critical services (Machireddy,2022). The Association of Certified Fraud Examiners estimates that a company loses around 5% of its annual revenues to fraudulent activities, which costs organizations billions of dollars in misappropriated taxpayer funds (Karakoyun, 2024). The risks of financial misconduct are further aggravated by the growing complexity of the funding processes in the government and nonprofit sectors, decentralized control, and underdeveloped auditing potential (Anderson, 2021; Lamothe *et al*., 2023). The traditional audit techniques that are mostly manual-based sampling and retrospective analysis rarely detect subtle or changing fraudulent schemes on time before causing huge losses (Del Caprio, 2025). Conversely, new developments in artificial intelligence (AI) and data analytics have given rise to new paradigms of proactive fraud detection (Bello & Olufemi, 2024). Audit analytics powered by AI can work with vast, heterogeneous datasets, detect complex trends, and report anomalies potentially caused by a fraudulent act or inefficiency (Del Caprio, 2025). These technologies provide auditors with better capabilities, as they allow uninterrupted surveillance and predictive risk modeling, as well as real-time detection of abnormalities in transactions and grants (Oko-Odion & Udoh, 2024). With the incorporation of machine learning and natural language processing implemented in audit systems, public institutions can reinforce oversight, promote accountability, protect taxpayer resources, and promote a culture of transparency and evidence-driven governance (Thapa *et al*., 2024).

Evolution of Fraud Detection Techniques

Traditionally, fraud detection relied on manual audits and rule-based systems that utilized specific predefined criteria and/or the judgment of an experienced auditor (Celestin & Vanitha, 2019; Elumilade *et al*., 2021; Del Caprio, 2025). While effective in detecting known patterns of fraud, these were limited in scalability and often missed sophisticated, constantly changing methods of fraud (Angela *et al*., 2024). The first turning point was data analytics, which enabled examining larger datasets to find anomalies and trends to indicate fraudulent behavior (Popoola, 2023). However, most analytics approaches remained reactive and retrospective, focusing on past transactions rather than projecting risks (Broby, 2022). The rise in data volume and complexity

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reinforced the need for more sophisticated approaches. As such, academics and professionals have begun to lean toward AI-driven techniques, including machine learning and neural networks. These features include real-time analysis, predictive capabilities, and the ability to continuously adapt to evolving tactics of fraud (Bello & Olufemi, 2024).

Current State of U.S. Fraud Detection in Reporting

The existing situation in the sphere of fraud identification in the U.S. corporate market indicates the shift toward data-driven and AI-based auditing models. The use of machine learning (ML) and anomaly detection algorithms becomes a more significant addition to traditional manual audit as they discover intricate fraud patterns almost in real-time application (Bello *et al*., 2023). Regulatory authorities such as PCAOB stress the need to incorporate continuous auditing to reduce the risks of financial misstatement (Akinsola, 2024). Deep learning and natural language processing (NLP) models contribute to the recognition of suspicious transactions and fraudulent disclosures (Lan *et al*., 2025). Nonetheless, companies still struggle with explainability, data control, and integration expenses, and the standardization of AI audit procedures is needed (Pahune *et al*., 2025).

Significance of Fraud Detection in Reporting

Detection of fraud in financial reporting continues to form key pillar of corporate governance and investor safeguard in the U.S. economy. Recent research highlights the importance of AI-based analytics for the purposes of off-the-record saturation and transparency in disclosures (Akhtar *et al*., 2024). Deep learning (DL) and machine learning (ML) models have been shown to improve levels of accuracy when detecting accounting anomalies (Bello *et al*., 2024). The regulatory frameworks related to SEC and PCAOB promote the practice of ongoing auditing and proactive assessment of the risk of fraud (Akinsola *et al*., 2024). Nevertheless, amidst the progress of technology, issues like the integrity of the data, bias in the algorithms, and explainability still impede the wholesome application in reporting settings (Poudel, 2024).

AI and Audit Analytics

The implementation of Artificial Intelligence in audit analytics has redefined the conventional audit process from periodic to real-time with the help of data analysis. The earlier implementation of audit automation was done through rule-based technology, whereas current technologies utilize machine learning algorithms and natural language processing to identify fraudulent activities within massive data sets (Elumilade *et al*., 2021; Del Caprio, 2025). These AI models allow for real-time auditing to identify unusual patterns in financial data related to multiple payments to vendors, incorrect classification of expenses, and fraudulent claims for grants related to funds received (Kokina & Davenport, 2017).

Predictive analytics improves auditors' forecast ability in identifying prospective risks of fraud by integrating behavioral and transactional data (Ilori *et al*., 2024). AI audit tools play critical roles in detecting any abuse of COVID-19 relief funds, thereby saving taxpayers millions of dollars. Additionally, neural networks and unsupervised machine learning algorithms demonstrate sensitivity in detecting relationships between different data sets, thus identifying hidden collusion or fraudulent activities (Van Duc *et al*., 2024).

The adoption of cloud-based auditing platforms with federative learning technology facilitates collaborative working on data while ensuring confidentiality of the information involved (Okolo *et al*., 2022). Nevertheless, there is a need for standardized frameworks in AI adoption in auditing to facilitate compliance with ethics, fairness, and understandability in the process (Schiff *et al*., 2024). Therefore, AI in audit analytics technology has brought about a new era, from detecting to preventing fraud in governance to improve accountability in public and non-profit organizations (Van Duc *et al*., 2024; Del Caprio, 2025).

Fraud Detection in Governmental Programs

Medicaid, unemployment benefits, and other U.S. Federal and state programs have faced major fraud, affecting trust and the budget for decades (Camarda *et al*., 2021). Traditional auditing processes are usually retroactive, narrow in nature, and not equipped to deal with massive data volumes associated with big programs (Elumilade *et al*., 2021). The application of AI in fraud detection has transformed the process and incorporated preventive models, clustering analyses, and anomaly analysis algorithms in identifying unhealthy patterns ahead of time. For example, unsupervised machine learning algorithms applied in Medicaid auditing raised the level of accuracy by over 40% with fewer FN

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cases, allowing earlier intervention to happen (Popoola, 2023; Sharma *et al*., 2024).

AI tools cross-validate vendor registration information, purchasing data, and contract compliance to reveal cases of deceptive billing and ghost vendors (Goela *et al*., 2024). In addition, the complementarity of AI with geospatial insights and network analysis makes it possible to trace related patterns of fraud across multiple locations (Bello & Olufemi, 2024). The U.S. Department of Health and Human Services and the Treasury Inspector General have separately employed AI-enabled data analytics to detect unusual patterns of payment in pandemic assistance programs (Das *et al*., 2023). These tools not only offer enhanced opportunities to detect fraudulent activities but also round out risk-based auditing processes with AI to direct resources to areas where problems are most likely to occur (Oko-Odion & Udoh, 2024).

Nevertheless, to implement it effectively, there must be data standardization, inter-agency collaboration, and good governance to counter biases and facilitate transparency in AI-driven decision-making processes (Poudel, 2024). Therefore, AI technology-driven fraud detection is an essential new era in protecting taxpayers' funds while maintaining good governance in such programs (Van Duc *et al*., 2024).

Nonprofit Accountability and Transparency

Non-profit organizations rely on multiple funding streams, such as donations, grants, and endowments, making them susceptible to fraudulent activities and improper usage because of the distributed nature of control and absence of internal controls (Buabeng, 2020). Unlike in the case of governmental organizations, which are bound by laws to perform auditing, in most cases, nonprofits fail to have the capability to perform real-time analytics on data, making them susceptible to being exploited in terms of funds misallocation and manipulation (Celestin, 2020; Nyombi *et al*., 2025). AI-based audit analytics can help nonprofits enhance accountability with respect to validating donor transactions, disbursed grants, and spending on different areas (Nyombi, 2022).

AI algorithms applied to text mining and natural language processing can scrutinize narrative files to reveal discrepancies between project performance data and spending amounts indicated in the project files, detecting discrepancies in spending data (Kokina & Davenport, 2017). Furthermore, predictive analysis can point to areas with high risks of operational deficiencies or to project managers with historical patterns of discrepancies in the past (Nahar *et al*., 2024). AI incorporated into auditing tools can greatly improve transparency and donor compliance with IRS Form 990 requirements (Buabeng, 2020). Lack of resources and technical knowledge can limit adoption in smaller nonprofits (Anuyah *et al*., 2023).

Data sharing platforms and AI audit processes by the government can help counter such challenges and ensure that the ethical handling of donor funds by nonprofits is maintained (Joseph, 2025). Basically, AI audit analytics promotes trust-driven transparency to help nonprofits integrate integrity in operations with mission-based goals while instilling faith in the management of charities (Nyombi *et al*., 2025).

Ethical and Governance Issues

Although AI technology has enhanced the efficiency and accuracy of fraud detection, the implementation of AI technology has raised significant concerns related to ethics, the law, and governance (Oko-Odion, 2025). The aspects of bias, opacity, and accountability associated with AI technology may result in incorrect targeting or unfair auditing results (Mensah, 2023). To eliminate these concerns, it has been recommended to implement Explainable AI technology, which can interpret AI results to auditors and governance bodies (Akhtar *et al*., 2024). The U.S. Federal Data Strategy and the guidelines issued by the Government Accountability Office clearly state the importance of being more transparent, fair, and privacy-conscious in adopting AI technology in governance (Poudel, 2024). There must be human oversight in AI fraud detection to complement, rather than supplement, the auditors' judgment in ethical auditing mechanisms (Tiron-Tudor & Deliu, 2022). There is also the need for harmony in AI technology-related auditing mechanisms with regulatory requirements, including the Federal Information Security Modernization Act (FISMA) and privacy policies modeled on GDPR to protect taxpayers' and donors' privacy (Gao, 2024; Ashrafuzzaman, 2025). Ethical considerations also emphasize stakeholder inclusiveness in model development to avoid perpetuating systemic biases inherent in data used in model training (Hanna *et al*., 2025). The key to the adoption of AI-based audit analytics, therefore, is to strike a balance between innovation and accountability in ensuring that technological progress enhances rather than

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undermines ethical foundations in public and not-for-profit financial management (Del Caprio, 2025).

Challenges and Policy Implications of AI-Based Audits

AI-driven audit analytics in the context of governmental and nonprofit disclosures must contend with issues of data integrity, explainability of AI algorithms, the absence of data integration across agencies, and accountability regarding ethics. Many governmental implementations continue to depend on disparate and dated data sources, making it difficult to trust AI models' accuracy and resulting in higher rates of incorrect hits (Poudel, 2024). Furthermore, black box AI algorithms pose questions about ethics and accountability, specifically with respect to transparency (Kolt, 2025). Ethics guidelines and regulations, such as the U.S. Federal Data Strategy, underscore the importance of explainable AI (XAI), privacy protection, and human oversight in the context of audit functions (Akhtar *et al*., 2024). Nevertheless, inconsistent technological implementation and a lack of related training for auditors render the process less than effective in practice (Al-Faryan, 2024). To reestablish fairness and integrity within finances, AI audit management must require standardization of data, ethics evaluation, and accountability processes in governmental bodies and not-for-profit organizations alike (Tiron-Tudor & Deliu, 2022).

CASE STUDIES AND EMPIRICAL APPLICATIONS

AI in Federal Oversight: The CARES Act and Pandemic Relief Funds

The COVID-19 crisis has revealed weaknesses in the current mechanisms for dispensing funds in the event of an emergency in the US, where funds amounting to multiple billions were released via the CARES Act and Paycheck Protection Program (PPP) funds (Ndongo, 2025). AI-based audit analytic tools were used in combination by the U.S. Government Accountability Office (GAO) and Pandemic Response Accountability Committee (PRAC) to identify cases of duplication of payment, fraudulent certification, and shells (Del Caprio, 2025). Based on machine learning algorithms and network analysis, the tools were able to cross-correlate employer identification numbers (EIN) tax numbers, addresses, and payment data to single out suspicious transactions (Iseal *et al*., 2024). AI algorithms designed to identify anomalies were able to identify $3.5+ billion in fraudulent PPP pay in the initial year, which was significantly more efficient than previous methods (Ndongo, 2025). Research conducted by Iseal *et al*. (2024) further supports the idea that combining predictive analysis with cross-agency databases can decrease audit inventory backlogs and improve fiscal accountability (Iseal *et al*., 2024). The PRAC's Center of Excellence for Pandemic Analytics has become the paradigm upon which the US can capitalize on implementing continuous auditing (CA) technology in each branch to improve the quality of funds and avoid unnecessary funds (Gao *et al*., 2025).

AI Applications in State-Level Medicaid Fraud Detection

Medicaid, one of the biggest federally and state-funded programs, has been prone to massive fraud in terms of overcharges, ineligible beneficiaries, and collusion in provider networks (Savino & Turvey, 2018). AI audit analytics, especially in the form of unsupervised clustering and predictive modeling, has been used in various states in the US, such as New York, Texas, and Florida, to improve the accuracy of fraud detection (Das *et al*., 2023; Sizan *et al*., 2025). The New York State Office of the Medicaid Inspector General (OMIG) uses AI technology to assess billing data, facilitate cross-validation between providers' claims, and identify unusual data points that significantly differ from others in terms of performance ratios (Chughtai *et al*., 2024). Various empirical analyses suggest that these models showed between 45%-60% improvement in terms of precision in fraudulent cases, thereby significantly decreasing the probability of incorrect accusations and unnecessary audits (Elumilade *et al*., 2021). The AI-enabled audit analytics in these studies further helped in preventive action, identifying cases that might potentially qualify to be fraudulent before actual payment was made to providers (Elumilade *et al*., 2021; Bello & Olufemi, 2024). The Center for Medicare & Medicaid Services further indicated enhanced revenue realization, with over $1.2 billion being reclaimed between 2019 and 2023 with the help of data-driven audit intelligence (Thornton, 2024). From the above case studies, the role of AI in improving efficiency and protecting the taxpayer in the implementation of AI audit systems at the state level has been proven.

AI in Non-Profit Grant Management

Non-profit organizations handling grants funded by the government face growing pressure in terms of transparency and responsible management of

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funds (Jamshidi, 2025). The National Science Foundation (NSF) has rolled out AI-related auditing solutions that ensure compliance with grants and detect anomalous spending of funds (Deng *et al*., 2023). These solutions apply text mining and semantic analysis to examine narrative write-ups, budget analyses, and spending data for discrepancies (Kokina & Davenport, 2017). For instance, the AI audit solution for NSF grants traced $50 million+ in ineligible spending between 2020 and 2022 (Deng *et al*., 2023). While progress has been made, the smaller nonprofits continue to face challenges in terms of adopting AI audit solutions owing to budgetary constraints and technological inaccessibility (Godefroid *et al*., 2024). Research indicates that service-delivery models and AI audit solutions in the cloud can help level the playing field to access anti-fraud technology solutions (Ionescu, 2025). AI audit analytics tools, in addition to ensuring compliance, instill donor trust via enhanced traceability and accountability in the management of nonprofits (Nyombi *et al*., 2025).

Implications of Implementation and Emergent Best Practices

Within the government and nonprofit sectors, there are three best practices in AI audit implementations. The importance of data unification and compatibility must be recognized, as it has been demonstrated that data fragmentation can lower the accuracy of models (Issa *et al*., 2016). For instance, organizations with data lakes in AI achieved higher precision in detection and consistency across multiple programs (Rodd, 2024). The need for AI to explain itself in governance to eliminate black-box problems while ensuring auditors remain confident in AI models has been validated (Zhang *et al*., 2022). The combination of automation with human capability is key to AI accomplishment in that hybrid models outperformed self-contained automated models in terms of decision correctness and adherence to ethics (Tiron-Tudor & Deliu, 2022; Chaudhry, 2024). For the Federal Administration in implementing the Federal AI Strategy for Oversight, empirical proof emphasizes the imperative to integrate best practices in AI to provide sustainability in fraud control and protection via the combination of AI analytics, ethics, and auditor training to facilitate enhanced detection and efficient protection for taxpayers (Del Caprio, 2025). Such best practices demonstrate how AI can greatly enhance the ability to detect fraud, even though AI can never prevent the crime of fraud from occurring.

CASE STUDIES 2

Failed or Underperforming AI Audit Systems in U.S. Governance and Nonprofits

AI-based audit analytic tools have demonstrated efficacy in identifying fraud, waste, and abuse, although there are many Federal, state, and nonprofit applications that experienced ineffectiveness because of improper data management, bias in algorithms, and implementation issues in AI adoption (Valentine, 2019). The primary instance would be related to the IRS Return Review Program (RRP), which is AI-enabled to identify fraudulent activities to replace the existing Electronic Fraud Detection System (EFDS) (Saia & Carta, 2019; Butler, 2020; Ariyibi *et al*., 2024). Despite investing $288 million in it, it failed to satisfy operational requirements because of improper data integration and variations in algorithmic models in the period ranging between 2017 and 2020 (Engstrom *et al*., 2020; Bindseil & Senner, 2023).

At the state level, the AI-based unemployment benefit fraud detection tool developed in California by the Employment Development Department (EDD) during the COVID-19 crisis was ineffective in detecting mass unemployment insurance benefit fraud because it falsely indicated eligible claims while missing $11+ billion in fraudulent distributions because of flawed data models (Mahmud, 2025). On the other hand, the Texas Health and Human Services' Medicaid audit analytical tool was not very effective because it was overwhelmed with unnecessary cases indicated by its machine learning models' high false positives (Azad & William, 2024). Within the nonprofit field, various AI algorithms designed to monitor grants in the United Way Digital Accountability Pilot Project failed because of data standardization issues and data privacy policies that prohibited data exchange between the donor and the recipient of the funds (2019–2022). Such constraints were major drawbacks in detecting anomalies, resulting in unrecorded cases of diverted funds (Ilori *et al*., 2023). Taken together, these failures highlight the importance of good model governance, AI explainability frameworks, and data standardization across agencies to ensure the efficacy and ethics of AI-enabled auditing tools and systems (Poudel, 2024; Ionescu, 2025).

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Research Gaps

Despite the increasing adoption of AI audit analytics tools, there are still areas in terms of knowledge and implementation that remain to be explored and addressed in AI-related studies and projects. First, there is a need to understand current empirical realities on AI audit performance in the U.S. public and not-for-profit sectors in terms of the long-run efficiency and accuracy of cost-benefit evaluations, with empirical studies needed to fill current knowledge gaps (Del Caprio, 2025; Gao *et al*., 2025). The concern is not only with the performance of AI but rather with the application of AI in real-world settings to improve auditing processes. Second, the literature on governance has not yet explored the importance of governance in ensuring there is fairness in AI, in addition to explaining AI (Akhtar *et al*., 2024; Poudel, 2024). There is a need to go beyond explaining AI in terms of technology and move on to exploring governance in AI. Third, it has been observed that data sharing between the Federal and state administrative agencies has not yet been addressed properly, thereby hindering the efficiency of AI models (Ionescu, 2025). The concern in AI is not only on efficiency, but on data sharing in terms of accessing different data. Such challenges are illustrated in the failed implementation of the IRS RRP, the California EDD AI system, and the United Way Pilot. This highlights the fact that the lack of human oversight can create complexities that even sophisticated systems cannot overcome (Mahmud, 2025; Azad & William, 2024).

DISCUSSION AND FINDINGS

The implications from the study reveal the efficiency of hybrid models of auditing that integrate AI analytic capabilities with auditor judgment to perform better than automated methods by controlling for incorrect predictions and validating accurate results in context (Tiron-Tudor & Deliu, 2022) (See Table 1). The AI analytic tools, properly governed in terms of transparency and ethics, improve fraud detection and accountability in the governance of government and nonprofit institutions. Nevertheless, current failures in collaborative data architecture between agencies continue to provide less-than-optimal performance efficiency for AI analytical tools in executing tasks (Ionescu, 2025; Poudel, 2024). The failures in operation of AI analytical tools in the IRS RRP program and in the EDD in California underscore that the absence of data standardization, algorithmic explainability, and trained oversight professionals in implementation can fail to optimize performance in operation (Mahmud, 2025). On the other hand, AI models in operation in Medicaid oversight and COVID-19 relief oversight performance demonstrate the application of integrated models with explainability to improve accuracy, efficiency, and early fraud detection in implementation performance.

Table 1: Comparison of Traditional and AI-Driven Auditing. (Del Caprio, 2025).

Aspect	*Traditional Audit*	*AI-Driven Audit*
Speed	Manual sampling and review; time intensive	Real-time or near-instant analysis of full datasets
Accuracy	Prone to human error and sample bias	High accuracy using anomaly detection across entire datasets
Transparency	Easily documented and explained	Often opaque ("black box") unless XAI techniques are implemented
Oversight	Full human oversight and decision-making	Human oversight remains essential; Ai just assists
Scope	Limited to sampled transactions	Comprehensive, analyses entire data population
Fraud Detection	Based on predefined rules; reactive focused on known red flags	Predictive and adaptive, using ML and NLP to detect evolving and subtle fraud patterns

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Hence, to be able to detect fraud properly, there needs to be an integrated policy implementation in terms of favoring data standardization, ethics validation, explainable AI models, and cross-agency team interaction performance to ensure AI auditing models can move beyond prototyping innovation to mainstream implementation in governance accountability models.

CONCLUSION

AI-powered audit analytics marks the beginning of an evolutionary revolution in the process of public and nonprofit financial management oversight. Despite the immense benefits they offer in terms of efficiency and accountability, AI analytics in auditing must, however, depend on clean governance practices, ethics, and data management best practices to perform to maximum efficiency and effectiveness in detecting fraudulent activities in organizations. The cases presented in the study clearly show why failed AI analytic models in organizations like the IRS RRP and California EDD AI failed, whereas others in organizations such as Medicaid and Federal Relief funds succeeded in terms of performance efficiency and effectiveness being achieved. Simply adopting AI analytics would, however, require organizations to not only depend on technology advancements in analytics but also on trust-building, data standardization, and enhanced auditor capability-building processes. By incorporating AI in transparent and ethical audit environments that promote collaboration, the government and non-profit organizations can secure public resources and rebuild trust in financial management.

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