

AI Software for Ethical Finance Auditing and Compliance



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Artificial Intelligence software in hospital finance auditing streamlines tasks such as balance sheet generation, expense categorization, and liquidity analysis within integrated accounting frameworks. . By automating pay-out tracking, income and expenditure reconciliation, and statutory compliance checks, AI reduces manual workload while enhancing data visibility. However, ethical and operational risks arise from poor data quality, unclear model parameters, and overreliance on automated outputs. This paper presents a dual validation approach such as the AI performs preliminary analysis while auditors verify results, ensuring transparency, accountability, and ethical governance, in decision making across healthcare institutions.

Keywords: Artificial Intelligence, Finance Audit, Ethics, Risk Governance, Accounting, Frameworks, Pay Out, Other Statutory requirements, Income and Expenditure.

1. Introduction

The idea of Artificial intelligence dates to 1950s, when British mathematician Alan Turing posed the question, “Can machines think?” in his paper *Computing Machines and Intelligence*. He is widely regarded as one of the founders of AI for proposing that machines could one day demonstrate human-like reasoning. In 1952, Arthur Lee Samuel at IBM developed a program that could play checkers by assigning programmed values to move one of the first demonstrations of machine learning in action.

The term “Artificial Intelligence” itself was formalized at the 1956 Dartmouth Summer Research Project, organized by John McCarthy, an American computer and cognitive scientist. Through the 1960s and 1970s, AI expanded rapidly with the development of early natural-language programs and robotics. Joseph Weizenbaum’s *ELIZA* (1966) represented the first conversational computer program, while Raj Reddy advanced natural-language processing (NLP). The 1970s also saw Japan’s *WABOT*, the first intelligent humanoid robot.

The 1980s brought new innovation with Ernst Dickmanns’ driverless Mercedes-Benz van, one of the earliest successful autonomous vehicle prototypes. In the 1990s, IBM’s *Deep Blue* gained worldwide attention by defeating chess grandmaster Garry Kasparov in 1997, demonstrating the capacity of AI to outperform humans in strategic reasoning.

By the 2000s, Artificial Intelligence had entered daily life through personal digital assistants such as Amazon’s Alexa, Apple’s Siri, and Google Assistant. The evolution culminated in 2023 with the widespread adoption of large language models (LLMs) like ChatGPT, which expanded AI’s capacity from forecasting outcomes to generating and validating content across multiple industries.

Within this historical arc, the integration of AI into healthcare administration represents the next major transformation. In hospitals, financial governance remains one of the most intricate and resource intensive domains. Managing assets, liabilities, expenditure, and compliance requires speed, precision, and accountability. AI offers the means to automate repetitive accounting processes, flag anomalies, and support finance officers in decision making but such power demands ethical oversight.

The purpose of this paper is to present a conceptual frame work for AI- assisted hospital finance audition and compliance, where automation and human judgement co-exist to preserve both operational accuracy and institutional integrity.

2. Concept and Framework

The proposed model relies on a **two-layer validation structure**.

• Layer 1: AI Automation Layer

The AI software reads ledger entries, vouchers, and transaction records to generate draft summaries. It applies trained logic to assign categories, compute totals, and flag inconsistencies. The system can also generate formula based calculations when younger or less experienced accountants are unsure of the correct structure.

Layer 2: Human Validation Layer

Once the draft is produced, a trained staff member reviews the AI’s work for accuracy. This ensures that hallucinated or misinterpreted outputs are caught early. A senior auditor or finance officer then performs the final approval, completing the accountability chain.

This layered approach transforms financial auditing from a static compliance exercise into a dynamic verification process. The AI performs repetitive analytics, while humans exercise professional judgment and ethical reasoning.

3. Functional Design

The AI system can generate accounting templates for expenditure and income statements, balance sheets, and audit reports. Using machine learning, it learns to:

1. Recognize common ledger entries and match them with correct categories.
2. Detecting duplicate or missing transactions.
3. Apply standard accounting formulas for depreciation, amortization, or inventory valuation.
4. Estimate budget deviations and alert users when expenses exceed predefined limits.
5. Summarize audit-ready reports for internal and statutory review.

Integration with Course of Accounts Rules and ERP Systems

Traditional rule based systems, such as CORs and enterprise resource planning (ERP) validation modules, already perform reliable syntactic checks. They verify that an account head exists, confirm debit-credit matching, and highlight untagged transactions. However, these systems cannot interpret the intent or context behind an entry. For example, if an invoice for oxygen-plant maintenance is posted under general administration instead of biomedical infrastructure, the ERP will accept it because the ledger head is valid. AI extends beyond these structural checks by adding a semantic layer that understands context.

A trained AI model can recognize that oxygen-plant expenses usually belong to biomedical cost centers, not administrative ones, and flag the inconsistency automatically. It can also identify patterns across departments and projects, linking fragmented entries to shared objectives such as grants or infrastructure upgrades. By learning from past ledgers, the AI adapts as new expense categories emerge without manual re-coding.

Therefore, AI is not replacing COR or ERP validation; it complements them. CORs enforce structural accuracy, while AI enforces contextual accuracy. Together, they create a system that is both technically correct and logically coherent.

Automation of these tasks shortens audit cycles and frees senior finance officers to focus on decision-making and compliance strategy rather than data reconciliation.

Beyond analytical automation, the AI module can streamline pay out verification, statutory deductions, and compliance reconciliation. It can automatically check whether vendor layouts align with approved purchase orders, flag unpaid statutory liabilities such as GST or employee provident fund dues, and cross verify tax entries against government reporting thresholds. This continuous reconciliation between income and expenditure statements strengthens real time liquidity management and prevents delayed or incorrect submissions.

By aligning automated tasks with standardized accounting frameworks such as Indian Accounting Standards (Ind-AS), ICAI Audit Guidance Notes, and NABH financial management protocols, the system ensures interoperability between hospital ERP data, external statutory findings, auditor review cycles.

4. Ethical and Operational Safeguards

The use of AI in financial auditing must preserve ethical accountability. The proposed framework embeds safeguards that maintain human control over automated outputs:

- **Traceability:** Every AI-generated action and edit must be logged and accessible for audit review.
- **Transparency:** The system must display how it arrived at a calculation or classification.
- **Oversight:** Final validation must always remain with a human officer.
- **Responsibility Chain:** Each step of the workflow including AI drafting, junior verification, senior approval should be time stamped and digitally signed.

These measures prevent AI hallucination from corrupting financial data and protect institutional integrity.

To maintain statutory credibility, AI-driven audits must also operate under defined data governance charters. These should specify model training boundaries, financial data retention limits, and access control consistent with institutional information security policy. Integrating the AI audit engine into ERP level authorization matrices ensures that all automated actions respect existing user privileges and approval hierarchies. This intersection of ethics, governance, and technology reduces the risk of algorithmic bias or unauthorized financial manipulation.

5. Implementation Considerations

Successful adoption requires investment in both technology and people. Finance teams need training in AI interfaces, error recognition, and audit verification techniques. Institutions should appoint roles such as AI Audit Coordinator or Finance Technology Officer to supervise deployment, review anomalies, and update learning models.

Integration with hospital ERP systems ensures that procurement, HR, and patient billing modules feed consistent data into the AI engine. Routine preventive maintenance of software and validation of algorithmic accuracy are essential to avoid drift and maintain compliance.

Integration should extend to statutory reporting channels, enabling seamless export of verified statements for income-tax, CSR, and audit committee submissions. Hospitals implementing such systems must collaborate with both IT and finance

vendors to validate interoperability between AI modules, ERP systems, and accounting-framework plug-ins. Regular reconciliation between automated and manually verified data should be incorporated into monthly audit cycles to detect model drift or systemic bias early.

6. Discussion

The proposed model does not replace financial auditors; it enhances their capacity. Automation reduces mechanical workload, while human reviewers retain control over ethical and regulatory compliance. The hybrid system offers transparency, traceability, and efficiency that are all central to modern hospital governance.

This approach also prevents unregulated use of third-party AI tools, which can inadvertently expose patient or institutional data. By developing an in-house or securely hosted AI auditing platform, hospitals protect confidentiality while reaping the benefits of automation.

In regulated healthcare environments, AI's ethical deployment depends on inter-system accountability. When the same financial data flows through ERP, human resource, and procurement modules, AI must adhere to standardized accounting taxonomies to prevent divergence across reports. Embedding the AI auditing tool within institutional risk-governance committees ensures that ethical concerns are reviewed alongside financial findings, integrating digital oversight into the broader corporate audit structure.

7. Conclusion

Artificial Intelligence has the potential to revolutionize hospital finance auditing when implemented within a clear ethical and operational framework. The two layer model that is AI drafting supported by human validation ensuring accuracy, accountability, and transparency. Such systems strengthen institutional trust and compliance readiness while empowering finance teams to work efficiently and intelligently.

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Author contributions

1. Dr. Uma Nambiar conceptualized the manuscript and led the framework design.
Dr. Sriram Menon Koottala structured the operational model and validation layers.
Ms. Gopika K and Ms. Maria Martin contributed to financial system mapping and institutional analysis.
All authors reviewed and approved the final paper.
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