

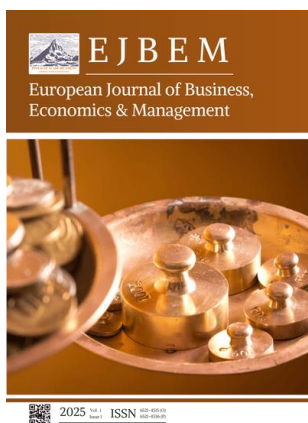
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Research on AI-Driven Financial Audit Efficiency Improvement and Financial Report Accuracy

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Abstract: In the efficient development of artificial intelligence technology, financial auditing and reporting work is facing profound changes. This article studies the use of artificial intelligence to improve the efficiency of financial auditing and ensure the accuracy of financial reports. It first constructs a comprehensive artificial intelligence-based financial auditing and reporting system, then analyzes current problems such as lagging audit evidence collection and inaccurate reports, and finally proposes the use of advanced technologies such as big data, natural language processing (NLP), and robotic process automation (RPA) to address these challenges. AI can not only improve the efficiency and accuracy of automated financial auditing processes, but also enhance the consistency and transparency of financial reports, thereby providing a good foundation for the digital management transformation of enterprises.

Keywords: artificial intelligence; financial audit; financial reports

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1. Introduction

Against the backdrop of rapid development in the digital economy, traditional financial auditing and reporting systems are facing unprecedented challenges. The massive development of big data, the increasing complexity of processes, and the demand for timely and accurate information disclosure make it difficult for traditional manual verification methods to meet the requirements of new financial management. Artificial Intelligence (AI) is bringing profound changes to financial management in areas such as image recognition, speech recognition, pattern learning, and automated operation. In recent years, more and more artificial intelligence technologies have been applied to financial auditing, such as audit evidence collection, text analysis, process design, verification of the legality and compliance of audit reports, and comprehensive data tracking. These applications have generally produced promising results. However, at the same time, most of the current research results are focused on preliminary applications, and there is a lack of research on the framework design and improvement strategies of AI algorithmic systems. Based on this, this article takes financial auditing and reporting under AI technology as an example to study the core technology route, common problem response methods, and targeted solutions to improve efficiency and ensure accuracy in this field, in order to assist in the transformation of financial intelligence.

2. Theoretical Overview of Financial Audit and Reporting Accuracy

The main tool for internal control and external supervision of enterprises is financial auditing, which examines and evaluates the company's accounting records, including

books, statements, and financial data to verify whether the company's financial data is accurate, complete, and compliant. The core function of financial auditing is not only to identify existing risks and errors, but also to enhance the transparency and reliability of a company's financial data [1]. With the development of modern corporate governance structures, financial reports have become an important carrier for showcasing the nature of a company to the outside world, and their accuracy also determines the key to the quality of information disclosure in public enterprises. A reliable and compliant financial report requires complete and accurate data, a logical layout, adherence to accounting regulations, and the ability to truthfully reflect the company's operating conditions and financial performance, and provide reference for investors, securities regulatory agencies, and corporate management.

In theory, there is a high correlation between financial audit efficiency and report accuracy. When the audit effectiveness is high, it can timely detect data inconsistencies and misleading behavior in managing data, ensuring the quality of the report; However, in reality, traditional audit methods rely mainly on human labor to make judgments, which is inefficient and difficult to fully capture the details of complex transactions in a large-scale data environment. This often leads to delayed audit results, errors, and omissions. Therefore, building an intelligent audit system based on information technology is not only an inevitable choice to improve audit efficiency, but also the main guarantee for report accuracy.

3. Construction of AI Driven Financial Audit and Reporting Framework

3.1. AI Assisted Financial Audit Process Design

The focus of AI-assisted financial auditing is to embed intelligent algorithms into every stage of the traditional audit process, enabling full-process intelligence, data collection, risk monitoring, and result generation. Compared to relying on a single audit path driven by human intervention, AI can monitor enterprises in real-time based on big data platforms and machine learning models, continuously collecting transaction data, account balances, and tracking changes in abnormal patterns. It can greatly improve the depth and accuracy of audits. In the audit process, firstly, the AI system can call historical data to train an audit risk identification model, and autonomously set audit focus points and inspection scope; Secondly, the system utilizes NLP technology to parse unstructured textual data such as invoices and contracts, extracting key elements to verify consistency with accounting data; Thirdly, the intelligent judgment engine is used to make preliminary assessments in complex or ambiguous cases and to assist in forming auxiliary audit conclusions. In addition, AI can seamlessly connect with process automation (such as RPA) devices to automatically execute standard actions, significantly reducing labor costs and audit cycles. This intelligent process not only enhances the integrity and real-time capabilities of auditing, but also lays the technical foundation for accurate financial report disclosure. In the long run, with the continuous development of AI technology, the financial audit process will gradually enter the intelligent era of intelligent control and self-optimization (Figure 1)[2].

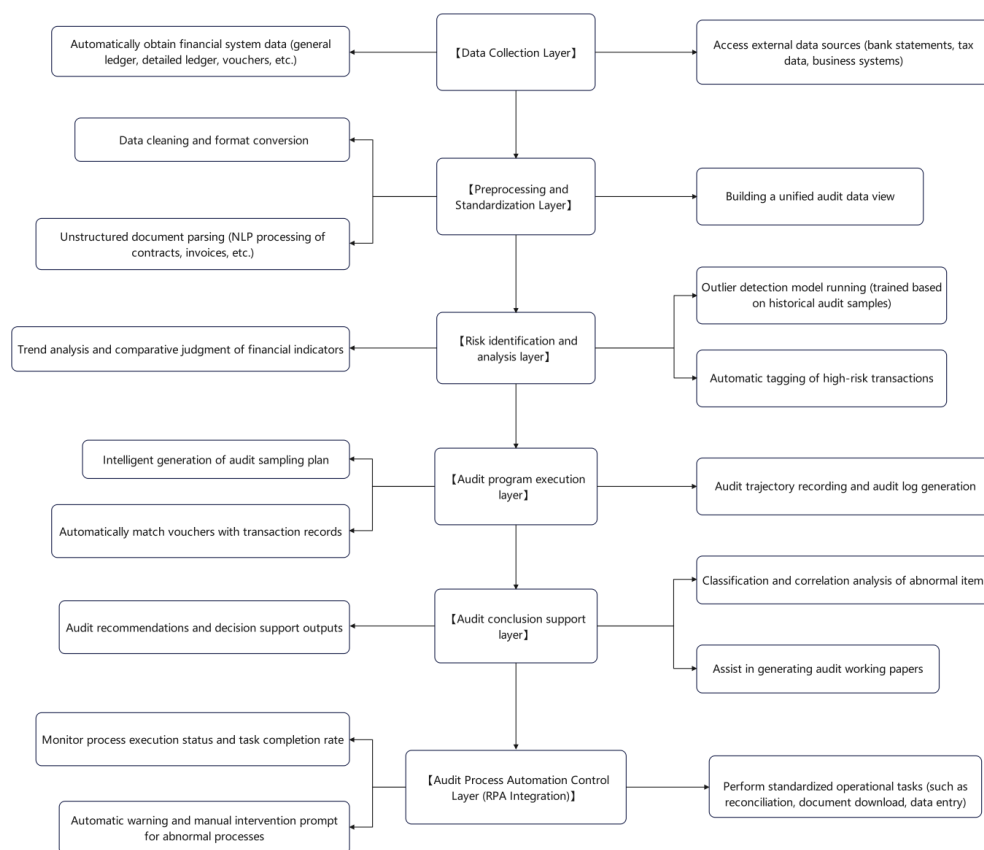


Figure 1. AI Assisted Financial Audit Process Framework Diagram.

3.2. AI Based Intelligent Verification System for Report Data

The accuracy of financial reports not only depends on the impact of data authenticity, but also on the logical consistency and reasonable structure between data. The traditional manual proofreading method and static rules for verification are prone to problems such as long manual proofreading time, high cost, and easy omission. Therefore, it is necessary to introduce artificial intelligence (Artificial InTell)-Intelligence (AI) is an intelligent proofreading system with automatic proofreading function, which automatically analyzes and compares data in various financial reports, enhancing the efficiency and accuracy of the proofreading process [3]. The system can generate data patterns in historical financial reports through machine learning, thereby automatically identifying abnormal data trends; Knowledge graphs and semantic analysis can be used to verify whether the inherent logical connections between different items in financial reports hold true, such as the fundamental equation: $assets = liabilities + owner's\ equity$.

In addition, the system can link report data with original documents and commercial system data for verification, ensuring the integrity of business processing flow and quickly identifying missing and tampered risks. Some systems have already started using OCR and NLP technologies to automatically extract content related to contracts, invoices, and other information and match them with report items, improving the fairness and standardization of report data. Overall, AI based intelligent verification systems have become an important means of ensuring the quality of financial reports and meeting the information requirements of regulatory authorities and investors [4].

3.3. Collaborative Optimization Mechanism for Audit and Reporting Results

In traditional financial management systems, audit results and financial reports often exhibit a fragmented state of "phased output and post verification". Once errors occur, they are difficult to correct immediately, reducing the accuracy of financial information

results. Relying on artificial intelligence technology, an iterative feedback loop can be created to jointly produce audit and reporting results, allowing for real-time online correction. On the one hand, AI can mark the issues discovered during the audit process and forward them to the financial report writing module to remind it of the added or corrected content; on the other hand, changes in key data in financial reports can also be synchronously fed back to the audit module, enabling repeated risk management and model updates.

This mechanism relies on a unified data platform and audit report interface standards to achieve information exchange, logical mapping, and response loops, improving the speed of information flow and risk prevention. In some cases, applications have been implemented, such as using intelligent rule engines to automatically adjust the report format and publicly disclosed content according to audit strategies, improving its applicability diversity and reasonable compliance [5]. This collaborative mechanism not only optimizes the process of auditing and reporting, but also helps enterprises achieve the dual goals of financial information transparency and intelligent risk management.

4. AI Driven Measures to Improve Financial Audit Efficiency

4.1. Building an Intelligent Audit and Evidence Collection System Based on Big Data Technology

As an important foundation of financial auditing, audit evidence collection directly affects the overall audit quality in terms of efficiency and coverage. Due to the limitations of traditional manual evidence collection methods, such as a large amount of information and scattered data, it has resulted in negative consequences such as low efficiency. Therefore, with the help of big data technology, an intelligent audit and evidence collection system can be implemented, which comprehensively integrates various financial, operational, and external data of enterprises, achieving automatic capture, cleaning, and preliminary filtering of evidence data. The system utilizes an audit model to apply multiple labels to data, enabling timely identification of high-risk areas and automatic determination of audit sampling ranges. In addition, the intelligent forensics system can also be used in conjunction with graph databases to study the correlation between cash flow, invoice flow, and contract flow, forming a business activity chain that helps detect signs of fraud in business activities. Based on this, auditors can focus on key issues, improve the depth and pertinence of audit work (Table 1).

Table 1. Comparison between Intelligent Audit Evidence Collection System and Traditional Methods.

Comparing dimensions	Traditional way	Intelligent Audit and Evidence Collection System
Data acquisition method	Manual retrieval and export	Multi source automatic collection, real-time capture
Data processing capability	Relying on the experience of auditors	Automatic cleaning, classification, and modeling of the system
Risk identification efficiency	Low, limited range	High, quickly locate abnormal transactions or accounts
Ability to analyze correlation relationships	Weak, difficult to detect hidden chains	Strong, supporting visual analysis of funds and trading paths

4.2. Integrating NLP Technology to Optimize Financial Text Recognition Mechanism

In the process of financial auditing, a large amount of unstructured textual materials such as contracts, invoices, meeting minutes, etc. contain abundant audit-relevant information, while traditional auditing methods mainly rely on manual understanding of the text, which is inefficient and prone to errors and forgetfulness. The use of text analysis

tools that combine NLP technology can achieve information extraction from financial documents, such as text entity recognition and content comparison, to achieve structured extraction of information and assist in audit decision-making. It can identify important contents such as contract amount, start and end dates, payment conditions, etc., and will cross-verify with accounting system data to check for issues such as unrecorded transactions, miscalculations, or violations of rules. Moreover, NLP models provide functions such as financial semantic correction and text similarity comparison, which help to improve the legality review of report content by identifying high-risk parts with unclear expressions and descriptions (Table 2).

Table 2. Key Applications of NLP Text Recognition in Financial Audit.

Application scenarios	NLP technology functions	Audit value reflection
Contract identification	Named Entity Recognition (NER)	Extract fields such as amount, date, payment terms, etc.
Invoice verification	OCR + Text Validation	Verify if the face value matches the incoming information
Risk statement review	Emotion analysis + semantic recognition	Identify ambiguous wording and potential risk disclosure omissions
Comparison of terms	Similarity analysis and syntactic structure comparison	Compare the risks of changes in different versions of contracts or agreements

4.3. Application of RPA Process Refactoring Audit Task Execution System

Many procedural tasks, such as voucher verification, account reconciliation, and report summarization, are carried out manually, which is time-consuming and prone to errors. Based on robotic process automation (RPA) technology, the audit process is remodeled with intelligent automation, and standardized steps are handed over to software robots to achieve an automated process loop. RPA can maintain the original system structure, simulate the operational behavior of auditors, automatically complete tasks such as data capture, system login, and form comparison in the system, and collaborate with the audit platform to form consistent work records and risk warning information. In addition, RPA can also be closely combined with AI models to invoke intelligent decision-making logic during robot operations, enabling dynamic adjustment of audit paths and intelligent access to key areas, so as to improve the response efficiency and coverage of audit operations while ensuring the accuracy of operations (Table 3).

Table 3. Comparison between Traditional Manual Operations and RPA Audit Process.

Operation steps	Traditional mode	RPA Automated Execution Mode
Data entry	Manually inputting each item takes a long time	Automatically capture and import, fast and error free
System reconciliation	Manual comparison is prone to errors	Automatic verification, highlighted abnormal items
Process leaving traces	Human records are prone to omission	Full process system recording, supporting backtracking and audit tracing
Response flexibility	Fixed process, poor adaptability	The task path can be dynamically adjusted according to the rules

5. AI Driven Optimization Strategy for Financial Report Accuracy

5.1. Building an Intelligent Financial Data Verification Model to Enhance Information Consistency

When preparing financial reports, due to the complex data sources and different definitions involved, numerical contradictions or inconsistent definitions are often encountered, undermining the credibility of financial reports. The intelligent detection mode of financial data can achieve multi-level verification and logical detection of various types of data in the enterprise financial system through AI technology, enhancing the integrity and accuracy of information. The intelligent detection mode for financial data usually uses historical financial information as training samples, and combines rule engines and machine learning to model a two-layer architecture of "audit rule library + anomaly recognition algorithm", which is used to automatically generate data reconciliation relationships between reports such as balance sheets, income statements, and cash flow statements for verification.

In addition, the model can also compare the transmission results of various business process data, such as whether the records of the financial system are consistent with those of the procurement, sales, and warehousing systems, to avoid distorted or duplicate data caused by data silos, automatically prompt the parts that need to be corrected, and help auditors process the work, greatly improving the quality and accuracy of reports. This model can improve the transparency of reports and reduce human error, and is one of the main measures for financial digitization.

5.2. Application of Semantic Intelligent Recognition System to Enhance Text Disclosure Compliance

A large amount of textual disclosure content in financial reports (such as management discussions, major issue explanations, risk warnings, etc.) requires extremely high compliance. Any slight omission or inappropriate wording may lead to accountability from regulatory agencies or market misinterpretation. The use of semantic intelligent recognition systems can utilize natural language processing technology and deep learning algorithms to understand the semantic meaning of the report text and compare it with compliance, identifying potential disclosure defects by extracting important text fragments through financial semantic models and semantically comparing them with relevant legal provisions, norms, and previous reports to identify areas of confusion such as unclear wording, missing important parts, or violations of regulations.

Semantic similarity discrimination is one of the core components of the system, which usually uses vector space models to calculate the semantic distance between paragraphs. Its basic form is cosine similarity:

$$\text{Sim}(A, B) = \frac{\vec{A} \cdot \vec{B}}{\|\vec{A}\| \cdot \|\vec{B}\|} \quad (1)$$

Among them, \vec{A} and \vec{B} represent the word vectors of text A and B , respectively. When the similarity is below the set threshold, it will be judged as a "statement deviation" state and feedback will be given to the user. Through this system, enterprises can express financial data more strictly and accurately, improving the disclosure and standardization of reports.

5.3. Building a Data Traceability Platform to Achieve Audit Traceability throughout the Entire Reporting Process

The final output of financial reports involves multi-level data processing and system integration. Without effective traceability mechanisms, it is easy to encounter problems such as information distortion and unclear responsibilities in the process. Artificial intelligence and blockchain technology can be used to build a data tracking platform that traces all records, confirmations, and audits throughout the entire process, from original

source documents and business systems to report generation. By using intelligent tagging and data fingerprinting technology, a tripartite linkage among data sources, processing paths, and final outputs can be established, ensuring that the data in any financial statement can be traced back to specific business actions and time nodes.

In this process, the platform introduces a "path credibility scoring" mechanism to evaluate the integrity and compliance of data processing paths. The scoring formula is as follows:

$$S = \sum_{i=1}^n (w_i \cdot \frac{v_i}{t_i}) \quad (2)$$

Among them, S is the path credibility score; w_i represents the weight of the i -th processing node; v_i is the number of times the node verification has passed; t_i is the total number of calls made to the node. This rating can assist the audit system in identifying high-risk points and abnormal paths in the data link, improving the visibility of the data link and the verifiability of reporting information, providing technical support for financial management and audit management.

6. Conclusion

Artificial intelligence is profoundly reshaping the operational logic and technological system of financial auditing and reporting. On the basis of AI technology, this article designs a collaborative optimization architecture that can promote financial auditing and financial reporting, and proposes the use of key core technologies such as big data, natural language (NLP), and robotic process automation (RPA) to ensure work efficiency and accuracy. AI can not only significantly improve the efficiency of obtaining financial audit evidence and executing audit procedures, but also increase the consistency, legality, and openness of financial reports. In the future, with the continuous maturity of AI algorithms and improvement of regulatory mechanisms, financial auditing and reporting will develop in a more intelligent, efficient, and reliable manner, promoting the digitization of companies.

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