

Research on the application status, problems and future trends of AI in audit work

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Abstract: Artificial intelligence (AI) technology is transforming the auditing industry by enhancing audit efficiency and accuracy through data processing and intelligent analysis, optimizing resource allocation, reducing errors, and driving industry digitalization. However, AI in auditing faces challenges including data quality, algorithmic transparency, regulatory compliance, and new skill requirements for auditors. The widespread adoption of AI has also sparked concerns about employment structure changes, necessitating a balance between AI and auditor roles. In the future, AI will play a greater role in real-time and automated audits to improve timeliness and precision. To enhance transparency and credibility, AI auditing tools may adopt explainable algorithms, while audit standards and regulations require adjustments. The auditing industry will increasingly emphasize human-machine collaboration, requiring auditors to strengthen professional judgment capabilities. To achieve deep integration and sustainable development of AI in auditing, it is essential to refine technical systems, optimize regulatory frameworks, and enhance auditor skills. This article provides insights for auditing professionals and researchers to facilitate the rational application of AI in auditing.

Key Words: Artificial intelligence; audit technology; data analysis; risk assessment

1. Introduction

In recent years, the rapid development of big data, cloud computing, and artificial intelligence (AI) technologies has driven profound digital and intelligent transformations in the auditing industry[1][2]. Traditional auditing methods, which rely on manual judgment and sampling analysis, suffer from issues such as heavy workload, low efficiency, and subjectivity. The introduction of AI provides new technical support for audit work. With its powerful data processing capabilities and intelligent analytical techniques, AI can perform real-time analysis of massive financial data, enhancing the accuracy of risk identification and improving audit efficiency and precision[3]. However, the application of AI in auditing remains in its developmental stage, facing challenges such as insufficient algorithm transparency, data quality issues, legal compliance risks, and increased skill requirements for auditors[4]. Therefore, studying the current status, existing problems, and future trends of AI in auditing not only promotes the rational application of AI technology in this field but also provides theoretical support and practical references for the intelligent transformation of the auditing industry, thereby improving the overall quality and risk control capabilities of audit work.

2. The application status of AI in audit work

Data Analysis and Audit Automation: Artificial intelligence demonstrates exceptional capabilities in processing large-scale datasets,

executing data preprocessing and integration tasks that significantly reduce manual intervention requirements. Natural Language Processing (NLP) technology has been applied in text data analysis, enabling automatic identification and extraction of key information. The implementation of automated testing systems has effectively enhanced audit efficiency, with intelligent systems capable of automatically generating audit working papers and reports.

Abnormal Detection and Risk Assessment: Through machine learning algorithms, AI analyzes financial data to identify potential anomalies, conducts in-depth transaction behavior analysis, and monitors risk conditions in real-time. Additionally, an intelligent algorithm-based risk scoring model has been developed to enable quantitative risk assessment.

Applications of AI in Financial Auditing: With the assistance of AI-powered audit software and Intelligent Optical Character Recognition (OCR) technology, financial data processing has become more efficient. Furthermore, knowledge graph technology enables the identification of complex transaction patterns. AI-driven audit robots show tremendous potential in performing routine audit tasks.

Intelligent Support for Internal and External Audits: AI plays a crucial role in internal audit automation through intelligent compliance checks. Simultaneously, this technology provides robust support for external auditors when analyzing financial statements and

audit data, enhancing audit precision and efficiency.

3. Problems and challenges faced by AI in audit work

The integration of artificial intelligence (AI) in auditing has sparked revolutionary transformations, significantly enhancing work efficiency and accuracy[5]. However, the application of this technology also brings a series of practical challenges that extend beyond technical aspects to include professional transformation within the auditing field, regulatory compliance, and ethical considerations[6]. This article will explore key issues and challenges faced by AI in auditing through concrete case studies.

First, technical limitations constitute one of the primary challenges in applying artificial intelligence (AI) to auditing. The effectiveness of AI heavily depends on data quality, yet accounting and audit data often suffer from incompleteness, inaccuracies, or biases. These issues can compromise the training and predictive accuracy of AI models, potentially leading to misjudgments or omissions. For instance, EY encountered operational disruptions when implementing AI technology due to missing or inconsistent historical data, which impaired the proper functioning of AI tools and consequently compromised audit accuracy[7]. While AI can process massive datasets, the absence of high-quality, standardized data significantly limits its practical effectiveness. Second, inherent imperfections in AI algorithms remain another limitation. Despite continuous advancements, AI cannot fully replace auditors' professional expertise in judgment and decision-making. When addressing complex financial fraud, corporate strategic decisions, and internal control issues—particularly in evaluating unconventional financial statements or exceptional circumstances—AI demonstrates inherent limitations[8]. Deloitte, for example, found that complex judgments still require human intervention in automated audit processes, as AI struggles with handling intricate details and exceptional scenarios.

The application of artificial intelligence (AI) technologies has brought challenges to the auditing profession itself, not only transforming how auditors work but also profoundly reshaping the industry's structure. Auditors are shifting from traditional meticulous review of financial statements to focusing more on analyzing AI-generated results and making judgments[9]. While AI can automate repetitive tasks like data entry, bill verification, and basic risk assessments, auditors must increasingly

demonstrate capabilities in complex decision-making, communication coordination, and anomaly handling. For instance, KPMG noted that the adoption of AI has significantly altered audit practices, requiring auditors to move beyond routine tasks into optimizing AI models and interpreting data outcomes.

With the deepening application of artificial intelligence in auditing, auditors need to acquire more technical knowledge and skills. Traditional auditing skills primarily focused on financial and accounting knowledge, but now auditors must also master data science, machine learning, and other technical expertise. Many accounting firms like PwC and Deloitte are strengthening technical training for employees to ensure effective use of AI tools. However, this has led to high training costs and puts pressure on traditional auditors to update their skills[10]. The application of AI in auditing inevitably raises related legal, regulatory, and ethical issues, mainly including: legal liability for audit results, data privacy and compliance concerns, as well as ethical issues regarding the transparency of AI judgments. Supported by AI technology, audit outcomes may be influenced by algorithms and data quality. If AI systems make errors or auditors fail to properly review AI-generated results, it could lead to incorrect audit conclusions and subsequent legal liabilities. For example, during the collaboration between EY and AI tools, if AI fails to accurately identify anomalies in financial statements and auditors do not promptly intervene to correct the results, it might be considered inadequate audit responsibility fulfillment, potentially misleading clients' financial information.

The widespread application of artificial intelligence (AI) in auditing requires handling massive amounts of sensitive financial data, which raises concerns about data privacy and information protection. Different countries and regions have varying legal requirements for data protection, particularly under privacy regulations like the EU's General Data Protection Regulation (GDPR)[11]. Legally collecting, storing, and processing customer financial data has become a major challenge. When using AI tools for audits, companies must ensure compliance with relevant data privacy laws to prevent leaks or misuse of customer information. Ethical issues and transparency in AI judgments are also critical challenges for the auditing industry. AI algorithms and decision-making often operate as "black boxes," making it difficult for auditors to explain conclusions—especially during complex risk assessments or anomaly detection. Moreover, AI judgments may be influenced by algorithm designers' biases, potentially compromising

audit fairness. Therefore, the auditing profession must address transparency in AI decision-making, ensuring ethical application that doesn't improperly affect audit outcomes. KPMG has publicly stated that while AI holds great potential for improving audit efficiency, maintaining fairness and transparency in AI decisions remains a key challenge. In summary, while AI applications in auditing demonstrate significant potential, they face multiple challenges including technological limitations, professional transformation in auditing, and regulatory and ethical considerations[12][13]. With the continuous development of technology and the improvement of industry norms, the role of artificial intelligence in audit will be more prominent, but its application still needs to overcome these challenges to better serve the development of audit industry.

4. Problems and challenges faced by AI in audit work

(1) Innovation and Development Directions of AI Technology

With the continuous advancement of artificial intelligence technology, the application of AI in the auditing field will exhibit a trend of diversification and deepening. In the future, AI will no longer be merely a simple data processing tool, but will become an indispensable intelligent assistant in audit work, driving innovation and transformation within the auditing industry.

The Application of Deep Learning and Natural Language Processing (NLP) Technologies In the future, deep learning and NLP technologies will see broader applications, particularly in automated analysis of audit reports, contracts, and other complex documents. AI will enhance audit efficiency by understanding document semantics, contextual implications, and potential risk factors. For instance, KPMG has implemented NLP technology in some audit projects to automatically scan and analyze key information from financial reports, reducing manual review time while improving data accuracy and reliability. Exploring the Integration of AI with Augmented Reality (AR) and Virtual Reality (VR) The convergence of AI with AR and VR technologies will drive innovative applications in the auditing industry. During internal control and asset audits, auditors can virtually inspect corporate assets using AR technology while leveraging AI to analyze actual conditions, enabling rapid identification of potential risks or non-compliance issues. Although currently in experimental stages, this technology is opening new avenues for audit practices.

(2) The integration trend of AI and audit work

Building a Fully Automated Audit System With continuous advancements in AI technology, future audit systems are expected to achieve full automation. Auditors will be freed from routine transactional tasks to focus on complex decision-making processes. For instance, Deloitte has implemented AI in automated financial audits, using machine learning models to automatically identify accounting errors and make corresponding adjustments[14]. As AI continues to be applied in auditing, many audit processes will gradually become automated, significantly improving efficiency and reducing human interference.

Redefining the Role of Auditors with AI In the future, AI will serve as a trusted assistant for auditors, efficiently handling tedious tasks such as data collection, analysis, and report generation[15]. Auditors will transition from traditional verification work to value-added roles like data analysis, risk assessment, and advisory services. Their role will evolve from "data processors" to "data analysts" and "risk evaluators," emphasizing decision-making guidance while AI handles repetitive tasks. For example, PwC has already utilized AI to automatically identify high-risk areas during audits, allowing auditors to focus on strategic decision-making.

Integrated Application of AI and Big Data in Auditing The convergence of AI and big data will usher in a new era for auditing[16]. By leveraging big data analytics, AI can extract valuable insights from massive financial datasets, detecting potential risks and irregularities. For example, EY has developed a real-time data analysis tool through integration with big data technology[17]. This tool enables monitoring of corporate financial data flows, promptly identifying anomalies and issuing alerts. It allows auditors to track and identify financial risks in real time during audits, thereby enhancing the timeliness and accuracy of audit work.

(3) The future impact of AI on the audit industry

Enhancing Audit Quality and Efficiency The application of AI in auditing will significantly improve audit quality and efficiency. Through data analysis and intelligent detection, AI can identify issues that traditional audit methods tend to overlook, thereby enhancing the comprehensiveness and accuracy of audits[18]. Additionally, the integration of AI will shorten audit cycles and boost overall audit efficiency. For instance, Deloitte employs AI technology for data preprocessing during audits, enabling rapid

identification of abnormal financial statement data and effectively reducing audit time.

Challenges and Opportunities Coexist While AI technology holds vast potential in audit work, it also presents multiple challenges. First, the complexity of AI requires auditors to possess technical expertise, raising higher demands on their professional competence. Second, the use of AI may lead auditors to over-rely on machine judgments during data analysis, potentially neglecting human judgment capabilities. Finally, as AI becomes more prevalent in auditing, regulatory frameworks and industry standards must evolve accordingly to ensure the proper application of AI technology.

5. Conclusion

This paper examines the current applications, challenges, and future trends of artificial intelligence (AI) in auditing, analyzing industry cases and research findings. The study highlights that AI technology has enhanced efficiency and accuracy in audit work, particularly excelling in processing financial data within big data environments. However, AI auditing faces challenges including algorithmic explainability, data quality assurance, and adaptability of auditors' skills. Despite AI's immense potential, it cannot fully replace human auditors in the short term. Future development will see collaborative AI-human systems as the mainstream approach, requiring the industry to focus on integrating technology with human expertise to drive intelligent upgrades. To address application issues in AI auditing, the paper proposes the following recommendations: improving algorithmic transparency and explainability, strengthening auditors' digital literacy, refining legal and regulatory frameworks for AI auditing, promoting technological integration, and establishing intelligent audit models. While AI will play a crucial role in auditing, it's essential to balance technological innovation with risk management. In the short term, AI will optimize audit processes as an auxiliary tool; long-term, it may replace traditional auditing in low-risk areas. Technological progress doesn't mean auditors will disappear, but rather demands higher-level capabilities. The auditing industry should proactively embrace both opportunities and challenges brought by AI, fostering deep integration between AI technology and audit practices to achieve intelligent, precise, and efficient auditing..

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