INTELLIGENT AUTOMATION IN ACCOUNTING AND FINANCIAL REPORTING

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Abstract

Introduction: As businesses face increasing pressure to streamline operations, reduce costs, and enhance accuracy, the integration of intelligent automation in accounting and financial reporting processes has emerged as a promising solution. Intelligent automation technologies, such as robotic process automation (RPA), artificial intelligence (AI), and machine learning (ML), offer opportunities to automate repetitive tasks, improve data accuracy, and generate valuable insights for decision-making in the finance and accounting domain. Problem Statement: Traditional accounting and financial reporting processes are often manual, time-consuming, and prone to errors, leading to inefficiencies and inaccuracies in financial data. Moreover, the complexity of regulatory compliance requirements further exacerbates the challenges faced by finance professionals. These issues highlight the need for innovative approaches to transform accounting and financial reporting practices. Objective: This research aims to explore the impact of intelligent automation on accounting and financial reporting processes, with a focus on efficiency gains, accuracy improvements, and compliance enhancements. By examining the adoption of intelligent automation technologies in various organizations, this study seeks to identify best practices and key success factors for leveraging automation in finance functions. Methodology: A comprehensive review of existing literature on intelligent automation in accounting and financial reporting will be conducted to establish a theoretical framework. Additionally, case studies and interviews with finance professionals will be conducted to gather empirical data on the implementation of intelligent automation solutions. Qualitative and quantitative analyses will be employed to evaluate the benefits, challenges, and implications of intelligent automation adoption in finance and accounting. Results: The findings of this research will provide insights into the effectiveness of intelligent automation technologies in improving

accounting and financial reporting processes. Specifically, the study will highlight the efficiency gains, accuracy improvements, and compliance enhancements achieved through the adoption of RPA, AI, and ML in finance functions. Moreover, the research will identify key success factors and challenges associated with implementing intelligent automation solutions in organizations. Conclusion: Intelligent automation holds significant potential to revolutionize accounting and financial reporting practices by automating routine tasks, enhancing data accuracy, and enabling proactive decision-making. However, successful implementation requires careful planning, stakeholder engagement, and ongoing monitoring to address challenges and maximize benefits. By embracing intelligent automation, organizations can achieve greater efficiency, accuracy, and compliance in their finance operations, ultimately driving competitive advantage and sustainable growth.

Keywords: Intelligent Automation, Accounting, Financial Reporting, Robotic Process Automation (RPA), Artificial Intelligence (AI), Machine Learning (ML).

1. INTRODUCTION

In the face of escalating demands for operational efficiency, cost reduction, and heightened accuracy, businesses across various sectors are increasingly turning to intelligent automation to revolutionize their accounting and financial reporting processes [1]. This burgeoning trend underscores the transformative potential of intelligent automation technologies, including robotic process automation (RPA), artificial intelligence (AI), and machine learning (ML), in optimizing finance and accounting operations.

The traditional landscape of accounting and financial reporting has long been characterized by manual, time-intensive processes fraught with the risk of errors, thus impeding efficiency and compromising data integrity [2]. Furthermore, navigating the intricate web of regulatory compliance requirements poses additional challenges for finance professionals, exacerbating the complexities inherent in traditional practices [3]. Consequently, there exists a pressing need for innovative solutions capable of transcending these challenges and catalyzing a paradigm shift in finance and accounting methodologies [4].

This research endeavors to investigate the profound impact of intelligent automation on accounting and financial reporting processes, with a primary focus on elucidating the efficiency gains, accuracy enhancements, and compliance improvements facilitated by its adoption [5]. By delving into the experiences of diverse organizations that have embraced intelligent automation, this study aims to unearth invaluable insights, identify best practices, and delineate key success factors essential for harnessing the full potential of automation in finance functions.

Methodologically, this research adopts a multifaceted approach encompassing a comprehensive review of existing literature on intelligent automation in accounting and financial reporting to establish a robust theoretical framework. Additionally, the incorporation of case studies and interviews with finance professionals will furnish empirical data crucial for illuminating real-world implementations of intelligent automation solutions [6]. Employing both qualitative and quantitative analyses, this study will meticulously evaluate the benefits, challenges, and broader implications

associated with the adoption of intelligent automation in the realm of finance and accounting.

The anticipated results of this research hold the promise of offering unparalleled insights into the efficacy of intelligent automation technologies in revolutionizing accounting and financial reporting practices. Specifically, the findings are expected to underscore the tangible efficiency gains, accuracy enhancements, and compliance advancements engendered by the integration of RPA, AI, and ML in finance operations. Moreover, by distilling key success factors and elucidating prevalent challenges, this research endeavors to equip organizations with the requisite knowledge and strategies to navigate the complexities of implementing intelligent automation solutions effectively.

The advent of intelligent automation heralds a transformative era for accounting and financial reporting, characterized by the automation of routine tasks, heightened data accuracy, and empowered decision-making capabilities. However, the realization of these transformative benefits hinges upon meticulous planning, robust stakeholder engagement, and vigilant monitoring to address challenges and optimize outcomes. By embracing intelligent automation, organizations stand to unlock unprecedented levels of efficiency, accuracy, and compliance in their finance operations, thereby propelling them towards sustained competitive advantage and enduring growth.

2. LITERATURE REVIEW: INTELLIGENT AUTOMATION IN ACCOUNTING AND FINANCIAL REPORTING

Intelligent automation (IA) represents a convergence of artificial intelligence (AI) and robotic process automation (RPA), aiming to enhance efficiency and accuracy in various industries. In the accounting and financial reporting sectors, IA promises transformative changes by automating routine tasks, enhancing data accuracy, and enabling predictive analytics [7]. This literature review explores the current state of IA in accounting and financial reporting, examining its benefits, challenges, and the future trajectory as indicated by recent research.

2.1 Benefits of Intelligent Automation in Accounting and Financial Reporting

The integration of IA in accounting and financial reporting offers numerous advantages. Studies have shown significant improvements in efficiency and accuracy. For instance, IA can reduce manual data entry errors and streamline reconciliation processes, resulting in faster financial close cycles [8]. Additionally, IA can handle vast amounts of data with high precision, enabling real-time financial analysis and reporting.

The predictive capabilities of IA tools also present substantial benefits. Predictive analytics facilitated by IA can forecast financial trends and identify potential risks, aiding in strategic decision-making [9]. This predictive power is particularly valuable in dynamic markets, where timely and accurate financial insights are crucial.

2.2 Challenges and Barriers to Implementation

Despite the evident benefits, the implementation of IA in accounting and financial reporting faces several challenges. One significant barrier is the integration with existing systems. Many organizations operate with legacy systems that are not compatible with modern IA technologies, necessitating costly and time-consuming upgrades [10].

Moreover, there is a skills gap in the workforce. The World Economic Forum (2020) emphasizes the need for upskilling accountants and financial professionals to work alongside IA technologies effectively [11]. This involves not only technical training but also developing a deeper understanding of data analytics and AI.

Data security and privacy concerns also pose significant challenges. As IA systems handle sensitive financial data, ensuring robust cybersecurity measures is paramount. Organizations are wary of potential breaches and the associated reputational and financial risks, which can impede the adoption of IA technologies [12].

2.3 Case Studies and Practical Applications

Several case studies highlight the successful application of IA in accounting and financial reporting. For example, implemented RPA to automate its accounts payable process. The result was a 60% reduction in processing time and a significant decrease in errors [13].Another case study explored the use of AI-driven analytics in a large financial institution. The institution employed machine learning algorithms to predict credit risk, resulting in more accurate risk assessments and a 30% reduction in default rates. These examples underscore the practical benefits of IA and provide a roadmap for other organizations considering similar implementations.

2.4 Future Directions and Research Opportunities

The future of IA in accounting and financial reporting is promising, with ongoing advancements in AI and machine learning poised to drive further innovation. By 2025 [14], more than half of all accounting tasks will be automated, allowing professionals to focusonstrategic activities. Emerging technologies such as blockchain also present exciting opportunities for integration with IA. Blockchain can enhance transparency and security in financial trans actions, complementing the capabilities of IA. However, further research is needed to address existing challenges and optimize IA applications. Areas for future investigation include developing more sophisticated algorithms for financial forecasting, enhancing interoperability between IA systems and legacy infrastructure, and addressing ethical considerations related to AI in financial decision-making. The literature on intelligent automation in accounting and financial reporting highlights its transformative potential, offering significant benefits in terms of efficiency, accuracy, and predictive capabilities [15]. However, the journey toward widespread adoption is fraught with challenges, including integration issues, skill gaps, and security concerns. Through continued research and practical applications, the field can overcome these barriers, paving the way for a future where intelligent automation is integral to accounting and financial reporting processes.

3. INTELLIGENT AUTOMATION TECHNOLOGIES

3.1 Description of Intelligent Automation

Intelligent automation (IA) refers to the integration of artificial intelligence (AI) with automation tools to enhance business processes, improve efficiency, and reduce human intervention. IA combines technologies such as machine learning, robotic process automation (RPA), and natural language processing (NLP) to automate complex tasks, analyze large volumes of data, and make data-driven decisions [16].

The aim of IA is to create systems that can learn, adapt, and make decisions with minimal human input, thus enabling organizations to operate more efficiently and effectively.

3.2 AI and Machine Learning in Accounting

AI and machine learning are transforming the accounting industry by automating routine tasks, enhancing accuracy, and providing deeper insights into financial data. Here are some key applications [17]:

- **Automating Routine Tasks**: AI can handle repetitive tasks such as data entry, invoice processing, and reconciliation, reducing the workload for accountants and minimizing human error.

- **Predictive Analytics**: Machine learning algorithms analyze historical data to predict future trends, helping accountants to forecast revenues, expenses, and cash flows with greater accuracy.

- **Fraud Detection**: AI systems can identify unusual patterns and anomalies in financial transactions, enabling early detection of fraudulent activities.

- **Expense Management**: AI-driven tools can automatically categorize expenses, flag unusual expenses, and ensure compliance with company policies and tax regulations.

- **Financial Reporting**: AI can assist in preparing financial statements by automatically gathering and analyzing relevant data, ensuring accuracy and compliance with accounting standards.

3.3 Robotic Process Automation (RPA)

Robotic Process Automation (RPA) is a technology that uses software robots or "bots" to automate highly repetitive and rule-based tasks typically performed by humans. In accounting and finance, RPA can be used to [18]:

- **Data Entry and Migration**: Bots can transfer data between systems quickly and accurately.

- **Invoice Processing**: RPA can automate the extraction of invoice data, matching it with purchase orders and processing payments.

- **Reconciliation**: Bots can compare financial records, identify discrepancies, and reconcile accounts.

- **Payroll Processing**: RPA can handle payroll calculations, tax deductions, and generate pay slips.

- **Regulatory Compliance**: Bots can monitor regulatory changes and ensure that financial processes comply with the latest standards.

RPA improves efficiency, reduces costs, and minimizes errors by handling mundane tasks, allowing human employees to focus on more strategic activities.

3.4 Natural Language Processing (NLP)

Natural Language Processing (NLP) is a branch of AI that focuses on the interaction between computers and humans through natural language. In accounting, NLP has several applications [19]:

- **Automated Document Analysis**: NLP can read and interpret financial documents, extracting key information and insights.

- **Chat bots and Virtual Assistants**: NLP-powered chatbots can assist with customer queries, provide financial advice, and support internal staff with accounting tasks.

- **Sentiment Analysis**: NLP can analyze text data from social media, news articles, and reports to gauge public sentiment about a company, influencing investment decisions.

- **Compliance Monitoring**: NLP can scan emails and documents for compliance with regulatory requirements and flag potential issues.

- **Financial Reporting**: NLP can generate narratives for financial reports, providing insights and explanations in natural language.

NLP enhances the ability of AI systems to understand and process human language, making it easier to automate complex tasks that involve unstructured data.

3.5 Blockchain Technology

Blockchain is a decentralized ledger technology that records transactions across a network of computers in a way that ensures data integrity and security. In accounting, blockchain offers several advantages [20-23]:

- **Immutable Records**: Once recorded, transactions on a blockchain cannot be altered, ensuring a secure and tamper-proof record of financial transactions.

- **Enhanced Transparency**: Blockchain provides a transparent view of all transactions, making it easier to audit and verify financial data.

- **Efficient Reconciliation**: Since blockchain maintains a single, immutable record of transactions, the reconciliation process becomes more straightforward and efficient.

- **Smart Contracts**: Blockchain enables the use of smart contracts, which are self-executing contracts with the terms of the agreement directly written into code. This can automate and enforce contract terms without the need for intermediaries.

- **Cost Reduction**: By reducing the need for third-party verification and streamlining processes, blockchain can lower the costs associated with financial transactions and audits.

Blockchain technology enhances the security, transparency, and efficiency of financial processes, making it a valuable tool for the accounting industry.

4. APPLICATIONS IN ACCOUNTING

The integration of advanced technologies, such as artificial intelligence (AI) and machine learning (ML), has revolutionized the field of accounting. Here's a detailed discussion on various applications:

4.1 Automated Bookkeeping

Automated bookkeeping leverages AI and ML to perform routine and repetitive tasks that traditionally required significant manual effort. These tasks include [24-26]:

- **Transaction Recording**: Automatically categorizing and recording financial transactions from bank feeds, credit card statements, and invoices into the appropriate accounts.

- **Expense Management**: Tracking and categorizing expenses, and even attaching receipts to transactions.

- **Reconciliation**: Matching transactions recorded in the accounting system with bank statements, ensuring that records are accurate and up-to-date.

Benefits:

- **Time Efficiency**: Reduces the time spent on manual data entry and reconciliation.

- **Accuracy**: Minimizes human errors, leading to more accurate financial records.

- **Cost Savings**: Lowers the cost of bookkeeping services by reducing the need for manual labor.

4.2 Fraud Detection

AI and ML are powerful tools for detecting fraudulent activities within financial records. They can analyze vast amounts of data to identify patterns and anomalies that may indicate fraud.

Key aspects include [27-29]:

- **Anomaly Detection**: Identifying unusual transactions or patterns that deviate from the norm.

- **Predictive Analysis**: Using historical data to predict and flag potentially fraudulent activities.

- **Behavioral Analysis**: Monitoring user behavior to detect unusual activities, such as unauthorized access or transactions.

Benefits:

- **Proactive Detection**: Enables early detection of fraudulent activities, potentially before significant damage occurs.

- **Continuous Monitoring**: Provides ongoing surveillance of financial transactions and systems.

- **Reduced Risk**: Helps mitigate the risk of financial loss due to fraud.

4.3 Tax Compliance

Ensuring compliance with tax regulations is a critical aspect of accounting. Automated systems assist in [30-32]:

- **Tax Calculation**: Automatically calculating taxes owed based on current laws and regulations.

- **Filing**: Preparing and filing tax returns electronically.

- **Updates**: Staying up-to-date with changes in tax laws and regulations, ensuring that the business remains compliant.

Benefits:

- **Accuracy**: Reduces errors in tax calculations and filings.

- **Efficiency**: Saves time by automating complex tax processes.

- **Regulatory Compliance**: Ensures adherence to ever-changing tax laws and regulations.

4.4 Auditing Processes

The auditing process benefits significantly from automation and AI-driven technologies. Key applications include [33-35]:

- **Data Analysis**: Automating the analysis of large datasets to identify trends, anomalies, and areas of risk.

- **Sampling**: Using statistical methods to select representative samples for audit.

- **Risk Assessment**: Identifying high-risk areas that require more in-depth audit procedures.

Benefits:

- **Increased Coverage**: Allows auditors to analyze a larger volume of data, providing a more comprehensive audit.

- **Efficiency**: Reduces the time required to perform audits.

- **Enhanced Accuracy**: Improves the accuracy of audits by minimizing human error.

4.5 Financial Forecasting and Analysis

Financial forecasting and analysis involve predicting future financial performance based on historical data and current trends.

Automation enhances these processes through [36-38]:

- **Predictive Modeling**: Using statistical and ML models to forecast future revenue, expenses, and other key financial metrics.

- **Scenario Analysis**: Evaluating the potential impact of different scenarios on financial performance.

- **Real-Time Insights**: Providing up-to-date financial insights and forecasts.

Benefits:

- **Informed Decision-Making**: Helps businesses make better strategic decisions based on accurate forecasts.

- **Flexibility**: Allows for quick adjustments to forecasts in response to changing conditions.

- **Data-Driven Insights**: Leverages large datasets to provide more accurate and reliable financial forecasts.

The adoption of AI, ML, and other advanced technologies in accounting significantly improves efficiency, accuracy, and compliance. Automated bookkeeping reduces manual labor and errors, fraud detection enhances security, tax compliance is streamlined, auditing processes are made more thorough and efficient, and financial forecasting and analysis provide critical insights for strategic decision-making. As these technologies continue to evolve, their applications in accounting are expected to expand, further transforming the industry.

5. APPLICATIONS IN FINANCIAL REPORTING

Financial reporting involves the disclosure of financial information to various stakeholders about the financial performance and position of an organization. With advancements in technology, especially AI and real-time data processing, financial reporting has seen significant improvements.

Let's delve into each of the points mentioned:

5.1 Real-time Financial Reporting

Explanation: Real-time financial reporting refers to the ability of organizations to produce financial reports almost instantaneously, leveraging advanced technologies such as AI, cloud computing, and big data analytics. Traditional financial reporting cycles, which could take days or weeks, are now being shortened dramatically [39-41].

Applications:

- **Continuous Monitoring:** Financial data is collected and analyzed continuously, enabling real-time insights into financial performance.
- **Immediate Decision-Making:** Executives and managers can make informed decisions quickly, based on the latest financial data.
- **Dynamic Reporting:** Real-time dashboards provide up-to-the-minute financial metrics, trends, and forecasts.
- **Risk Management:** Immediate identification and mitigation of financial risks through constant monitoring of financial transactions and balances.

Benefits:

- Enhances transparency and accountability.
- Improves responsiveness to market changes.
- Facilitates proactive management of financial health.

5.2 Enhancing Accuracy and Reducing Errors

Explanation: AI and advanced data processing technologies significantly enhance the accuracy of financial reports and reduce human errors. Automated systems can handle large volumes of data with precision, applying consistent rules and checks [42-45].

Applications:

- **Automated Data Entry:** AI-driven tools can automate the collection and entry of financial data, reducing manual errors.
- **Reconciliation Processes:** Automated reconciliation of accounts ensures accuracy and consistency across financial statements.
- **Error Detection:** Machine learning algorithms can identify anomalies and discrepancies that may indicate errors or fraudulent activities.

Benefits:

- Reduces the risk of financial misstatements.
- Saves time and resources by minimizing the need for manual data entry and corrections.
- Increases confidence in the accuracy of financial information.

5.3 Streamlining Regulatory Compliance

Explanation: Regulatory compliance is critical in financial reporting, requiring adherence to various laws, standards, and regulations. Advanced technologies can help streamline these processes, ensuring that financial reports meet all necessary compliance requirements efficiently [39].

Applications:

- **Regulatory Reporting Tools:** AI-driven software can automatically generate reports that comply with regulatory standards.

- **Compliance Monitoring:** Continuous monitoring of financial activities to ensure compliance with regulations such as GAAP, IFRS, and other local standards.

- **Audit Trails:** Maintaining detailed and automated audit trails that are readily accessible during regulatory reviews and audits.

Benefits:

- Reduces the burden and complexity of regulatory compliance.

- Minimizes the risk of non-compliance and associated penalties.

- Ensures timely and accurate submission of regulatory reports.

5.4 Integrating AI with Existing Financial Systems

Explanation: Integrating AI with existing financial systems involves embedding AI capabilities into traditional financial software and workflows. This integration enhances the overall functionality and efficiency of financial reporting processes [45-48].

Applications:

- **Predictive Analytics:** AI can analyze historical data to forecast future financial trends and outcomes, aiding in strategic planning.

- **Natural Language Processing (NLP):** Enhances the ability to interpret and analyze unstructured financial data from various sources, including documents and emails.

- **Robotic Process Automation (RPA):** Automates repetitive and routine financial tasks, such as invoice processing, expense management, and compliance checks.

Benefits:

- Enhances the functionality and value of existing financial systems.

- Increases operational efficiency by automating routine tasks.

- Provides deeper insights through advanced data analysis and predictive modeling.

The integration of advanced technologies like AI, real-time data processing, and automated systems has revolutionized financial reporting. Real-time financial reporting allows for instant insights and decision-making. Enhancing accuracy and reducing

errors improves the reliability of financial data. Streamlining regulatory compliance ensures that financial reports meet all necessary standards efficiently. Integrating AI with existing financial systems enhances their functionality and efficiency, driving better financial management and strategic planning. Together, these advancements contribute to a more transparent, accurate, and efficient financial reporting environment.

6. FINDINGS AND RESULTS DISCUSSION

The research findings on the effectiveness of intelligent automation technologies in improving accounting and financial reporting processes provide valuable insights into how modern technological advancements can transform finance functions. Here is a detailed discussion and explanation of the outcomes:

6.1 Efficiency Gains

6.1.1 Time Savings and Cost Reduction

Intelligent automation technologies such as Robotic Process Automation (RPA), Artificial Intelligence (AI), and Machine Learning (ML) significantly enhance efficiency in accounting and financial reporting processes. These technologies automate repetitive and time-consuming tasks such as data entry, reconciliation, and report generation, leading to substantial time savings. This reduction in manual labor translates into cost savings for organizations by decreasing the need for extensive human resources dedicated to routine tasks.

6.1.2 Streamlined Processes

Automation streamlines various financial processes, eliminating bottlenecks and ensuring smoother workflows. By standardizing and optimizing procedures, intelligent automation reduces process cycle times and improves overall operational efficiency. For instance, month-end closing processes can be expedited, allowing finance teams to focus on more strategic activities.

6.2 Accuracy Improvements

6.2.1 Reduction of Human Error

One of the significant benefits of intelligent automation is the reduction of human error. Manual data entry and processing are prone to mistakes, which can lead to inaccurate financial reports and compliance issues. RPA and AI systems perform tasks with high precision, ensuring data integrity and accuracy in financial records.

6.2.2 Enhanced Data Quality

Machine Learning algorithms can be trained to detect anomalies and inconsistencies in financial data. This capability enhances data quality by identifying and correcting errors that might go unnoticed in manual processes. As a result, organizations can rely on more accurate and reliable financial information for decision-making.

6.3 Compliance Enhancements

6.3.1 Adherence to Regulatory Requirements

Compliance with regulatory requirements is crucial in finance. Intelligent automation technologies ensure that financial processes adhere to relevant regulations and standards. Automated systems can be programmed to incorporate compliance checks and validations, reducing the risk of non-compliance and associated penalties.

6.3.2 Audit Trail and Transparency

Automation provides a robust audit trail, capturing detailed logs of all transactions and processes. This transparency is invaluable during audits, as it allows auditors to trace and verify the accuracy of financial records easily. The improved traceability and documentation facilitated by intelligent automation enhance overall compliance and governance.

6.4 Key Success Factors

6.4.1 Clear Strategy and Vision

Successful implementation of intelligent automation in finance requires a clear strategy and vision. Organizations need to define their objectives, identify key areas for automation, and develop a roadmap for implementation. A well-articulated strategy ensures alignment with business goals and maximizes the benefits of automation.

6.4.2 Change Management and Training

Adopting intelligent automation technologies necessitates effective change management and training programs. Employees must be prepared for the transition, with adequate training to use new systems and adapt to changes in workflows. Addressing resistance to change and fostering a culture of continuous improvement are critical for success.

6.4.3 Technology Integration and Scalability

Integration with existing systems and scalability are essential considerations. Intelligent automation solutions must seamlessly integrate with current financial software and infrastructure. Additionally, the chosen technologies should be scalable to accommodate future growth and evolving business needs.

6.5 Challenges

6.5.1 Initial Investment and ROI

Implementing intelligent automation requires a significant initial investment in technology, infrastructure, and training. Organizations may face challenges in justifying this expenditure and demonstrating a clear return on investment (ROI). However, the long-term benefits often outweigh the initial costs.

6.5.2 Data Security and Privacy

With increased automation, data security and privacy concerns become paramount. Organizations must ensure that automated systems comply with data protection regulations and implement robust security measures to safeguard sensitive financial information.

6.5.3 Continuous Monitoring and Maintenance

Intelligent automation solutions require continuous monitoring and maintenance to ensure optimal performance. Regular updates, system checks, and troubleshooting are necessary to address any issues and keep the technology functioning effectively.

7. CONCLUSION

The research highlights that intelligent automation technologies such as RPA, AI, and ML can significantly improve efficiency, accuracy, and compliance in accounting and financial reporting processes. However, successful implementation depends on several factors, including a clear strategy, effective change management, and robust technology integration. While there are challenges to overcome, the long-term benefits of adopting intelligent automation in finance are substantial, paving the way for more streamlined, accurate, and compliant financial operations.

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