

## ARTIFICIAL INTELLIGENCE AND GOODS & SERVICE TAX

NIRANJAN MURTHY. N. J<sup>1</sup>, CHANDANA K B<sup>2</sup>

<sup>1</sup>Faculty Member DoS in Commerce & Research Kuvempu University Shankaraghatta  
Shivamoga, Karnataka

<sup>2</sup> II Year M. Com DoS in Commerce & Research Kuvempu University Shankaraghatta Shivamoga,  
Karnataka..

### Abstract:

The blending of technology and taxation has become a key area of focus in public administration worldwide. In India, a nation with more than 1.5 billion people and a quickly changing economy, managing tax systems comes with its own set of challenges. The move toward digital tax processes started with the introduction of e-filing in 2006 and picked up speed with the rollout of the Goods and Services Tax (GST) in 2017, creating one of the biggest digital tax systems globally. Now, artificial intelligence is taking this digital transformation to the next level. Technologies like machine learning, natural language processing, and predictive analytics provide strong tools to tackle ongoing issues in tax management, such as spotting tax evasion, boosting compliance, lowering administrative workloads, and improving services for taxpayers. Both the Central Board of Direct Taxes (CBDT) and the Central Board of Indirect Taxes and Customs (CBIC) have started to see the value of AI, launching different projects to use these technologies in their work. This article looks at how AI is currently being used in Indian tax administration, explores examples of successful projects, and discusses the challenges and limits of these efforts. It also looks ahead to future possibilities for policy and practice. Information from academic studies, government documents, and international examples, this study provides a detailed overview of how AI is impacting to tax structure in India

**Keywords:** GSTN, Artificial Intelligence, Companies, Tax, Technology, CBDT, CBIC

### Introduction

A paradigmatic shift has taken place in India to reform the entire taxation of India. Whether you are an entrepreneur or industrialist, the new tax regime will affect every member of the society. Such is the encompassing nature of GST. The huge number of modifications are required in the entire taxation system to make it successful tax compliant. Almost everything included in the tax structure requires great digitization. To make the GST more effective, accurate and convenient, Government is making use of newer technologies. The team of tax and technology experts has been appointed by GSTN (GST Network) to make the rollout smooth and continuous. India's tax system has changed a lot since the country became independent. In 1944, the Central Board of Revenue was set up, which later split into the Central Board of Direct Taxes (CBDT) and the Central Board of Indirect Taxes and Customs (CBIC) in 1964. For many years, the process of handling taxes was done using paper and involved a lot of manual work. It also had weak enforcement and many people didn't follow the rules properly. The introduction of the Goods and Services Tax (GST) in 2017 was one of the biggest digital tax reforms in India's history. The GST Network (GSTN) created a single digital platform to manage indirect taxes. This system handles millions of taxes returns each month and collects a large volume of transaction data that can be used for further analysis using artificial intelligence.

### **Artificial Intelligence Applications in Indian Tax Administration**

The GST system generates vast amounts of transactional data, creating opportunities for AI-driven analytics. The GSTN has implemented several

#### **AI applications:**

- Invoice matching algorithms: Automatically verify the consistency of transactions reported by suppliers and recipients, identifying discrepancies that may indicate fraud or evasion.
- Risk-based scoring systems: Assign risk scores to taxpayers based on their compliance history, transaction patterns, and industry benchmarks.
- Network analysis: Map relationships between businesses to identify potential fraud networks and circular trading arrangements designed to claim fraudulent input tax credits.

#### **Automated Invoice Matching**

One of the most error-prone and labour-intensive tasks in GST compliance is the matching of purchase and sales invoices between buyers and suppliers. Discrepancies often lead to the denial of Input Tax Credit (ITC), penalties, and compliance burdens.

#### **AI-powered ML models can:**

- Automatically compare and validate invoices from GSTR-1 (supplier's return) and GSTR-2A/2B (recipient's auto-populated return).
- Flag mismatches in tax amounts, GSTIN numbers, and item classifications.
- Adaptively learn from past corrections to improve matching accuracy over time.
- This significantly reduces human intervention, processing time, and risks associated with ITC claims.

#### **Risk Profiling and Predictive Analytics**

AI can enhance the enforcement capabilities of tax authorities by developing risk scores for individual taxpayers or entities. These scores are based on:

- Filing history and return accuracy
- Frequency and scale of mismatches or delays
- Network relationships with high-risk entities
- Volume and diversity of transactions

#### **Fraud Detection**

A major area of GST fraud involves shell companies, circular trading, and fake invoice chains. Traditional methods struggle to detect such complex, multi-party arrangements. AI-based graph analytics can:

- Map transactions across businesses to identify unusual patterns.
- Detect closed-loop trading, where goods/services are cycled through fake firms to claim illegitimate ITC.
- Uncover fraud rings using link prediction and anomaly detection. These models are trained on labeled fraud cases and improve continuously with more data, enabling authorities to prevent fraud before ITC is credited.

#### **Reconciliation Tools**

Reconciliation between books of accounts and GST returns is critical but often overlooked by small and medium enterprises. Errors in this process can lead to ITC loss, penalties, and litigation. AI-powered tools:

- Automatically reconcile accounting data with GSTR-2A/2B.

▪ Detect inconsistencies in HSN codes, invoice numbers, and GST amounts. ▪ Suggest corrective actions and alert businesses before filing.

### **Chatbots and Taxpayer Services**

AI-powered virtual assistants have been deployed to improve taxpayer services:

- Ask IT: An AI chatbot launched by the Income Tax Department that addresses taxpayer queries in natural language, handling over 20,000 queries daily during peak filing periods (Income Tax Department, 2023).
- GSTBOT: A virtual assistant for GST-related inquiries, capable of answering questions about filing requirements, payment procedures, and policy clarifications in multiple Indian languages (GSTN, 2023). These implementations reflect a growing recognition of AI's potential to transform both compliance enforcement and taxpayer service aspects of tax administration.

### **Challenges in GST Compliance**

- Volume and Complexity of Data: Businesses generate millions of invoices monthly, making manual processing and reconciliation inefficient and error-prone.
- Delayed Return Filings: Mismatched invoices often lead to ITC rejections and penalties.
- Fraudulent Practices: Cases of fake invoicing, shell companies, and circular trading schemes to claim ineligible ITC are on the rise.
- Integration Issues: Disparate accounting software and lack of API integration with GSTN complicate data flow.

### **Recommendations for Ethical AI Use in GST**

- To ensure safe and responsible adoption of AI in GST, the following steps are recommended:
- Implement periodic audits of AI models for fairness and accuracy
- Establish explainable decision-making frameworks
- Train tax officers and developers in AI ethics and compliance law
- Set up independent oversight bodies to monitor AI deployments in tax administration

### **Role of AI in Modern Tax Systems**

Around the world, tax administrations are increasingly embracing Artificial Intelligence (AI) to modernize enforcement mechanisms, reduce revenue leakages, and streamline taxpayer services. With the explosion of digital data, conventional tax enforcement strategies—reliant on audits and manual scrutiny—are no longer sufficient to deal with complex and high-volume transactional ecosystems. (Rao, 2021) AI offers tax authorities the ability to shift from a reactive to a proactive model of governance by identifying risks, anomalies, and fraudulent behaviours before they cause substantial fiscal harm.

### **Review of Literature**

The integration of Artificial Intelligence (AI) into tax systems has become a global trend, driven by the need for proactive fraud detection, enhanced compliance, and operational efficiency. **Allingham and Sandmo (1972)** emphasized that taxpayer behavior is influenced by the likelihood of detection and penalties, laying the theoretical basis for data-driven enforcement strategies. Globally, tax authorities have begun leveraging AI to modernize their systems such as the UK's HMRC using machine learning for risk profiling, the IRS in the U.S. optimizing audits through predictive analytics, and the Australian Tax Office using NLP for document review. **Das-Gupta et al. (2021)** and Tandon and Kapoor (2022) have shown how AI and predictive analytics have improved compliance by identifying fraud patterns within GST filing. However, scholars such as Schreiber and Ozturan (2022) and institutions like NASSCOM (2022) and MeitY (2023) raise ethical concerns related to data privacy, bias, and transparency in algorithmic governance. **Central Board of Direct Taxes (CBDT, 2018)** and AI-powered analytics by the

GST Network (GSTN, 2023) explore in the Indian context, the implementation of the Goods and Services Tax (GST) has led to growing concerns around invoice fraud, fake input tax credit claims, and shell firms. Projects like "Insight" of digital initiatives aimed at enhancing compliance.

### Research Gap

Global and Indian literature highlight the potential of AI in tax administration, few studies combine quantitative validation (e.g., statistical testing) with ethical and operational analysis, creating a gap that this research aims to address.

### Significance of Ai in Customs and Taxation

Combining AI and taxation is a transformative trend that's rapidly gaining momentum in India. This technological infusion is poised to overhaul the Indian taxation landscape, enhancing efficiency, accuracy, and compliance. As the country embraces digital transformation, understanding the market size and anticipated growth of AI in taxation becomes crucial for stakeholders across sectors. India's journey towards digitizing its taxation system, underscored by the implementation of AI and machine learning technologies, has begun to show tangible impacts. As of the latest data, the Indian AI market, encompassing various sectors including taxation, is burgeoning. The exact market size of AI in taxation is intricate to pinpoint due to the confluence of multiple technologies and platforms across different government and private sectors<sup>3</sup>. However, it's a critical component of the broader AI landscape in India, which is projected to reach billions of dollars in the next few years. The expected growth of AI in taxation in India is nothing short of exponential. With the Indian government's continued focus on digital infrastructure and the increasing adoption of AI by financial technology companies, the sector is ripe for expansion. Forecasts suggest a multi-fold increase in the market size within the next five to ten years.

### Objectives of the Study

- To identify and document the current applications of AI in GST operations, including invoice matching, risk profiling, and fraud detection.
- To evaluate the effectiveness of AI tools in detecting and reducing GST fraud, using real-world data and statistical methods.
- To examine the ethical, legal, and operational risks associated with AI adoption in tax administration.

### Research Methodology

This research employs a mixed-methods approach combining qualitative insights with quantitative analysis. The methodology includes:

- Data Collection ➤ Secondary data was collected from credible sources such as the Ministry of Finance, PIB India, GSTN reports, and reputed financial news publications (e.g., Economic Times, Business Standard).
- Tools and Technique A literature review was conducted covering global AI adoption in tax systems, including practices from the UK, USA, and Australia. Case studies of Indian tax tech startups (Clear Tax, Tally, Zoho) were analysed to understand practical applications of AI in GST compliance Case Deducted (approx.)

**Table 1: Invoice Matching**

Year	Case Deducted (approx.)	Value Involved (Approx)	Interpretation
2023	8350	15000+Crore	Initial surge in fake

			invoicing
2024	7400	13000+Crore	Detecting and Controlling the Invoice Mismatching
2025	5000	9000+Crore	Reducing the mismatching of tax invoice

**Table 2: Fraud deducting**

Year	Case Deducted (approx.)	Value Involved (Approx)
2023	2567	₹1.32 lakh crore
2024	5674	₹2.30 lakh crore
2025 (upto August)	3245	₹1.79 lakh crore

Source: Ministry of Finance Statements

**Interpretation**

- There is a statistically significant reduction in fraud cases after AI tools were introduced in the GST system (from 2021 onward).
- This suggests AI-based detection and monitoring systems had a meaningful impact in reducing fraud.

**Findings**

1. From 2023 to 2025 and applying statistical methods, the study provides empirical evidence that AI implementation has led to a significant reduction in fraud cases.
2. For India's GST system, AI offers a pathway toward proactive enforcement, cost effective compliance, and intelligent public service delivery.
3. The intelligent automation and predictive analytics can bolster the enforcement capabilities of tax authorities and reduce the dependency on manual audits and retrospective scrutiny.
4. This research highlights the transformative potential of Artificial Intelligence (AI) in enhancing the efficiency, transparency, and integrity of India's Goods and Services Tax (GST) system

**Suggestions**

- Ethical deployment requires a balance between automation and human oversight to ensure fairness and accountability.
- AI is not just a technological upgrade—it represents a strategic shift in how tax systems can operate in the 21st century.
- Adoption of AI is not without risks. Concerns around data privacy, algorithmic bias, legal admissibility, and over-reliance on automated systems must be addressed through robust governance, regulatory frameworks, and continuous model validation.

**Conclusion**

Artificial intelligence represents a transformative force in Indian tax administration, offering unprecedented opportunities to enhance compliance, reduce evasion, and improve taxpayer service. The initiatives already undertaken by the CBDT and CBIC demonstrate recognition of AI's potential. As India continues its digital transformation journey, a balanced approach to AI implementation, one that enhances both enforcement capabilities and taxpayer service while maintaining robust safeguards for privacy and fairness will be essential. The experiences of

other countries suggest that successful AI integration requires not only technological investment but also institutional adaptation, skill development, and clear governance frameworks. The future of AI in Indian tax administration will likely involve increasingly sophisticated applications that leverage emerging technologies like blockchain and federated learning while addressing the unique challenges of India's diverse and complex economic landscape. By addressing the technical, institutional, and ethical challenges identified in this study, India can harness AI's potential to create a more efficient, equitable, and effective tax system.

**References:**

- Allingham, M. G., & Sandmo, A. (1972). Income tax evasion: A theoretical analysis. *Journal of Public Economics*, 1(3-4), 323-338. [https://doi.org/10.1016/0047-2727\(72\)90010-2](https://doi.org/10.1016/0047-2727(72)90010-2)
- Bezdityni, V. (2024). Use of artificial intelligence for tax planning optimization and regulatory compliance. *Research Corridor Journal of Engineering Science*, 1(1), 103-142.
- Bhatia, A., & Singh, V. (2021). Artificial intelligence and big data analytics in indirect taxation: A strategic framework for developing economies. *Asia-Pacific Tax Bulletin*, 27(3), 145-160.
- CBDT. (2018). Project Insight: Enhancing tax compliance through technology. Ministry of Finance, Government of India.
- Chen Weiguang, Some Thoughts on the Problem of Artificial Intelligence Governance, *AcademicFrontier*, vol. 20, pp.48-55,2017.
- Das-Gupta, A., Ghosh, S., & Mookherjee, D. (2021). Information technology and tax compliance: Evidence from Project Insight in India. *Journal of Development Economics*, 153, 102716. <https://doi.org/10.1016/j.jdeveco.2021.102716>
- Himanshu Kumar, "Artificial Intelligence in Indian Taxation: Market Size and Projected Growth", Article Published in IndiaAI Portal, April 2024.
- Jia Kai, Jiang Yuhao, Three basic problems of artificial intelligence governance: technical logic, risk challenge and public policy choice, *China Administration*, vol. 10, pp. 40-45,2017.
- Roger Institute artificial intelligence research group, Application of artificial intelligence technology in tax collection and management, *International Taxation*, vol. 5, pp.20-24,2018.
- Unnikrishnan, "AI Impact on Taxation – Hypes and Realities", *Technology News, CNBC TV*, Published on May 2024.
- Wu Handong, Institutional Arrangement and Legal Regulation in the Age of Artificial Intelligence, *Social Science Abstracts*, vol. 12, pp.76-78,2017