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Artificial Intelligence For India'S Digital Public Infrastructure: A Review Of Opportunities, Architecture And Responsible Integration

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Abstract—India's Digital Public Infrastructure (DPI), comprising foundational platforms such as Aadhaar for digital identity, the Unified Payments Interface for payments, DigiLocker for documents and the Account Aggregator framework for consented data sharing, has transformed access to public and financial services at population scale. Integrating Artificial Intelligence with DPI creates opportunities for intelligent automation, predictive analytics, fraud detection, personalized services and multilingual access, while DPI in turn supports AI development through interoperable platforms and large-scale digital services. This paper reviews AI-enabled DPI using a conceptual and analytical approach based on research papers, government policies and secondary sources. It explains the layered, open-standards design of DPI, examines national AI initiatives and Indian-language technology such as the Bhashini mission and Indic language models, and analyses applications in payments fraud detection, welfare targeting, healthcare, agriculture and citizen services. A five-layer architecture showing how AI services can be built on DPI with consent and governance is proposed, along with research gaps, objectives and a comparison of DPI components and AI use cases. Challenges of data privacy, cybersecurity, algorithmic bias, digital literacy and unequal access, particularly in rural communities, are discussed in light of the Digital Personal Data Protection Act 2023.

Index Terms—Digital public infrastructure, India Stack, Aadhaar, UPI, Account Aggregator, AI governance, Bhashini, data protection

I. Introduction

1.1 Motivation

In little more than a decade, India built digital public infrastructure that reaches over a billion people. Digital identity, instant payments, digital documents and consented data sharing were designed as open, interoperable public platforms on which governments and private companies can build services. Nilekani [1] described this approach as giving people control over their data and access to services, and analyses by the Bank for International Settlements [2] and the IMF [3] documented its role in financial inclusion and efficiency.

During India's G20 presidency, DPI was promoted internationally through a common framework [4]. The next step is to combine DPI with AI. The IndiaAI Mission [5] aims to build compute capacity, datasets and applications, and national strategy documents [6] identified AI for social good as a priority.

This paper reviews opportunities, architecture and governance for AI-enabled DPI.

1.2 Objectives of the Review

- To describe India's DPI components and design principles.
- To examine how AI can enhance DPI-based services.
- To propose an architecture for AI-enabled DPI with consent and governance.
- To compare DPI components and their AI use cases.
- To analyse risks and recommend responsible integration practices.

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II. Overview of Key Concepts

2.1 Layers of DPI

Fig. 1 organizes DPI into identity, payments, data-sharing and service layers, with examples, and shows how AI can add value at each.

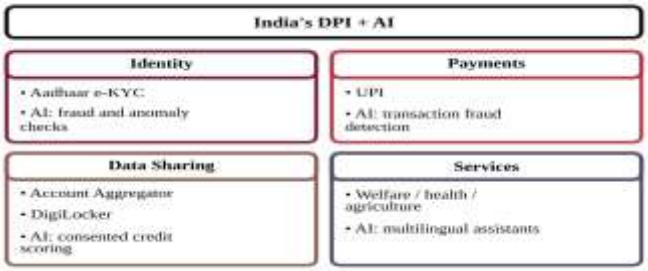


Fig. 1. Layers of India's DPI and corresponding AI opportunities.

2.2 Design Principles

DPI is built on open APIs and standards, interoperability, minimal centralized data, consent-based sharing and a role for private innovation on public rails. These principles shape how AI can be integrated responsibly.

III. Review of Existing Work

D'Silva *et al.* [2] analysed India's digital financial infrastructure and highlighted its layered design of identity, payments and data, which lowered costs and expanded access. Alonso *et al.* [3] estimated the benefits of India's digital journey for financial inclusion, government transfers and tax administration. The G20 framework [4] defined DPI as shared digital systems that are secure, interoperable and built on open standards.

The Account Aggregator framework [7] allows individuals to share financial data with consent, which can feed AI models for credit assessment of people without formal credit histories. The Digital Personal Data Protection Act [8] establishes obligations for consent, purpose limitation and data protection that AI services on DPI must follow.

Language is a key barrier. Kakwani *et al.* [9] released IndicNLPSuite, corpora and models for Indian languages, and Gala *et al.* [10] presented IndicTrans2, translation models for all 22 scheduled languages. The Bhashini mission [11] provides public language technology services that can make DPI accessible in voice and regional languages.

AI applications on DPI include fraud detection in payments [12], health records exchange and agriculture advisories. Obermeyer *et al.* [13] showed how biased algorithms can deny services to disadvantaged groups, a risk magnified at population scale. Table I summarizes these works.

Ref.	Method	Key Findings	Limitations
[1]	Vision of India's inclusive internet	Data empowerment approach	Policy perspective
[2]	Analysis of digital financial infrastructure	Layered design lowers costs	Finance focus
[3]	IMF study of India's digital journey	Quantified inclusion benefits	Macro-level
[4]	Framework for DPI systems	International DPI definition	Non-binding framework
[7]	Account Aggregator directions	Consent-based data sharing	Regulatory text
[9]	IndicNLPSuite	Resources for Indian languages	Text only
[10]	IndicTrans2 translation	All 22 scheduled languages	Compute for deployment

Ref.	Method	Key Findings	Limitations
[13]	Algorithmic bias audit	Bias can deny services	US healthcare context

TABLE I Summary of Literature Survey

IV. Identified Research Gaps

- Empirical evaluations of AI services built on DPI are limited.
- Governance frameworks specific to AI on public platforms are still evolving.
- Algorithmic bias at population scale can exclude vulnerable groups.
- Digital literacy and connectivity gaps limit benefits in rural areas.
- Cybersecurity risks increase as DPI becomes more connected and intelligent.

V. System Architecture

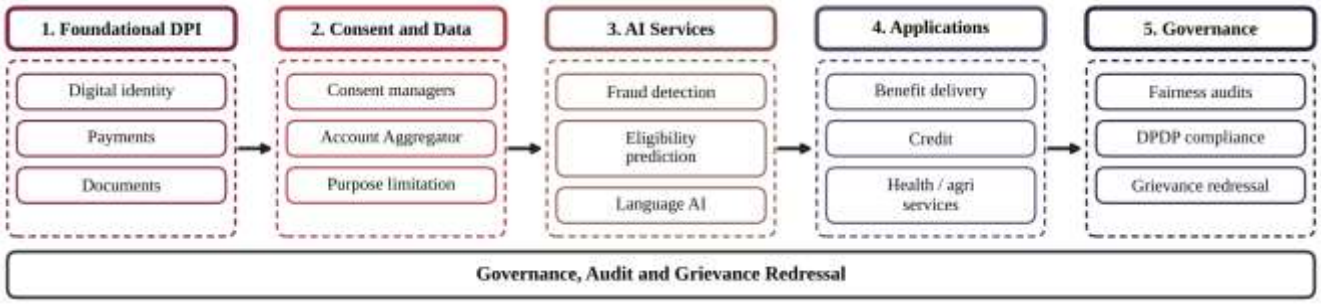


Fig. 2 presents the proposed architecture.

Fig. 2. Proposed architecture for AI-enabled digital public infrastructure.

5.1 Foundational DPI Layer

Digital identity, payments and document platforms provide authentication, transactions and verified records through open APIs.

5.2 Consent and Data Layer

Consent managers and the Account Aggregator framework control which data are shared, with whom and for what purpose.

5.3 AI Services Layer

AI models provide fraud detection, eligibility prediction for welfare schemes, credit scoring from consented data, and language translation and speech interfaces.

5.4 Application Layer

Government departments and private providers build citizen services such as benefit delivery, loans, health records and agricultural advice.

5.5 Governance Layer

Audits, fairness testing, grievance redressal and compliance with data protection law oversee AI decisions.

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VI. Implementation Methodology

Fig. 3 shows how a citizen service operates. For example, a welfare eligibility model predicts the probability that a household qualifies,

$$p = \sigma(w^T x + b) \quad (1)$$

using only consented data x, and fairness is checked by comparing approval rates across groups, such as the ratio

$$DI = P(approve \mid group\ A) / P(approve \mid group\ B) \quad (2)$$

with large deviations from one triggering review.

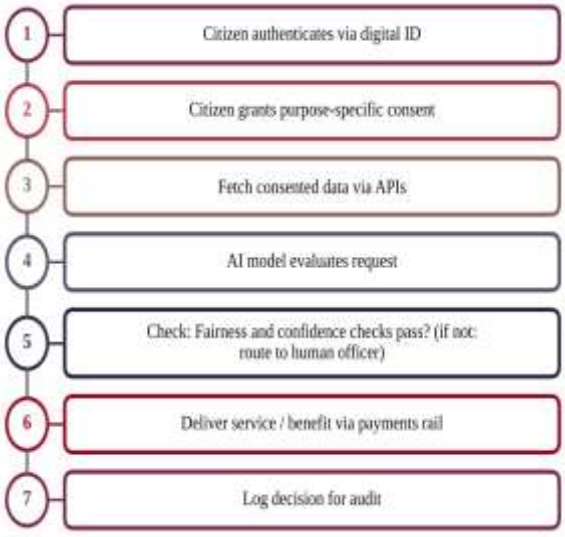


Fig. 3. AI-enabled citizen service workflow on DPI.

VII. Performance Comparison

Table II compares DPI components and AI use cases. Each layer offers different AI opportunities and risks.

DPI Component	AI Use Case	Key Risk
Digital identity	Authentication anomaly detection	Exclusion by errors
UPI payments	Real-time fraud detection	False blocks
Account Aggregator	Consented credit scoring	Bias in lending
DigiLocker	Document verification	Privacy
Bhashini	Multilingual voice services	Translation errors

TABLE II DPI Components and AI Use Cases

VIII. Open Issues and Future Directions

Table III summarizes challenges. Future directions include voice-first AI services in Indian languages, privacy-preserving analytics on DPI data, open AI models as public goods and international cooperation on AI-enabled DPI.

Challenge	Mitigation
Data privacy	Consent architecture; DPDP compliance
Cybersecurity	Security audits; zero-trust design

Challenge	Mitigation
Algorithmic bias	Fairness testing; human review
Digital literacy	Voice and vernacular interfaces
Unequal access	Assisted service centres; offline modes

TABLE III Challenges and Mitigation

IX. Conclusion

India's DPI provides a strong foundation for AI-driven public services at population scale. The reviewed literature and policy documents show how identity, payments and consented data sharing, combined with Indian-language AI, can enable more efficient, inclusive and personalized services. Realizing these benefits requires strong privacy protection, cybersecurity, fairness auditing and efforts to close the digital divide so that AI-enabled DPI serves every citizen.

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References

1. N. Nilekani, “Data to the people: India’s inclusive internet,” Foreign Affairs, vol. 97, no. 5, 2018.
2. D. D’Silva, Z. Filková, F. Packer, and S. Tiwari, “The design of digital financial infrastructure: Lessons from India,” BIS Papers No. 106, Bank for International Settlements, 2019.
3. C. Alonso, T. Bhojwani, E. Hanedar, D. Prihardini, G. Uña, and K. Zhabska, “Stacking up the benefits: Lessons from India’s digital journey,” IMF Working Paper WP/23/78, 2023.
4. G20, “G20 Framework for Systems of Digital Public Infrastructure,” G20 Digital Economy Working Group, New Delhi, India, 2023.
5. Ministry of Electronics and Information Technology, “IndiaAI Mission,” Government of India, 2024.
6. NITI Aayog, National Strategy for Artificial Intelligence #AIforAll. New Delhi, India: Government of India, 2018.
7. Reserve Bank of India, Master Direction – Non-Banking Financial Company – Account Aggregator (Reserve Bank) Directions, 2016. Mumbai: RBI, 2016.
8. Government of India, The Digital Personal Data Protection Act, 2023 (Act No. 22 of 2023). New Delhi: Ministry of Law and Justice, 2023.
9. D. Kakwani et al., “IndicNLPSuite: Monolingual corpora, evaluation benchmarks and pre-trained multilingual language models for Indian languages,” in Findings EMNLP, 2020, pp. 4948–4961.
10. J. Gala et al., “IndicTrans2: Towards high-quality and accessible machine translation models for all 22 scheduled Indian languages,” Trans. Mach. Learn. Res., 2023.
11. Ministry of Electronics and Information Technology, “BHASHINI: National Language Translation Mission,” Government of India, 2022.
12. A. Dal Pozzolo, G. Boracchi, O. Caelen, C. Alippi, and G. Bontempi, “Credit card fraud detection: A realistic modeling and a novel learning strategy,” IEEE Trans. Neural Netw. Learn. Syst., vol. 29, no. 8, pp. 3784–3797, 2018.

13. Z. Obermeyer, B. Powers, C. Vogeli, and S. Mullainathan, “Dissecting racial bias in an algorithm used to manage the health of populations,” Science, vol. 366, no. 6464, pp. 447–453, 2019.