



DIGITAL DREAMS TO REALITY: THE INDIAN ODYSSEY OF ARTIFICIAL INTELLIGENCE

Sahilpreet Singh Patang

Senior research fellow(UGC-NET), Department of Public Administration, Punjabi University Patiala.

ABSTRACT

The evolution of Artificial Intelligence (AI) in India reflects a strategic convergence of technological innovation, policy intervention, and socio-economic priorities. Rooted in early academic research during the 1980s within institutions such as the Indian Institutes of Technology (IITs) and the Indian Statistical Institute (ISI), AI's trajectory accelerated significantly in the post-2018 era. The release of NITI Aayog's National Strategy for Artificial Intelligence positioned AI as a national priority, identifying five core sectors-healthcare, agriculture, education, smart cities, and smart mobility—for targeted transformation. Between 2018 and 2025, AI adoption in India has expanded through integrated digital platforms, data-driven governance, and public-private collaborations, with notable applications in biometric authentication, crop monitoring, telemedicine, adaptive learning, and predictive urban planning. The synergy between government initiatives, such as Digital India and AI research missions, and industry-led innovations has strengthened India's position in the global AI ecosystem. This paper examines the chronological progression, policy frameworks, and sectoral impacts of AI in India, highlighting its role in fostering inclusive growth, enhancing public service delivery, and advancing sustainable development. By 2025, AI in India stands as both a technological catalyst and a governance instrument, reshaping the nation's development trajectory while setting a precedent for emerging. Research Methodology: This research is based on an analysis of data gathered from secondary sources. The study's data is collected from reputable academic journals, newspaper articles, Government papers, policy documents, and research articles. The qualitative approach has been applied to synthesize and present the findings, allowing for meaningful conclusions to be drawn.

KEYWORDS : Artificial Intelligence in India, National Strategy for Artificial Intelligence (NITI Aayog), Digital India, IndiaAI Mission, Public-Private Partnerships in AI, AI in Healthcare, AI in Agriculture, AI in Education, AI in Smart Cities, AI in Smart Mobility, AI in Law Enforcement, AI in Public Safety, AI Startup Ecosystem, AI in Governance, Biometric Authentication, Predictive Urban Planning, AI-Driven Legal Accessibility, Personalized Adaptive Learning (PAL), Sustainable Development through AI, Inclusive Growth with AI

INTRODUCTION

Artificial Intelligence (AI) refers to the development of computer systems that replicate human cognitive functions such as learning, reasoning, problem-solving, perception, and language understanding. Its goal is to enable machines to perform tasks requiring human intelligence with greater efficiency, precision, and scalability. From speech recognition and analyzing large datasets to making predictions and providing decision support, AI is transforming operations across sectors.

The concept of AI was formally introduced in 1956 by John McCarthy during the Dartmouth Conference, marking the birth of a field that would later revolutionize technology. Since then, AI has evolved significantly, leading to highly specialized systems categorized into narrow AI and general AI. Narrow AI, widely used today, is designed for specific tasks like voice assistants, image recognition, and personalized recommendations. These operate within defined parameters and lack human-like general intelligence. General AI—still theoretical—would understand, learn, and apply knowledge across multiple domains, like a human.

The History of AI in India began in the 1980s and 1990s, when institutions like the IITs, ISI, and IISc pioneered research in machine learning, pattern recognition, and natural language processing. Supported by the Department of Electronics (now MeitY) and the Department of Science and Technology, early efforts focused on academic research and limited public sector uses. The early 21st century brought rapid digitization, expanded internet access, and smartphone adoption, generating massive datasets for applied AI.

Initiatives like the National e-Governance Plan (2006) and Aadhaar (2009) enhanced data-driven governance and financial inclusion. By the mid-2010s, AI in healthcare, agriculture, education, and urban management gained momentum. Recognizing AI's strategic importance, the government launched NITI Aayog's 2018 National Strategy for

Artificial Intelligence. From 2018 to 2025, large-scale AI adoption in governance, industry, and education through initiatives like Digital India, National AI Portal, and AI-powered platforms revolutionized public service delivery and innovation.

AI in Public Safety and Law Enforcement

Public safety in India is undergoing a shift, with AI emerging as a transformative force in law enforcement and emergency management. Governments are adopting AI tools to ensure more responsive, data-informed, and citizen-centric policing.

The Shravani Mela at Baba Baidyanath Dham in Deoghar, Jharkhand, draws millions of pilgrims over several weeks. In 2025, to address logistical and safety challenges, the district administration adopted a technology-driven framework powered by AI. It featured facial recognition cameras, drone surveillance, QR-based signage, and AI-enabled analytics to maintain order and enhance the experience for devotees. Cameras along routes such as the 100-km path from Sultanganj to Deoghar fed live data into a command center, enabling real-time football tracking, congestion detection, and timely interventions like route diversions. This minimized stampede risks, especially on high-density days like Mondays, when over two lakh visitors gathered. AI also helped reunite lost pilgrims, particularly vulnerable individuals. Over 30 "Lost and Found" centers used facial recognition software to match missing persons with family members. Images submitted by attendees were cross-referenced with surveillance feeds, reuniting over 18,000 individuals. This digital infrastructure made Shravani Mela 2025 a benchmark for AI-integrated event management, setting a precedent for similar gatherings.

Transforming Legal Accessibility With AI In Uttar Pradesh

To enhance public access to legal procedures and streamline operations, the Uttar Pradesh Police, in collaboration with IIT Kanpur, launched an advanced AI chatbot in 2025. Built using Retrieval-Augmented Generation (RAG) technology, it enables users to retrieve accurate, context-specific responses

from a vast database of official documents. Both police personnel and the public can query over a thousand official Hindi circulars by asking natural language questions such as, "What steps are needed to file an FIR for theft?" The chatbot interprets and generates responses by drawing from a digitized archive of UP Police circulars.

The backend uses Optical Character Recognition (OCR) to convert scanned documents into searchable text and employs a vector-based retrieval mechanism for fast, accurate information. Developed by IIT Kanpur researchers with the Agra Police, the tool ensures consistent application of rules across police stations, reducing variations in interpretations. For officers in remote areas or junior staff without direct supervision, the chatbot offers a dependable reference platform. It ensures procedural uniformity, reduces delays, and empowers law enforcement to work autonomously without compromising accuracy. By breaking language and technical barriers, the system represents a milestone in legal digitization and citizen-friendly governance.

AI In Healthcare Delivery

India's public healthcare sector faces persistent challenges including resource constraints, uneven distribution of professionals, and rising chronic disease burdens. AI is being used to address these challenges through predictive diagnostics, improved operational efficiency, and expanded access to quality healthcare.

India bears a significant burden of tuberculosis (TB), accounting for a large portion of global cases. The Ministry of Health and Family Welfare has integrated AI into public health interventions. A major advancement is the deployment of AI-powered diagnostic tools like Qure.ai's qXR, which uses deep learning to interpret chest X-rays and identify signs of pulmonary TB with speed and accuracy. This is particularly useful in remote or underserved areas lacking trained radiologists. The tool scans and interprets both digital X-rays and lower-quality images from analog systems, making it ideal for resource-constrained settings. The implementation of qXR in India gained momentum around 2020, with deployment in urban hospitals and rural clinics. Cities like Mumbai used it to detect undiagnosed TB cases, including asymptomatic ones. AI-assisted screenings have improved detection rates and enabled same-day diagnosis, crucial for timely treatment. Evaluations show the system meets WHO-approved benchmarks and can reduce costly confirmatory tests by pre-screening large populations. In tribal areas and aspirational districts with minimal infrastructure, mobile vans equipped with qXR have improved outreach and reduced diagnostic gaps. By rapidly identifying cases and directing them into treatment pathways under the National Tuberculosis Elimination Programme (NTEP), this initiative is transforming TB elimination in India.

AI in Agriculture and Rural Governance

Agriculture supports over 50% of India's population but faces challenges such as unpredictable weather, low productivity, and limited access to inputs and credit. Artificial Intelligence (AI) is transforming this landscape through precision farming, crop monitoring, and data-driven rural governance.

AI-Driven Sowing Advisory System: Andhra Pradesh's Partnership with Microsoft and ICRISAT

The Government of Andhra Pradesh collaborated with Microsoft India and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) to develop an AI-powered sowing advisory system. Launched in Devanakonda village, Kurnool district, it addressed uncertainties in rainfed farming using predictive data models. Historical climate data, real-time weather inputs, and satellite imagery formed the backbone of this system. A Moisture Adequacy Index (MAI) helped determine ideal sowing times for crops like

groundnut. Farmers received recommendations in Telugu via SMS on when to prepare land, apply fertilizer, and sow seeds. A Microsoft Power BI dashboard helped agricultural officers monitor field conditions and plan interventions. Farmers following the advisories reported yield improvements of up to 30% compared to traditional methods. The pilot demonstrated that AI, integrated with local knowledge and multilingual outreach, could reduce weather-related risks and improve farmer incomes. The success built confidence in digital tools for grassroots governance.

AI-Powered Pest Surveillance And Forecasting By ICAR

The Indian Council of Agricultural Research (ICAR) is deploying AI for pest and disease management. Through its Virtual Centre of Excellence on AI in Agriculture, ICAR developed mobile apps to detect plant diseases, nutrient deficiencies, and pest infestations from farmer-uploaded images. A key initiative is the National Pest Surveillance System (NPSS), launched with ICAR-NCIPM, ICAR-IASRI, the Department of Agriculture & Farmers' Welfare, PEAT Inc., and Wadhwani AI. The system uses AI and machine learning to analyze data from field sensors, weather inputs, and farmer reports, enabling early pest detection and timely alerts. These warnings reduce crop losses and unnecessary pesticide use. Such tools are valuable in tribal and remote areas where access to agricultural extension officers is limited. By merging local data with AI, ICAR is transforming pest management into a predictive, preventive service, making agriculture more resilient.

AI in Education and Digital Learning

AI-Driven Personalization Through DIKSHA

DIKSHA (Digital Infrastructure for Knowledge Sharing), launched by the Ministry of Education with NCERT and the National Informatics Centre, is India's national digital platform for school education. It offers curriculum-aligned learning material for students, teachers, and administrators. Initially a content repository, DIKSHA now uses Personalized Adaptive Learning (PAL) technology to track progress, assess learning curves, and recommend tailored videos, exercises, and quizzes. This ensures support suited to each learner's needs, making education more efficient and engaging. DIKSHA supports content in over 35 Indian languages, offering voice-enabled navigation, real-time translation, and adaptive dashboards for students and teachers. Educators can track performance, identify struggling students, and assign targeted resources. The system aligns with the National Education Policy (NEP) 2020, which emphasizes mother-tongue instruction and digital literacy. As of 2025, DIKSHA serves over 50 million monthly users from more than 1.5 million schools.

Support for India's AI Startup Ecosystem

India's AI startup ecosystem is growing due to policy support, digital infrastructure, and innovation-driven programs. The Atal Innovation Mission (AIM) under NITI Aayog has set up over 10,000 Atal Tinkering Labs (ATLs) in schools to promote creativity and early exposure to AI and robotics. The Government e-Marketplace (GeM) allows technology startups, including AI providers, to list products and services for purchase by government departments. This reduces market access barriers for small firms and encourages innovation in public service delivery. GeM has become a vital gateway for AI startups scaling solutions in governance, healthcare, and agriculture.

The IndiaAI Mission, with a budget of over 10,000 crore, aims to build high-end AI compute infrastructure, fund startups, and establish innovation fellowships. It also includes creating a National Data Management Office to curate and distribute government datasets for AI training, addressing the challenge of limited access to clean, structured, high-volume data.

CONCLUSION

AI is redefining governance and service delivery in India. From smart agriculture and accessible healthcare to transparent policing and personalized education, AI interventions are creating inclusive, scalable solutions. Their success depends on sustained investment in infrastructure, talent, data governance, and ethical regulation. Initiatives such as the IndiaAI Mission, Digital India, and National Strategy for AI show the government's commitment to making India a global AI hub. Public-private partnerships, startup ecosystem support, and citizen-centric design will be key. Equally important is ensuring AI literacy, especially in rural and underserved communities, to prevent a digital divide.

REFERENCES

1. <https://www.niti.gov.in/>
2. <https://www.niti.gov.in/national-strategy-artificial-intelligence>
3. <https://indiaai.gov.in/>
4. <https://abdm.gov.in/>
5. <https://main.icmr.nic.in/>
6. <https://www.startupindia.gov.in/>
7. <https://aim.gov.in/>
8. <https://ncrb.gov.in/>
9. <https://www.digitalindia.gov.in/>
10. https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf
11. <https://agricoop.nic.in/>
12. <https://icar.org.in/>
13. <https://pib.gov.in/>