

Building India's Brain

KARTHIKEYA S EXAMINES WHAT IT WOULD TAKE TO DEVELOP SOVEREIGN AI MODELS IN INDIA, AND THE STRUCTURAL CHALLENGES INVOLVED

ALL CHIPS ON THE TABLE

CAN INDIA LEAD IN AI?

While the world measures AI power through massive models and vast GPU clusters, India's route runs through app strength, careful engineering, and a growing appetite for purposeful AI

and infrastructure realities can be deployed widely, including in settings where global models are either too expensive or poorly aligned.

For students and young professionals trying to work out where they fit into this landscape, the advice is both simple and demanding. Ravindran describes AI as a "booster" that will sit inside almost every profession rather than as a separate destiny. "My advice would be to learn how to work effectively with the AI tools that are available to you," he says. Shunning AI completely closes off possibilities, yet blind dependence is equally risky. Those who study AI itself face a different temptation. "Students who are studying AI should not avoid the fundamentals and jump directly to tool development," he cautions. Without mathematical and systems grounding, it becomes harder to innovate when the current generation of tools is replaced by the next one.

Viewed through these lenses, India is not at the front of the pack in every leg of the AI race, but it is definitely not out of the contest either. Strong engineering depth and steady adoption coexist with limits in compute and research capacity, producing a landscape that is capable in some areas and constrained in others. What comes next will depend on sustained investment in skills and infrastructure rather than declarations of ambition, and on whether the country can turn its practical strengths into long-term capability.

VERY few months, a new global model launch resets the scoreboard. The phrase "AI race" gets thrown around to describe everything from chip manufacturing to chatbot popularity, often without a clear sense of what is actually being measured.

If the race is about building frontier-scale models that sit in the same league as ChatGPT or DeepSeek, the contest today is dominated by the United States and China, backed by vast compute budgets and tightly integrated research ecosystems. Look a little closer, however, and the picture becomes more layered, and India's position more diffuse.

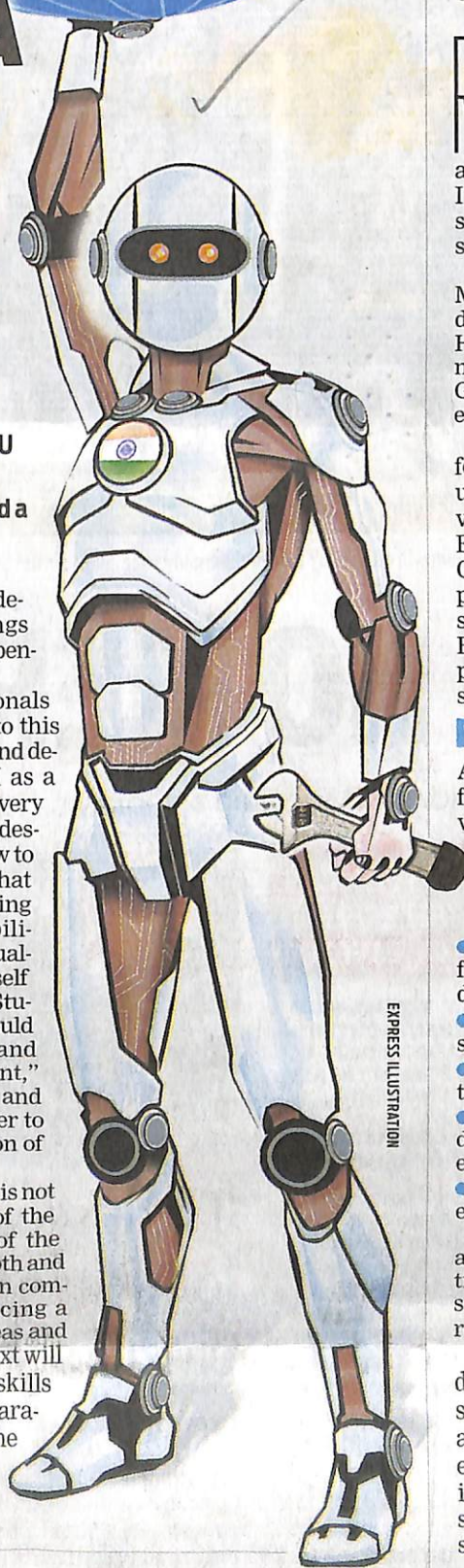
The AI landscape can be divided into at least four distinct arenas. There is the frontier model layer, where a handful of laboratories train enormous systems on thousands of GPUs. There is the compute infrastructure layer, which decides who can afford to experiment at that scale. There is the research talent layer, which produces new algorithms and architectures. Finally, there is the adoption layer, in which governments, companies, and professionals actually use these systems in their work.

"I do not think 'AI race' is being applied to real-world adoption as much as to foundational models or talent depth," says Balaraman Ravindran, who heads data and AI research initiatives at IIT Madras, including the Robert Bosch Centre for Data Science and Artificial Intelligence. "If AI adoption is the metric then India's position is not that bad. But we are not yet at a point where we are competing in the true frontier model space." The reason lies partly in who does what. India has a large pool of AI engineers who can build applications using existing models and platforms, and they work across global technology firms and startups. The research base that produces new methods is much smaller. "India does not produce a lot of AI researchers, yet," he points out. "For true fundamental breakthroughs, you need more researchers, who also have the ability to build tools."

real talk

Underneath that talent gap sits a more material barrier. Training and experimenting with large models requires access to high-end compute that is expensive and unevenly distributed. When asked whether compute is India's biggest structural bottleneck, Ravindran is blunt. "In short, yes," he says. He is quick to add that hardware alone cannot carry a country forward. Making racks of GPUs available without also investing in training, research ecosystems, venture capital, and adoption pathways will not change much. Yet the lack of affordable, sustained access to compute slows Indian researchers in ways that are easy to underestimate. When a single training run consumes weeks instead of hours, iteration suffers, and so does ambition.

Within these constraints, rather than chasing a single gigantic model that aims to serve every use case, some Indian teams are working on smaller systems trained for specific domains or languages. He describes these as "right-sized" models that are tuned for scale and cost in an Indian context. "They are not available off-the-shelf, and significant R&D has to be carried out to establish leadership in that space," he notes, however. The hope is that models designed for Indian languages



EXPRESS ILLUSTRATION

RECENTLY, Bengaluru-based startup Sarvam AI announced that its latest models, Sarvam Vision and Bulbul V3, outperformed large language models such as ChatGPT and Gemini on parameters specific to Indian contexts. The claim underscores a broader ambition: AI sovereignty.

Policy initiatives like the IndiaAI Mission have further strengthened India's push in the global AI landscape. However, rather than a single dominant model, India's response to ChatGPT may emerge as a distributed ecosystem.

Sarvam is building multilingual foundation models tailored to Indian use cases. Krutrim is developing conversational and agentic AI systems. Enterprise-focused platforms such as CoRover.ai's BharatGPT are being deployed in customer service and public-sector applications. At the policy level, Bhashini seeks to strengthen digital public infrastructure across India's 22 scheduled languages.

THE ROAD TO AN INDIAN AI

A sovereign AI stack would need to reflect India's linguistic and cultural diversity, operate at population scale, and be developed with strategic control over key infrastructure.

This would require:

- High-quality training datasets reflecting India's social and regional diversity
- Access to advanced compute infrastructure, including GPU capacity
- Robust language corpora across multiple Indian languages and dialects
- A skilled workforce spanning model development, MLOps, and data engineering
- Clear regulatory frameworks governing data use and deployment

While initiatives such as the IndiaAI Mission and recent budget allocations for AI skilling and R&D address some of these needs, structural gaps remain.

India has limited domestic semiconductor manufacturing capacity. Datasets are often fragmented across states and sectors. Regulatory clarity around emerging AI applications is still evolving. There is also a shortage of researchers capable of building frontier-scale models.

If India aims to move from deploying AI tools to developing foundational systems, long-term investments in compute infrastructure, research ecosystems, and public-private collaboration will be essential.



Students who are studying AI should not avoid the fundamentals and jump directly to tool development; in the long-run, it will limit your ability to innovate

— Balaraman Ravindran, Head of DSAI, WSAI, RBCDSAI, IIT Madras