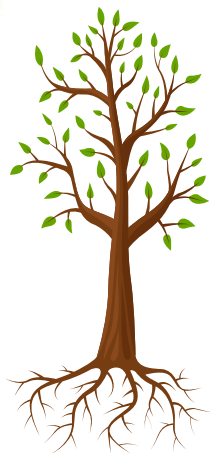


India's Sovereign AI Vision, Open Telecom & BharatGen



915+ Research papers & multiple books published in AI-ML & **30+ patents**

Prof Ganesh Ramakrishnan
Institute Chair Professor, Dept of CSE, IIT Bombay
(Founding Director, BharatGen)



सिद्धिमूलं प्रबन्धनम्
भा. प्र. सं. इन्दौर
IIM INDORE



50+ Global Experts + (100+ Students).
IITs & Big Tech (Google, Amazon) pedigree across
AI/ML and Indic Linguistics.



Hon'ble Prime Minister
Shri Narendra Modi
Visited the BharatGen stall at
India AI Impact Expo 2026

Unmatched Indian-Language Data

Ground up data collection from Indic sources

The India Telecom Stack: A UPI Moment for Telecom

"Vasudhaiva Kutumbakam" — Scaling through extreme openness, like UPI transformed fintech



Stack Architecture

- Dis-aggregation beyond O-RAN with marketplace approach
- Each layer standardized by an ML model with open APIs
- Every component virtualized as a platform
- Plumbing parts open-sourced (80% of chip work)
- Standardized OS/hypervisor for portability & abstraction
- Implementations proprietary but interfaces standardized



Trust, Telemetry & Security

- Every component auditable for trusted source and security
- Every component provides telemetry data hooks
- National data lake for offline ML analysis
- ML-first approach: network designs itself from frameworks
- Cognitive RAN: foundational AI model generates waveforms by ingesting real-time RF data
- Parallels: GNU, Linux, UPI — openness drives scaling

LLMs in Telecom: Where They Fit & Where They Don't

Genuine Value

NOC/SOC Operations Copilot

Correlate millions of alarms, surface root cause, cut MTTR

Natural Language to Network Policy

Convert business intent into network configs

3GPP Standards Navigation

Navigate 10,000s of pages of specs and vendor docs

Agentic Network Management

LLM agents plan changes, verify against digital twin, execute

Not the Right Tool

Real-Time RAN PHY Control

Sub-ms beam decisions cannot use LLM inference loops

Safety-Critical Control Loops

No deterministic guarantees; hallucination risk unacceptable

Hard Latency SLA Enforcement

LLMs are probabilistic; latency-bound functions need deterministic models

The agentic + digital twin combination is the most promising and underexplored frontier for 6G network intelligence.



(Knowledge driven
inclusivity)



श्रीमानुमानसिंह
ज्येष्ठ शिक्षा अधिकारी
राज्य शिक्षा
विभाग, दिल्ली
विद्यया ऽ मृतमश्नुते



BharatGen
GenAI for Bharat, by Bharat

[illegible]

मिडिलेन उपाध्याय
भा. प. सं. इन्दौर
IIM INDORE



पत्रम सूक्तम श्रुतम
(9 languages)

परम (22 languages)



**Governance
Education**

आयुर्परम

(Data & Knowledge
Sovereignty)



Heritage Foundation
Save Culture Save Future

Heritage Foundation
Save Culture Save Future



BharatGen
GenAI for Bharat, by Bharat



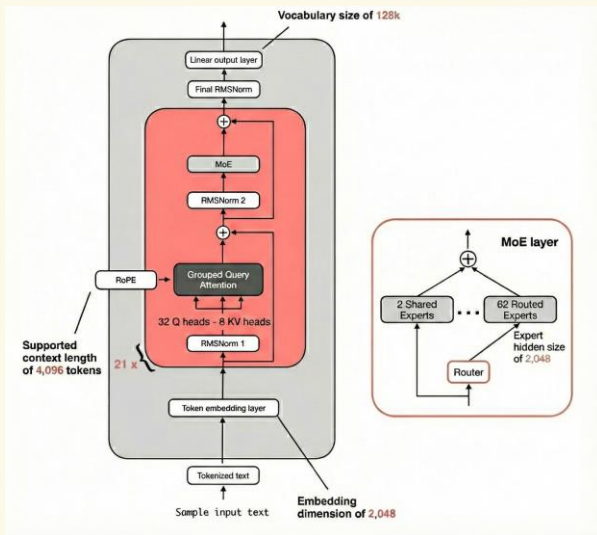
PARAM 2 17B MoE - Hybrid MoE: Efficiency & Specialization

Architectural Innovation

Employs a unique **Hybrid MoE** approach to solve the "instability" often found in sparse models:

- Shared Experts:** Two experts remain **always active** to maintain stable cross-lingual representations and smooth code-switching.
- Routed Experts:** Six experts dynamically selected per token to handle specialized tasks and specific language nuances.
- Dense Pre-processing:** A dense layer transforms raw inputs into structured representations before MoE, ensuring better training stability.

Technical Specifications at a Glance



Metric	Value	Metric	Value
Total Parameters	17B	Active Params/Token	2.4B
Total Experts	64	Top-K Experts	6 (Routed) + 2 (Shared)
Context Length	4096 Tokens	Vocabulary Size	128,000
Attention	Grouped Query (GQA)	Precision	bf16-mixed
Hidden Layers	21	Activation	SiLU / RMSNorm

BharatGen: India's Sovereign AI Ecosystem

GenAI for Bharat, by Bharat — Led by IIT Bombay consortium. 50+ global experts, 100+ students, 915+ papers, 30+ patents.



Research

Optimization & Algorithms

- Efficient LLM training (PeFT, MoE, pruning)
- Data subset selection via submodular optimization
- Adaptive intelligence & curriculum learning



Foundational Models

Recipes & Benchmarks

- Multi modal LLM upto 1 Trillion Parameters (22+ languages)
- Inclusive of following capabilities
- Text to speech
 - Speech to Text
 - Document VLM
 - Code, Math, Reasoning
 - Structure data & KG



Diversity is Resilience

Data & Knowledge Sovereignty

- Ground-up Indic data collection
- Bharat Data Sagar for training
- Cultural compliance & quality judges



Deployments

Knowledge-driven Inclusivity

- Governance: MahaGPT, IFSCA Chatbot
- Healthcare: MedSum (Amrita)
- Education: Yojaka, Learning Path Explorer

\$150M funding secured from Government of India (DST + MeitY). 10 consortium members, scaling to 100+ ML experts.

Sovereign BharatGen Model Suite & 6G Synergy

Text LLMs (Param)

India-centric corpus, 22+ languages. Instruction-tuned, safety-aligned. RAG/tool support; APIs, on-prem/cloud.

6G Telecom Synergy

Fine-tune for network intelligence, intent-based orchestration, zero-touch O&M

ASR (Shrutam) / TTS (Sooktam)

Robust ASR: code-switching, noisy settings. Natural TTS in 12+ Indic voices. Low-bandwidth/edge ready.

6G Telecom Synergy

Multilingual voice AI at 6G edge; real-time customer service for 600M+ rural users

Document Vision (Patram)

OCR + layout parsing, forms/KV extraction. Vernacular scripts, document Q&A. Secure & auditable.

6G Telecom Synergy

CSI heatmap analysis, RF coverage optimization from satellite imagery, anomaly detection

India First All the Way: Need to originate substantial IP
Precedent of Broadcast (Anywhere) through D2M



Thank You

AI/ML in 6G Networks — India's Sovereign AI Vision, Open Telecom & BharatGen

Questions & Discussion