

Sham Satish Thakare

Independent Computer Science Researcher | First Class with Distinction

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RESEARCH INTERESTS

Mathematical Machine Learning & RLVR: Token-predictive entropy confounding with completion length ($r = +0.486$), length-controlled credit allocation, and verifiable reward optimization in foundation models.

Fault-Tolerant Distributed Consensus: Dynamic quorum adaptation algorithms, latency profiling under non-uniform round-trip delays, and tail latency elimination in C++20 Raft consensus clusters (quorumshift).

State-Matched Counterfactual Error Recovery: Difference-in-differences evaluation protocols isolating self-correction from unconditional generative capacity under frozen structural covariates.

EDUCATION & ACADEMIC HONORS

Savitribai Phule Pune University (APCOER Pune), Pune, Maharashtra, India

2020 – 2024

Bachelor of Engineering (B.E.) in Artificial Intelligence and Data Science | **First Class with Distinction**

Conferred April 2024

- **Academic Standing:** Cumulative GPA: **8.70 / 10.00** (170/170 Credits Completed, Total Grade Points: 1479/1700; Seat: B191102032, PRN: 72159719L).
- **Final Year Academic Rank:** Final Year SGPA: **9.53 / 10.00** (Department Rank 1).
- **Flagship Coursework Honors (Grade O / 10.0 Outstanding):** Distributed Computing (10/10), Artificial Neural Networks (10/10), Operating Systems (10/10), Cyber Security (10/10), Capstone Senior Thesis (10/10), Industry Internship (10/10).
- **Medium of Instruction:** Certified as **ENGLISH** on official university transcripts (Ref: EXAM./TRANS./BEN241203044).

RESEARCH & PROFESSIONAL EXPERIENCE

Independent Research — Foundation Model Reasoning & Systems

06/2024 – Present

Pre-Doctoral Researcher / Systems Research Lead

Pune, India

- Formulated failure-domain aware dynamic quorum adaptation algorithms and spectral latency estimators in C++20 Raft consensus clusters (quorumshift), proving non-empty quorum intersection invariants under asymmetric partitions.
- Eliminated p99 tail latency degradation under asymmetric partitions without violating safety or linearizability guarantees across multi-region benchmarks. Manuscript under review at *IEEE Transactions on Artificial Intelligence (IEEE TAI)*.
- Investigated token-predictive entropy confounding in reinforcement learning with verifiable rewards (GRPO), demonstrating substantial completion-length collinearity ($r = +0.486$) and developing length-controlled credit allocation estimators. Under review at *IEEE TAI 2026*.
- Formulated state-contrast continuation evaluation ($D_{\text{recovery}} = -0.1100$) in `recovery_eval` and `stateshift` to measure error recovery under frozen structural covariates. Under review at *IEEE BigData 2026* and submitted to *Elsevier AIJ*.
- Designed layered runtime boundary enforcement and deterministic state-interception architectures for autonomous tool execution safety (medirush-safeagent). In peer review at *Intelligence-Based Medicine (Elsevier)* & SSRN 7446543.

APCOER Pune (Savitribai Phule Pune University) — Dept. of AI & Data Science

06/2023 – 12/2024

Undergraduate Researcher & Teaching Assistant

Pune, India

- Conducted research on foundation model reasoning architectures, length confounding, and evaluation protocols with department faculty.
- Served as Teaching Assistant for undergraduate coursework in *Data Structures, Algorithms, and Foundations of Machine Learning*.
- Developed open-source benchmark scripts and automated test suites for algorithmic problem solving.

PUBLICATIONS, PREPRINTS & MANUSCRIPTS UNDER REVIEW

• **When Confidence Proxies Confound Reasoning Complexity: Pitfalls of Uncertainty-Weighted Credit Assignment in Language Model Reinforcement Learning**

Sham Satish Thakare • Under Review at *IEEE Transactions on Artificial Intelligence (IEEE TAI)*, 2026. [Code] [PDF]

- **AdaptiveReplica: Dynamic Quorum Adaptation and Failure-Aware Replica Selection in Distributed Consensus**
Sham Satish Thakare • Under Review at *IEEE Transactions on Artificial Intelligence (IEEE TAI)*, 2026. [Code (C++20)]
- **recovery_eval: State-Matched and Provenance-Aware Evaluation of Recovery Behavior in Language-Model Reasoning**
Sham Satish Thakare • Under Review at *11th IEEE Special Session on Machine Learning on Big Data (IEEE BigData 2026)*. [Code] [PDF]
- **StateShift: State-Matched Evaluation of Error Recovery in Neural Reasoning**
Sham Satish Thakare • Submitted to *Elsevier Artificial Intelligence (AIJ)*, 2026. [Code] [PDF]
- **MediRush-SafeAgent: Layered Runtime Enforcement for Healthcare-Commerce LLM Tool Execution**
Sham Satish Thakare • In Peer Review at *Intelligence-Based Medicine (Elsevier)* & SSRN Preprint 7446543. [Code] [SSRN]

TEACHING, MENTORSHIP & LEADERSHIP

- **President, Social Volunteer Club**, APCOER Pune (2023 – 2024): Elected student head of university community outreach during final undergraduate year. Directed educational mentoring in quantitative and computational skills for 200+ underprivileged high-school youth, blood donation camps, digital literacy programs, and campus sustainability drives across Pune district.
- **Teaching Assistant, Foundations of Machine Learning**, APCOER Pune (2023 – 2024): Conducted tutorial sessions, code walkthroughs, and doubt-clearing labs covering supervised learning, optimization algorithms, loss landscape geometry, and PyTorch implementations.
- **Teaching Assistant, Data Structures & Algorithms**, APCOER Pune (2023 – 2024): Led lab sessions on algorithmic complexity, graph traversal, balanced search trees, and dynamic programming. Designed automated test evaluation harnesses for student programming assignments.

TECHNICAL SKILLS & CERTIFICATIONS

- **Mathematics & Theory**: Real Analysis, Advanced Linear Algebra (Spectral Decomposition, SVD), Probability Theory & Stochastic Processes, Convex Optimization (KKT Conditions, Gradient Dynamics), Discrete Mathematics, Graph Theory.
- **Machine Learning & AI**: Reinforcement Learning (PPO, GRPO, RLVR), Transformer Architectures, Statistical Learning Theory, PyTorch, JAX, Hugging Face Transformers, NumPy, SciPy.
- **Systems Programming**: C++ (C++20 Multithreading, Lock-free Atomics), Distributed Consensus (Raft), POSIX, Linux Kernel Internals, OpenTelemetry, Git, Docker, LaTeX.
- **Standardized Exams & Credentials**: Academic IELTS Overall Band **6.5** (CEFR B2) • German APS Certificate (Prüfnummer 41183/24) • Oracle Certified Architect Associate (OCI 2024) • Oracle AI Database Foundations • Microsoft Certified: SQL AI Developer • Google AI Professional Certificate • IIT Bombay Kotlin Tutorial (Cert: 3206110F6D).