Harshaa Vardhana KV

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Final-year CS student, agentic AI researcher and applied mathematician: large action models, agentic workflows, AI data analytics tools, and research in NLP and deep RL. Built a drug-revenue forecast scored against SEC filings (10.71% median error vs a 14.43% baseline). Re-founded a claims cost estimator on disclosed actuals (bias −44.4% → −0.5%).

Skills

Languages: Python, C++, C, TypeScript, JavaScript, Java, SQL, Dart, Solidity
ML and AI: PyTorch, TensorFlow, scikit-learn, LightGBM, AutoGluon, Chronos-2, TimesFM, FinBERT, MLX, NLP, generative AI, LLMs, RAG, fine-tuning, prompt engineering, LLM orchestration, LangGraph, embeddings and reranking, Ollama, Cerebras, deep RL, DDPG and SAC, anomaly detection, PINNs
Data and infrastructure: BigQuery, ClickHouse, DuckDB, Postgres, pgvector, Qdrant, Neo4j, MongoDB, MySQL, SQLite, Redis, dbt, Kafka, Spark, Docker, Kubernetes, Jenkins, CI/CD, Git, Linux (Debian), AWS (EC2, VPC)
Web: Next.js, React, Astro, Node.js, Express, REST APIs, FastAPI, Flask, Django REST Framework, Spring Boot, Prisma, Zod, Tailwind, Nodemailer
Methods: point-in-time backtesting, adversarial data audits, empirical-Bayes shrinkage, held-out calibration, claims-lag completion (chain-ladder), metamorphic testing, retrieval evaluation (MRR, recall@k), bootstrap confidence intervals, alerting pipelines

Experience

AI Full Stack Engineering Intern, DocNexus.ai — Jun 2026 – Aug 2026, Oct 2026 – present · Remote

- Architected FinSignal, a point-in-time drug-revenue forecast from de-identified US claims, scored against SEC filings. August: deterministic, 2 fitted constants, 10.71% median error vs a 14.43% baseline on 271 drug-quarters. October: a gradient-boosted successor under a frozen protocol, 9.42% vs 11.32% on the same 172 cells.
- Built its adversarial point-in-time audit (mutation and equivalence checks on every row): 0 of 271 forecasts moved. Closed three real leaks on the way, one of which made our own headline worse; that is the figure published.
- Re-founded a full-history claims cost estimator on disclosed actuals, creating a validation surface that did not exist: line bias −44.4% → −0.5%, DRG bias +0.1% (empirical-Bayes shrinkage, winsorized rate lattices, held-out calibration, BigQuery).
- Replaced a circular network heuristic with a 9-rank evidence ladder over payer CARC codes, resolved at query time; same-claim inheritance recovered 40.67% of unknown lines without imputation.
- Built a deterministic agent router (rules, kNN on bge-small, agent fallback) at 97.5% held-out accuracy; shipped PayerLens and a market-sizing engine as static Next.js apps with no runtime database.

Foundational AI Researcher, NLP & Generative AI, OSPI '26, IEEE Computer Society — Jan 2026 – Mar 2026

- Co-authoring Axiom: training-free activation steering for RAG knowledge conflicts, with Bayesian per-query layer selection (BCILS). On ConFiQA with Gemma 3 4B it lifts context-faithfulness from 0.755 to 0.817.

Research Intern, Centre for Robotics, Automation and Intelligent Systems (cRAIS), PES University — Jun 2025 – Aug 2025

- Compared DDPG with a GRU warm start (A* demonstrations) against SAC with LSTM actor-critics for LIDAR navigation; designed the reward shaping. Published at IEEE ICSET.

Cybersecurity Intern, Security Operations Centre, PES University — Oct 2024 – Aug 2025

- Analysed the Mydoom worm; simulated volumetric DDoS traffic in an isolated, authorized lab to validate detection and mitigation controls.

Projects

- **auto-mem** (Oct 2026 – present): On-device multimodal memory engine: MRR 0.697 vs 0.045 for keyword search, adversarial benchmark.
- **Apex Agentic OS (AAOS)** (2026 – present): Agent platform built around blast radius: VM and Docker walls, one key-holding router.
- **AI physician-outreach platform (MVP)** (May 2026): Pharma-outreach CRM (Next.js 16) with LLM-written emails and allowlist-gated delivery.
- **InsureMithra** (Dec 2025): MERN + TypeScript insurance automation: 1,000+ policies, Redis caching (sub-2s), 50+ REST endpoints.

Research

- **Context-Aware Hierarchical Summarization of Long Documents via Adaptive Chunking and Semantic Boundary Detection.** EMNLP 2026, Budapest. **Submitted**, Oct 2026.
- **A Deterministic Multimodal Earnings Call Analysis Pipeline with FinBERT Embeddings and Rule-Based Transcript and Presentation Extraction.** 12th IntelliSys 2026, Amsterdam. **Accepted**, Sep 2026.
- **DRL-based Navigation of Mobile Robot in Unknown Environment.** 2025 IEEE 15th International Conference on System Engineering & Technology (ICSET), Kuala Lumpur. **Published**, Dec 2025.
- **ORACARE: A Multimodal Digital Twin of the Oral Cavity for Predictive Diagnostics and Treatment Simulation of Oral Cancer.** Capstone, PES University. **In progress**, May 2025 – present.

Education

B.Tech, Computer Science, PES University (RR Campus). CGPA 8.02/10 — Aug 2023 – 2027
BS in Data Science and Applications (online degree programme), IIT Madras. CGPA 8.0/10 — May 2023 – present

Certifications and awards

- TCM Security, Malware Analysis; AWS course completions: EC2, VPC; Generative AI, PESU IO.
- JEE Main rank 7,786 · KCET rank 1,258 · VITEEE rank 2,504 (2023); CNR Rao Merit Scholarship, PES University (2024 – 2025).

Case studies, every project and the papers: kvharshaavardhana.uk