

VIKHYAT CHAUHAN

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SUMMARY

Production AI and Full-stack engineer who takes systems from prototype to production. Deep expertise in designing and maintaining end-to-end system architecture with direct customer-facing deployment and consistently quantified results. M.S. in Computer Engineering (Virginia Tech, 4.0 GPA) with NSF-funded research and granted patent.

SKILLS

- **AI & LLM Engineering:** RAG, LangGraph, Agentic workflows, MCP integration, LLM fine-tuning, production observability, grounded generation / hallucination guardrails, Claude Code workflows (compressing multi-week web-app builds into hours)
- **Cloud & Infrastructure:** GCP (Cloud Run, GKE, Vertex AI), AWS (EC2, Lambda, S3, EKS), Kubernetes, Docker, FastAPI, Spring Boot, CI/CD (Jenkins, SonarQube), MongoDB, RabbitMQ, Kafka, MQTT, microservices, REST, regulated medical SDLC (IEC 62304, 21 CFR Part 11)
- **Languages & Tools:** Python, C++, TypeScript, SQL; Bash, Git

PROFESSIONAL EXPERIENCE

Virginia Polytechnic Institute and State University

Aug 2024 – May 2026

Graduate AI/ML Researcher

Blacksburg, VA

- Designed and experimentally validated the Conflict Architecture (CA) framework for brain-inspired UAV navigation (NSF Award #2204780, PI: J.M. Paul), achieving a simultaneous 34.6% reduction in compute energy and elapsed time over baseline through parallel conflict resolution, with strong statistical significance ($p < 0.0001$, $n = 1,000$ runs across 3 real-world-mapped environments).

GE HealthCare

2022 – 2024

Software Engineer II

Bengaluru, IN

- Led the end-to-end modernization of a legacy MRI image-stitching application serving GE's 1,000+ system global fleet, re-architecting into containerized microservices that increased throughput from single-process to 20+ parallel operations while meeting the 99% clinical accuracy threshold. Sole SWE II in the organization to receive the Impact Award.
- Segregated a core C++ algorithm from a legacy monolith and designed a microservices architecture (TypeScript, Java REST, Docker/Helm, RabbitMQ), along with a CI/CD pipeline, adopted as the standard across multiple applications.
- Scaled the team from 1 to 4 engineers and partnered with global platform architects and clinical specialists to deliver validation, regulatory sign-off, and onsite technician training.

The Next Move Electronics (TNM)

2020 – 2022

Co-Founder & Sole Technical Lead

Delhi, IN

- Founded and bootstrapped (~\$10K self-funded) a home-automation hardware startup, owning every layer from PCB design and firmware to cloud backend and a Flutter/Alexa mobile app
- Owned the entire customer relationship as sole founder — discovery, onboarding, and support across 100+ households — converting early prospects into first design-win customers.
- Architected an AWS microservice backend (EC2, Lambda, RabbitMQ, MongoDB, MQTT), scaling from 0 to 1,000+ devices at 99.9% uptime and cutting field bug reports 98% through a structured hardware-software validation workflow.

PROJECTS

Professional RAG Pipeline

- Built a two-stage retrieval pipeline (BGE-base embeddings → MS-MARCO cross-encoder reranker) from scratch without framework abstractions, evaluated with Hit@K and MRR; LLM-as-judge scoring showed consistent faithfulness gains over single-stage retrieval across 50+ test queries.
- Implemented SHA-256 query hashing for semantic caching, reducing LLM API overhead by 30%, with per-query token/cost tracking for full inference observability.
- Deployed as a containerized microservice on Google Cloud Run with per-stage latency instrumentation and grounded-generation logic to eliminate hallucinations.

Hearth — Shared-Household App + Natural-Language Action Layer

- Built and deployed a full-stack collaborative household-management web app ([live](#); Next.js App Router/TS, React + Tailwind, Supabase Postgres + Drizzle ORM, Google OAuth, Vitest, Vercel) featuring invite-code households with admin roles, recurring chores (RFC 5545 RRULE) with bidirectional Google Calendar sync (outbound push + inbound webhook reconcile), announcements, a shared shopping list, and Splitwise-style expense splitting.

- Layered on a natural-language command bar that turns plain English (e.g. “I paid \$48 for groceries, split with Sam and Alex”) into validated structured mutations — Claude (Haiku 4.5 / Sonnet 4.6) emits tool calls whose schemas *are* the app’s existing zod mutation schemas, routing straight into the proven validate → Drizzle pipeline, with a clarify-or-decline guardrail on ambiguous or out-of-scope input to prevent bad writes. [Ongoing]

CANavigator — Brain-Inspired Drone Navigation Framework

- Architected a modular ROS 2 + Gazebo Harmonic simulation stack with procedural city-grid and Perlin-noise NFZ generators, deterministic seeded RNG for bit-exact replay, and a physics-accurate DJI FlyCart 30 dynamics model (2nd-order actuator latency, aerodynamic drag, Ornstein-Uhlenbeck wind gusts).
- Implemented a dual energy model tracking CPU compute cost alongside motion energy (208.9 J/m EPM baseline), with per-strategy CSV telemetry across 8 metrics including compute latency, zone violations, and event deadline miss rates.
- Designed a fair head-to-head benchmarking protocol in which all four planners (APE1/APE2/APE3/CA) navigate identical procedurally generated arenas with shared event sequences, counting only runs where every strategy reaches the target toward the 1,000-run corpus.

Physiological Stress Classifier

- Developed a Conv1D autoencoder pipeline compressing high-dimensional physiological signals (BVP, EDA, EMG, TEMP) from wearable sensors into compact unsupervised representations.
- Engineered a multimodal classification system on the WESAD dataset, achieving 83.5% accuracy in three-class emotion detection across 15 subjects.
- Implemented preprocessing and normalization for heterogeneous sensor sampling rates, transforming raw bio-signals into features for real-time stress monitoring.

EDUCATION

Virginia Polytechnic Institute and State University

Aug 2024 – May 2026

M.S., Computer Engineering (Thesis Track)

Blacksburg, VA

- **Achievements:** Defended M.S. thesis, [Brain-Inspired Drone Navigation Using the Conflict Architecture](#); 4.0 GPA
- **Coursework:** CS5424: Advanced Machine Learning, CS5465: Applications of Machine Learning, ECE5504: Computer Architecture

Uttarakhand Technical University

Jul 2016 – Dec 2020

B.E., Electronics and Communication Engineering

Uttarakhand, IN

- **Achievements:** Graduated with First Division

PUBLICATIONS

- V. Chauhan, [Brain-Inspired Drone Navigation Using the Conflict Architecture](#), M.S. Thesis, Virginia Tech, 2026.
- D. Dave, G. Sawhney, V. Chauhan, “[Multi-Agent Stock Prediction Systems: Machine Learning Models, Simulations, and Real-Time Trading Strategies](#),” arXiv:2502.15853, 2025.
- V. Chauhan et al., *Master-Slave Microcontroller Communication System for Home Automation*, The Next Move Electronics — [Patent No. 202111060973](#) (Granted), 2021.

AWARDS & RECOGNITION

- **GE Impact Award:** Recognized for leading the cross organizational modernizing of a critical legacy MR imaging application to production microservices, directly adding business value with concurrency and reduced maintainance
- **NSF-Funded Graduate Research Assistant:** Supported on NSF Award #2204780 (CCF: Small: Paradox and Brain-inspired Computer Architecture, PI: JoAnn M. Paul); contributed significantly to thesis research on brain-inspired autonomous systems
- **Honor Society of Phi Kappa Phi:** Inducted, Virginia Tech Chapter (2026); top 10% of Master’s graduate students across all disciplines
- **Omicron Delta Kappa National Leadership Honor Society:** Selected for membership, Alpha Omicron Circle, Virginia Tech (2026 Cohort); recognizes achievement in academics, research, and service