Ved Panse

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EDUCATION

UNIVERSITY OF CALIFORNIA, SAN DIEGO — La Jolla, CA
Bachelor of Science (B.S.) — Expected May 2027
(Double Major) Mathematics—Computer Science, Data Science — Cumulative GPA: 3.942/4.0
Research Interests: AI Memory Models, Intelligent Virtual Assistants, LLM Systems

HONORS & AWARDS

- International Rank 1, *United States Cybersecurity Challenge* (2024) — Hosted by the U.S. Department of Homeland Security & Central Intelligence Agency (CIA). Invited to the ACT-IAC Cybersecurity Summit, Washington, D.C.
- International Rank 4, *Kotlin Multiplatform Contest* (2025) — Organized by the Kotlin Foundation. Ranked among the top global competitors; invited to KotlinConf 2025, Copenhagen.
- Provost's Honors, UC San Diego (2023 – Present) — Awarded for GPA ≥3.8 (Top 5%). Earned across multiple quarters while completing a double major in Data Science and Mathematics–Computer Science.

RESEARCH EXPERIENCE

Optimized Memory Model Pipeline for LLM Chatbots — Apr 2025 – Present
Advisors: Yu Wang, UC San Diego; Julian McAuley, UC San Diego

- Designing and evaluating memory update algorithms for LLM-based chat systems, focusing on balancing retention, redundancy elimination, and conflict resolution.
- Proposed a hybrid scoring framework combining sentence-transformer embeddings with "triviality" heuristics to deprioritize redundant content without loss of fidelity.
- Implemented the LLM-Memory-Engine, a prototype integrating Redis, GPT-based enrichment, and custom retrieval strategies to simulate human-like long-term memory.
- Conducting benchmarking on multi-session dialogue datasets; manuscript in preparation for ACL 2026 (Workshop on LLM Memory & Dialogue Systems).

Applied Conversational Memory Systems at Scale — Spuddie (AI Companion Startup) — Apr 2025 – May 2025
Advisors: Emma Waldron Chen, Ross Ingram

- Developed a production-ready long-term memory system using vector databases and heuristic scoring, deployed across 500+ daily users.
- Improved AI contextual relevance and continuity, yielding a 30% increase in measured helpfulness from user feedback surveys.
- Designed a story-retention pipeline to capture narrative arcs across conversations, now adopted as the startup's core memory layer.

Ballhawk AI: Predictive Modeling for Baseball Home Run Trajectories — Jan 2025 – Mar 2025
Independent Research Project

- Modeled spatiotemporal trajectories of baseball home runs using historical Statcast data (exit velocity, launch angle, spray angle).
- Developed supervised ML pipelines (SciKit-Learn, regression ensembles) to predict landing zones, generating stadium-specific heatmaps for seating optimization.
- Validated predictions against live MLB game data; integrated real-time lineup changes through the MLB API.
- Research focused on sports analytics + applied machine learning; targeting submission to SABR Analytics Conference.

Applied Anomaly Detection for Real Estate Valuation — Findability Sciences — Apr 2022 – May 2022
Advisors: Suresh Shakkarwar, Mandar Kulkarni

- Investigated outlier detection strategies for large-scale property datasets (10,000+ U.S. real estate records), focusing on improving predictive model robustness.
- Implemented Isolation Forest and statistical thresholding techniques, achieving an 18% boost in model accuracy on regional price forecasts.
- Delivered a proof-of-concept pipeline that was adopted by Diamond Realty Investment (Mitsubishi Group, Japan) for enterprise-scale valuation workflows.

WORK EXPERIENCE

Falcon Eye Irvine, CA

Co-Founder, Lead Software Developer Jan 2025 – Present

- Developed a synthetic vision / terrain-aware flight assistance system in C++/OpenGL, achieving real-time 30 FPS rendering on <$100 hardware, matching the capability of avionics displays costing $40k–$100k.
- Designed a custom rasterization engine that streams raw RGB values directly to STM32 microcontrollers, enabling plug-and-play deployment without cockpit integration.
- Secured $1.2M in funding from DGTronics to support FAA review, machinery acquisition, and initial production release.
- Selected for integration into the upcoming version of the HAL Tejas fighter jet, establishing Falcon Eye as a military-grade avionics solution.

Pepper Advantage London, UK

Software Developer Intern Jun 2023 – Aug 2023

- Developed a Spring Boot automation platform enabling 100+ Excel macros to be executed in parallel, cutting financial data processing time by 60%.
- Streamlined automation workflows for 15+ enterprise finance teams across partner institutions (including Wells Fargo, Bank of America, and JPMorgan Chase).
- Integrated Apache POI + Spring MVC to strengthen reliability and ensure seamless adoption in production financial operations.

SELECTED PROJECTS

Strata: Cross-Platform AI Productivity Assistant 2025 - Present

Kotlin Multiplatform (Compose Desktop/Android/iOS), Voyager, Ktor, SQLDelight, GraphQL, Redis

- Designed a unified personal assistant integrating Gmail, Google Calendar, Tasks, Health, and Finance into a seamless cross-device experience.
- Built a modular gateway + services + queues + caches + WebSocket architecture, inspired by Uber-scale distributed systems, enabling real-time synchronization across platforms.
- Engineered a polished multi-platform UI/UX (Compose Multiplatform) with advanced navigation and state management for desktop and mobile.

ShardWise: Distributed Task Processing System 2025 - Present

Rust, Kafka, Redis, PostgreSQL, Docker, Kubernetes

- Designed a fault-tolerant distributed system for sharding and load balancing tasks across multiple nodes, reducing processing latency under high concurrency.
- Implemented leader election and replication protocols to maintain consistency and availability under node failure.
- Built a Kafka-backed queueing architecture with Redis caching to handle dynamic scaling and message throughput.
- Containerized with Docker + Kubernetes for deployment, supporting automated scaling and resilience in clustered environments.

ADDITIONAL

Systems & Languages: C, C++, Python, Rust, Kotlin, Java, JavaScript (Node.js, React.js, Next.js, Electron)
AI/ML & Data: Transformers, TensorFlow, Scikit-Learn, Pandas/NumPy, OpenCV
Infrastructure & Tools: Redis, Kafka, PostgreSQL, MongoDB, AWS/GCP, Docker, Kubernetes, Spring Boot, Git