Nirvek Pandey

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Education

University of California San Diego **La Jolla, CA**
B.S. in Computer Science, *Regents' Scholar* September 2022 – June 2026

- **Fundamentals:** Object Oriented Programming, Advanced Data Structures, Computer Security, Theory of Computation, Design and Analysis of Algorithms, Software Engineering, Database Systems
- **AI/ML:** Search & Learning Algorithms, Modeling, Deep Learning, NLP, Recommender Systems and Web Mining
- **Systems:** OS, Networked Services, Parallel Computing, Graduate OS, Data Center Systems, Wireless Systems

Experience

Data Science Intern **Costa Mesa, CA**
Newton(Neurolens) June – September 2024

- Collaborated with data architects to implement an ETL system using SQL and Azure Pipelines, separating analytics workloads that improved pipeline reliability by 27% and accelerated R&D analysis.
- Built an ML pipeline with OpenCV and PyTorch to detect suppressed eye-tracking signals with 84% accuracy in identifying suppressed measurement and enabling more reliable data interpretation for optometry research.
- Created data visualizations utilizing Matplotlib and Seaborn to illustrate the impact of architectural updates.
- Influenced stakeholder decisions to invest in regression-based modeling for next-generation device development.

Software Engineering Intern **La Jolla, CA**
UC San Diego April – June 2024

- Led a cross-functional Agile Scrum team of 8, facilitating weekly stand-ups and retrospectives that enhanced communication and reduced update turnaround times 46%, managing task progress using GitHub Projects.
- Designed CI/CD workflows with GitHub Actions, reducing deployment errors by 24% and accelerating releases through automated JUnit unit tests and Jest/Puppeteer-based integration and end-to-end testing.
- Directed sprint planning and backlog refinement to synchronize front-end and back-end efforts, increasing development velocity by 20% and raising milestone delivery rates from 65% to 85% over two quarters.

Projects

Personal Portfolio Site *Next.js, Go, Firebase, PostgreSQL, Google Cloud Run* January 2025 – Present

- Upgraded full-stack portfolio from static React to Next.js + Go microservice architecture, implementing SSR, batched loading, and CDN/CMS caching to achieve 90% fewer API calls and 300% faster load times.
- Integrated Google Drive API for dynamic, location-tagged content management, enhancing personalization while maintaining high availability through automated CI/CD with Docker, GitHub Actions and Vercel.

Research - OS Performance Analysis *Linux, C, ARM64, Python* September – December 2025

- Developed low-level benchmarking suite in C for ARM architecture testing CPU scheduling, memory hierarchy, TCP/IP protocols, and file system I/O performance across multiple operating system layers.
- Quantified storage bottlenecks by measuring a 500x latency spike for disk-based page faults and identified a 6.4 GB file buffer cache limit using pointer chasing to map the L1/L2/L3 cache and DRAM hierarchy.
- Benchmarked network performance using ping, ethtool, and custom socket programs, discovering an 8x latency penalty for remote file access over WiFi compared to local disk operations.

TritonTube *Go, SQLite, gRPC, etcd, AWS EC2, FFmpeg, MPEG-DASH, HTTP* May – July 2025

- Engineered fault-tolerant video platform with RESTful APIs for upload/playback, implementing MPEG-DASH adaptive streaming to optimize video quality and reduce buffering by over 50% across varying network conditions.
- Built scalable metadata and content services on AWS EC2 with etcd-backed RAFT consensus protocol, ensuring data consistency and high availability while supporting 100+ concurrent users for video processing workloads.

Research - RedShift *CUDA, HuggingFace, Ollama, Prompt Engineering* January – March 2025

- Extended the "Distract LLMs for Automatic Jailbreak Attack" framework by integrating chain-of-thought prompting and FastChat support, expanding attack coverage by 67% across 2,000+ attacks and 50 adversarial prompts.
- Enhanced an ML orchestration pipeline with LLMs as attackers, defenders, and judges; standardized adversarial datasets using custom PyTorch scripts for consistent benchmarking, tracked with WandB.

Skills

- **Programming Languages:** Python, Go, Java, JavaScript/TypeScript, C, C++, SQL, HTML, CSS
- **Libraries & Frameworks:** PyTorch, NumPy, Pandas, Matplotlib, TensorFlow, Scikit-Learn, OpenCV, React, Next.js, Angular, Express.js, Node.js, Flask, Tailwind CSS, JUnit, Jest, Puppeteer, FFmpeg
- **Tools & Technologies:** Git, Docker, gRPC, etcd, Kubernetes, PostgreSQL, SQLite, MongoDB, Supabase, Firebase, Redis, GCP, Google Cloud Run, Vercel, Azure Pipelines, AWS EC2, AWS S3, WandB, CUDA, OpenCL, MPEG-DASH, GitHub Actions, Linux, SharePoint, Excel, PowerPoint